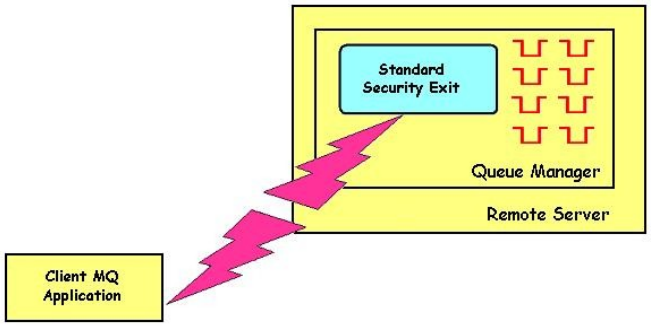
MQSSX for z/OS Installation and Operation Manual



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1 Introduction

1.1 Overview

MQ Standard Security Exit for z/OS (z/MQSSX) is a solution that allows a company to control and restrict who is accessing a IBM MQ resource. The security exit will operate with IBM MQ v5.3.1, v6.0, v7.0, v7.1, v8.0, v9.0, v9.1 and v9.2 for z/OS environments. It works with Server Connection, Receiver, Requestor and Cluster-Receiver channels of IBM MQ queue manager.

The MQ Standard Security Exit for z/OS solution is comprised of a server-side security exit.

The server-side security exit 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.

The server-side security exit supports the concept of 'Proxy IDs'. After a user has been successfully validated against the native OS or file based validation data and the 'Proxy Mode' flag is set, then the 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 connecting with a blank UserID value. This is controlled by the server-side security exit's property keyword 'AllowBlankUserID'.

The server-side security exit has the ability to block 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 MQAdmin can enable Excessive Client Connections alerting system that counts the number of connections over a period of time (i.e. Day / Hour / Minute) and writes a message to the log when the count exceeds a particular value. If the keyword WriteToEventQueue is set to ‘Y’ then an event message is also written to an event queue. ECC feature is designed to catch applications that are poorly written, such as, applications that continuously connect and disconnect from the queue manager for every message sent or received.

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

The server-side security exit has the ability to allow or restrict the incoming UserID against a group. A list of groups can be queried for the incoming UserID. The groups are stored a group file.

1.2 Executive Summary

The MQ Standard Security Exit for z/OS solution is comprised of a server-side security exit.

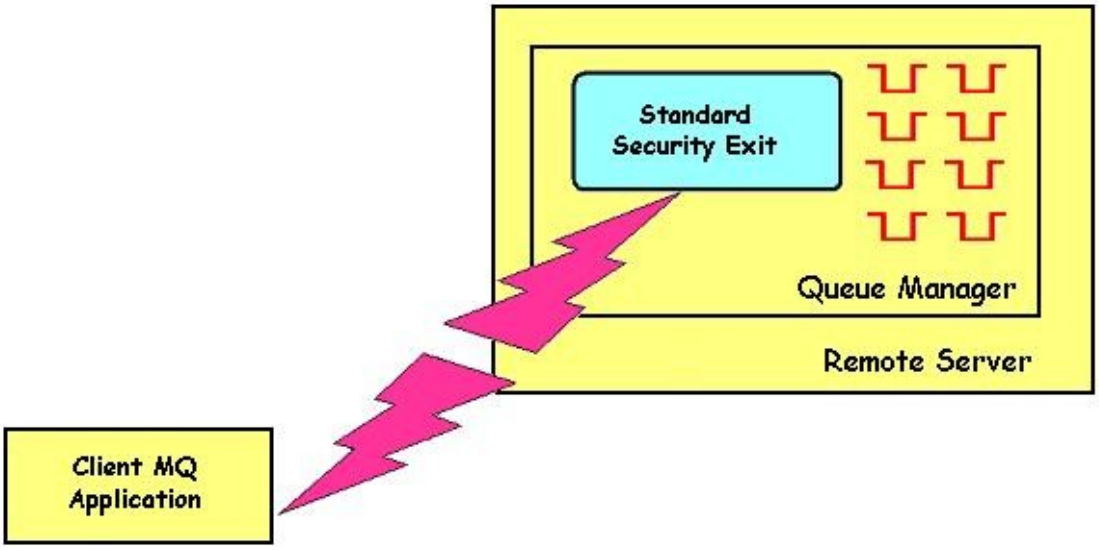
The server-side security exit is available as:

- z/OS load-module

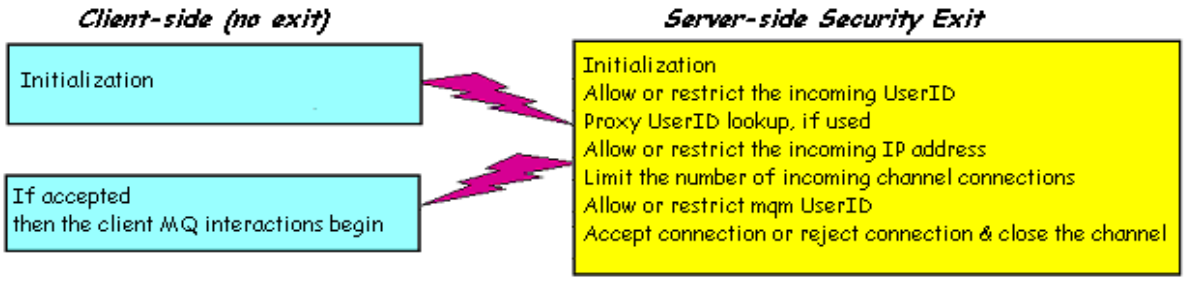
The major features of MQ Standard Security Exit for z/OS are as follows:

- Allows or restricts the incoming UserID against a regular expression pattern
- Allows or restricts the incoming UserID against a Group
- Provides support for Proxy UserIDs
- Allows or restricts the incoming IP address against a regular expression pattern
- Allows or restricts the incoming hostname against a regular expression pattern
- Allows or restricts the incoming SSL DN against a regular expression pattern
- Limit the number of incoming channel connections on a SVRCONN channel.
- Allows or restricts the use of the 'CHIN' or the CHIN's Started-task UserIds
- Ability to set the maximum number of allowable connections per a given channel (MCC)
- Ability to monitor for excessive client connections (ECC) and then generate an alert
- Provides logging capability for all connecting client applications regardless if they were successful or not.
- Provides logging capability via Write To Operator (WTO) facility.

1.3 Context Diagram (Logical View)



1.4 Security Message Flow (Logical View)



1.5 Prerequisites

This section details the minimum supported software levels. These prerequisites apply to the server-side installations of MQ Standard Security Exit for z/OS.

1.5.1 Operating System

MQ Standard Security Exit for z/OS can be installed on any of the following supported servers:

1.5.1.1 IBM z/OS

- IBM z/OS v1.4 or higher

1.5.2 IBM MQ

- IBM MQ for z/OS v5.3.1, v6.0, v7.0, v7.1, v8.0, v9.0, v9.1 and v9.2

2 Installing MQ Standard Security Exit for z/OS

This section describes how to install Capitalware's MQ Standard Security Exit for z/OS.

2.1 Server-side Security Exit

The following files are the platform specific server-side security exits and the required initialization file (IniFile).

2.1.1 z/OS Installation

To install the MQSSX for z/OS, first unzip the **mqssx_zos-setup.zip**. The zip file contains 2 z/OS XMIT prepared datasets.

- **MQSSX.LOAD.ZOS** is the XMIT dataset that contains the z/OS load-module.
- **MQSSX.SYSIN.ZOS** is the XMIT dataset that contains a sample initialization file for the server-side security exit and sample MQSC script to define MQ channels with the security exits.

Steps to install the server-side security exit:

1. ftp the z/OS XMIT prepared datasets to the z/OS LPAR.

```
ftp -s:mqssx.ftp  z/OS_hostname
```

```
your-z/OS-userid
your-z/OS-password

binary
quote SITE recfm=fb lrecl=80 blksize=3120
put MQSSX.LOAD.ZOS
put MQSSX.SYSIN.ZOS
quit
```

If the user receives the following error message then they will need to pre-allocate the z/OS datasets:

```
ftp> put MQSSX.LOAD.ZOS
200 Port request OK.
550-SVC99 RETURN CODE=4 S99INFO=0 S99ERROR=38656 HEX=9700 S99ERSN code X'000003F3'.
550 Unable to create data set xxxxx.MQSSX.LOAD.ZOS for STOR command.
ftp> put MQSSX.SYSIN.ZOS
200 Port request OK.
550-SVC99 RETURN CODE=4 S99INFO=0 S99ERROR=38656 HEX=9700 S99ERSN code X'000003F3'.
550 Unable to create data set xxxxx.MQSSX.SYSIN.ZOS for STOR command.
```

To pre-allocating the XMIT datasets go to option 3.2 of ISPF and allocate both datasets: MQSSX.LOAD.ZOS and MQSSX.SYSIN.ZOS.

Use the following dataset attributes when allocating both datasets:

Space	
Units	BLOCKS
Primary Quantity	40
Secondary Quantity	40
Directory Blocks	0
DCB Parameters	
RECFM	FB
LRECL	80
BLKSIZE	3120
DsnType	Blank

After the user has pre-allocated the datasets, they can redo the ftp commands.

2. Log on to z/OS LPAR and issue the following TSO RECEIVE commands:

```
TSO RECEIVE INDATASET(MQSSX.LOAD.ZOS)
TSO RECEIVE INDATASET(MQSSX.SYSIN.ZOS)
```

After issuing the above commands, the following product datasets will appear:

- **+HLQ+.CPTLWARE.MQSSX.LOAD** is the dataset that contains the z/OS load-module.
- **+HLQ+.CPTLWARE.MQSSX.SYSIN** is a dataset that contains a sample initialization file for the server-side security exit and sample MQSC script to define MQ channels with the security exits.

2.1.2 z/MQSSX DataSets

z/MQSSX solution is comprised of 2 datasets: +HLQ+.CPTLWARE.MQSSX.LOAD and +HLQ+.CPTLWARE.MQSSX.SYSIN.

2.1.2.1 +HLQ+.CPTLWARE.MQSSX.LOAD

- **MQSSX** is the actual security exit z/OS load-module that will be invoked by the MQ Server component.

2.1.2.2 +HLQ+.CPTLWARE.MQSSX.SYSIN

- **MQSSXINI** is a sample initialization file for the server-side security exit.
- **SSXMQSC** is a sample MQSC script to define MQ channels with the security exits.

2.1.3 z/OS CHIN JCL

This section describes the required JCL for z/MQSSX.

2.1.3.1 CSQXLIB DDName

The MQSSX load-module needs to be put in the executable path for the CHINIT started-task. There are 2 options for achieving this:

1. Add the dataset to the CSQXLIB concatenation of the CHINIT's CSQXLIB.

```
//CSQXLIB  DD DISP=SHR,DSN=+MQHLQ+.+QMGRNAME+.USERAUTH
//         DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.LOAD
```

2. Or copy the MQSSX load-module to your existing MQ exit / link-edited parameter dataset. Here is a sample JCL to copy the MQSSX load-module:

```
//COPY1  EXEC PGM=IEBCOPY,REGION=1024K
//SYSPRINT DD  SYSOUT=*
//SYSUT3   DD  DSN=&&SYSUT3,UNIT=SYSDA,DISP=(,DELETE),
//         SPACE=(CYL,(5,1))
//SYSUT4   DD  DSN=&&SYSUT4,UNIT=SYSDA,DISP=(,DELETE),
//         SPACE=(CYL,(5,1))
//*
//IN       DD  DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.LOAD
//*
//OUT      DD  DISP=SHR,DSN=+MQHLQ+.+QMGRNAME+.USERAUTH
//*
//SYSIN    DD  *
 COPYMOD OUTDD=OUT,INDD=((IN,R))
      S M=MQSSX
/*
```

2.1.3.2 MQSSXIN DDName

MQSSXIN is the DDName that points to a dataset containing the IniFile parameters.

Add the following line to the CHINIT's JCL.

```
//MQSSXIN  DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.SYSIN(MQSSXINI)
```

2.1.3.3 PROXY DDName - Optional

PROXY is the DDName that points to a dataset containing the UserId proxy values.

Add the following line to the CHINIT's JCL:

```
//PROXY    DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.PROXY
```

To allocate the PROXY dataset go to option 3.2 of ISPF and allocate a dataset using the following dataset attributes:

Space	
Units	BLOCKS
Primary Quantity	40
Secondary Quantity	40
Directory Blocks	0
DCB Parameters	
RECFM	FB
LRECL	80
BLKSIZE	27920
DsnType	Blank

See section 4.9 for more information on the use of Proxy UserIds.

2.1.3.4 Group DDName - Optional

GROUP is the DDName that points to a dataset containing the Group file values.

Add the following line to the CHINIT's JCL:

```
//GROUP    DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.GROUP
```

To allocate the GROUP dataset go to option 3.2 of ISPF and allocate a dataset using the following dataset attributes:

Space	
Units	BLOCKS
Primary Quantity	40
Secondary Quantity	40
Directory Blocks	0
DCB Parameters	
RECFM	FB
LRECL	80
BLKSIZE	27920
DsnType	Blank

See section 4.9 for more information on the use of Proxy UserIds.

2.1.4 MQSSX-ISPF-GUI for z/OS Installation

Read section 2 of the ***MQSSX-ISPF-GUI for z/OS User Guide*** for information on the installation process.

3 Configuring Server-side Security Exit

This section describes how to configure the server-side security exit.

3.1 z/MQSSX Filtering

Starting with IBM v7.1, IBM has included a feature called channel authentication record. Channel authentication record feature allows for the filtering of incoming client connections. Exiting queue managers that are migrated to MQ v7.1 or higher will have this feature disabled but when the MQAdmin creates a new queue manager, this feature will be enabled. Hence, to use z/MQSSX's filtering feature, issue the following MQSC command to disable channel authentication record mechanism:

```
ALTER QMGR CHLAUTH(DISABLED)
```

3.2 Security User Data (SCYDATA)

MQSSX supports 2 ways to specify an IniFile via the Security User Data (SCYDATA) field: DD Name and DD Name with a Member Name.

3.2.1 SCYDATA with DD Name

In this case, only the DD Name is used to specify the IniFile. The DD Name provided in the SCYDATA field must match the DD Name in the CHIN's JCL. The DD statement's DSN keyword can contain either a fully qualified Partition DataSet with the Member name or a Sequential DataSet.

3.2.1.1 SCYDATA with DD Name using Partition DataSet

The CHIN's DD Name references the DSN keyword which contains the fully qualified Partition DataSet Name (highlighted in **red**) and member name (highlighted in **blue**). Since the Member Name is included in the CHIN'S DD DSN keyword, do not put the Member Name in the SCYDATA field.

e.g.
SCYDATA('**DDName**')

CHIN JCL using Partition DataSet

```
//MQSSXIN DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.SYSIN(MQSSXINI)
```

```
DEFINE CHANNEL ('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN) +
       TRPTYPE(TCP) +
       SCYEXIT(MQSSX') +
       SCYDATA('MQSSXIN') +
       REPLACE
```

3.2.1.2 SCYDATA with DD Name using Sequential DataSet

The CHIN's DD Name specifies a DSN which will contain the Sequential DataSet. As seen below, the DD Name in the SCYDATA field matches the DD Name in the CHIN's JCL.
e.g.
SCYDATA('**DDName**')

CHIN JCL using Sequential DataSet

```
//MQSSXIN DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.SYSIN.SEQ
```

```
DEFINE CHANNEL ('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN) +
       TRPTYPE(TCP) +
       SCYEXIT(MQSSX') +
       SCYDATA('MQSSXIN') +
       REPLACE
```

3.2.2 SCYDATA with DD Name and Member Name

In this case, both the DD Name (highlighted in **red**) and the Member Name (highlighted in **blue**) are used to specify the IniFile since the DSN keyword of the DD statement only contains the Partition DataSet Name. In other words, the user specifies the Member Name as a parameter to the SCYDATA field. This is a dynamic configuration that allows for different IniFiles for different channels.

e.g.
SCYDATA('**DDName**(**MemberName**)')

CHIN JCL using Partition DataSet

```
//MQSSXIN DD DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.SYSIN
```

```
DEFINE CHANNEL ('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN) +
       TRPTYPE(TCP) +
       SCYEXIT(MQSSX') +
       SCYDATA('MQSSXIN(MQSSXINI)') +
       REPLACE
```

3.3 SVRCONN Channel

This section describes the necessary entries to enable the server-side security exit. The MQ Administrator will need to update 2 fields of the SVRCONN Channel that the server-side security exit will be applied to.

Note: The Security Exit Data (SCYDATA) field must NOT exceed 32 characters.

3.3.1 z/OS

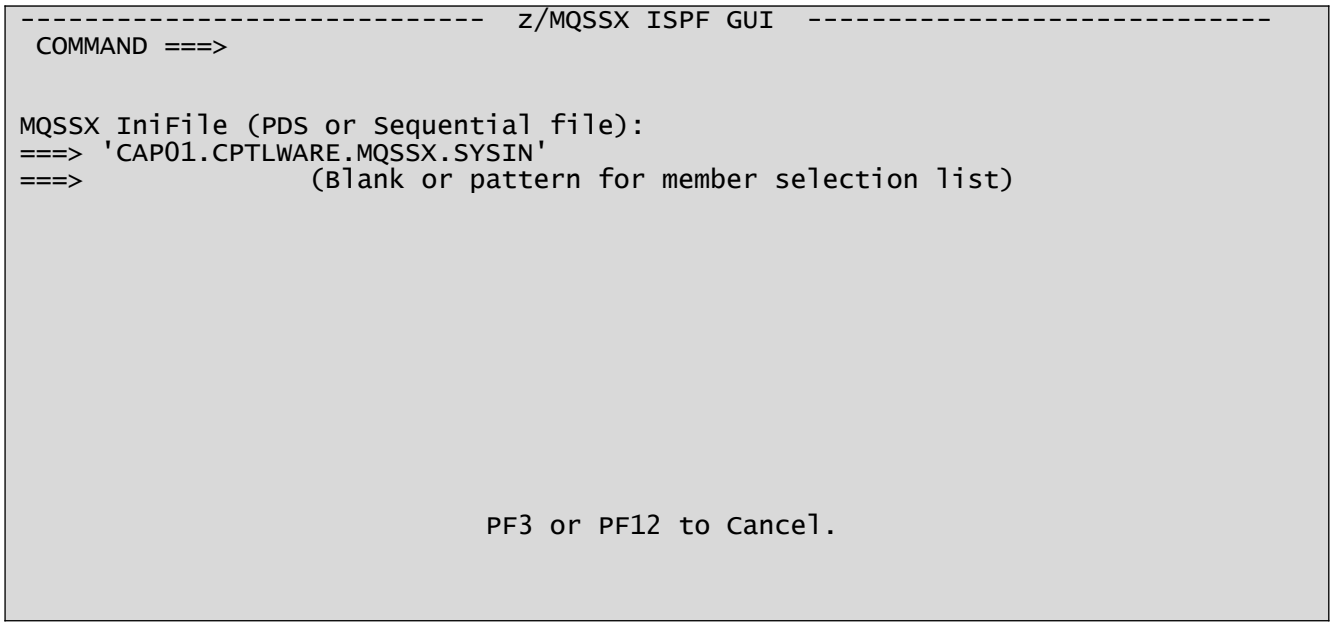
On z/OS, SCYEXIT and SCYDATA will contain the following values assuming a default install.

- SCYEXIT
  MQSSX
- SCYDATA
  MQSSXIN

```
DEFINE CHANNEL ('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN) +
       TRPTYPE(TCP) +
       SCYEXIT('MQSSX') +
       SCYDATA('MQSSXIN') +
       REPLACE
```

3.4 MQSSX-ISPF-GUI for z/OS

This section briefly describes the new ISPF GUI program called MQSSX-ISPF-GUI for z/OS. MQSSX-ISPF-GUI for z/OS assists the user in creating and managing their z/MQSSX IniFiles. For more information, please see the ***MQSSX-ISPF-GUI for z/OS User Guide*** manual.



4 IniFile Keywords (Server-side)

This section describes IniFile keywords.

4.1 Logging

This section describes the necessary entries to enable z/MQSSX to write log information. To enable and control logging, you need 9 keywords in the IniFile:

1. **LogMode** specifies what type of logging the user wishes to have. LogMode supports 4 values [Q / N / V / D] where Q is Quiet, N is Normal, V is Verbose and D is Debug. The default value is N.

2. **LogFile** specifies the location of the log file. The default is as follows:

   For z/OS:

   ```
   LogFile=SYSPRINT
   ```

3. **LogDiscMessage** specifies whether or not MQSSX write a disconnect message when the client application closes the channel. The default value is No.

4. **LogMessageQuote** specifies the type of quote (single or double) to be used on the log message. The default value is ' (single quote).

5. **WriteToSystemLog** specifies that z/MQSSX write a log entry to the server's 'logging system'. On z/OS, the server's 'logging system' is JES. The default value is N.

6. **SystemLogMessage** specifies what messages will be written to the system log.. SystemLogMessage supports 3 values [B / A / R] where B is Both, A is Accepted Only, and R is Rejected Only messages. The default value is B.

7. **WriteToEventQueue** specifies whether or not MQSSX will write an event message containing the log entry information to the event queue. The default value is N.

   WriteToEventQueue provides the ability to write custom MQ Events to System Channel Event Queue to allow MQSSX to be tied into an MQ Monitoring tool.
   - 9101 for Connection rejected (Authentication failed) event message
   - 9201 for MCC Warning event message
   - 9202 for MCC Exceeded event message

8. **EventQueueName** specifies the event queue name. The default value is 'SYSTEM.ADMIN.CHANNEL.EVENT'.

9. **UseFormFeed** specifies that a FormFeed command be issued once a day at midnight. UseFormFeed supports 2 values [Y / N]. The default value is N.

```
LogMode=N
LogFile=SYSPRINT
WriteToSystemLog=Y
```

4.2 Allow or Restrict the Incoming UserID against a Group

This section describes the necessary entries to enable the feature that allows or restricts the incoming UserID against a group file. This feature uses the following four keywords:

- **UseGroups** keyword controls the use of Groups. Set to 'Y' to allow authorization by either OS or a group file.
- **Groups** keyword specifies the authorized groups that can connect to the queue manager. Each group is separated from the next by a semi-colon (';').
- **GroupFile** keyword specifies the location of the group file

4.2.1 Authorization against a Group File

This section describes how to implement groups files. The group files are implemented in a similar manner to the way they are implemented in Unix and Linux (i.e. **/etc/group** file).

Below is an IniFile with the Group keywords:

```
unique_group_name = UserID1;UserID2;UserID3
```

Example:

```
grp1=fred;wilma;pebbles
grp2=barney;betty;bammbamm
grpA=arnold;rockhead;slate;gazoo
grpB=dino;puss;doozy;hoppy
```

z/MQSSX will check, in order, each group listed in the Groups keyword for a particular UserID. The UserID must exist in one of the groups or else MQSSX will not allow the connection.

Example:

```
UseGroups=Y
Groups=grp1;grp2;grpB
GroupFile=GROUP
```

4.3 Allow or Restrict the Incoming IP Address

This section describes the necessary entries to enable the feature that allows or restricts the incoming IP addresses through the use of regular expression patterns. This feature uses the following two keywords:

- **UseAllowIP** controls the use of AllowIP. Set to Y to activate feature.
- **AllowIP** specifies the regular expression patterns that limit the allowable incoming IP addresses

The server-side security exit will look up the regular expression patterns from the **AllowIP** keyword in order to determine if the entire incoming IP address matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? ! ^ - \', a backslash ('\') must precede the special character.

Note: AllowIP must NOT exceed 2048 characters.

```
UseAllowIP=Y
AllowIP=192.168.*.*;10.15[0-9].2[0-5][0-9];127.0.0.?
```

4.4 Allow or Restrict the Incoming Hostname

This section describes the necessary entries to enable the feature that allows or restricts the incoming Hostnames through the use of regular expression patterns. This feature uses the following two keywords:

- **UseAllowHostname** controls the use of AllowHostname. Set to Y to activate feature.
- **AllowHostname** specifies the regular expression patterns that limit the allowable incoming Hostnames

The server-side security exit will look up the regular expression patterns from the **AllowHostname** keyword in order to determine if the entire incoming Hostname matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- '#' matches any single numeric digit (0-9)
- '@' matches any single alphabetic character (A-Z, a-z)
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? # @ ! ^ - \', a backslash ('\') must precede the special character.

Note: AllowHostname must NOT exceed 2048 characters.

Separate each Hostname pattern with a ';' semi-colon.

```
UseAllowHostname=Y
AllowHostname=abc01.acme.com;abc02.acme.com
```

4.5 Allow or Restrict the Incoming IP against IP of Hostname

This section describes the necessary entries to enable the feature that allows or restricts the incoming IP against IP of Hostnames that z/MQSSX will perform a gethostbyaddr() call against to compare the returned IP address against the incoming IP address. This feature uses the following two keywords:

- **UseAllowHostByName** controls the use of AllowHostByName. Set to Y to activate feature.

- **AllowHostByName** specifies the Hostnames that z/MQSSX will perform a gethostbyaddr() call against to compare the returned IP address against the incoming IP address to allow the incoming connection.

The server-side security exit will perform a gethostbyaddr() call against hostnames from the **AllowHostByName** keyword and use the returned IP address and compare the returned IP address.

Note: AllowHostByName must NOT exceed 2048 characters.

Separate each Hostname pattern with a ';' semi-colon.

```
UseAllowHostByName=Y
AllowHostByName=abc01.acme.com;abc02.acme.com
```

4.6 Allow or Restrict the Incoming SSL DN

This section describes the necessary entries to enable the feature that allows or restricts the incoming SSL DN through the use of regular expression patterns. This feature uses the following two keywords:

- **UseAllowSSLDN** controls the use of AllowSSLDN. Set to Y to activate feature.
- **AllowSSLDN** specifies the regular expression patterns that limit the allowable incoming SSL DN

The server-side security exit will look up the regular expression patterns from the **AllowSSLDN** keyword in order to determine if the entire incoming IP address matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? ! ^ - \', a backslash ('\') must precede the special character.

Note: AllowSSLDN must NOT exceed 2048 characters.

```
UseAllowSSLDN=Y
AllowSSLDN=O=Capitalware,DC=net;CN=roger;O=acme
```

4.7 Allow or Restrict the Incoming UserID

This section describes the necessary entries to enable the feature that allows or restricts the incoming UserIDs through the use of regular expression patterns. This feature uses the following two keywords:

- **UseAllowUserID** controls the use of AllowUserID. Set to Y to activate feature.
- **AllowUserID** specifies the regular expression patterns that limit the allowable incoming UserIds

The server-side security exit will look up the regular expression patterns from the **AllowUserID** keyword in order to determine if the entire incoming UserID matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- '#' matches any single numeric digit (0-9)
- '@' matches any single alphabetic character (A-Z, a-z)
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? # @! ^ - \', a backslash ('\') must precede the special character.

Note: AllowUserID must NOT exceed 2048 characters.

```
AllowUserID=mq*;hr[0-9][a-f];abc??01
```

4.8 Reject the Incoming IP Address

This section describes the necessary entries to enable the feature that rejects the incoming IP addresses through the use of regular expression patterns. This feature uses the following two keywords:

- **UseRejectIP** controls the use of RejectIP. Set to Y to activate feature.
- **RejectIP** specifies the regular expression patterns that explicitly reject incoming IP Address

The server-side security exit will look up the regular expression patterns from the **RejectIP** keyword in order to determine if the entire incoming IP address matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- '#' matches any single numeric digit (0-9)
- '@' matches any single alphabetic character (A-Z, a-z)
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? # @ ! ^ - \', a backslash ('\') must precede the special character.

Note: RejectIP must NOT exceed 2048 characters.

```
UseRejectIP=Y
RejectIP=192.161.*.*;10.13[0-9].2[0-5][0-9];10.10.1.15
```

4.9 Reject by Hostname

This section describes the necessary entries to enable the feature that rejects by the Hostnames through the use of regular expression patterns. This feature uses the following two keywords:

- **UseRejectHostname** controls the use of RejectHostname. Set to Y to activate feature.
- **RejectHostname** specifies the regular expression patterns that explicitly reject by hostname

The server-side security exit will look up the regular expression patterns from the **RejectHostname** keyword in order to determine if the entire incoming Hostname matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- '#' matches any single numeric digit (0-9)
- '@' matches any single alphabetic character (A-Z, a-z)
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? # @ ! ^ - \', a backslash ('\') must precede the special character.

Note: RejectHostname must NOT exceed 2048 characters.

Separate each Hostname pattern with a ';' semi-colon.

```
UseReject=Y
RejectHostname=xyz01.acme.com;xyz02.acme.com
```

4.10 Reject by Incoming IP against IP of Hostname

This section describes the necessary entries to enable the feature that rejects the incoming IP against IP of Hostnames that z/MQSSX will perform a gethostbyaddr() call against to compare the returned IP address against the incoming IP address. This feature uses the following two keywords:

- **UseRejectHostByName** controls the use of RejectHostByName. Set to Y to activate feature.

- **RejectHostByName** specifies the Hostnames that z/MQSSX will perform a gethostbyaddr() call against to compare the returned IP address against the incoming IP address.

The server-side security exit will perform a gethostbyaddr() call against hostnames from the **RejectHostByName** keyword and used the returned IP address and compare the returned IP address to reject the incoming connection.

Note: RejectHostByName must NOT exceed 2048 characters.

Separate each Hostname pattern with a ';' semi-colon.

```
UseReject=Y
RejectHostByName=xyz01.acme.com;xyz02.acme.com
```

4.11 Reject the Incoming SSL DN

This section describes the necessary entries to enable the feature that rejects the incoming SSL DN through the use of regular expression patterns. This feature uses the following two keywords:

- **UseRejectSSLDN** controls the use of RejectSSLDN. Set to Y to activate feature.
- **RejectSSLDN** specifies the regular expression patterns that explicitly reject incoming SSL DN

The server-side security exit will look up the regular expression patterns from the **RejectSSLDN** keyword in order to determine if the entire incoming IP address matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- '#' matches any single numeric digit (0-9)
- '@' matches any single alphabetic character (A-Z, a-z)
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? # @ ! ^ - \', a backslash ('\') must precede the special character.

Note: RejectSSLDN must NOT exceed 2048 characters.

```
UseRejectSSLDN=Y
RejectSSLDN=192.161.*.*;10.13[0-9].2[0-5][0-9];10.10.1.15
```

4.12 Reject the Incoming UserID

This section describes the necessary entries to enable the feature that rejects the incoming UserIDs through the use of regular expression patterns. This feature uses the following two keywords:

- **UseRejectUserID** controls the use of RejectUserID. Set to Y to activate feature.
- **RejectUserID** specifies the regular expression patterns that reject incoming UserId

The server-side security exit will look up the regular expression patterns from the **RejectUserID** keyword in order to determine if the entire incoming UserID matches any of the specified expression patterns. Each regular expression pattern is separated from the next pattern by a semi-colon (';').

In the regular expression pattern:

- '*' matches any sequence of characters (zero or more)
- '?' matches any single character
- '#' matches any single numeric digit (0-9)
- '@' matches any single alphabetic character (A-Z, a-z)
- [SET] matches any character in the specified set,
- [!SET] or [^SET] matches any character except those specified in the set (negation).

A SET can be composed of characters or ranges. A range is in the form: 'character – character' (i.e. 0-9 or A-Z). Although this is the simplest range allowed in the [ ] pattern, more complex inclusive ranges such as [0-9a-zA-Z] are allowed. [0-9a-zA-Z] specifies that the character can be 0 through 9 **or** a through z **or** A through Z. Other characters are allowed (ie. 8 bit characters) if your system supports them.

In order to suppress the special syntactic significance of any of these characters '[] * ? # @ ! ^ - \', a backslash ('\') must precede the special character.

Note: RejectUserID must NOT exceed 2048 characters.

```
UseRejectUserID=Y
RejectUserID=abc*;x[0-9][a-f]
```

4.13 Excessive Client Connections

This section describes the necessary entries to configure Excessive Client Connections (ECC) alert system in MQSSX. This is controlled by the IniFile's property keyword 'UseECC'.

ECC is an alert system that counts the number of connections over a period of time (i.e. Day / Hour / Minute) and writes a message to the log when the count exceeds a particular value. If the keyword WriteToEventQueue is set to 'Y', an event message is also written to an event queue. ECC feature is designed to catch applications that are poorly written, such as, applications that continuously connect and disconnect from the queue manager for every message sent or received.

To enable the alerting of excessive client connections, you need 3 keywords in the IniFile:

- **UseECC** enables excessive client connections feature
- **ECCWarnCount** specifies a count which, when exceeded, will cause an alert to be generated. The default value is 5000.
- **ECCInterval** specifies a time interval to monitor the incoming number of connections. Valid values are D/H/M (Day, Hour and Minute) The default value is 'D'.

```
UseECC=Y
ECCWarnCount=200
ECCInterval=H
```

4.14 Set Maximum Number of Incoming Connections per Channel

This section describes the necessary entries to set a maximum number of allowable connections per a given channel. This is controlled by the IniFile's property keyword 'UseMCC'. Setting 'UseMCC' to 'Y' (Yes) will cause the server-side security exit to look up channel's name as a property keyword in the IniFile.

To enable the restricting of allowable connections per a given channel, you need 10 keywords in the IniFile:

1. **UseMCC** enables restricting of allowable connections per a given channel
2. **DefaultMCC** specifies the default maximum allowable connections for a particular channel.
3. **MCCEventWarnLevel** specifies the percentage of incoming channels to the maximum allowable number of channels that will cause MQSSX to write a warning message to the event queue. The default value is 80.
4. **UseMCCRedo** keyword specifies whether or not states that the server-side security exit should issue PCF command. The default value for 'UseMCCRedo' is 'Y'.
5. **MCCRedoMinutes** specifies a time internal to issue the 'display channel status' command.
6. **MCCRedoCount** specifies how often the 'display channel status' command should be issued.
7. **MCCGetTimeOut** specifies how long the security exit will wait for the reply from the queue manager's command server. The default value is 3 seconds.
8. **ModelQueueName** is the name of the system model reply queue
9. **CommandQueueName** is the name of the command queue used by the Queue Manager's Command Server
10. **TempDynPrefix** is the queue name prefix that will be used when the Queue Manager creates the temporary dynamic queue

For example, if 'UseMCC' is set to 'Y' and the incoming connection is on 'SYSTEM.ADMIN.SVRCONN', the server-side security exit will look up in the IniFile the keyword of 'SYSTEM.ADMIN.SVRCONN'. If the 'SYSTEM.ADMIN.SVRCONN' keyword is not found, then the server-side security exit will look up 'DefaultMCC' keyword in the IniFile.

If the 'DefaultMCC' keyword is not found, the 'UseMCC' keyword is then switched to 'N' (No).

The server-side security exit uses shared memory to keep track of the channel connection and disconnection. MQSSX was designed to periodically refresh the shared memory counter by issuing a PCF command to get the current channel status. This information is written to the shared memory.

There are 2 IniFile keywords to control how often the PCF Inquire channel status command is issued: 'MCCRedoMinutes' and 'MCCRedoCount'. 'MCCRedoMinutes' keyword states that the server-side security exit should issue PCF command if more than 'x' minutes have passed since the last PCF command was issued. The default value for 'MCCRedoMinutes' is 720 minutes. 'MCCRedoCount' keyword states that the server-side security exit should issue PCF command if more than 'x' connection attempts passed since the last PCF command was issued. The default value for 'MCCRedoCount' is 5000.

MCCEventWarnLevel keyword states that the server-side security exit should write a warning message to the event queue when the number of connections exceeds the percentage level. The default value for 'MCCEventWarnLevel' is 80. Note: Only used if both UseMCC and WriteToEventQueue are each set to 'Y'.

MCCGetTimeOut keyword specifies how long the security exit should wait for a reply from the queue manager's command server. The default value is 3 seconds.

```
UseMCC=Y
SYSTEM.ADMIN.SVRCONN=5
ABC.CH01=50
DEF.CH01=40
SYSTEM.DEF.SVRCONN=5
#
DefaultMCC=25
#
UseMCCRedo=Y
MCCRedoMinutes=900
MCCRedoCount=2000
MCCGetTimeOut=5
#
CommandQueueName=SYSTEM.COMMAND.INPUT
ModelQueueName=SYSTEM.COMMAND.REPLY.MODEL
TempDynPrefix=SYSTEM.MQSSX.*
```

Note: For queue managers with thousands for active connections, the user may wish to increase the values for 'MCCRedoMinutes' and 'MCCRedoCount' to a higher value. This will keep the overhead to a minimum.

```
UseMCCRedo=Y
MCCRedoMinutes=1440
MCCRedoCount=8000
```

4.15 Proxy ID

This section describes the necessary steps to enable the use of 'Proxy IDs'. Proxy ID allows an authorized User to use a different UserID for MQ interactions.

- **UseProxy** allows an authorized User to use a different UserID for MQ interactions.
- **ProxyFile** specifies the location of the file to do alternate UserID look up.

```
UseProxy=Y
ProxyFile=PROXY
```

The format of the Proxy file is similar to an IniFile or properties file where each keyword has an associated value. Each keyword and its value is on a separate line. The format is as follows:

```
Validated_UserID = ProxyID
```

Example:

```
Roger=app1
Fred=app2
Barney=app1
```

If the UserID is not found in the Proxy file then the incoming connection is rejected. To have a default Proxy UserID in the Proxy file use the "DefaultProxyID" value.

Example:

```
DefaultProxyID=readonly
```

4.16 CheckFinalUserID

This section describes the necessary entries to enable z/MQSSX to process the final UserID against UseAllowUserID, AllowUserID, UseRejectUserID, RejectUserID and Allowmqm keywords.

```
CheckFinalUserID=Y
```

4.17 UserIDFormatting

This section describes the necessary entries on how to handle the incoming UserID. 'UserIDFormatting' supports 3 values [A / U / L]. ('As Is, Uppercase and Lowercase). The default value is A.

```
UserIDFormatting=U
```

4.18 Allow Users to Login as 'mqm'

This section describes the necessary entries to enable users to login with the mqm or MUSR_MQADMIN or QMQM system account. This is controlled by the IniFile's property keyword 'Allowmqm'. Setting 'Allowmqm' to 'Y' (Yes) will activate this feature; otherwise, it will be blocked.

```
Allowmqm=Y
```

4.19 Allow connection to have a blank UserID

This section describes the necessary entries to enable connection to have a blank UserID. This is controlled by the IniFile's property keyword 'AllowBlankUserID'. Setting 'AllowBlankUserID' to 'Y' (Yes) will allow connections to have a blank UserID.

```
AllowBlankUserID=Y
```

4.20 MCAUSER Field

This section describes the necessary steps to enable the use of the channel's MCAUSER field. If this IniFile parameter is set to Yes then after the authentication process is complete, the connection will use the UserID value specified in the MCAUSER field.

- **UseMCAUser** enables the connection to use the UserID value specified in the channel's MCAUSER field

```
UseMCAUser=Y
```

4.21 SSL Self-Signed Certificate

This section describes the necessary steps to allow or reject SSL Self-Signed Certificates. If the AllowSSLSSCert IniFile parameter is set to 'Y' (Yes) then the SSL Self-Signed Certificate are

allowed. If AllowSSLSSCert is set to 'N' (No), the SSL Self-Signed Certificate is disallowed (i.e. the incoming connection is closed).

- **AllowSSLSSCert** specifies whether or not to allow the Self-Signed Certificate on the channel.

```
AllowSSLSSCert=Y
```

4.22 SSLCertUserID Field

This section describes the necessary steps to enable the use of the channel's SSLCertUserID field. If the UseSSLCertUserID IniFile parameter is set to 'Y' (Yes) then after the authentication process is complete, the connection will use the UserID value specified in the SSLCertUserID field.

- **UseSSLCertUserID** enables the connection to use the UserID value specified in the channel's SSLCertUserID field

```
UseSSLCertUserID=Y
```

4.23 Set UserID from SSL DN

MQSSX supports the retrieval of the UserID from the channel's SSL DN field. To enable the retrieval of the UserId from the channel's SSL DN field, you may use the following 4 keywords in the IniFile:

- **UseSSLUserIDFromDN** specifies that the UserID is to be retrieved from a SSL DN entry.
- **SSLDNAttrName** specifies the SSL DN attribute field name
- **SSLDNAttrStartPos** specifies the start position of the retrieval
- **SSLDNAttrLength** specifies the length of the field to be extracted (* means all)

```
UseSSLUserIDFromDN = Y
SSLDNAttrName = CN
SSLDNAttrStartPos = 1
SSLDNAttrLength = *
```

4.24 LicenseFile

This section will describe how to have a file that contains all of the user's MQSSX license keys.

The format of the LicenseFile is similar to an IniFile or properties file where each keyword has an associated value. Each keyword and its value are on a separate line. The format is as follows:

```
QMgrName = License_Key
```

Example:

```
MQA1 = 10S0-AAAA-BBBBBBBB
MQB1 = 10S0-XXXX-CCCCCCCC
```

If the queue manager name is not found in the LicenseFile then the License keyword will be used to retrieve the license key value.

The following are the default values for LicenseFile:

For z/OS DD:

```
LicenseFile=SSXFILE
```

4.25 License Key

This section will describe how to license MQ Standard Security Exit for z/OS to a particular queue manager.

Note: The License keyword is not required if the user has implemented the LicenseFile keyword or the License file actually exists in the default location.

Your license will look something like: 10S0-AAAA-BBBBBBBB (Note: This is a sample license only and will NOT work).

```
License=10S0-AAAA-BBBBBBBB
```

5 Server-side Log File

To verify that the process flow was successful, you can view the log file for the events that are generated.

5.1 z/OS

The log file is located at the following (assuming a default install of SYSPRINT):

CHIN Started-task JES-log

All log entries will be marked with either **INFO** or **ERROR** in columns 21 to 26.

```
2007/02/14 16:07:40 INFO    MQSSX #00858: Connection accepted for QMgr='MQA1' ChlName='MY.TEST.EXIT'
ConName='127.0.0.1' RemoteUserID='tester'
2007/02/14 16:07:51 INFO    MQSSX #00858: Connection accepted for QMgr='MQA1' ChlName='MY.TEST.EXIT'
ConName='127.0.0.1' RemoteUserID='tester '
2007/02/14 16:07:57 INFO    MQSSX #00858: Connection accepted for QMgr='MQA1' ChlName='MY.TEST.EXIT'
ConName='127.0.0.1' RemoteUserID='tester '
```

6 Appendix A – z/MQSSX IniFile

The sample IniFile below is the MQSSXINI file supplied for z/OS. The IniFile supports the following keywords and their values:

```
LogMode=N
LogFile=SYSPRINT
AllowUserID=mq*;abc[0-9]??;HR???
Allowmqm=N
AllowBlankUserID=N
UseMCC=N
UseAllowIP=N
UseProxy=N
UserIDFormatting=N
SequenceNumberFlag=N
```

Note: Keywords are case sensitive.

Keyword	Description of Server-side keywords
AllowBlankUserID	**AllowBlankUserID** specifies where or not to allow the incoming connection to have a blank UserID value. AllowBlankUserID supports 2 values [Y / N]. The default value is N. e.g. AllowBlankUserID=Y
AllowHostByName	**AllowHostByName** specifies the Hostnames that MQSSX will perform a gethostbyaddr() call against to compare the returned IP address against the incoming IP address to allow the incoming connection. The default is '*'. You must separate the hostname regular expression patterns with a ';' semi-colon. e.g. AllowHostByName=abc01.acme.com;abc02.acme.com Note: Only used if UseAllowHostByName is set to 'Y'.
AllowHostname	**AllowHostname** specifies a set of regular expression patterns that the hostname will be compared against. The default is '*'. You must separate the hostname regular expression patterns with a ';' semi-colon. e.g. AllowHostname=abc01.acme.com;abc02.acme.com Note: Only used if UseAllowHostname is set to 'Y'.

Keyword	Description of Server-side keywords
AllowIP	**AllowIP** specifies a set of regular expression patterns that the incoming channel's IP address will be parsed against. The default is '*'. You must separate the IP regular expression patterns with a ';' semi-colon. e.g. AllowIP=192.168.*.1[0-5][0-9];127.0.0.?;10.*.*.[0-9] Note: Only used if UseAllowIP is set to 'Y'.
Allowmqm	**Allowmqm** specifies whether or not to allow a user to be able to login using 'mqm' (Unix), 'MUSR_MQADMIN' (Windows) or 'QMQM' (OS/400) system account. Allowmqm supports 2 values [Y / N]. The default value is N. e.g. Allowmqm=Y
AllowSSLDN	**AllowSSLDN** specifies a set of regular expression patterns that the incoming channel's SSL DN will be compared against. You must separate the SSL DN regular expression patterns with a ';' semi-colon. e.g. AllowSSLDN=O=Capitalware,C=CA;O=IBM,DC=com Note: Only used if UseAllowSSLDN is set to 'Y'.
AllowSSLSSCert	**AllowSSLSSCert** specifies whether or not to allow Self-Signed Certificate on the channel. AllowSSLSSCert supports 2 values [Y / N]. The default value is Y. e.g. AllowSSLSSCert=Y
AllowUserID	**AllowUserID** specifies a set of regular expression patterns that the incoming connection's UserID will be parsed against. The default is '*'. You must separate each IP regular expression pattern with a ';' semi-colon. e.g. AllowUserID=mq*;abc??;xyz[0-9][a-f];hr[0-9][0-9]

Keyword	Description of Server-side keywords
CommandQueueName	**CommandQueueName** specifies the queue used by the queue manager's Command Server to process MQSC commands. The default value is 'SYSTEM.COMMAND.INPUT'. e.g. CommandQueueName=SYSTEM.COMMAND.INPUT Note: Only used if UseMCC is set to 'Y'.
CheckFinalUserID	**CheckFinalUserID** specifies whether or not the final UserID will be checked against the UseAllowUserID, AllowUserID, UseRejectUserID, RejectUserID and Allowmqm keywords. CheckFinalUserID supports 2 values [Y / N]. The default value is N. e.g. CheckFinalUserID=Y
DefaultMCC	**DefaultMCC** specifies a default maximum number of incoming connections that a particular channel will allow. There is no default value. e.g. DefaultMCC=25
ECCInterval	**ECCInterval** specifies a time internal to monitor the incoming number of connections. Valid values are D/H/M (Day, Hour and Minute) The default value is 'D'. e.g. ECCInterval =H Note: Only used if UseECC is each set to 'Y'.
ECCWarnCount	**ECCWarnCount** specifies a count which, when exceed, will cause an alert to be generated. The default value is 5000. e.g. ECCWarnCount =4000 Note: Only used if UseECC is each set to 'Y'.
EventQueueName	**EventQueueName** specifies the name of the event queue. The default value is 'SYSTEM.ADMIN.CHANNEL.EVENT'. e.g. EventQueueName= SYSTEM.ADMIN.CHANNEL.EVENT Note: Only used if WriteToEventQueue is set to 'Y'.

Keyword	Description of Server-side keywords
Groups	**Groups** specifies the list of groups that the authorizations will be performed against. e.g. Groups=grpA;grpF;grpM
GroupFile	**GroupFile** specifies the DDName of the file to look up the UserID against a group. The default value is 'GROUP'. e.g. GroupFile=GROUP Note: Only used if UseGroups is set to 'Y'.
License	**License** specifies the queue manager's license key. Your license will look something like: 10S0-AAAA-BBBBBBBB (Note: This is a sample license only and will NOT work). e.g. License=10S0-AAAA-BBBBBBBB
LicenseFile	**LicenseFile** specifies the location of License file that contains all of the customer's license keys. The following are the default values for LicenseFile: For z/OS DD: LicenseFile=SSXFILE e.g. LicenseFile=SSXFILE
LogDiscMessage	**LogDiscMessage** specifies whether or not a disconnect message is outputted to the logfile. LogDiscMessage supports 2 values [Y / N]. The default value is N. e.g. LogDiscMessage=Y
LogFile	**LogFile** specifies the location of the log file. The default is as follows: For z/OS: LogFile=SYSPRINT

Keyword	Description of Server-side keywords
LogMessageQuote	**LogMessageQuote** specifies what type of quote (single or double) is to be used with the log message. LogMessageQuote supports 2 values [' / "] (single or double quote). The default value is ' (single quote). e.g. LogMessageQuote="
LogMode	**LogMode** specifies what type of logging the user wishes to have. LogMode supports 4 values [Q / N / V / D] where Q is Quiet, N is Normal, V is Verbose and D is Debug. The default value is Q. e.g. LogMode=V
MCCEventWarnLevel	**MCCEventWarnLevel** specifies the percentage level of the number of connections that will cause MQSSX to write a warning message to the event queue. The default value is 80. e.g. MCCRedoCount=80 Note: Only used if both UseMCC and WriteToEventQueue are each set to 'Y'.
MCCGetTimeOut	**MCCGetTimeOut** specifies the number of seconds that the security exit will wait for a reply form the queue manager's command server. The default value is 3. e.g. MCCGetTimeOut=3 Note: Only used if UseMCC is set to 'Y'.
MCCRedoCount	**MCCRedoCount** specifies the number of connection attempts to occur before the next PCF 'display current channel status' is issued. The default value is 5000. e.g. MCCRedoCount=5000 Note: Only used if UseMCC is set to 'Y'.

Keyword	Description of Server-side keywords
MCCRedoMinutes	**MCCRedoMinutes** specifies the period of time in minutes to wait before the next PCF 'display current channel status' is issued. The default value is 360 minutes. e.g. MCCRedoMinutes= 360 Note: Only used if UseMCC is set to 'Y'.
ModelQueueName	**ModelQueueName** specifies the model queue to be used when z/MQSSX creates a temporary reply queue. The default value is 'SYSTEM.COMMAND.REPLY.MODEL'. e.g. ModelQueueName=SYSTEM.COMMAND.REPLY.MODEL Note: Only used if UseMCC is set to 'Y'.
ProxyFile	**ProxyFile** specifies the DDName of the file to do alternate UserID look-up. The default value is 'PROXY'. e.g. ProxyFile=PROXY Note: Only used if UseProxy is set to 'Y'.
RejectHostByName	**RejectHostByName** specifies a list of hostnames that z/MQSSX will perform a gethostbyaddr() call against the hostname to compare the returned IP address against the incoming IP address to reject the incoming connection. You must separate the hostnames with a ';' semi-colon. e.g. RejectHostByName=xyz01.acme.com;xyz02.acme.com Note: Only used if UseRejectHostByName is set to 'Y'.
RejectHostname	**RejectHostname** specifies a set of regular expression patterns that the hostname will be compared against. You must separate the hostname regular expression patterns with a ';' semi-colon. e.g. RejectHostname=xyz01.acme.com;xyz02.acme.com Note: Only used if UseAllowHostname is set to 'Y'.

Keyword	Description of Server-side keywords
RejectIP	**RejectIP** specifies a set of regular expression patterns that the incoming channel's IP address will be compared against. You must separate the IP regular expression patterns with a ';' semi-colon. e.g. RejectIP=192.168.*.1[0-5][0-9];127.0.0.?;10.*.*.[0-9] Note: Only used if UseAllowIP is set to 'Y'.
RejectSSLDN	**RejectSSLDN** specifies a set of regular expression patterns that the incoming channel's SSL DN will be compared against. You must separate the SSL DN expression patterns with a ';' semi-colon. e.g. RejectSSLDN=O=xyz*,C=CA;O=abc*,DC=net Note: Only used if UseRejectSSLDN is set to 'Y'.
RejectUserID	**RejectUserID** specifies a set of regular expression patterns that the incoming connection's UserID will be compared against. You must separate each IP regular expression pattern with a ';' semi-colon. e.g. RejectUserID=mq*;abc??;xyz[0-9][a-f];hr[0-9][0-9] Note: Only used if UseRejectUserID is set to 'Y'.
SequenceNumberFlag	**SequenceNumberFlag** is a z/OS (OS/390) only flag. It states whether or not there are sequence numbers in columns 72 to 80. SequnceNumberFlag supports 2 values [Y / N]. The default value is N. e.g. SequenceNumberFlag = Y
SSLDNAttrLength	**SSLDNAttrLength** specifies the length of the extraction of the UserId from the SSL DN attribute. The default value is '*' (* means all). e.g. SSLDNAttrLength=* Note: Only used if UseSSLUserIDFromDN is set to 'Y'.

Keyword	Description of Server-side keywords
SSLDNAttrName	**SSLDNAttrName** specifies the name of SSL DN attribute to be used to extract UserId from. The default value is 'CN'. e.g. SSLDNAttrName=CN Note: Only used if UseSSLUserIDFromDN is set to 'Y'.
SSLDNAttrStartPos	**SSLDNAttrStartPos** specifies the start position for the extraction of the UserId from the SSL DN attribute. The default value is '1'. e.g. SSLDNAttrStartPos=1 Note: Only used if UseSSLUserIDFromDN is set to 'Y'.
SystemLogMessage	**SystemLogMessage** specifies what messages will be written to the system log.. SystemLogMessage supports 3 values [B / A / R] where B is Both, A is Accepted Only, and R is Rejected Only messages. The default value is B. e.g. SystemLogMessage=B Note: Only used if WriteToSystemLog is set to 'Y'.
TempDynPrefix	**TempDynPrefix** specifies a prefix name for the temporary dymanic queue. The default value is 'SYSTEM.MQSSX.*'. e.g. TempDynPrefix= SYSTEM.MQSSX.* Note: Only used if UseMCC is set to 'Y'.
UseAllowHostByName	**UseAllowHostByName** allows MQ Admin to allow or restrict by performing a gethostbyaddr() call against the hostname to compare the returned IP address against the incoming IP address to allow the incoming connection. UseAllowHostByName supports 2 values [Y / N]. The default value is N. e.g. UseAllowHostByName=Y
UseAllowHostname	**UseAllowHostname** allows MQ Admin to allow or restrict by hostname by comparing it against a regular expression pattern. UseAllowHostname supports 2 values [Y / N]. The default value is N. e.g. UseAllowHostname=Y

Keyword	Description of Server-side keywords
UseAllowIP	**UseAllowIP** allows MQ Admin to allow or restrict incoming channel IP address against a regular expression pattern. UseAllowIP supports 2 values [Y / N]. The default value is N. e.g. UseAllowIP=Y
UseAllowSSLDN	**UseAllowSSLDN** allows MQ Admin to allow or restrict incoming channel's SSL DN by comparing it against a regular expression pattern. UseAllowSSLDN supports 2 values [Y / N]. The default value is N. e.g. UseAllowSSLDN=Y
UseECC	**UseECC** allows MQ Admin to have MQSSX generate an alert when the ECCWarnCount is exceeded. UseECC supports 2 values [Y / N]. The default value is N. e.g. UseECC=Y
UseFormFeed	**UseFormFeed** specifies that a FormFeed command be issued once a day at midnight. UseFormFeed supports 2 values [Y / N]. The default value is N. e.g. UseFormFeed=Y
UseGroups	**UseGroups** allows or restricts the incoming UserID against a group file. UseGroups supports 2 values [Y / N]. The default value is N. e.g. UseGroups=Y
UseMCAUser	**UseMCAUser** allows the connection to use the UserID value specified in the channel's MCAUSER field. UseMCAUser supports 2 values [Y / N]. The default value is N. e.g. UseMCAUser=Y
UseMCC	**UseMCC** allows MQ Admin to set a limit on the maximum number of connections to a given channel. UseMCC supports 2 values [Y / N]. The default value is N. e.g. UseMCC=Y

Keyword	Description of Server-side keywords
UseMCCRedo	**UseMCCRedo** keyword specifies whether or not the server-side security exit should issue PCF command. UseMCCRedo supports 2 values [Y / N]. The default value is Y. e.g. UseMCCRedo=Y
UseProxy	**UseProxy** allows an authorized User to use a different UserID for MQ interactions. UseProxy supports 2 values [Y / N]. The default value is N. e.g. UseProxy=N
UseRejectHostByName	**UseRejectIHostByName** allows MQ Admin to perform a gethostbyaddr() call against the hostname to compare the returned IP address against the incoming IP address to reject the incoming connection. UseRejectHostByName supports 2 values [Y / N]. The default value is N. e.g. UseRejectHostByName=Y
UseRejectHostname	**UseRejectIHostname** allows MQ Admin to reject a hostname by comparing it against a regular expression pattern. UseRejectHostname supports 2 values [Y / N]. The default value is N. e.g. UseRejectHostname=Y
UseRejectIP	**UseRejectIP** allows MQ Admin to reject incoming channel IP address by comparing it against a regular expression pattern. UseRejectIP supports 2 values [Y / N]. The default value is N. e.g. UseRejectIP=Y
UseRejectSSLDN	**UseRejectSSLDN** allows MQ Admin to reject incoming channel's SSL DN by comparing it against a regular expression pattern. UseRejectSSLDN supports 2 values [Y / N]. The default value is N. e.g. UseRejectSSLDN=Y

Keyword	Description of Server-side keywords
UseRejectUserID	**UseRejectUserID** allows MQ Admin to reject incoming UserID by comparing it against a regular expression pattern. UseRejectUserID supports 2 values [Y / N]. The default value is N. e.g. UseRejectUserID=Y
UserIDFormatting	**UserIDFormatting** specifies how z/MQSSX will handle the incoming UserID. UserIDFormatting supports 3 values [A / U / L]. ('As Is, Uppercase and Lowercase). The default value is A. UserIDFormatting=U
UseSSLCertUserID	**UseSSLCertUserID** allows the connection to use the UserID value specified in the channel's SSLCertUserID field. UseSSLCertUserID supports 2 values [Y / N]. The default value is N. e.g. UseSSLCertUserID=Y
UseSSLUserIDFromDN	**UseSSLUserIDFromDN** specifies to set the channel's UserId to be the value extracted from the SSL DN. UseSSLUserIDFromDN supports 2 values [Y / N]. The default value is N. e.g. UseSSLUserIDFromDN=Y
WriteToEventQueue	**WriteToEventQueue** specifies that MQSSX write an event message containing the log entry information to an event queue. WriteToEventQueue supports 2 values [Y / N]. The default value is N. e.g. WriteToSystemLog =Y
WriteToSystemLog	**WriteToSystemLog** specifies that z/MQSSX write a log entry to the server's 'logging system'. On z/OS, the server's 'logging system' is JES. WriteToSystemLog supports 2 values [Y / N]. The default value is N. e.g. WriteToSystemLog =Y

7 Appendix B – z/MQSSX Upgrade Procedures

To upgrade an existing installation of z/MQSSX from an older version to a newer version, do please do the following in the appropriate section below.

1. Stop all of the channels using the z/MQSSX server-side security exit or stop the queue manager's CHIN (channel initiator).

2. ftp the z/OS XMIT prepared datasets to the z/OS LPAR.

   ```
   ftp -s:mqssx.ftp  z/OS_hostname
   ```

   ```
   your-z/OS-userid
   your-z/OS-password

   binary
   quote SITE recfm=fb lrecl=80 blksize=3120
   put MQSSX.LOAD.ZOS
   quit
   ```

   If the user receives the following error message then they will need to pre-allocate the z/OS datasets:

```
ftp> put MQSSX.LOAD.ZOS
200 Port request OK.
550-SVC99 RETURN CODE=4 S99INFO=0 S99ERROR=38656 HEX=9700 S99ERSN code X'000003F3'.
550 Unable to create data set xxxxx.MQSSX.LOAD.ZOS for STOR command.
ftp> put MQSSX.SYSIN.ZOS
200 Port request OK.
550-SVC99 RETURN CODE=4 S99INFO=0 S99ERROR=38656 HEX=9700 S99ERSN code X'000003F3'.
550 Unable to create data set xxxxx.MQSSX.SYSIN.ZOS for STOR command.
```

   To pre-allocating the XMIT datasets go to option 3.2 of ISPF and allocate both dataset: MQSSX.LOAD.ZOS

   Use the following dataset attributes when allocating the dataset:

Space	
Units	BLOCKS
Primary Quantity	40
Secondary Quantity	40
Directory Blocks	0
DCB Parameters	
RECFM	FB
LRECL	80
BLKSIZE	3120
DsnType	Blank

After the user has pre-allocated the dataset, the user can redo the ftp commands.

- Log on to z/OS LPAR and issue the following TSO RECEIVE command:

```
TSO RECEIVE INDATASET(MQSSX.LOAD.ZOS)
```

After issuing the above command, the following product dataset will appear:

+HLQ+.CPTLWARE.MQSSX.LOAD is the dataset that contains the z/OS load-module.

- Start all of the channels using the z/MQSSX server-side security exit or restart the queue manager's CHIN.

8 Appendix C – Capitalware Product Display Version

z/MQSSX includes a program to display the product version number.

8.1 Examples

8.1.1 z/OS

To use the CWDSPVER program on z/OS, use the following JCL:

```
//CWDSPVER EXEC PGM=CWDSPVER,
//SYSPRINT DD  SYSOUT=*
//STEPLIB  DD  DISP=SHR,DSN=+HLQ+.CPTLWARE.MQSSX.LOAD
```

9 Appendix D – Support

The support for MQ Standard Security Exit for z/OS can be found at the following location:

By email at:
support@capitalware.com

By regular mail at:

Capitalware Inc.
Attn: MQSSX for z/OS Support
Unit 11, 1673 Richmond Street, PMB524
London, Ontario N6G2N3
Canada

10 Appendix E – Summary of Changes

- MQ Standard Security Exit for z/OS v2.6.0
  - Enhanced the code for dumping the pointers passed into exit.
  - Fixed an issue in the subroutine that removes trailing blanks
  - Fixed issue when an invalid or expired license key is used
  - Fixed an issue with default exit path

- MQ Standard Security Exit for z/OS v2.5.0
  - Tuned the code that is called on entry
  - Tuned the logging code

- MQ Standard Security Exit for z/OS v2.4.0
  - Fixed an issue in the logging framework where a constant was being modified.

- MQ Standard Security Exit for z/OS v2.3.0
  - Added support for log disconnect message (new keyword: LogDiscMessage)
  - Added support for single or double quotes for log message (new keyword: LogMessageQuote)

- MQ Standard Security Exit for z/OS v2.2.1
  - Fixed an issue with using "size_t" variable type when it should have been "int"

- MQ Standard Security Exit for z/OS v2.2.0
  - Ability to monitor for excessive client connections (ECC) and then generate an alert (new keywords: UseECC, ECCWarnCount & ECCInterval)

- MQ Standard Security Exit for z/OS v2.1.0
  - Added new CheckFinalUserID keyword. It will take the final UserID and reprocess it against UseAllowUserID, AllowUserID, UseRejectUserID, RejectUserID and Allowmqm keywords.
  - Improved the IniFile processing speed.
  - Fixed an issue with Enterprise License key not being loaded from a License file.
  - Fixed an issue with MQSSX not recognizing the filename specified for FBAFile keyword.
  - Tested with MQ v8.0

- MQ Standard Security Exit for z/OS v2.0.1
  - Added UseMCCRedo flag to control MCCRedoCount, MCCRedoMinutes and MCCGetTimeOut
  - Renamed UppercaseUserID flag to UserIDFormatting. UserIDFormatting supports 3 values: A/U/L (As Is/Uppercase/Lowercase)

- MQ Standard Security Exit for z/OS v2.0.0
  - Added keyword UseAllowHostname and AllowHostname to only allow hosts by name (reverse lookup of incoming IP address)

- Added keyword UseRejectHostname and RejectHostname to explicitly reject a hostname (reverse lookup of incoming IP address)
- Added keyword UseAllowHostByName and AllowHostByName to only allow hosts by name
- Added keyword UseRejectHostByName and RejectHostByName to explicitly reject a hostname
- Added keyword SystemLogMessage to control what type of messages ('accepted' and/or 'rejected') are written to system log
- Added keywords UseGroups, Groups & GroupFile
- Added program CWDSPVER to display the product version number
- Added code in the Ini parser to distinguish between 'ABC' and 'ABCDEF' keywords
- Added keyword UseFormFeed (z/OS only) to issue a FormFeed command once a day at midnight
- Increased the accepted IniFile parameter length from 1024 to 2048 characters
- Updated the "Connection accepted" log record to include the UserID set for the connection.
- Updated MCC logic so that a command server failure does not affect the exit.
- Changed MCCRedoCount default value from 1000 to 5000
- Fixed a bug with ConnectionName when both IPv4 and IPv6 stacks are used
- Fixed a bug in the in-memory Ini parser
- Fixed a bug with Proxy file processing
- Fixed a bug in the AllowSSLDN processing
- Fixed a bug with SSLPeerNamePtr field.
- Tested with MQ v7.1

➢ MQ Standard Security Exit for z/OS v1.3.0

- Added UseSSLCertUserID IniFile keyword to enable the use of the UserID from the channel's SSLCertUserID field
- Added AllowSSLSSCert IniFile keyword to enable the check for Self-signed Certificate
- Added UseSSLUserIDFromDN, SSLDNAttrName, SSLDNAttrStartPos and SSLDNAttrLength IniFile keywords to extract the UserID from the channel's SSL DN field
- Added LicenseFile to support multiple license keys in a single file
- Fixed a bug with Proxy file processing

➢ MQ Standard Security Exit for z/OS v1.2.0

- Major performance and tuning to many modules - a 7% - 12% improvement in speed depending on features used
- Added the ability to explicitly reject an incoming IP address based on a pattern-matching (UseRejectIP and RejectIP).
- Added the ability to explicitly reject an incoming UserId based on a pattern-matching (UseRejectUserID and RejectUserID).
- Added the code to disable Event Warning messages when WriteToEventQueue is being used.

- Added code to limit the number of messages written to the event queue when WriteToEventQueue is being used.
- Added MCCGetTimeOut keyword to allow the user to define how long to wait on the "DIS CHL(<ChannelName>)" command when UseMCC is being used.

- MQ Standard Security Exit v1.1.4
  - Added the ability to write custom MQ Events to System Channel Event Queue to allow MQSSX to be tied into an MQ Monitoring tool.
    - 9101 for Connection rejected event message
    - 9201 for MCC Warning event message
    - 9202 for MCC Exceeded event message
  - Successfully tested with MQ v7.0
  - Fixed a bug related to a memory leak when using the MCC feature under extreme load.
  - Created a MQSSX manual: MQSSX Queue Manager To Queue Manager Configuration.

➢ MQ Standard Security Exit for z/OS v1.1.3
  - Updated MQSSX ISPF GUI to reflect updated keywords.

➢ MQ Standard Security Exit for z/OS v1.1.2
  - Added more debug information related to memory pointers.
  - Changed MCCRedoSeconds keyword to MCCRedoMinutes.
  - Changed default values for MCCRedoMinutes and MCCRedoCount

➢ MQ Standard Security Exit for z/OS v1.1.1
  - Initial release.

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12 Appendix G – Notices

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