Client-side Security Exit for Depository Trust Clearing Corporation Installation and Operation Manual

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1 Introduction

1.1 Overview

Client-side Security Exit for Depository Trust Clearing Corporation (SX4DTC^2) is a new solution that allows a company to perform verification with a Depository Trust Clearing Corporation queue manager. The client-side security exit will operate with IBM MQ v7.0, v7.1, v7.5, v8.0, v9.0, v9.1 and v9.2 in Windows, Unix, IBM i and Linux environments. It works with Sender, Server, and Cluster-Sender channels of IBM MQ queue manager.

The SX4DTC^2 solution is comprised of a client-side security exit.

Note: SunGard's Loanet division requires the EXACT same format as the client-side Security Exit for Depository Trust Clearing Corporation. Therefore, if your company is interacting with Loanet and requires a client-side MQ Security Exit, you can use SX4DTC^2.

The SX4DTC^2 solution is licensed as '***Licensed As Free***' meaning a user can freely download the software and use it (i.e. Same as how IBM licenses MQ Client software.). If the user wants support for SX4DTC^2 then they can purchase a support subscription from Capitalware.

On AIX, HP-UX, Linux, Solaris and Windows, SX4DTC^2 can be configured and used with a non-default installation of MQ in a multi-install MQ environment.

Note: Raspberry Pi is a Linux ARM 32-bit OS (Operating System). Hence, simply follow the Linux 32-bit instructions for installing and using the solution on a Raspberry Pi.

1.2 Executive Summary

The SX4DTC^2 solution contains a client-side security exit.

The client-side security exit is available in 3 forms:
- ➢ Windows DLL
- ➢ Shared library for AIX, HP-UX, Linux, and Solaris.
- ➢ IBM i exit module

The major features of SX4DTC^2 are as follows:
- ➢ Performs verification with a Depository Trust Clearing Corporation queue manager
- ➢ Provides logging capability for all outbound connection requests regardless if they were successful or not.

1.3 Prerequisites

This section provides the minimum supported software levels. These prerequisites apply to client-side installations of SX4DTC^2.

1.3.1 Operating System

SX4DTC^2 can be installed on any of the following supported servers:

1.3.1.1 IBM AIX
- ➢ IBM AIX 6L version 6.1 or higher

1.3.1.2 HP-UX IA64
- ➢ HP-UX v11.23 or higher

1.3.1.3 IBM i (OS/400)
- ➢ IBM i V6R1 or higher

1.3.1.4 Linux x86
- ➢ Red Hat Enterprise Linux v5, v6, v7, v8
- ➢ SUSE Linux Enterprise Server v11, v12, v15

1.3.1.5 Linux x86_64 (64-bit)
- ➢ Red Hat Enterprise Linux v5, v6, v7, v8
- ➢ SUSE Linux Enterprise Server v11, v12, v15

1.3.1.6 Linux on POWER
- ➢ Red Hat Enterprise Linux v5, v6, v7, v8
- ➢ SUSE Linux Enterprise Server v11, v12, v15

1.3.1.7 Linux on zSeries (64-bit)
- ➢ Red Hat Enterprise Linux v5, v6, v7, v8
- ➢ SUSE Linux Enterprise Server v11, v12, v15

1.3.1.8 Raspberry Pi (Linux ARM 32-bit)
- ➢ Raspberry Pi OS v9 or higher

1.3.1.9 Sun Solaris
- ➢ Solaris SPARC v10 or higher
- ➢ Solaris x86_64 v10 or higher

1.3.1.10   Windows
- ➢ Windows 2008, 2012 or 2016 Server (32-bit & 64-bit)
- ➢ Windows 7, 8, 8.1 or 10 (32-bit & 64-bit)

1.3.2 IBM MQ

➢ IBM MQ v7.0, v7.1, v7.5, v8.0, v9.0, v9.1 and v9.2 (both 32-bit and 64-bit)

Operating System	MQ v7.0, v7.1, v7.5, v8.0, v9.0, v9.1 and v9.2
AIX v6.1 or higher	64-bit
HP-UX IA64 v11.23 or higher	64-bit
IBM i (OS/400)	64-bit
Linux x86	32-bit
Linux x86_64	64-bit
Linux on POWER	64-bit
Linux on zSeries	64-bit
Raspberry Pi ARM	32-bit
Solaris SPARC v10 & v11	64-bit
Solaris x86_64 v10 & v11	64-bit
Windows 2008, 2012, 2016, 7, 8, 8.1 & 10	32-bit

1.3.3 Windows 32-bit

The following is the software prerequisite for Windows 32-bit:

- Microsoft Visual C++ 2010 Redistributable Package (x86)
  https://www.microsoft.com/en-ca/download/details.aspx?id=5555

1.3.4 Windows 64-bit

The following is the software prerequisite for Windows 64-bit:

- Microsoft Visual C++ 2010 Redistributable Package (x64)
  https://www.microsoft.com/en-ca/download/details.aspx?id=14632

2 Installing SX4DTC²

This section describes how to install SX4DTC².

2.1 Client-side Security Exit

2.1.1 Windows Installation

To install the security exit on Windows, first unzip the **sx4dtc2.zip** and then run the **sx4dtc2_setup.exe** file. Follow the on-screen instructions and the security exit will be installed in the **C:\Capitalware\SX4DTC2** directory (default installation).

The user may copy or ftp the sx4dtc2.dll file from one Windows server to another Windows server.

2.1.2 Linux 32-bit Installation

To install the 32-bit version of SX4DTC² on Linux, first unzip the **sx4dtc2.zip** and then select the appropriate TAR file for the target platform. You will find 2 TAR files in the original ZIP file:

- **Linux_x86/sx4dtc2_linux.tar**
- **RaspberryPi_ARM/sx4dtc2_raspberrypi_arm.tar**

Steps to install the client-side security exit:
1. ftp or copy the selected TAR file to the target platform to the */var/mqm/exits/* directory.
2. Un-tar the sx4dtc2_xxx.tar file into the */var/mqm/exits/* sub-directory (xxx is either aix, hpux, solaris or linux)

   ```
   cd /var/mqm/exits/
   tar -xvf  sx4dtc2_xxx.tar
   ```

3. Change directory to */var/mqm/exits/*
4. Next, do the following commands against *SX4DTC2*:

   ```
   chown mqm:mqm sx4dtc2
   chmod 550 sx4dtc2
   ```

2.1.3 Unix and Linux 64-bit Installation

To install the 64-bit version of SX4DTC^2 on Unix or Linux, first unzip the **sx4dtc2.zip** and then select the appropriate TAR file for the target platform. You will find 9 TAR files in the original ZIP file:

- **AIX/64-bit/sx4dtc2_aix53_64.tar**
- **AIX/64-bit/sx4dtc2_aix61_64.tar** for AIX v6.1 or higher
- **HPUX_IA64 /sx4dtc2_hpux64_ia64.tar**
- **Linux_x86_64/sx4dtc2_linux_x86_64.tar**
- **Linux_POWER/sx4dtc2_linux_power64.tar**
- **Linux_zSeries/64-bit/sx4dtc2_linux_zseries64.tar**
- **Solaris_SPARC/64-bit/sx4dtc2_solaris64.tar** for Solaris SPARC v8 and v9
- **Solaris_SPARC/64-bit/sx4dtc2_solaris10_64.tar** for Solaris SPARC v10 or higher
- **Solaris_x86_64/sx4dtc2_solaris_x86_64.tar**

Steps to install the client-side security exit:
1. ftp or copy the selected TAR file to the target platform to the */var/mqm/exits64/* directory.
2. Un-tar the sx4dtc2_xxx.tar file into the */var/mqm/exits64/* sub-directory (xxx is either aix, hpux, solaris or linux)

```
cd /var/mqm/exits64/
tar -xvf  sx4dtc2_xxx64.tar
```

3. Change directory to */var/mqm/exits64/*
4. Next, do the following commands against *SX4DTC^2*:

```
chown mqm:mqm sx4dtc2
chmod 550 sx4dtc2
```

2.1.4 IBM i Installation

To install the SX4DTC^2 on IBM i, first unzip the **sx4dtc2.zip** and then select the files in the IBM i (IBM i) directory.

- **sx4dtc2.savf** is the IBM i 'Save File' that contains the library with the security exit.

- **sx4dtc2_iseries.tar** is the IBM i IFS TAR file that contains a sample initialization file for the client-side security exit and sample MQSC script to define MQ channels with the security exits.

Steps to install the client-side security exit:

1. Log onto the target IBM i server and do the following command:

   CRTSAVF FILE(QGPL/SX4DTC2)

2. ftp the IBM i files to the IBM i server as follows:

   ftp –s:sx4dtc2_iseries.ftp iseries_hostname

   ```
   your-IBM i-userid
   your-IBM i-password

   binary
   cd QGPL
   put sx4dtc2.savf

   quote SITE NAMEFMT 1

   cd /QIBM/UserData/mqm/
   put sx4dtc2_iseries.tar
   quit
   ```

3. Log onto the target IBM i server and do the following commands:

   RSTLIB SAVLIB(SX4DTC2) DEV(*SAVF) SAVF(QGPL/SX4DTC2)
   CLRSAVF FILE(QGPL/SX4DTC2)
   CHGOBJOWN OBJ(SX4DTC2) OBJTYPE(*LIB) NEWOWN(QMQM)
   qsh
   cd /QIBM/UserData/mqm/
   tar -xvf sx4dtc2_iseries.tar
   chown -R QMQM sx4dtc2
   rm sx4dtc2_iseries.tar

3   Configuring Client-side Security Exit

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

3.1   Specifying Credentials directly in the Channels SCYDATA

Security User Data (SCYDATA) field must NOT exceed 32 characters.

To explicitly set the Company, UserID and Password in the channel's SCYDATA field then set
SCYDATA as follows:

> C=yourcompany;U=youruserid;P=yourpassword

where :
- yourcompany is the company's Depository Trust Clearing Corporation Identification
- youruserid is the company's UserID as given by Depository Trust Clearing Corporation
- yourpassword is the company's Password as given by Depository Trust Clearing
  Corporation

E.g. Windows
```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('C:\Capitalware\SX4DTC2\sx4dtc2(SX)') +
       SCYDATA('C=A001;U=roger;P=mypwd') +
       REPLACE
```

3.2 Specifying Credentials in a File

Security User Data (SCYDATA) field must NOT exceed 32 characters. In order to work with this limitation, SX4DTC[2] supports 3 ways to specify an IniFile path: absolute path, relative path and environment variable.

3.2.1 Absolute Path

Absolute pathing (specifying the complete path) for the SCYDATA works on Linux, Unix and Windows platforms.

E.g. Windows

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('C:\Capitalware\SX4DTC2\sx4dtc2(SX)') +
       SCYDATA('C:\Capitalware\SX4DTC2\sx4dtc2.ini') +
       REPLACE
```

Hence, SX4DTC2 will use the following path as the IniFile path:
`C:\Capitalware\SX4DTC2\`

3.2.2 Relative Path

Relative pathing for the SCYDATA is supported on Linux, IBM i, Unix and Windows platforms. SX4DTC[2] will extract the path from SCYEXIT field and prefix it to the IniFile specified in the SCYDATA field in order to locate the IniFile.

E.g. Unix

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('/var/mqm/exits/sx4dtc2(SX)') +
       SCYDATA('sx4dtc2.ini') +
       REPLACE
```

Hence, SX4DTC[2] will use the following path as the IniFile path:
`/var/mqm/exits/`

3.2.3 SX4DTC2_HOME Environment Variable

SX4DTC[2] supports the use of the SX4DTC2_HOME environment variable which holds the directory path information. SX4DTC2_HOME environment variable is supported on Linux, IBM i, Unix and Windows platforms.

E.g. Unix

```
export SX4DTC2_HOME=/really/long/path/MQHA/QMgrName/data/
```

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('/var/mqm/exits64/sx4dtc2(SX)') +
       SCYDATA('sx4dtc2.ini') +
       REPLACE
```

Hence, SX4DTC[2] will use the following path as the IniFile path:
`/really/long/path/MQHA/QMgrName/data/`

3.3 SENDER or SERVER Channel

This section describes the necessary entries to enable the client-side security exit. The MQ Administrator will need to update 2 fields of the SENDER (or SERVER) Channel that the client-side security exit will be applied to.

3.3.1 Windows

On Windows, SCYEXIT and SCYDATA will contain the following values assuming a default install.

- SCYEXIT
  `C:\Capitalware\SX4DTC2\sx4dtc2(SX)`
- SCYDATA
  - Explicitly set the credentials in the SCYDATA field
    `c=A001;u=roger;p=mypwd`
  - Or specify the credentials in a file then input the filename in the SCYDATA field
    `C:\Capitalware\SX4DTC2\sx4dtc2.ini`

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('C:\Capitalware\SX4DTC2\sx4dtc2(SX)') +
       SCYDATA('C=A001;U=roger;P=mypwd') +
       REPLACE
```

3.3.2 Linux 32-bit

On Linux, SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT
  `/var/mqm/exits/sx4dtc2(SX)`
- SCYDATA
  - Explicitly set the credentials in the SCYDATA field
    `c=A001;u=roger;p=mypwd`
  - Or specify the credentials in a file then input the filename in the SCYDATA field
    `C:\Capitalware\SX4DTC2\sx4dtc2.ini`

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('/var/mqm/exits/sx4dtc2(SX)') +
       SCYDATA('C=A001;U=roger;P=mypwd') +
       REPLACE
```

3.3.3 Unix and Linux 64-bit

On Unix and Linux (excluding Linux x86), SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT
  `/var/mqm/exits64/sx4dtc2(SX)`
- SCYDATA
  - Explicitly set the credentials in the SCYDATA field
    `c=A001;u=roger;p=mypwd`
  - Or specify the credentials in a file then input the filename in the SCYDATA field
    `C:\Capitalware\SX4DTC2\sx4dtc2.ini`

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('/var/mqm/exits64/sx4dtc2(SX)') +
       SCYDATA('C=A001;U=roger;P=mypwd') +
       REPLACE
```

3.3.4 IBM i

On IBM i, SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT is made up of 10 characters for program name (padded with blanks) followed by 10 characters for the LIBRARY name (padded with blanks).
  `SX4DTC2       SX4DTC2`

- SCYDATA
  - Explicitly set the credentials in the SCYDATA field
    `c=A001;u=roger;p=mypwd`
  - Or specify the credentials in a file then input the filename in the SCYDATA field
    `sx4dtc2.ini`

```
DEFINE CHANNEL ('TEST.CHL') CHLTYPE(SDR) +
       TRPTYPE(TCP) +
       SCYEXIT('SX4DTC2       SX4DTC2      ') +
       SCYDATA('C=A001;U=roger;P=mypwd') +
       REPLACE
```

4 Appendix A – Summary of Client-side IniFile (Optional)

The sample IniFile below is the sx4dtc2.ini file supplied for Windows. The IniFile supports the following keywords and their values:

```
LogMode=N
LogFile=C:\Capitalware\SX4DTC2\sx4dtc2.log
#
Company=A001
UserID=Roger
Password=MyPwd
```

Note: Keywords are case sensitive.

Keyword	Description of client-side keywords
Company	**Company** specifies the company Id to be used for Depository Trust Clearing Corporation verification. e.g. Company=A001
BackupLogFileCount	**BackupLogFileCount** specifies the number of backup logfiles that the security exit will be keeping. The default value is 9. e.g. BackupLogFileCount=9
LogFile	**LogFile** specifies the location of the log file. The default is as follows: For Windows: LogFile=C:\Capitalware\SX4DTC2\sx4dtc2.log For IBM MQ 32-bit on Linux: LogFile=/var/mqm/exits/sx4dtc2.log For IBM MQ 64-bit on Unix and Linux: LogFile=/var/mqm/exits64/sx4dtc2.log For IBM MQ on IBM i: LogFile=/QIBM/UserData/mqm/SX4DTC2/sx4dtc2.log
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 N. e.g. LogMode=N

Keyword	Description of client-side keywords
Password	**Password** specifies the password to be used for Depository Trust Clearing Corporation verification. e.g. Password=abcdef
RotateLogDaily	**RotateLogDaily** specifies whether or not daily log file rotation should take place. RotateLogDaily supports 2 values [Y / N]. The default value is Y. e.g. RotateLogDaily=Y
UserID	UserID specifies the UserID to be used for Depository Trust Clearing Corporation verification. e.g. UserID=fred

5 Appendix B – SX4DTC² Upgrade Procedures

To upgrade an existing installation of SX4DTC² from an older version to a newer version, do please do the following in the appropriate section below.

5.1.1 Windows Upgrade

- Stop all of the channels using the SX4DTC² client-side security exit or completely stop the queue manager.
- Backup all SX4DTC² IniFiles in the SX4DTC2 install directory
- If SX4DTC² was installed using the Windows Installer then
  - Click the **Start** -> **All Programs** -> **Control Panel** -> **Add or Remove Programs**, select SX4DTC² from the list and click the **Remove** button then follow the prompts to remove it
  - Run the **SX4DTC2-setup.exe** file from the **Windows** directory to install the new version
- Otherwise copy the following files (latest version) to the SX4DTC2 install directory:
  - SX4DTC2.dll
  - rotatelog.bat
- Restore the SX4DTC² IniFiles if they were altered / deleted.
- Start all of the channels using the SX4DTC² client-side security exit or restart the queue manager if it was previously stopped.

5.1.2 Linux 32-bit Upgrade

- Login under the mqm account
- Stop all of the channels using the SX4DTC² client-side security exit or completely stop the queue manager.
- Backup all SX4DTC² IniFiles in the SX4DTC2 install directory
- Copy the appropriate tar file to the */var/mqm/exits/* directory
- Un-tar the contents of the tar file.
  i.e. For AIX, do the following command:
  ```
  tar -xvf  sx4dtc2_linux.tar
  ```
- Run the script as follows:
  ```
  ./setsx4dtc2.sh
  ```
- Restore the SX4DTC² IniFiles if they were altered / deleted.
- Delete the SX4DTC2 tar file
- Start all of the channels using the SX4DTC² client-side security exit or restart the queue manager if it was previously stopped.

5.1.3 Unix and Linux 64-bit Upgrade

➤ Stop all of the channels using the SX4DTC^2 client-side security exit or completely stop the queue manager.
➤ Backup all SX4DTC^2 IniFiles in the SX4DTC2 install directory
➤ Copy the appropriate tar file to the ***/var/mqm/exits64/*** directory
➤ Un-tar the contents of the tar file.

> i.e. For AIX, do the following command:

```
tar -xvf  sx4dtc2_aix.tar
```

➤ Run the script as follows:

```
./setsx4dtc2.sh
```

➤ Restore the SX4DTC^2 IniFiles if they were altered / deleted.
➤ Delete the SX4DTC^2 tar file
➤ Start all of the channels using the SX4DTC^2 client-side security exit or restart the queue manager if it was previously stopped.

5.1.4 IBM i Upgrade

➤ Stop all of the channels using the SX4DTC^2 client-side security exit or completely stop the queue manager.
➤ Backup all SX4DTC^2 IniFiles in the SX4DTC2 install directory
➤ ftp the IBM i files to the IBM i server as follows:

```
ftp –s:sx4dtc2_iseries.ftp  iseries_hostname
```

```
your-IBM i-userid
your-IBM i-password

binary
cd QGPL
put sx4dtc2.savf
quote SITE NAMEFMT 1
cd /QIBM/UserData/mqm/
put sx4dtc2_iseries.tar
quit
```

➤ Log onto the target IBM i server and do the following commands:

```
RSTLIB SAVLIB(SX4DTC2) DEV(*SAVF) SAVF(QGPL/SX4DTC2)
CLRSAVF FILE(QGPL/SX4DTC2)
CHGOBJOWN  OBJ(SX4DTC2) OBJTYPE(*LIB)  NEWOWN(QMQM)
qsh
cd /QIBM/UserData/mqm/
tar -xvf sx4dtc2_iseries.tar
chown -R QMQM SX4DTC2
rm sx4dtc2_iseries.tar
```

➤ Restore the SX4DTC^2 IniFiles if they were altered / deleted.
➤ Start all of the channels using the SX4DTC^2 client-side security exit or restart the queue manager if it was previously stopped.

6 Appendix C – Capitalware Product Display Version

SX4DTC[2] includes a program to display the product version number. The command to display the product version number is:

cwdspver

6.1 Examples

6.1.1 Windows

To use the cwdspver program on Windows, open a Command prompt and change the directory to C:\Capitalware\SX4DTC2\ and type the following:

```
cwdspver.exe
```

6.1.2 Linux 32-bit

To use the cwdspver program on Unix/Linux for MQ 32-bit, open a shell prompt and change directory to /var/mqm/exits/ and type the following:

```
./cwdspver
```

6.1.3 Unix and Linux 64-bit

To use the cwdspver program on Unix/Linux for MQ 64-bit, open a shell prompt and change directory to /var/mqm/exits64/ and type the following:

```
./cwdspver
```

6.1.4 IBM i

To use the cwdspver program on IBM i for MQ, issue the following command on the prompt:

```
CALL SX4DTC2/CWDSPVER
```

7 Appendix D – Support

The support for SX4DTC^2 can be found at the following location (requires a support contract):

Online Help Desk Ticketing System at
www.capitalware.com/phpst/

By email at:
support@capitalware.com

By regular mail at:

Capitalware Inc.
Attn: SX4DTC^2 Support
Unit 11, 1673 Richmond Street, PMB524
London, Ontario N6G2N3
Canada

8 Appendix E – Summary of Changes

➢ SX4DTC^2 v1.0.5
  o Enhanced the code for dumping the pointers passed into exit.
  o Fixed an issue in the subroutine that removes trailing blanks
  o Fixed an issue with default exit path

➢ SX4DTC^2 v1.0.4
  o Added code to append trailing slash for ExitPath if it is missing.
  o Tuned the code that is called on entry
  o Tuned the logging code

➢ SX4DTC^2 v1.0.3
  o Fixed an issue in the logging framework where a constant was being modified.

➢ SX4DTC^2 v1.0.2
  o Enhanced logging - the LogFile keyword now supports the following tokens: %QM%, %CHL%, %UID%, %PID% & %TID%

➢ SX4DTC^2 v1.0.1
  o Fixed an issue on Windows with freeing environment variable memory (error with FreeEnvironmentStrings Windows API call)
  o Fixed an issue with using "size_t" variable type when it should have been "int"

➢ SX4DTC^2 v1.0.0
  o Initial release.

9 Appendix F – License Agreement

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

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