Digital Certificate Manager Setup

Pre-configuration

Sample control scripts

Network ID: *FTP_EXTOL:
Portal/Easy Link scripts: RCVSSL – Receive via SSL;
SENDSSLEDI – Send EDI data via SSL;
SENDSSLTXT – Send TXT data via SSL.

Other sample scripts: SEND_SECUR – Send to IFS Folder w/SSL;
SEND_SECU2 – Send to IP Address w/SSL.

Server Requirements

- iSeries with V5R2 or later of OS400.
- V5R2 or later of TCP/IP Connectivity Utilities (5722-TC1).
- Cryptographic Access Provider 128-bit for iSeries (5722-AC3).
- IBM Digital Certificate Manager – DCM (5722-SS1, Option 34).
- IBM HTTP Server (5722-DG1).
- The home server uses Certificates to protect access to public applications.
- All servers use OS400 TCP/IP FTP server/client for FTP sessions.
- EXTOL EDI Integrator V 6.1 or greater (to utilize the BATCHFTPS command).

With security officer authority – review the installed programs on the iSeries server.
At a command line, **`type:go licpgm`**, select option **`#10 – Display installed licensed programs`**, ensure the **`Installed status`** is either **`*COMPATIBLE`** or **`*INSTALLED`** and the option is satisfied. Press **`F11`** to toggle the display.

Prerequisites

- All software requirements for working with SSL on iSeries are installed.
- The **`*ADMIN HTTP`** instance is started on both iSeries servers for the use of Digital Certificate Manager (DCM).
- User profiles performing all configurations have **`*IOSYSCFTG`** special authority.
- A Certificate Authority or *SYSTEM store has not been created on either system.

Technical documents available online at

- Digital Certificate Infrastructure:
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg245659.pdf
- V5 TCP/IP Applications:
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg246321.pdf
- IBM eServer iSeries Wired Network Security
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg246168.pdf
- V4 TCP/IP for AS/400: More Cool Things Than Ever
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg245190.pdf
- For security terminology – see Appendix A.

Firewall Considerations

- Symantec – Passing outbound SSL – secured:

http://service1.symantec.com/SUPPORT/ent-gate.nsf/805bf841a2655e7988256d9700455b6c/971a36a467b670328825708c00531d09?OpenDocument&src=bar_sch_nam&seg=en

Important: Every firewall has unique configuration requirements. It is recommended that the Firewall-specific Support Team is notified with the intended communication plans prior to actively exchanging data using FTP *Secure.

Introduction

1. Problem Overview

Two iSeries servers must communicate via FTP with secure active (SSL).

2. Problem Definition

Two iSeries servers must communicate via FTP with *Secure. The home server is located in New Jersey with the system name SERVER1. The remote server is located in Pennsylvania with a system name SERVER2. In each location there is an iSeries used to run various business applications. Each night the remote server in PA, SERVER2, is required to send reports to the main headquarters in New Jersey, SERVER1. Until now the files were simply transferred files over the Internet using FTP. The customer is now looking for a solution that will move the files with privacy and security intact from SERVER2 to SERVER1, in both directions.

3. Solution

The solution to this problem would be to use the home box, SERVER1, as the FTP Server and the remote box, SERVER2, as the FTP Client. This same solution would apply for multiple remote locations.

In order to use SSL secured FTP sessions, the FTP server must have a certificate associated with it. Also, the FTP client(s) must trust the Certificate Authority (CA) that issued the FTP server's certificate. In this scenario we use a local Certificate Authority to issue the server's certificate. The Certificate Authority is created on the iSeries server in New Jersey, SERVER1.

Important: EXTOL provides this working example for this particular scenario of security requirements. This is a sample solution and as such should be used as a guide. Installation plans should be made prior to starting the security setup. It is up to the installer to adjust security requirements as applicable.

Configuration

4. Configure iSeries Servers to use FTP *Secure

For both SERVER1 & SERVER2 servers:

- Plan the configuration of:
  - Local certificate authority
  - System store and server certificate
- Create the local certificate authority
- Create the *SYSTEM server certificate
- Configure the FTP server to listen for secure connections
- Export the certificate of authority to the IFS

Transport Certificates: Transport certificate(s) as needed

SERVER2: Remote server

- Import the Certificate Authority certificate from SERVER1 into *SYSTEM certificate store

SERVER1: Home Server

- Import the certificate of authority from other server into *SYSTEM certificate store.
- Configure the FTP client to trust the SERVER2 certificate authority.

Test configuration.

SETUP / PLANNING STEPS FOR CERTIFICATE CREATION

4.1.a Certificate Authority Configuration – Plan values for **SERVER1 & SERVER2**

CONFIGURATION	SERVER1 (NJ) PARM VALUE	SERVER2 (PA) PARM VALUE
Key size	1024	1024
Certificate Authority name	EXTOL Inc. SERVER1 CA	EXTOL Inc. SERVER2 CA
Organization unit	New Jersey Headquarters	PA Office
Organization name	Extol Inc.	Extol Inc.
Locality	Franklin Lakes	Pottsville
State	New Jersey	Pennsylvania
Country	US	US
Validity period of Certificate	1095 (default)	1095
Allow creation of user certs	NO	NO
Verify period of certificates issued By the CA (default=365)	365 days	365 days

4.1.b *SYSTEM server configuration: The FTP server needs a server certificate in order to create secure connections with the FTP clients.

CONFIGURATION	SERVER1 (NJ) PARM VALUE	SERVER2 (PA) PARM VALUE
Key size	1024	1024
Certificate label	SERVER1 FTP Server	SERVER2 FTP Server
Common name	SERVER1 FTP Server	SERVER2 FTP Server
Organization unit	New Jersey Headquarters	PA Office
Organization name	Extol Inc.	Extol Inc.
Locality	New Jersey	Pottsville
State	New Jersey	Pennsylvania
Country	US	US

SETUP OF iSeries Digital Certificate Manager certificates:

ALL: Ensure the HTTP server is started:

1. WRKACTJOB SBS(QHTTPSVR)
   You should see several jobs named ADMIN running in this subsystem.
   a. To start the server:
      - STRTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN)
      - ENDTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN)

Verify the jobs start. If this is the first time the ADMIN server is started it may take several minutes before you may access it. Proceed to the next step once you verify that all of the ADMIN jobs (there should be 3) have started and are in **`SIGW`** status.

To setup multiple servers – execute steps **a** through **k** for each system.

- (a) Log on to server with iSeries task menu
- (b) Click on Digital Certificate Manager
- (c) Create a certificate authority
- (d) Install local CA certificate authority
- (e) The certificate authority policy data
- (f) Create a *System certificate store and server certificate.
- (g) Select applications
- (h) Configure the FTP server to listen for secure connections
- (i) Restart FTP server
- (j) Export local CA for exchange
- (k) Transport certificate to partnering server and rename to extension: .cer.

- Do each of the following for each server:
  - (l) Import the local certificate authority to partnering server
  - (m) Configure FTP client to trust the imported certificate

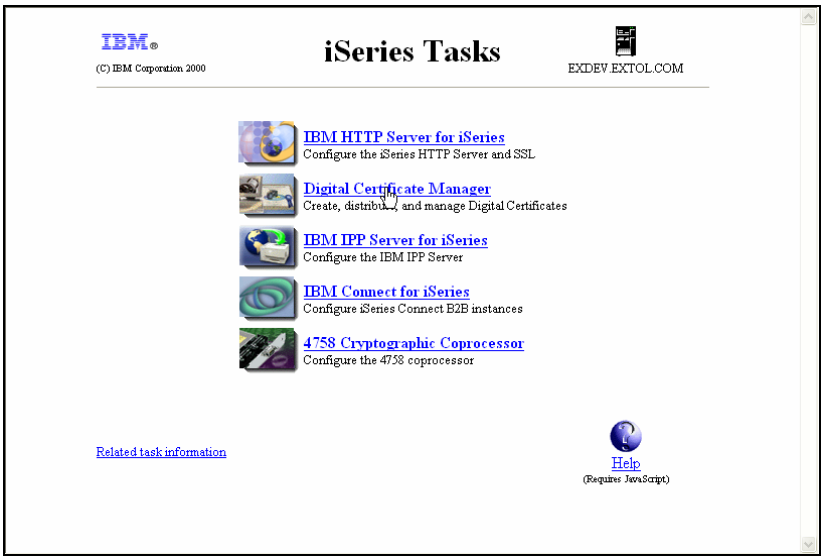
5. SERVER1 home server: Setup DCM tasks

Access the **iSeries Task** page by opening the location http://SERVER1:2001/ or http://SERVER2:2001/

Sign on to server with Security officer authority.

6. Select Digital Certificate Manager

On the **iSeries Task** page, click **Digital Certificate Manager**.



On the DCM page, in the navigation (left) panel, click on **Create a Certificate Authority (CA)**.

Note: Tip: If you do not see the *Create a Certificate Authority* option in the left panel you already have a local Certificate Authority on this system. Reference the Redbook AS/400 Internet Security: Developing a Digital Certificate Infrastructure, SG24-5659-00 for information on deleting the Certificate Authority and store. Section 5.2.3 gives the name and location of all of the files that make up the Certificate Authority and *System certificate store. These files can be deleted allowing you to start from scratch. Prior to deleting the *System store you should verify that the store does not contain certificates that have been purchased or are currently in use. *There is no way to recover files that have not been backed up after performing this operation.*

7. Create a Certificate Authority

Reference values declared in Table 4.1.b, page 7:

- Key Size – default is 1024
- Assign password for local Certificate of Authority.
- Certificate Authority (CA) name
- Organization unit
- Organization name
- Locality or city, State, Country or Region
- Validity period of Certificate Authority
- Click **Continue**.

Note: If the Local CA has already been created – you will see:

"*Install Local CA Certificate on Your PC*" – if so, skip this step.

8. Install a local Certificate Authority certificate

If you want your browser to trust the local Certificate Authority, you must add the local CA certificate to the browser configuration. To add the CA certificate, click **Install certificate** and follow the steps. This is not a required step but may be useful if you ever plan on using this CA certificate to secure browser based applications.

Click **Continue**.

9. Certificate Authority (CA) Policy Data

Allow creation of user certificates? Default is No.

Validity period of certificates that are issued by this Certificate Authority (CA) field specify the number of days the certificates issued by the local CA are valid.

Click **Continue**.

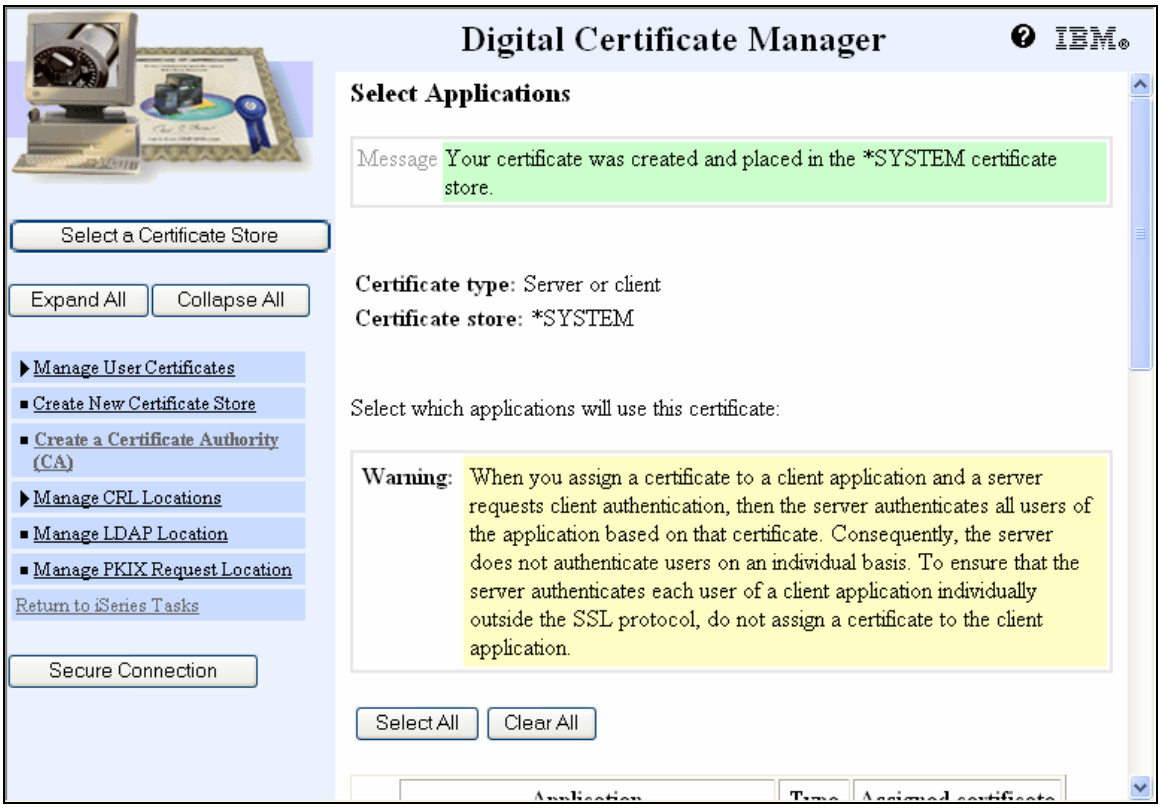
The creation of the Certificate Authority is now complete. Select **Continue**. You can now begin creating the *SYSTEM certificate store and server certificate.

10. Create the *SYSTEM certificate store and server certificate

The *SYSTEM certificate store maintains the server certificate associated with the FTP server. If you have never created certificates on this system the *SYSTEM store will not exist.

- Key Size (default value 1024)
- Certificate Label
- Certificate store password (record for future use)
- Common Name
- Organization, locality, state, and country
- Click **Continue**.

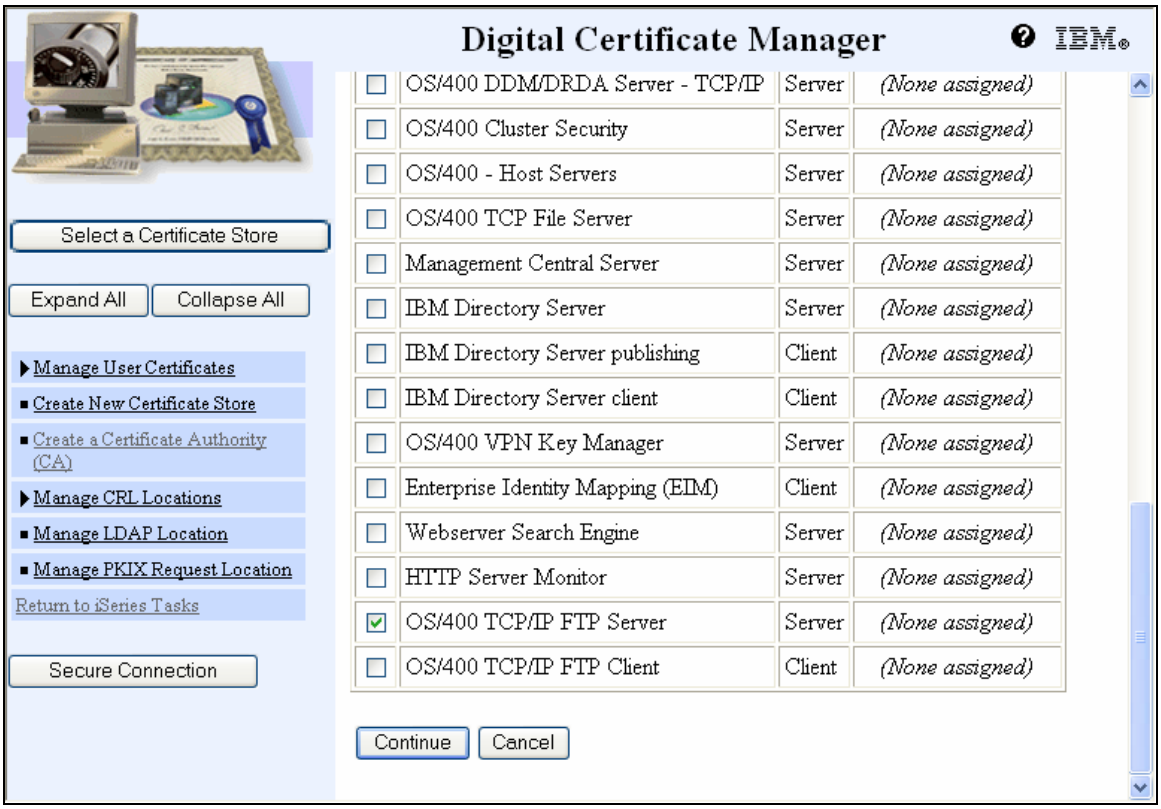
Message	Your certificate was created and placed in the *SYSTEM certificate store.



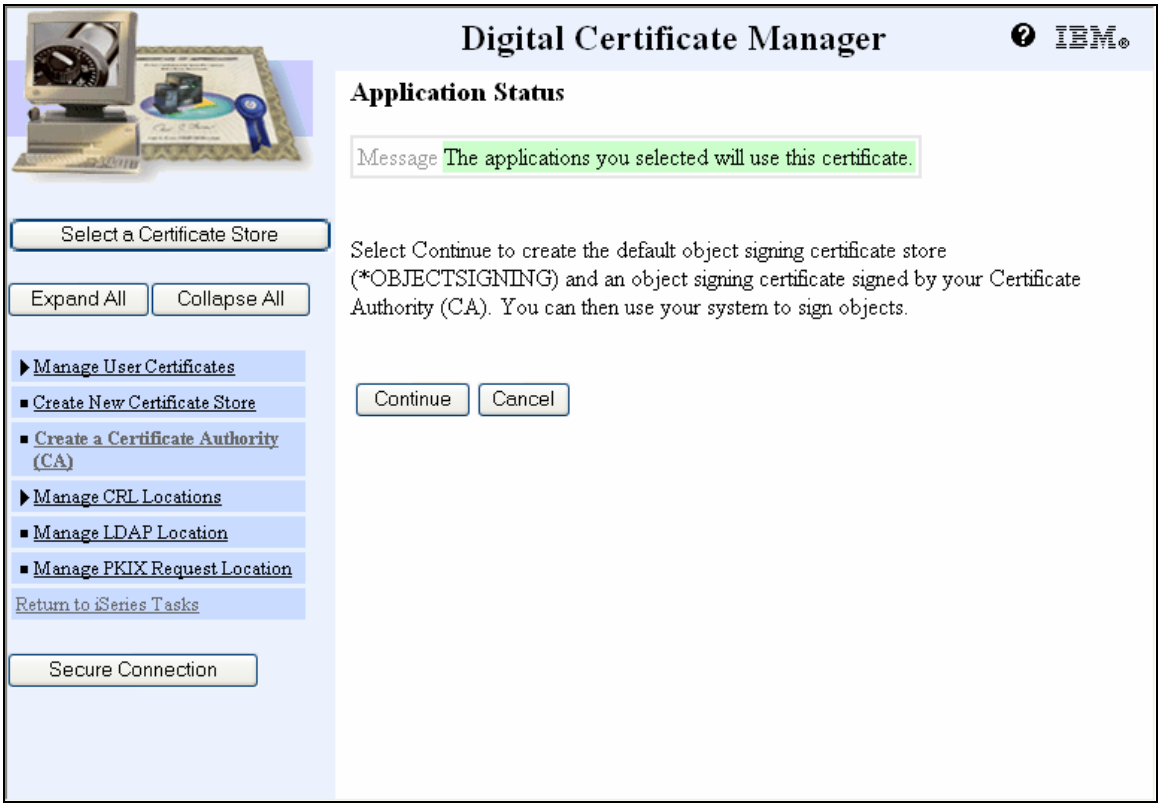
11. Select Applications

Scroll down and *check* **OS/400 TCP/IP FTP Server**.

Click **Continue**.



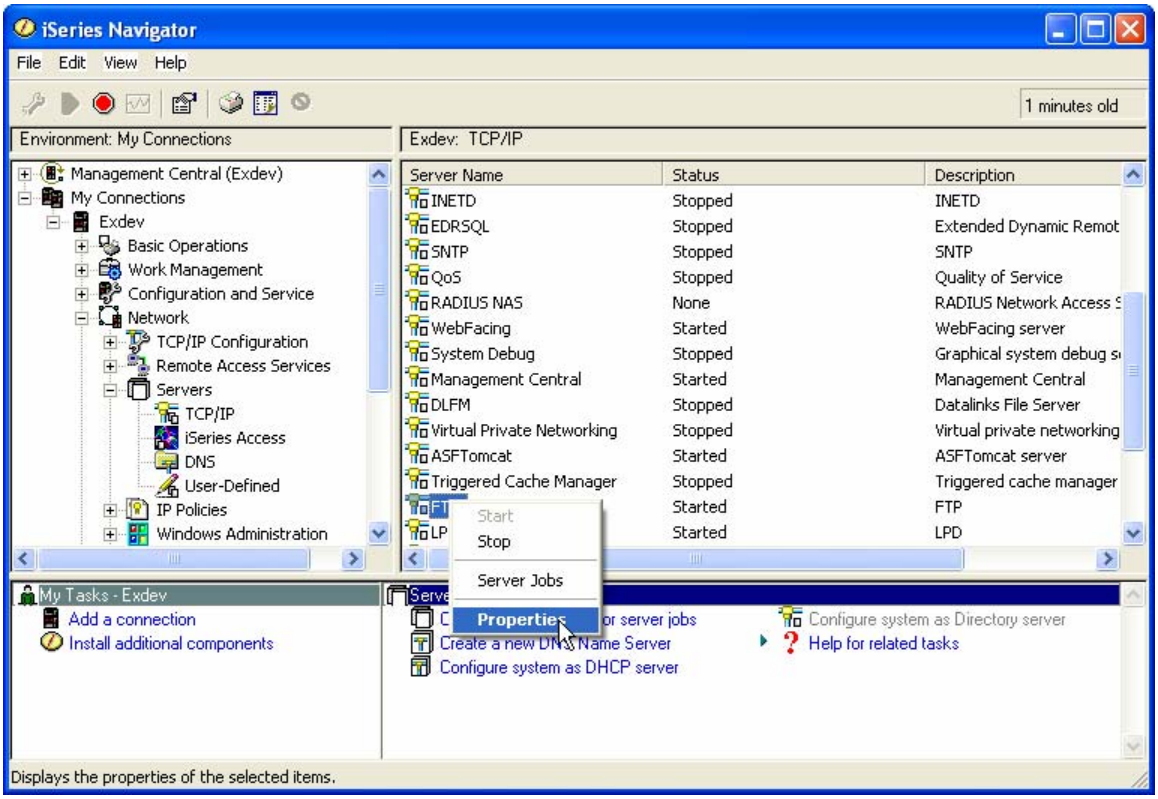
When the application status is successful - click **Cancel**.



12. Configure the FTP Server to listen for secure connections

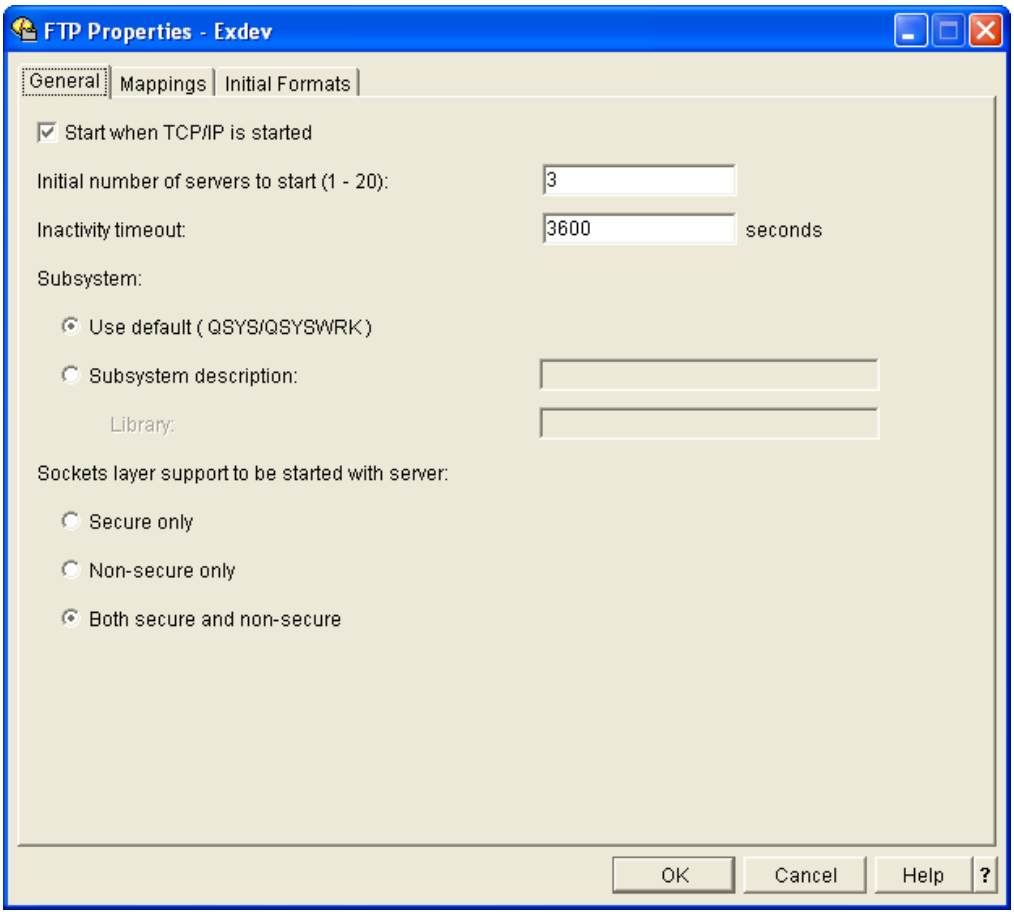
From the iSeries Navigator:

- Expand **iSeries server**
- Expand **Network**
- Expand **Servers**
- Click on **TCP/IP**
- Right click on **FTP** and select **Properties**



For the **General** tab's **Sockets layer support to be started with the server** option, select either **Secure Only** or **Both Secure and Non-secure** (Default).

Click **OK**.



13. Restart the FTP Server

In order for the modifications to take effect, the FTP server should be restarted. Once this done the FTP server will be able to support secure connects with any clients that trust our Certificate Authority. (See Security Procedure Tips – "To start and stop the TCP Server")

This completes the configuration of the FTP server to accept secure connections.

14. Export local Certificate Authority

Export the local certificate authority certificate to IFS (for iSeries partnering machine)

- To establish the trust between servers – the home server exports the local CA certificate to be imported on the remote server. The FTP client on the remote server must trust the local Certificate Authority that signed the FTP server certificate.
    - Click on **Select a Certificate Store** button
    - Select the **Local Certificate Authority (CA)** button, click **Continue**
    - Enter password and click **Continue**
    - Expand the **Manage Local CA** and click on **Export**, click **Continue**

- Select **File** (radio button) and click **Continue**
- Supply the Export file name to the IFS, click **Continue**
- It is suggested that a standard IFS folder is created for all certificates. The example here is /cert.

1. Sample: /cert/i5p1ca.cer
   a. For this example “Cert” is the Folder Name.
2. Confirmation message and click OK
   a. The contents of this message vary based on release.

Export Certificate Successful

Message	The Certificate Authority (CA) certificate was successfully copied to the export file: /Cert/i5p1ca.cer You must now transfer the file to the system that will use this Certificate Authority (CA) certificate.

OK

15. Transport certificates to partnering servers

See **Appendix C** for available options.

16. Import the CA certificate - from the Digital Certificate Manager

- Click on **Select a certificate store** button
    - Select the ***SYSTEM** radio button, click **Continue**
    - Supply the password, click **Continue**
    - Expand **Manage Certificates** and select **Import Certificate**
    - Select the **Certificate Authority (CA)** radio button and click **Continue**
    - Import Certificate – select **Certificate Authority (CA)**, click **Continue**
    - Supply the path and file name of the certificate authority (CA) and click **Continue**
    - /cert/SERVER1CA.cer, press **Enter**
    - Provide the **CA Certificate Label** by:
        i. Provide your desired description or if you prefer to use what the value was on file:
            1. Return to the Certificate Authority View
            2. Highlight and copy the Certificate label: LOCAL_CERTIFICATE_AUTHORITY(1)
            3. Paste copied value into the CA Certificate Label, click **Continue**
        ii. You should receive the following message:

Import Certificate Authority (CA) Certificate

Message	The certificate has been imported. Use the Manage Applications task if you want to specify that applications trust this Certificate Authority (CA).

OK

Click **OK**.

17. Configure FTP client to trust Certificate Authority from partnering server

- After the certificate is imported – expand **Manage Applications**
- Click on **Define CA trust List**.
- Click the **Client** radio button, click **Continue**
- Select the **OS/400 TCP/IP FTP Client** radio button and click **Define CA Trust List**
- A list of certificate authorities is displayed.
    - Select the recently imported CA in the **Trusted** column and click **OK**.
    - Select the Local CA from server and check the **Trusted** column. Click **OK**.
- The list will be redisplayed with the change in place. The following message will be displayed: “Certificate Authority (CA) changes applied”.

Message	Certificate Authority (CA) changes applied.

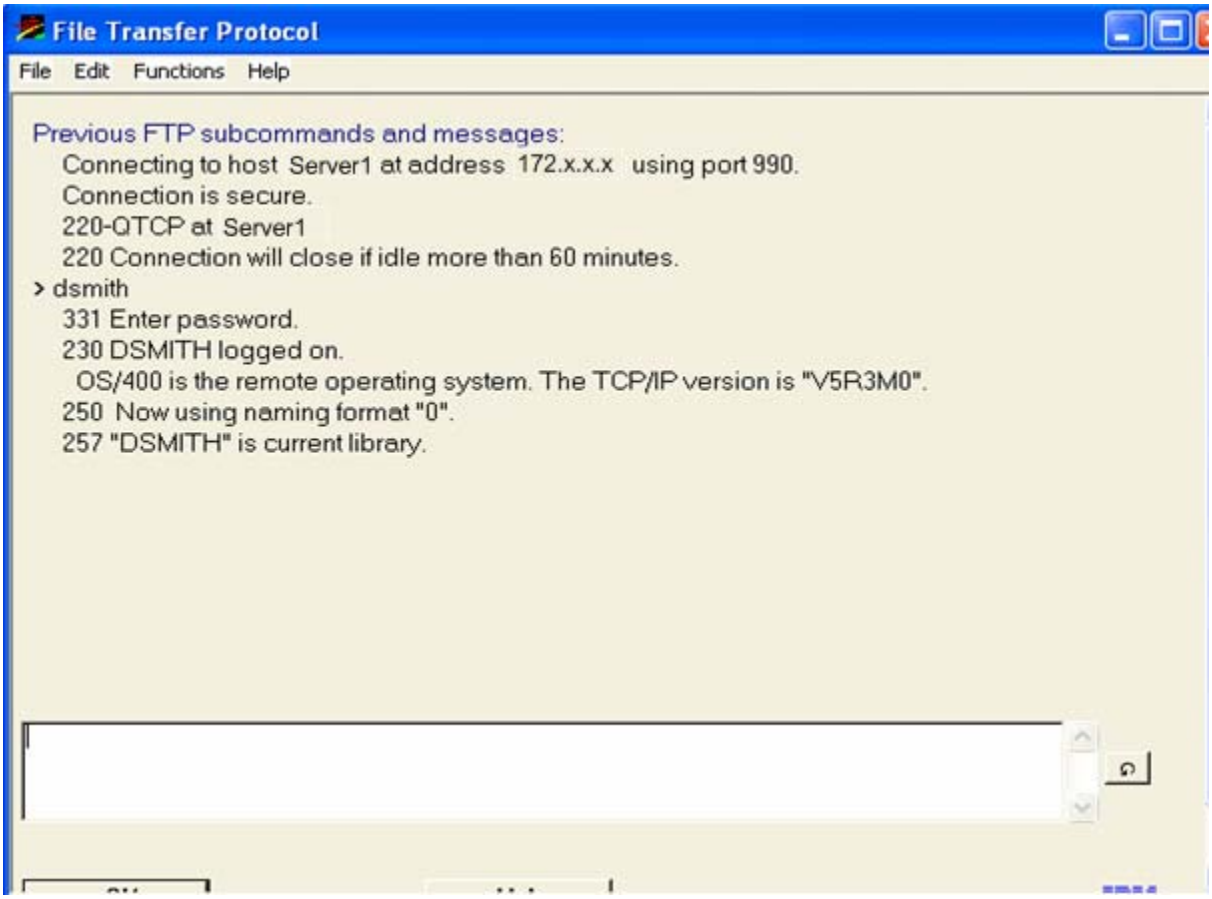
Click **Cancel** to exit.

Test the configuration

18. Start a successful secure FTP session to the remote server

At a command line, type: **`FTP RMTSYS(SERVER1) PORT(*SECURE)`**

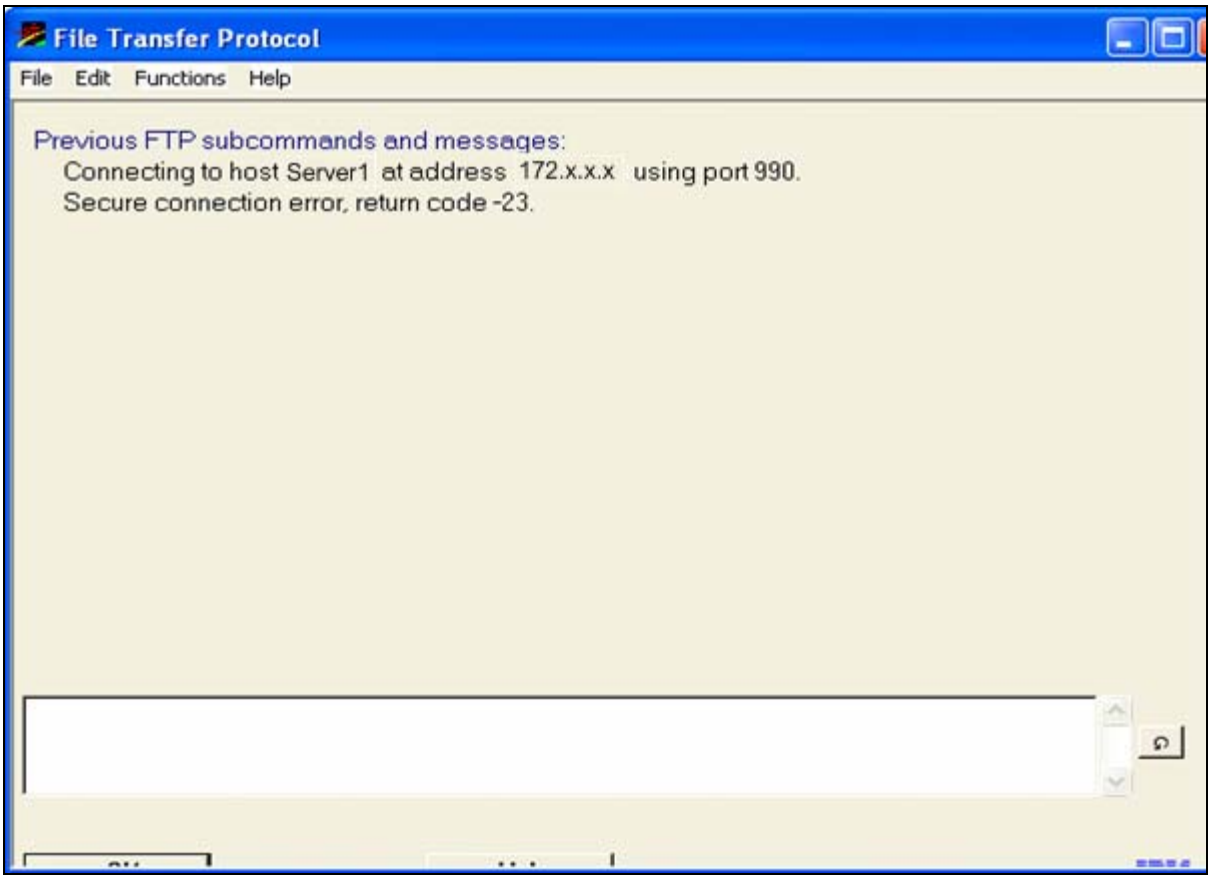
Press **Enter**.



19. Start a secure FTP session to remote server with a certificate disabled

At a command line, type: **`FTP RMTSYS(SERVER1) PORT(*SECURE)`**

Press **Enter**.



To disable a certificate, see step 20.

Change original configuration

20. Limit FTP access to a specific server:

To turn on / off **Trusted** certificates

- Visit ***System** certificate store on home server
- Select **Set CA Trust**
- Define partnering certificate to **Disallow** and confirm
    - This will cause an ftp communication to fail from home server (return code –23) but the partnering server can still connect with *Secure.
- Test configuration.

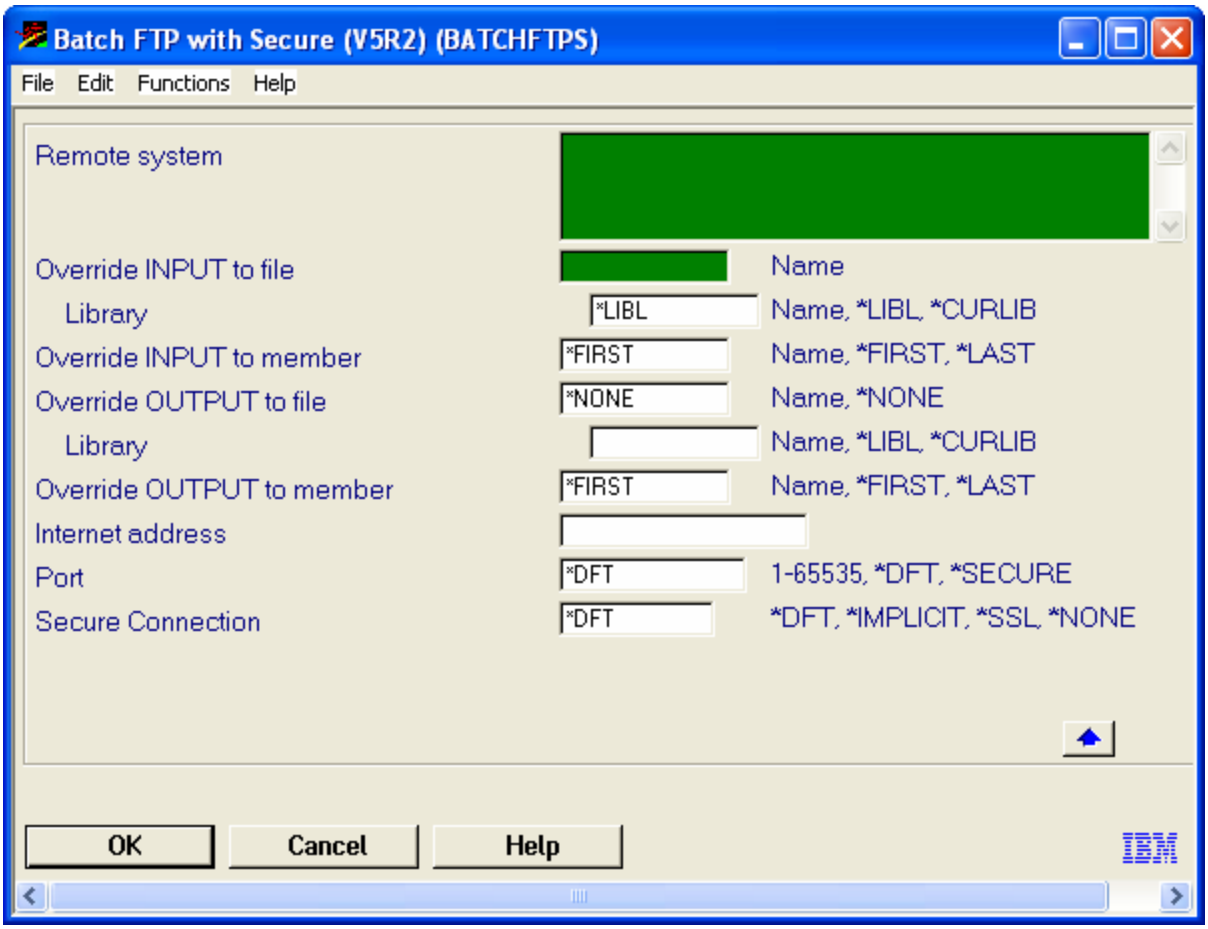
If **Disallowed** partnering local CA – and wish to reactivate it's secure permission:

- Must revisit to **Allow** the Trusted status
- Revisit the FTP server and client to ensure the certificates are trusted.
- This is proven by retesting your scripts to connect properly.

Important: As certificates are changed, disallowed, or imported into the DCM security bank, manual records should be kept offline for emergency recovery purposes.

21. Sample scripts provided

Screen Layout for Batch FTP command with Secure:




```
Sample of Batch FTP with Secure active within control script:

CCMDEXC     CMD(BATCHFTPS RMTSYS(loopback) INPUTFILE(@NL+
              /QTXTSRC) INPUTMBR(I@CL) OUTPUTFILE(@NL/QT+
              XTSRC) OUTPUTMBR(O@CL) PORT(*SECURE) SECCN+
              N(*DFT) DTAPROT(*DFT))
```

Appendix A: Security Procedure Tips

Start and stop the TCP Server

- To ensure all changes are effective – the TCP server may need shutdown and restarted.
  - Check active jobs to ensure TCP server is running:
    - `WRKACTJOB SBS(QHTTPSVR)`
    - There should be a few `ADMIN`, `QTMHHTTP` jobs running.
  - To manually start: `STRTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN)`
  - To manually end: `ENDTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN)`

Other

You can specify another directory such as /your_directory_name to store certificates. Customer applications that are written to use SSL_Init (instead of the newer SSL_Init_App) can make more use of this. System administrators can also make use of this certificate store for certain kinds of backups or testing before moving into their production environment. Some functions, such as exporting certificates from certificate stores created while the system was on a previous release, may also make use of this. Again do not use this if you want to use OS/400 secure applications.

Appendix B: Terms associated with digital certificates

Authentication

Authentication is the function of proving the identity of an entity.

AS/400 DCM

The AS/400 Digital Certificate Manager (DCM) is an application for managing digital certificates. It includes the ability to create and store certificates on the AS/400, to validate certificates, and to associate certificates with user profiles and applications.

Certificate Authority (CA)

A CA is an organization that issues digital certificates. Companies such as VeriSign and Thawte are examples of Internet Certificate Authorities. A digital certificate will be issued from a Certificate Authority when the required information is given to them, a fee is paid, and the information passes their security checks.

Digital Certificates

A digital certificate is a form of personal identification that can be verified electronically. It is used as a form of identification for individual persons and other entities, such as servers. A digital certificate can be compared with a passport. The issuing bureau validates the authenticity of the data in a passport. A certificate authority (CA) issues digital certificates and validates them as well.

Digital certificates can be used for authentication, for convenience, to secure information being transmitted across a not trusted network, and to establish the ownership and integrity of information you receive.

Entity

An entity is a person, organization, or machine that can participate in a communications network.

Secure transmitted data

Digital certificates are used as the basis for Secured Socket Layer (SSL), which is a method of encrypting data sent across TCP/IP networks. SSL can be used by most of the services that run across TCP/IP to ensure others cannot intercept or modify data.

NOTE: To establish a secure SSL connection, only the server needs to possess a certificate.

HTTP servers frequently use SSL, and generally the client browsers do not possess a certificate. However, the CA that signed the HTTP server's certificate must be known to the client browsers.

Appendix C: How to move certificates between servers

To distribute local certificate authority(s) to partnering servers from Windows

- From the home server:
    - Select a certificate store, Local Certificate Authority (CA), enter password
    - Select **Install Local CA Certificate on Your PC**
    - Select **Copy and Paste**
    - Copy the entire certificate – from `BEGIN CERTIFICATE` through `END CERTIFICATE`-----
    - Launch the Notepad application. Paste the Certificate information with the "Courier" font.
    - Save the Notepad document to your Desktop. There are no specific rules on naming conventions but a suggestion would be: SERVER1CA.cer.
    - To distribute: To ship by email – the file may need to be renamed .cert to allow electronic transfer.

If transporting a certificate that was exported to IFS (binary format)

a. Using OS/400 operating system tools:

Note that the following instructions only describe a summary of steps and not the details because basic OS/400 knowledge is presumed. To move this export file from the source to the target system, follow these instructions:

- Create a save file (SAVF).
- Save the export file from the IFS using the SAV command into the SAVF.
- Transfer the SAVF to the target system.
- Restore the export file to the IFS using the RST command.

We recommend the approach described here to transfer the CA certificate using a save file. If you use FTP to transfer the export file directly, this can cause the error Base64 encode error when receiving the CA certificate on the target system. This error occurs when you use the wrong format when FTPing the file.

```
SAV DEV('\QSYS.LIB\EXTSAVF.LIB\DCMCERT.file') OBJ(('/DSMITH/SERVER1CA.cer'))
```

b. Using OS/400 FTP to retrieve exported certificate from IFS:

From iSeries server green screen:

```
FTP SERVER1
UserId (    QDSMITH)
Password (QSPEEDY)
NAMEFMT 1
CD /DSMITH
LCD /DSMITH
GET SERVER1CA.cer
QUIT
```

c. Using WS_FTPLE tool:

- Start up: WS_FTPLE 95
- Connect to local server (SERVER1) in your local folder
- Transfer the SERVER1CA.cer in ASCII mode to your local folder
- Close the connection from the local server (SERVER1)
- Reconnect to the remote server (SERVER2)
- Transfer the exported CA from your local folder to the remote server folder
    - From /local folder
    - To /SERVER2/Your IFS Folder
- Close the connection with the remote server (SERVER2)
- To view your transferred file - use windows explorer
    - Drill down to your local folder on SERVER2
- Right click on the exported certificate (SERVER1CA.cer)
- Select: Open with
- Roll cursor down to WordPad and select
    - The exported file should resemble this following layout:

```
-----BEGIN CERTIFICATE-----
MIICIDCCAYmgAwIBAgIEQ6C0ZjANBgkqhkiG9w0BAQQFADBKMQswCQYDVQQGEwJV
UzETMBEGA1UECBMKTmV3IEplcnNleTETMBEGA1UEChMKRVhUT0wgSW5jLjERMA8G
A1UEAxMIRVhUUk4gQ0EwHhcNMDUxMjE0MDAxMDE0WhcNMDgxMjE0MDAxMDE0WjBK
MQswCQYDVQQGEwJVUzETMBEGA1UECBMKTmV3IEplcnNleTETMBEGA1UEChMKRVhU
T0wgSW5jLjERMA8GA1UEAxMIRVhUUk4gQ0EwgZ8wDQYJKoZIhvcNAQEBBQADgY0A
MIGJAoGBAL8FNFfDIxAgaXduA8qKai8pFNUnvA8Z67Xh3muuBU4aoxbzN3EGbjzH
AAR4IOjZzapbSf9P9oh/ZORbfAu0bnfdIbSQ2O3nT87LBP0o4otixSZ6vWc+9dpc
D5rpvQUCkJg6TH+xWf3LDD5C5L1vGrOoc7+WGmx7Cg23Scdc88BhAgMBAAGjEzAR
MA8GA1UdEwEB/wQFMAMBAf8wDQYJKoZIhvcNAQEEBQADgYEAtDh/h5Nr/w+i239W
OB45Og8ALhsjt1AXI8GCP2JnaEAlTN+qJdVmy/MVwp+pgZTJyO5t+cUwC5G8g7w/
VYuuSQ5RqNnOs71kUMXmLL+PUIK/iesB2LP8jmNenOY7H82heLJphLSrrJj6yfsM
3I+LvzTY+tbFeMcMx+R+nFb4yn8=
-----END CERTIFICATE-----
```

Appendix D: Sample scripts

Network: *FTP_EXTOL, Control Script: RECVSSL

```
CWRTLINE   LINEDATA('account password')

          CWRTLINE   LINEDATA('namefmt 1')

          CWRTLINE   LINEDATA('lcd /folder/inssl')

          CWRTLINE   LINEDATA('bin')

          CWRTLINE   LINEDATA('mget *')

          CWRTLINE   LINEDATA('quit')

          CSETUP     CLOSE(*YES)

          CCMDEXC    CMD(DLTOVR FILE(QTXTSRC))

          CCMDEXC    CMD(BATCHFTPS RMTSYS(SFTP.EASYLINK.COM) INPU+
                       TFILE(@NL/QTXTSRC) INPUTMBR(I@CL) OUTPUTFI+
                       LE(@NL/QTXTSRC) OUTPUTMBR(O@CL)        POR+
                       T(61476) SECCNN(*SSL) DTAPROT(*DFT))

          CCMDEXC    CMD(SCANTXTSRC SCANSTRING(*MSGID) FILE(@NL/Q+
                       TXTSRC) MBR(O@CL) MSGQ(C@CL) MSGF(*LIBL/EX+
                       TSSL) MSGID(MSG0001 MSG0002)          IGN+
                       ORECASE(*YES) ERRCON(*ABSENT))

          CCMDEXC    CMD(PRCDIRSF FROMDIR('/folder/inssl') OPTION(*CMBDLT)+
TOMBR('/QSYS.L-
 IB/@NL.LIB/@NC.FILE/T@CL.MBR')        TAB+
                       EXPN(*NO) MBROPT(*ADD) ENDLINFMT(*FIXED))

          CCMDEXC    CMD(CPYF FROMFILE(@NL/@NC) TOFILE(@NL/@NC) F+
                       ROMMBR(@ND) TOMBR(R@CL) MBROPT(*REPLACE))

          CCMDEXC    CMD(CPYF FROMFILE(@NL/@NC) TOFILE(@NL/@NC) F+
                       ROMMBR(T@CL) TOMBR(R@CL) MBROPT(*ADD))

          CCMDEXC    CMD(CRTCNNIMP FILE(@NL/@NC) MBR(R@CL) FROMCH+
                       AR(1) TOCHAR(@NR) SCRIPT(@CS) CNNLOGNBR(@C+
                      L) UPDATELOG(*PREV) IMPORTSCR(*NONE)   FOR+
                      MAT(*WRAP))

         CCMDEXC    CMD(CPYSRCF FROMFILE(@NL/QTXTSRC) TOFILE(*PR+
                      INT) FROMMBR(I@CL))

         CCMDEXC    CMD(CPYSRCF FROMFILE(@NL/QTXTSRC) TOFILE(*PR+
                      INT) FROMMBR(O@CL))

         CCMDEXC    CMD(RMVM FILE(@NL/QTXTSRC) MBR(I@CL))

         CCMDEXC    CMD(RMVM FILE(@NL/QTXTSRC) MBR(O@CL))

         CCMDEXC    CMD(RMVM FILE(@NL/@NC) MBR(T@CL))

         CCMDEXC    CMD(RMVM FILE(@NL/@NC) MBR(R@CL))

         CEXIT
```

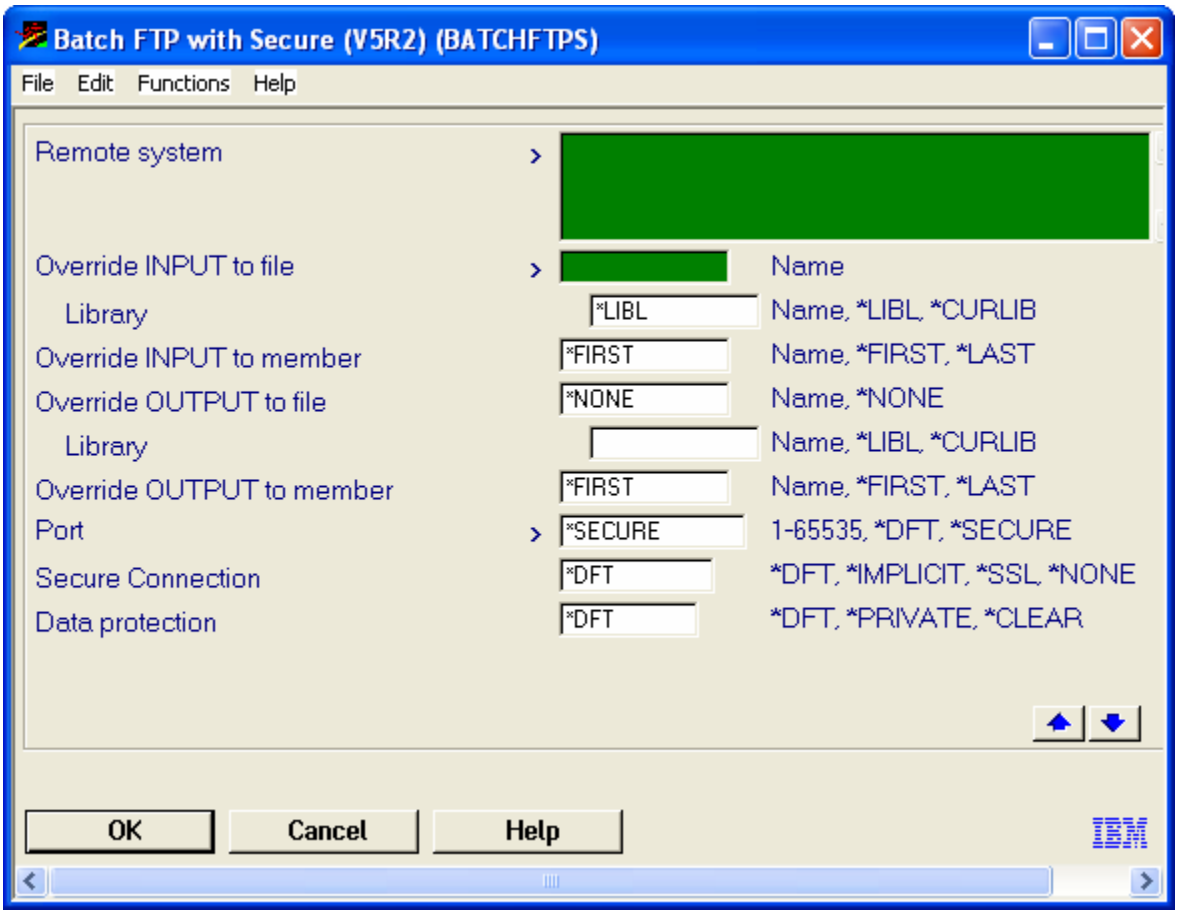
Network: *FTP_EXTOL, Control Script: SEND_SECUR

```
          CCMDEXC    CMD(ADDMBR MBR(I@CL) PFILE(@NL/QTXTSRC) MBRO+
                       PT(*REPLACE) TEXT('@CS/@NP JOB:@JN/@JU/@JB-
'))

          CCMDEXC    CMD(ADDMBR MBR(O@CL) PFILE(@NL/QTXTSRC) MBRO+
                       PT(*REPLACE) TEXT('@CS/@NP JOB:@JN/@JU/@JB-
'))

          CCMDEXC    CMD(OVRDBF FILE(QTXTSRC) TOFILE(@NL/QTXTSRC) +
                       MBR(I@CL))

          CSETUP     OPEN(*YES)

          CWRTLINE   LINEDATA('account password')

          CWRTLINE   LINEDATA('NAMEFMT 1')

          CWRTLINE   LINEDATA('CD /dsmith/edidata')

                       CWRTLINE   LINEDATA('LCD /QSYS.LIB/@NL.LIB')

          CWRTLINE   LINEDATA('PUT @NC.FILE/@ND.MBR  C@CL.Edi')

          CWRTLINE   LINEDATA('DIR')

          CWRTLINE   LINEDATA('QUIT')

          CSETUP     CLOSE(*YES)

          CCMDEXC    CMD(DLTOVR FILE(QTXTSRC))

          CCMDEXC    CMD(BATCHFTPS RMTSYS(loopback) INPUTFILE(@NL+
                       /QTXTSRC) INPUTMBR(I@CL) OUTPUTFILE(@NL/QT+
                       XTSRC) OUTPUTMBR(O@CL) PORT(*SECURE) SECCN+
                       N(*DFT) DTAPROT(*DFT))

          CEXIT
```

Network: *FTP_EXTOL, Control Script: SEND_SECU2

```
          CCMDEXC    CMD(ADDMBR MBR(I@CL) PFILE(@NL/QTXTSRC) MBRO+
                       PT(*REPLACE) TEXT('@CS/@NP JOB:@JN/@JU/@JB-
'))

          CCMDEXC    CMD(ADDMBR MBR(O@CL) PFILE(@NL/QTXTSRC) MBRO+
                       PT(*REPLACE) TEXT('@CS/@NP JOB:@JN/@JU/@JB-
'))

          CCMDEXC    CMD(OVRDBF FILE(QTXTSRC) TOFILE(@NL/QTXTSRC) +
                       MBR(I@CL))

          CSETUP     OPEN(*YES)

          CWRTLINE   LINEDATA('account password')

          CWRTLINE   LINEDATA('close')

          CWRTLINE   LINEDATA('SOpen '172.x.x.x'')

          CWRTLINE   LINEDATA('user name password')

          CWRTLINE   LINEDATA('NAMEFMT 1')

          CWRTLINE   LINEDATA('CD /dsmith')

          CWRTLINE   LINEDATA('LCD /QSYS.LIB/@NL.LIB')

          CWRTLINE   LINEDATA('PUT @NC.FILE/@ND.MBR')

          CWRTLINE   LINEDATA('DIR')

          CWRTLINE   LINEDATA('QUIT')

          CSETUP     CLOSE(*YES)

          CCMDEXC    CMD(DLTOVR FILE(QTXTSRC))

          CNOOP            TEXTSTRING('ECCNN(*DFT) DTAPROT(*DFT) +
                       ')

          CCMDEXC    CMD(BATCHFTP RMTSYS(loopback) INPUTFILE(@NL/+
                       QTXTSRC) INPUTMBR(I@CL) OUTPUTFILE(@NL/QTX+
                       TSRC) OUTPUTMBR(O@CL))

        CEXIT
```

Appendix E: Batch FTP *Secure command parameters



The parameters in ***red*** are associated with the ***Secure** option.

Port

Specifies the port number used for connecting to the FTP server. If a specific port is required then supply it here. If using *DFT – it will use port 21.
If *SECURE is used – The value 00990 is used. Port 990 is reserved for secure FTP servers, which use TLS or Transport Layer Security or SSL (Secure Sockets Layer SSL).
If a Port_Value is supplied – this will be used.

Secure Connection

Specifies the type of security mechanism to be used for protecting information transferred on the FTP control connection (which includes the password used to authenticate the session with the FTP server). Transport Layer Security (TLS) and Secure Sockets Layer (SSL) are compatible protocols that use encryption to protect data from being viewed during transmission and verify that data loss or corruption does not occur.

*DFT: If the PORT parameter specifies *SECURE or 990, *IMPLICIT is used; otherwise, *NONE is used.

*IMPLICIT: The FTP client immediately attempts to use TLS/SSL when connecting to the specified FTP server (without sending an AUTH subcommand to the server). If the server does not support implicit TLS/SSL on the specified port, or the TLS/SSL negotiation fails for any reason, the connection is closed.

*SSL: After connecting to the specified FTP server, the FTP client sends an AUTH (authorization) subcommand requesting a TLS/SSL protected session. If the server supports TLS/SSL, a TLS/SSL negotiation performed. If the server does not support TLS/SSL or the TLS/SSL negotiation fails, the connection is closed.

Data Protection

Specifies the type of data protection to be used for information transferred on the FTP data connection. This connection is used to transfer file data and directory listings. The FTP protocol does not allow protection of the data connection if the control connection is not protected. Note: The DTAPROT parameter controls the use of the PROT (protection) FTP server subcommand. The FTP client subcommand SECDATA can be used to change protection for specific FTP data connections during an FTP client session.

*DFT: If the SECCNN parameter specifies a protected control connection, *PRIVATE is used; otherwise, *CLEAR is used.

*PRIVATE: Information sent on the FTP data connection is encrypted. Note: If the SECCNN parameter specifies that the FTP control connection is not encrypted, *PRIVATE cannot be specified.

*CLEAR: Information sent on the FTP data connection is not encrypted.

Appendix F: Restart the security definition process

Important: If you must restart your security definition, this process will totally remove existing security without recourse.

- The DCM files can be deleted to restart the definition process.
- The Certificate Authority, server and user certificates, and related information are stored in different directories on the AS/400 system. DCM provides a default store location.

Certificate Authority store location

DCM uses a fixed store location for the local CA. You cannot change the location. After you create a local CA you will see the following files in a specific directory. These directories must be protected from unauthorized access. The directory and files for the CA objects are:

```
/QIBM/UserData/ICSS/Cert/CertAuth
Directory
  CA.TXT          CA certificate and public key
  DEFAULT.KDB     CA certificate and CA private key
  DEFAULT.POL     CA policy file
  DEFAULT.STH     Stashed password for accessing the local CA KDB.

/QIBM/UserData/ICSS/Cert/Download/CertAuth
Directory containing the CA certificate available for distribution to clients
  CA.CACRT        CA certificate in binary format
```

System certificate store location

You can select two types of locations to store a certificate. OS/400 server applications, such as HTTP and Telnet, can only use certificates stored in the ***SYSTEM** certificate store. Another selection is **OTHER**, which enables you to store certificates in any directory on the AS/400 Integrated File System (IFS).

The directory and file structure is as follows:

```
*SYSTEM (default store location)

/QIBM/UserData/ICSS/Cert/Server
      Directory
DEFAULT.KDB       System certificate(s), private key(s) and CA certificates
DEFAULT.RDB       Certificate request
DEFAULT.STH       Stashed password for automatic access to a KDB file by the
                  server
```