Connect:Direct® Secure+ Option for z/OS

Implementation Guide

Version 4.8

sterling commerce

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Version 4.8
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Contents

Chapter 1

About Connect:Direct Secure+ Option

Connect:Direct Secure+ Option provides enhanced security for Connect:Direct. It uses cryptography to secure data transmission. You select the security protocol to use with the Secure+ Option product. Connect:Direct Secure+ Option for z/OS supports IBM System Modification Program Extended (SMP/E) and non-SMP/E installations. For optimum performance, use an SMP/E installation.

Security Concepts

Cryptography is the science of keeping messages private. A cryptographic system uses encryption keys between two trusted communication partners. These keys encrypt and decrypt information so that the information is known only to those who have the keys.

There are two kinds of cryptographic systems: *symmetric-key* and *asymmetric-key*. Symmetric-key (or secret-key) systems use the same secret key to encrypt and decrypt a message. Asymmetric-key (or public-key) systems use one key (public) to encrypt a message and a different key (private) to decrypt it. Symmetric-key systems are simpler and faster, but two parties must somehow exchange the key in a secure way because if the secret key is discovered by outside parties, security is compromised. Asymmetric-key systems, commonly known as public-key systems, avoid this problem because the public key may be freely distributed, but the private key is never transmitted.

Cryptography provides information security as follows:

- **Authentication** verifies that the entity on the other end of a communications link is the intended recipient of a transmission.
- **Non-repudiation** provides undeniable proof of origin of transmitted data.
- **Data integrity** ensures that information is not altered during transmission.
- **Data confidentiality** ensures that data remains private during transmission.

Connect:Direct Secure+ Option enables you to implement multiple layers of security. You can select three security protocols to use to secure data during electronic transmission: Transport Layer Security (TLS), Secure Sockets Layer protocol (SSL), or Station-to-Station protocol (STS). Depending on the security needs of your environment, you can also validate certificates using the Sterling External Authentication Server application.

Security Protocols

Before you configure Connect:Direct Secure+ Option, you must determine the protocol that you and your trading partners will use to secure communications sessions. For planning information, see Chapter 2, *Plan Your Implementation of the SSL or TLS Protocol*, and Chapter 3, *Plan Your Implementation of the STS Protocol*.

Transport Layer Security Protocol and Secure Sockets Layer Protocol

The Transport Layer Security protocol (TLS) and the Secure Sockets Layer (SSL) protocol use certificates to exchange a session key between the node that initiates the data transfer process (the primary node, or PNODE) and the other node that is part of the communications session (the secondary node, or the SNODE). A certificate is an electronic document that associates a public key with an individual or other entity. It enables you to verify the claim that a given public key belongs to a given entity. Certificates can be self-issued or issued by a certificate authority (see *Self-Signed and CA-Signed Certificates* on page 21 for details). When a CA receives an application for a certificate, the CA validates the applicant's identity, creates a certificate, and then signs the certificate. A certificate authority (CA) issues and revokes CA-issued certificates. Self-signed certificates are created and issued by the owner of the certificate, who must export the certificate in order to create a trusted root for the certificate and supply the trusted root of the self-signed certificate to the partner in a connection.

The Sterling External Authentication Server application enables you to validate certificates that are passed during an SSL or TLS session. Using the Sterling External Authentication Server application, you can configure certificate chain validation, including the option to validate certificates against one or more Certificate Revocation Lists (CRLs) that are stored on an LDAP server. You can also configure the Sterling External Authentication Server application to return attributes associated with the incoming certificate, such as group information, that are stored on an LDAP server. See *Sterling External Authentication Server Implementation Guide* for installation information.

To use the Sterling External Authentication Server application, you configure your application to connect to the host name and port where the Sterling External Authentication Server application resides and specify a certificate validation definition. See the instructions for creating the parameters file manually or using the network map for the TLS or SSL protocols for instructions to create the remote node record for the Sterling External Authentication Server application (.EASERVER).

Station-to-Station Protocol

The Station-to-Station (STS) protocol is a three-pass variation of the basic Diffie-Hellman protocol. It enables you to establish a shared secret key between two nodes with mutual entity authentication. Nodes are authenticated using digital signatures that sign and verify messages. When you use the STS protocol, you are responsible for generating and managing authentication and signature public keys and exchanging these keys with your trading partners.

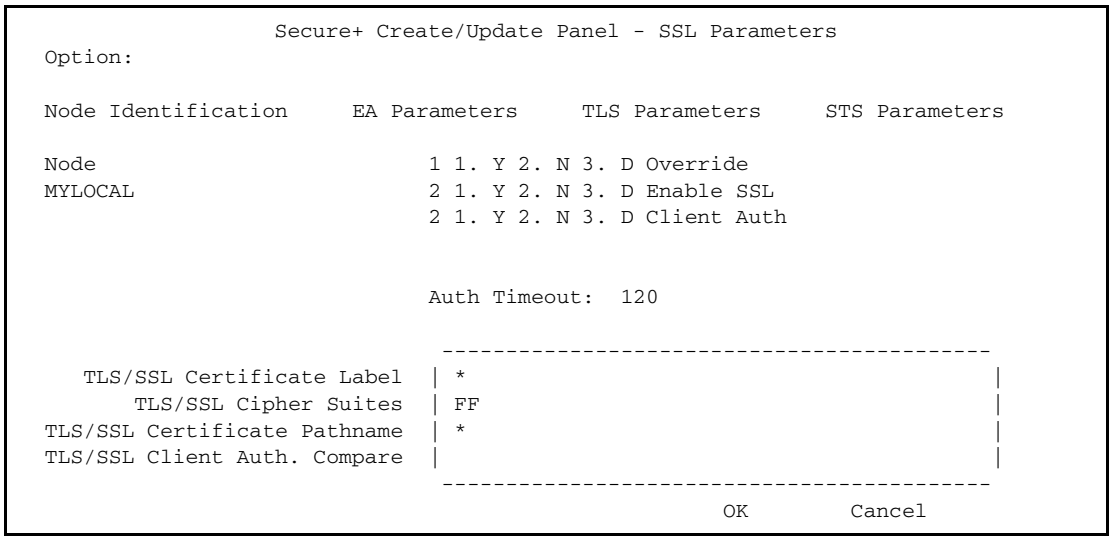
Secure+ Option Tools

Connect:Direct Secure+ Option consists of three components: the Administration Tool (Admin Tool), the parameters file, and the access file. The following sections describe these components and their purpose within Connect:Direct Secure+ Option.

Administration Tool

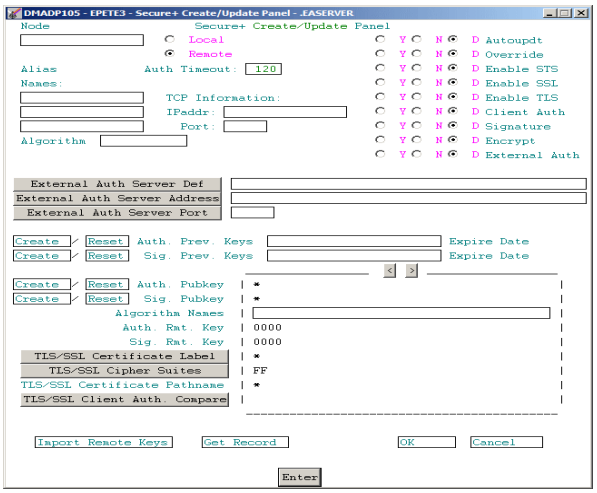
The Secure+ Option Admin Tool enables you to configure and maintain the Secure+ Option environment. The Admin Tool is the only interface for creating and maintaining the Secure+ Option parameters file. Other operating system utilities and editing tools do not work.

Two interface modes are available for the Admin Tool: native ISPF or graphical user interface (GUI). Both of these modes are driven by ISPF, so the screen content and functionality are identical, but the elements of the interfaces are different. The following sample illustrates the native ISPF interface display of the protocol-specific SSL panel. If you use the native ISPF interface, you can change the ISPF settings (Option 0) for the action bar choices and point-and-shoot fields. Changing these settings to fit your personal preferences can enhance operation and navigation in the Secure+ Option Admin Tool.



The GUI interface mode display uses command buttons, option buttons, and text boxes. To use the GUI mode, you must download an IBM workstation agent and change your ISPF settings (Option 0) to set up and use the workstation agent. See the IBM z/OS reference manuals for more information about downloading and using an IBM workstation agent. The following GUI interface sample illustates the view when you customize Secure+ Option to display all parameters in a single panel.

Sample Customized GUI Interface



See Appendix E, *Customize Secure+ Option Panels*, for instructions on customizing the Secure+ Option panels.

Parameters File

The Secure+ Option parameters file contains information that determines the protocol and encryption method used during security-enabled Connect:Direct operations. To configure Secure+ Option, each site must have a parameters file that contains one local node record and a remote node record for each trading partner who uses Secure+ Option to perform a secure connection. The local node record defines the most commonly used security and protocol settings at the site and can be used as a default for one or more remote node records. Each remote node record defines the specific security and protocol used by a trading partner.

For additional security, the parameters file is stored in an encrypted format. The information used for encrypting and decrypting the parameters file (and private keys) is stored in the Secure+ Option access file.

Access File

The Secure+ Option access file is generated automatically when you create the Secure+ Option parameters file for the first time. You type a passphrase when you first initialize Secure+ Option. This passphrase is used to generate the keys necessary to encrypt and decrypt the entries with the Secure+ Option parameters file. The passphrase itself is not retained.

Your Secure+ Option administrator must secure the access file. This requires full create and update capability. The Connect:Direct server must have read authority. To maintain a secure access file, the general user community should not have access permission.

This file can be secured with any available file access restriction tools. Availability of the access file to unauthorized personnel can compromise the security of data exchange.

Before You Begin

Before you configure Connect:Direct Secure+ Option on the z/OS operating system, ensure that you complete the following tasks.

Identify Expert Security Administrator

The instructions and information provided to assist you in implementing the SSL/TLS protocol assume that you have an expert z/OS security administrator who is familiar with the terms associated with digital certificates and has experience using the tools required to generate and manage certificates, including:

- UNIX System Services
- IBM ICSF application and Crypto Hardware device
- System security applications, for example, gskkyman, RACF, CA-Top Secret, or CA-ACF2
- Security terminology associated with digital certificates (see *Terminology and Security Applications for SSL and TLS Certificates* on page 23)
- Working knowledge of the Connect:Direct application and its environment

Allocate Connect:Direct ISPF Libraries in TSO

To ensure that you can perform Secure+ parameters file functions and generate the SAVE AS JCL for the Secure+ Option parameters file, you must allocate the following Connect:Direct ISPF libraries in your TSO session before you try to perform Secure+ parameters file functions and generate and submit the Save As JCL as described in Chapter 12, *Enable and Validate Secure+ Operation* or the Save Active JCL as described in Chapter 14, *Maintain Secure+ Option*:

- ISPCLIB (must be allocated as SYSPROC)
- ISPLLIB
- ISPPLIB
- ISPSLIB
- ISPMLIB

If these required libraries have not been allocated, or have been allocated incorrectly, when you perform the save and submit procedure, the JCL for the SAVE AS job is not generated, and you have to repeat the configuration tasks. For more information on the required libraries and how to allocate them, see the *Connect:Direct for z/OS Installation Guide*.

Assess Security Requirements of Trading Partners

Security planning is a collaborative effort between you and your trading partners. You must know the expectations of your trading partners and plan your security implementation to meet these requirements. Consider the following guidelines for configuring communications sessions using the SSL or TLS protocol:

- ✦ You must acquire the certificates before you configure Secure+ Option.
- ✦ Determine whether you and your trading partner will use self-signed certificates or certificates signed by a Certificate Authority.
- ✦ Determine whether to use client authentication.
- ✦ Using the Sterling External Authentication Server application in conjunction with Secure+ Option to validate the other node's certificate for a secure session requires the following:
  - ◆ Using the TLS or SSL protocol for connections to the EA server
  - ◆ Enabling client authentication in remote node records so that the SNODE can validate the PNODE certificate
  - ◆ Exchanging certificates between the Connect:Direct for z/OS and the Sterling External Authentication Server node

Plan Your Implementation of Connect:Direct Secure+ Option

After you have identified your security administrator and determined the security requirements of your trading partners, review Chapter 2, *Plan Your Implementation of the SSL or TLS Protocol*, or Chapter 3, *Plan Your Implementation of the STS Protocol*, for protocol-specific configuration information.

Complete the Worksheets

Before you configure Connect:Direct Secure+ Option for z/OS, complete the worksheets in Appendix B, *Configuration Worksheets*. Use this information to configure the local and remote nodes to use Connect:Direct Secure+ Option for z/OS.

Connect:Direct Secure+ Option Documentation

See the *Connect:Direct for z/OS Release Notes* for a complete list of the product documentation.

About This Guide

The *Connect:Direct Secure+ Option for z/OS Implementation Guide* describes how to implement peer-to-peer security into Connect:Direct operations with Secure+ Option. This document includes information to plan, configure, and use Secure+ Option. The *Connect:Direct Secure+ Option for z/OS Implementation Guide* is for programmers and network operations staff who install and maintain Secure+ Option.

This guide assumes knowledge of the following:

- ✦ Connect:Direct system, including its applications, network, and environment
- ✦ Security policies and applications used in your environment

Task Overview

The following table guides you to the information required to perform Secure+ Option tasks.

Task	Reference
Understanding Secure+ Option and assessing your security requirements	Chapter 1, *About Connect:Direct Secure+ Option*
Planning to use the TLS or SSL protocol	Chapter 2, *Plan Your Implementation of the SSL or TLS Protocol* Appendix A, *Definitions of Certificate Parameters*
Planning to use the STS protocol	Chapter 3, *Plan Your Implementation of the STS Protocol*
Navigating the Secure+ Admin Tool and populating the parameters file	Chapter 4, *Using the Secure+ Admin Tool and Populating the Parameters File* Appendix D, *Configure for a Secure Connection between z/OS and OpenVMS Nodes*
Setting up local and remote node records for the SSL protocol	Chapter 5, *Create the Parameters File Manually for the SSL Protocol* Chapter 9, *Configure the Local Node Record Imported from the Network Map* Chapter 10, *Configure Remote Node Records Imported from the Network Map* Appendix B, *Configuration Worksheets*
Setting up local and remote node records for the TLS protocol	Chapter 6, *Create the Parameters File Manually for the TLS Protocol* Chapter 9, *Configure the Local Node Record Imported from the Network Map* Chapter 10, *Configure Remote Node Records Imported from the Network Map* Appendix B, *Configuration Worksheets* Appendix D, *Configure for a Secure Connection between z/OS and OpenVMS Nodes*
Configuring special-purpose remote node records to perform one of the following functions: ◆ Validate certificates using the Sterling Authentication Server application ◆ Block nonsecure TCP API connections	Chapter 7, *Additional Configuration Options for SSL and TLS*

Task	Reference
Setting up and testing local and remote node records for the STS protocol	Chapter 8, *Create the Parameters File Manually for the STS Protocol* Chapter 9, *Configure the Local Node Record Imported from the Network Map* Chapter 10, *Configure Remote Node Records Imported from the Network Map* Appendix B, *Configuration Worksheets* Appendix C, *Test Secure+ Option with the STS Protocol*
Managing STS keys	Chapter 11, *Manage Keys for the STS Protocol*
Saving the parameters file and preparing Connect:Direct for operation	Chapter 12, *Enable and Validate Secure+ Operation*
Validating and testing connections by session	Chapter 12, *Enable and Validate Secure+ Operation*
Performing exception processing by overriding Secure+ Option settings in the PROCESS statement	Chapter 13, *Override Settings in Connect:Direct Processes*
Maintaining Secure+ Option	Chapter 14, *Maintain Secure+ Option*
Viewing Secure+ Option statistics	Chapter 15, *Secure+ Option Statistics*
Understanding error messages and resolving errors	Chapter 16, *Troubleshooting*
Customizing Secure+ panels	Appendix E, *Customize Secure+ Option Panels*

Chapter 2

Plan Your Implementation of the SSL or TLS Protocol

Before you configure Connect:Direct Secure+ Option, review the following concepts, requirements, terms, and tool descriptions to ensure that you have all the resources and information necessary to implement the Transport Layer Security (TLS) protocol or the Secure Sockets Layer (SSL) protocol.

Transport Layer Security Protocol and Secure Sockets Layer Protocol

The TLS and the SSL protocols use certificates to exchange a session key between the node that initiates the data transfer process (the primary node, or PNODE) and the other node that is part of the communications session (the secondary node, or the SNODE). A certificate is an electronic document that associates a public key with an individual or other entity. It enables you to verify the claim that a given public key belongs to a given entity. Certificates can be self-issued or issued by a certificate authority (see *Self-Signed and CA-Signed Certificates* on page 21 for details). When a certificate authority (CA) receives an application for a certificate, the CA validates the applicant's identity, creates a certificate, and then signs the certificate. You use the CA signature to authenticate CA-issued trading partner certificates. A certificate authority issues and revokes CA-issued certificates. Self-signed certificates are created and issued by the owner of the certificate, who must export the certificate in order to create a trusted root for the certificate and supply the trusted root of the self-signed certificate to the partner in a connection.

The TLS and SSL protocols provide three levels of security:

- During the first level of authentication called server authentication, the site initiating the session (PNODE) requests a certificate from its trading partner (SNODE), during the initial handshake. The SNODE returns its ID certificate (read from its key certificate file) and the PNODE authenticates it using one or more trusted root certificates stored in a trusted root certificate file (the name and location of which are specified in the remote node record for that specific trading partner in the PNODE's Secure+ Option parameters file). Root certificates are signed by a trusted source—either a public certificate authority, such as Thawte, or by the trading partner acting as its own CA. If the ID certificate from the SNODE cannot be validated using any root certificate found in the trusted certificate file, or if the root certificate has

expired, the PNODE terminates the session. Connect:Direct writes entries to the statistics logs of both nodes, and the session is aborted.

- The second level of authentication is optional and is called client authentication. If this option is enabled in the SNODE's Secure+ Option parameters file definition for the PNODE, the SNODE will request a certificate from the PNODE, and authenticate it using the information in its trusted root certificate file. If this authentication fails, the SNODE terminates the session and Connect:Direct writes information about the failure to the statistics logs of both nodes.

  In order to perform this security check, the trading partner must have a key certificate file available at its site and the Connect:Direct server must have a trusted root file that validates the identity of either the Certificate Authority (CA) who issued the key certificate or the entity that created the certificate, if it is self-signed.

- The third authentication level is also optional and consists of validating the PNODE's certificate common name. When the security administrator enables client authentication, they can also specify the common name (CN) contained in the PNODE's ID certificate. During client authentication, the SNODE compares the common name it has specified for the PNODE in its Secure+ Option Parameters file with the common name contained in the certificate sent by the PNODE. If the compare fails, that is, the information is not identical, the SNODE terminates the session, and Connect:Direct writes information about the failure to the statistics logs of both nodes.

The SSL and TLS protocols provide data security in the following areas:

- Authentication—Certificates used in the SSL or TLS session are digitally signed by a CA through an established procedure to validate an applicant's identity or digitally signed by the certificate owner-issuer. The SSL or TLS protocol validates the digital signature of the certificate being used.
- Proof of data origin and data integrity validation—The certificate provides proof of origin of electronic transmission and encryption validates data integrity. Message digest (hashing) and encrypting the message digest ensure that the data is not altered.
- Data confidentiality—Cipher suites encrypt data and ensure that the data remains confidential. The sending node converts sensitive information to an unreadable format (encryption) before it is sent to the receiving node. The receiving node then converts the information back into a readable format (decryption).

Both the SSL protocol and the TLS protocol manage secure communication in a similar way. However, TLS provides a more secure method for managing authentication and exchanging messages, using the following features:

- While SSL provides keyed message authentication, TLS uses the more secure Key-Hashing for Message Authentication Code (HMAC) to ensure that a record cannot be altered during transmission over an open network such as the Internet.
- TLS defines the Enhanced Pseudorandom Function (PRF), which uses two hash algorithms to generate key data with the HMAC. Two algorithms increase security by preventing the data from being changed if only one algorithm is compromised. The data remains secure as long as the second algorithm is not compromised.
- While SSL and TLS both provide a message to each node to authenticate that the exchanged messages were not altered, TLS uses PRF and HMAC values in the message to provide a more secure authentication method.
- To provide more consistency, the TLS protocol specifies the type of certificate that must be exchanged between nodes.

- ✦ TLS provides more specific alerts about problems with a session and documents when certain alerts are sent.

Summary of Processing Using the TLS or SSL Protocol

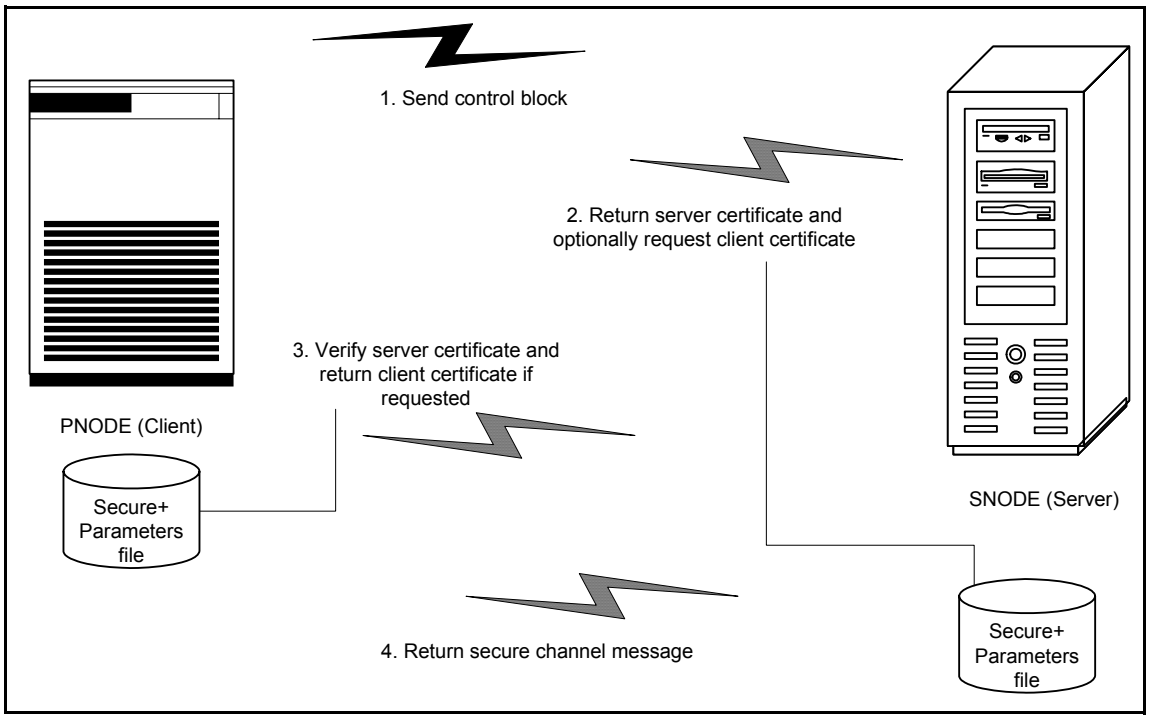
After you configure Secure+ Option, you are ready to exchange data securely with other security-enabled Connect:Direct nodes. Data is securely exchanged between two nodes using the protocol defined in the parameters file.

Secure+ Data Exchange

Data exchange consists of two processes: authentication and sending/receiving data. The TLS or SSL protocol data exchange process is described in the following sections.

Authentication

The following figure illustrates the authentication process using the TLS or SSL protocol:



The following steps occur during authentication:

1. The PNODE (client) sends a control block containing protocol (TLS or SSL) and cipher information to the SNODE (server). The SNODE confirms that it has a record defined in its Secure+ Option parameters file for the PNODE, and determines if a common cipher can be found and used for secure communication. Cipher suites are used to encrypt the data being sent between nodes. If the SNODE finds a record for the PNODE in its Secure+ Option parameters file and verifies it has a cipher defined in common with the PNODE, a common cipher is negotiated and the session continues.

2. The SNODE sends its ID certificate to the PNODE who confirms that it has a record defined in the Secure+ Option parameters file. Information for creating a public key is included. The PNODE verifies the ID certificate of the SNODE using the trusted root certificate file defined in its Secure+ Option parameters file, and generates a session key.
3. If client authentication is enabled on the SNODE, the SNODE requests an ID certificate from the PNODE. The PNODE sends its ID certificate defined in its Secure+ Option parameters file to the SNODE for verification against the trusted root certificate file specified in the SNODE's Secure+ Option parameters file. If a common name was also specified in the Secure+ Option parameters file for the PNODE, this name is used to verify the common name field of the PNODE's certificate.
4. The SNODE confirms that a secure environment is established and returns a secure channel message.

Send/Receive Customer Data

Once a Secure+ session has been established, all control blocks and customer data transmitted between the PNODE and SNODE are encrypted using the negotiated cipher.

Connect:Direct Access to System Resources for SSL or TLS

Before you can configure the Connect:Direct Secure+ Option records to use the SSL or TLS protocol, you must ensure that the Connect:Direct components have access to the resources listed in the following table.

Component	Access to Resource
Connect:Direct	UNIX System Services (USS), or POSIX environment, must be installed and set up for Connect:Direct access.
	Access to the following APF-authorized IBM system libraries through the STEPLIB or LINKLST: ◆ CEE.SCEERUN (language environment) ◆ CBC.SCLBDLL (C/C++ environment) ◆ GSK.SGSKLOAD for IBM z/OS release 1.6 and earlier, or SYS1.SIEALNKE for IBM z/OS release 1.6 and later (System SSL Environment)
	For end-user server certificates with ICSF private key type: ◆ The ICSF application must be running on the same environment as the Connect:Direct application. ◆ The Crypto Hardware device and the ICSF application must be running and accessible by the Connect:Direct application.

Component	Access to Resource
Connect:Direct User ID (under which DTF runs)	Address space uses the maximum sockets (and other TCP/IP configurations) assigned by the UNIX System Services
	OMVS access
	A default UNIX directory
	UPDATE authority to the BPX.SERVER facility
SSL/TLS	Access to key database or key ring as follows: ◆ gskkyman key database ◆ RACF, CA-ACF2, or CA-Top Secret key ring
	Access to the following APF-authorized IBM system library through the STEPLIB or LINKLST: ◆ GSK.SGSKLOAD for IBM z/OS release 1.6 or SYS1.SIEALNKE for IBM z/OS release 1.6 and later (System SSL Environment)
	Permission to read Connect:Direct key ring that is created using RACDCERT, as follows: ◆ Define the IRR.DIGTCERT.LIST and IRR.DIGTCERT.LISTRING resources with universal access of **None**. ◆ Grant the CONNECT:DIRECT User ID read access to the IRR.DIGTCERT.LIST and IRR.DIGTCERT.LISTRING resources in the FACILITY class. ◆ Activate the FACILITY general resource class. ◆ Refresh the FACILITY general resource class.
Connect:Direct User ID key database or key ring	Verification of other certificates requires access to the trusted root certificate of either: ◆ A trusted CA certificate ◆ Copy of a self-signed trusted certificate without private key
Secure+ Option Parameters file	Your node must have a remote node record in the parameters file of each of your trading partners that will use secure connections.

Self-Signed and CA-Signed Certificates

Determining the type of certificate to use for secure communications sessions and the method to generate the certificate is challenging. Self-signed certificates and digital certificates issued by certificate authorities offer advantages and disadvantages. You may also be required to use both

types of certificates, depending on the security requirements of your trading partners. The following table compares the advantages and disadvantages of self-signed and CA-signed certificates.

Type of Certificate	Advantages	Disadvantages
Self-signed certificate	No cost	Requires you to distribute your certificate, minus its private key, to each trading partner in a secure manner.
	Easy to generate	Difficult to maintain; anytime the certificate is changed, it must be distributed to all clients.
	Self-validated	Not validated by a third-party entity
	Efficient for small number of trading partners	Inefficient for large number of trading partners
CA-signed certificate	Not required to store the public key of trading partner The public key signed by the CA is exchanged at SSL negotiation and authenticated against the CA's Trusted Root Key, which is stored in the Trusted Root directory and the USS key database or key ring of the Secure+ server.	Must be purchased from third-party vendor
	Tools used to generate certificates typically load the currently available CA certificates to the key database or key ring being generated, which means that you can connect your trading partner's certificates to the key ring to verify its trustworthiness.	
	Eliminates having to send your certificate to each trading partner	Trading partners must download digital CA-signed certificate used to verify the digital signature of trading partner public keys only if the CA certificate is not available
	Requires the remote client to store only the CA's digitally signed certificate (trusted key) in the Trusted Root directory	Must store the CA-signed certificate in the UNIX System Services (USS) key database or key ring and in the Trusted Root file
	No changes are required on the trading partner's system if you recreate the CA digitally signed certificate using the same CA	

Terminology and Security Applications for SSL and TLS Certificates

The following table defines the security terms associated with SSL and TLS certificates and applies them to communications sessions between a Connect:Direct PNODE (client) and SNODE (server). The terms are listed in alphabetical order.

Term	Definition
CA-Signed Certificate	Digital document issued by a certificate authority that binds a public key to the identity of the certificate owner, thereby enabling the certificate owner to be authenticated. An identity certificate issued by a CA is digitally signed with the private key of the certificate authority.
Certificate Authority (CA)	An organization that issues digitally-signed certificates. The certificate authority authenticates the certificate owner's identity and the services that the owner is authorized to use, issues new certificates, renews existing certificates, and revokes certificates belonging to users who are no longer authorized to use them. The CA digital signature is assurance that anybody that trusts the CA can also trust that the certificate that it signs is an accurate representation of the certificate owner.
Certificate Signing Request (CSR)	Message sent from an applicant to a certificate authority in order to apply for a digital identity certificate. Before creating a CSR, the applicant first generates a key pair, keeping the private key secret. The CSR contains information identifying the applicant (such as a directory name in the case of an X.509 certificate), and the public key chosen by the applicant. The CSR may be accompanied by other credentials or proofs of identity required by the certificate authority, and the certificate authority may contact the applicant for further information.
Key Database	Database generated by the GSKKYMAN utility for creating and managing public and private keys and certificates. Typically, the files in this database are password-protected to ensure that they are inaccessible to unauthorized users.
Key ring	File that contains public keys, private keys, trusted roots, and certificates. A key ring is a collection of certificates that identify a networking trust relationship (also called a trust policy) and are stored in a database. key rings are associated with specific user IDs, which can have more than one key ring. Key rings enable you to share key rings across multiple servers.

Term	Definition
Private Key	String of characters used as the private, “secret” part of a complementary public-private key pair. The asymmetric cipher of the private key is used to sign outgoing messages and decrypt data that is encrypted with its complementary public key. Data that is encrypted with a Public Key can only be decrypted using its complementary Private Key. The private key is never transmitted.
Public Key	String of characters used as the publicly distributed part of a complementary public-private key pair. The asymmetric cipher of the public key is used to confirm signatures on incoming messages and encrypt data for the session key that is exchanged between server and client during negotiation for an SSL/TLS session. The public key is part of the ID (public key) certificate. This information is stored in the key certificate file and read when authentication is performed.
Self-Signed Certificate	Digital document that is self-issued, that is, it is generated, digitally signed, and authenticated by its owner. Its authenticity is not validated by the digital signature and trusted key of a third-party certificate authority. To use self-signed certificates, you must exchange certificates with all your trading partners.
Session Key	Asymmetric cipher used by the client and server to encrypt data. It is generated by the SSL software.

The following table describes some system security applications available for generating certificates. Review the documentation for your security application for detailed instructions for generating certificates. See Appendix A, *Definitions of Certificate Parameters*, for more information on creating certificates using these tools.

Certificate Tool	Description
gskkyman	IBM utility for creating and managing digital certificates and public and private keys stored in a key database. Files created using the gskkyman utility have the following default names: ◆ key.kdb = private key file ◆ certreq.arm = Certificate Signing Request (CSR) file ◆ cert.arm = public key file The gskkyman utility loads currently available CA certificates to the key database.

Certificate Tool	Description
Resource Access Control Facility (RACF)	An IBM application that provides access control by identifying users to the system; verifying users of the system; authorizing access to protected resources; logging detected, unauthorized attempts to enter the system; and logging detected accesses to protected resources. The RACF utility can be used to create, store, and manage keys, digital self-signed or CA-signed certificates, and key rings. Because the RACF application can manage multiple key rings, certificates and key rings are added to the RACF database independently and then a certificate is associated with one or more key rings. For example, you can add the CA public key to you database and associate the certificates of your trading partners created by that CA with its public key. The RACF utility does not assign default names to the files you generate with it.
Computer Associates Access Control Facility (CA-ACF2)	Security application, similar to the RACF application, that enables you to authenticate users and to protect a variety of z/OS resources. You can generate, administer, and process certificate requests, export keys, and manage key rings. The CA-ACF2 application does not assign default names to the files you generate with it.
CA-Top Secret	Security application, similar to the RACF application, that protects your mainframe computer systems and data by controlling access to resources and enables you to generate, administer, and process certificate requests, export keys, and manage key rings. The CA-Top Secret application does not assign default names to the files you generate with it.

General Requirements for Certificates

The certificate for the Connect:Direct Secure+ Option server defined in the local node record has the following general requirements:

- X.509 version 3 end-user server certificate that can interpret digital signatures and can encrypt and decrypt data
- Must be defined to the key database or key ring
- Must be stored in the key database or key ring
- Must have a private key
- Must be valid and not expired
- Must be signed by a CA or self-signed
- Must be set as default in the key database or key ring

Application-Specific Requirements

In addition to the general requirements for certificates, see Appendix A, *Definitions of Certificate Parameters*, for details on the minimum parameter definitions required for the security applications described in *Terminology and Security Applications for SSL and TLS Certificates* on page 23.

Obtain Server Certificates and Set Up Connect:Direct for Certificates

To use the SSL or the TLS protocol to perform a secure connection, you must obtain a server certificate and set up Connect:Direct to use certificates.

Obtain a Certificate

Certificates require key settings that define the type of security to implement at your site, including authentication, non-repudiation, data integrity, and data confidentiality, as described in *Security Concepts* on page 9. Although the security application that you use to create a digital certificate may use different terms to describe these security concepts (for example, digital signature, key encipherment, data encipherment, and non-repudiation), both self-signed certificates and certificate requests sent to a certificate authority must designate all these key usage items to ensure that Secure+ Option can use the certificates to perform the intended security functions.

You can use the following methods to obtain an X.509 version 3 server certificate:

- Your registration authority can contract with a formal certificate authority (CA) to obtain a server certificate. When you obtain the server certificate, you then import this certificate into the IBM System SSL toolkit key database or key ring.
- Your registration authority can create a self-signed private and public key using one of the system security applications described in *Terminology and Security Applications for SSL and TLS Certificates* on page 23.
- Using one of the system security applications described in *Terminology and Security Applications for SSL and TLS Certificates* on page 23, your registration authority can generate a certificate signing request (CSR) for submission to third-party Certificate Authority to obtain a CA-signed public key. You forward this certificate to a certificate authority to be signed. When you receive the signed certificate, you import this certificate into the IBM System SSL key database or key ring. Refer to the IBM documentation *IBM Cryptographic Services System Secure Sockets Layer Programming Guide and Reference* for details.

Set Up Connect:Direct to Use Certificates

Before using the TLS or SSL protocol, you must set up Connect:Direct to use certificates.

To set up Connect:Direct to use certificates:

1. Ensure that the local Connect:Direct node to be configured for the TLS or SSL protocol has either a key ring or a key database on the z/OS image that contains its certificate.
2. Record the following information on your local node record worksheet for use when you configure the local node record in the Secure+ Option parameters file:
   - Name of the key ring or full file name of the key database
   - Label of the certificate in your key ring or key database
   - Password used when the key database was created

   Note: Key rings do not use passwords.
3. If you are using a key database, issue the UNIX command **chmod 666** to ensure that Connect:Direct has permission to read from and write to the key database.
4. Issue the **INQUIRE APFILE** command to verify that the Connect:Direct license management key for Product Name (authorized abbreviated version) and the STS, TLS, and SSL protocols are installed. The license management file must contain feature bits SECURE_PLUS and SECURE-SSL to enable the STS, TLS, and SSL protocols.

Chapter 3

Plan Your Implementation of the STS Protocol

The Station-to-Station (STS) protocol is a three-pass variation of the basic Diffie-Hellman protocol. It enables you to establish a shared secret key between two nodes with mutual entity authentication. Nodes are authenticated using digital signatures that sign and verify messages.

Station-to-Station Protocol

The STS protocol is a three-pass variation of the basic Diffie-Hellman protocol. It enables you to establish a shared secret key between two nodes with mutual entity authentication. Nodes are authenticated using digital signatures that sign and verify messages.

Each message is signed by the PNODE with its current authentication private key (and possibly its previous authentication private key) and verified by the SNODE using the corresponding public key of the PNODE. Each node uses two session keys to process control blocks: one for sending and the other for receiving. The encryption algorithms for control blocks and data copying functions are also determined. When strong authentication is completed successfully, control blocks are exchanged in an encrypted format for the entire session.

STS Data Security

The STS protocol provides data security in the following areas:

- Strong authentication—The STS protocol uses a digital signature for strong authentication. After you enable this feature, control blocks are signed and verified. A digital signature uniquely authenticates the node signing an electronic document much like a human signature uniquely identifies the person signing his or her name to a physical document.
- Proof of data origin and data integrity validation—The digital signature verifies the sender of the message. The digital signature feature also provides data integrity validation. If the digital signature is verified, then an uncorrupted message was transmitted.
- Data confidentiality—The data encryption feature ensures confidentiality of the data sent in a Connect:Direct transfer. Sensitive information is converted to an unreadable format (encryption) by the PNODE before it is sent to the SNODE. The SNODE then converts the

information back into a readable format (decryption). In order for the encryption/decryption process to work, each of these communicating nodes must have the public key value of the other.

Encryption Options

In a previous release of Secure+ Option, two versions of Secure+ Option were available for the STS protocol, based on government regulations regarding export laws. The difference in the versions is the encryption algorithms available.

The Limited Export version of Secure+ Option supports the following encryption algorithms:

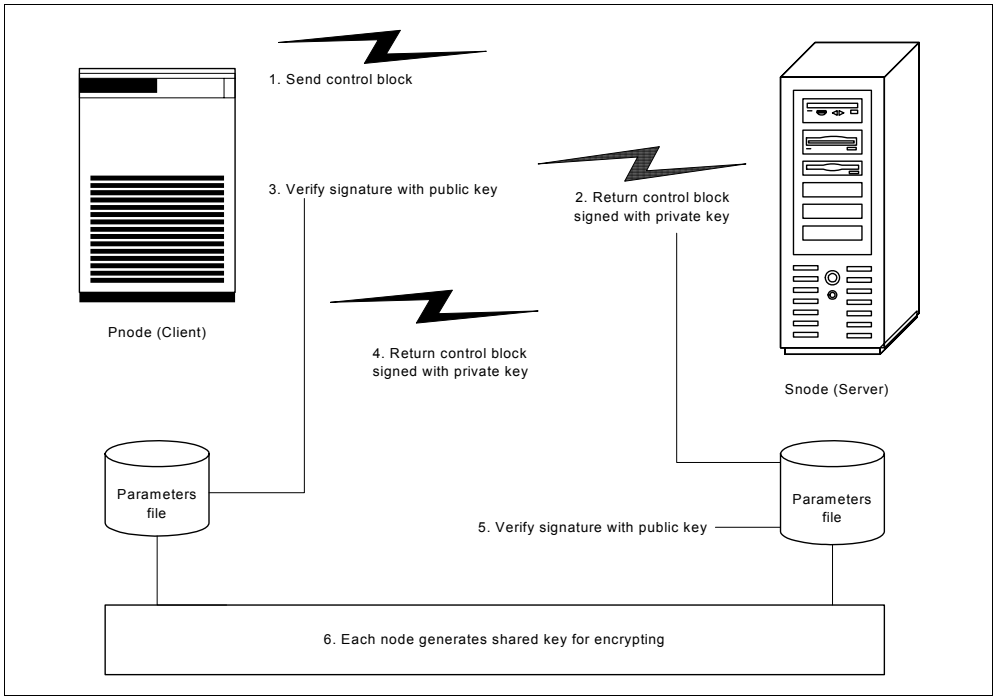
- 56-bit DES using Cipher Block Chaining Mode (DESCBC56)
- 112-bit Triple DES in Cipher Block Chaining Mode (TDESCBC112)
- 128-bit IDEA in Cipher Block Chaining Mode (IDEACBC128)

Summary of Processing Using the STS Protocol

Data exchange consists of three steps: authentication, sending data, and receiving data. The primary node (PNODE) initiates the data transmission, and the secondary node (SNODE) receives the data.

Authentication

The following figure illustrates the authentication process using the STS protocol:



The following steps occur during authentication:

1. The PNODE sends a control block to the trading partner (SNODE). Information for creating an encryption key for the PNODE is included. The SNODE confirms that it has a record defined in the Secure+ Option parameters file for the PNODE. If so, it retains the information for key encryption for processing later. If not, the session fails.
2. The SNODE sends a control block signed with its private authentication key. Information for creating an encryption key is included.
3. The PNODE verifies the signature of the SNODE using its public authentication key and returns a control block signed with its private authentication key.
4. The PNODE returns a control block signed with its private authentication key.
5. The SNODE verifies the signature using the public authentication key of the PNODE.
6. When authentication is successful, each node generates a shared session encryption key for encrypting control blocks.

Sending Customer Data

After communication is authenticated, the PNODE begins transmitting data.

- If data encryption is enabled, information for creating an encryption key is exchanged in the control blocks.
- If digital signature is enabled, the PNODE applies the signature algorithm to the data using its private signature key to ensure that the data was sent by the PNODE and has not been altered.
- If data compression is enabled, the PNODE compresses the data, based on settings defined in Connect:Direct.
- If data encryption is enabled, the PNODE encrypts the data with an encryption algorithm using a shared secret encryption key generated specifically for this transmission. The encryption algorithm is determined at authentication.

Receiving Customer Data

The SNODE receives the data.

- If data is encrypted, the SNODE decrypts the data using the encryption algorithm available for both the PNODE and the SNODE.
- If the data is compressed, the SNODE decompresses it.
- If digital signature is enabled, the SNODE verifies the origin and integrity of the data by applying a verification algorithm using the public digital signature key of the PNODE.

Merging Secure+ Option Settings Using the STS Protocol

When two nodes use the STS protocol to exchange secure data, Secure+ Option settings are exchanged during authentication. These settings are then merged and the resulting value for each security function is used for the Connect:Direct session. The result is based upon the values defined on the primary node (PNODE) and the secondary node (SNODE).

See *Digital Signature* on page 32 and *Algorithm for Encrypting Control Blocks* on page 32 to illustrate how the results of the merged PNODE and SNODE values is used to achieve the most secure connection.

Digital Signature

When Secure+ Option settings are merged, the most secure setting from either node is used for the digital signature feature. If either node enables the digital signature feature, digital signatures are used for the session. If both nodes disable digital signatures, digital signatures are not used. The following table shows the digital signature setting after the PNODE and SNODE values are merged:

PNODE Value	SNODE Value	Merged Results
Y	Y	Y
Y	N	Y
N	Y	Y
N	N	N

Algorithm for Encrypting Control Blocks

The algorithm that encrypts Connect:Direct control blocks used for strong authentication is the first algorithm ID in the PNODE list that is also in the SNODE list. If the nodes do not share a common algorithm, the copy function fails.

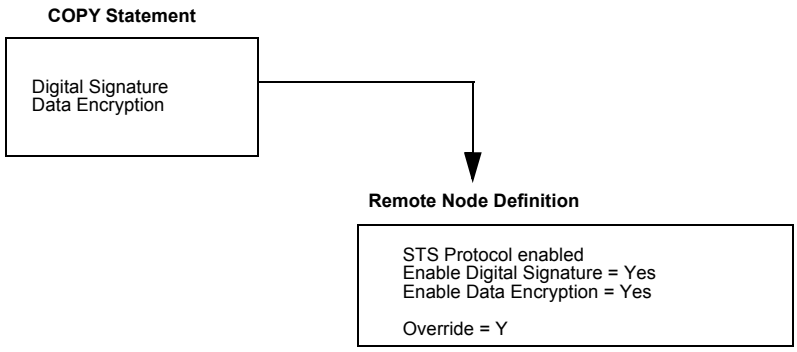
Data Encryption

The most secure setting from either node is used for data encryption. If the nodes do not share a common algorithm, the copy operation fails. The following table shows the setting after the PNODE and SNODE values are merged:

PNODE Value	SNODE Value	Merged Results
N	N	N
N	Y	First algorithm ID in the SNODE list that is in the PNODE list.
N	algorithm ID	SNODE algorithm ID if it is in the PNODE list.
Y	N | Y | algorithm ID	First algorithm ID in the PNODE list that is in the SNODE list.
algorithm ID	N | Y | algorithm ID	PNODE algorithm ID if it is in the SNODE list.

Override STS Functions from the COPY Statement

When you configure a node to use the STS protocol, you can use the COPY statement in a Connect:Direct Process to override the settings in the parameters file, if override is enabled in the remote node record. Secure+ Option uses the most secure connection available. Therefore, if the remote node record enables digital signatures or encryption, the PNODE can not turn those options off by using the COPY statement override. The following illustration shows how the COPY statement overrides the security functions in a remote node:



For more information on using the COPY statement to override values set in a remote node record, see *Override STS Functions from the COPY Statement* on page 104.

Key Management for the STS Protocol

When you configure a remote node record to use the STS protocol, you generate unique authentication and signature public keys. In addition, your trading partner generates authentication and signature public keys for their node. In order to communicate with the trading partner, all four keys must be defined in the parameters file for both your configuration and the trading partner's configuration. Therefore, you and your trading partner must exchange these keys.

For the initial configuration, you manually exchange these keys. You export keys and send them to the trading partner. Then you import the keys you receive from the trading partner into the parameters file. After the initial exchange, you can automate the exchange of key information by defining the appropriate options in the remote node record.

If a remote node uses the STS protocol, you must decide how often to update keys and how to manage key files received from trading partners.

Exchange Public Keys Using Autoupdate

After you exchange keys with a trading partner, both partners can enable the automatic key update feature for easier key management. If both nodes enable the autoupdate function, the authentication and signature public key values are dynamically updated during authentication if the remote node supplies different values. Both you and your trading partner must enable automatic key update in

order to use this feature. Enabling autoupdate eliminates much of the work that has to be performed by the Secure+ Option administrator for maintaining the keys.

Key Update Frequency

Decide how frequently to update authentication and signature keys. The more frequently you update key values, the more secure your environment is. When you turn on automated key updates, you can update keys daily, because the updated keys are sent to the trading partners automatically and securely during authentication.

Import Key File Management

Before you begin exchanging key files with a trading partner, you must consider how to manage key files. Connect:Direct Secure+ Option names exported key files based on the name of the target node; therefore, new key files that you receive from a trading partner have the same name as the old key file. To avoid overwriting an old key file with a new one, you manage key files in one of the following ways:

- Import the new key file immediately after receiving it from your trading partner and then delete the old key file.
- Rename the key file upon receipt or have your trading partner rename it before sending it.
- Create a directory for each remote node and store each key file separately in the associated directory.

See Chapter 11, *Manage Keys for the STS Protocol*, for instructions on importing and exporting keys.

Chapter 4

Using the Secure+ Admin Tool and Populating the Parameters File

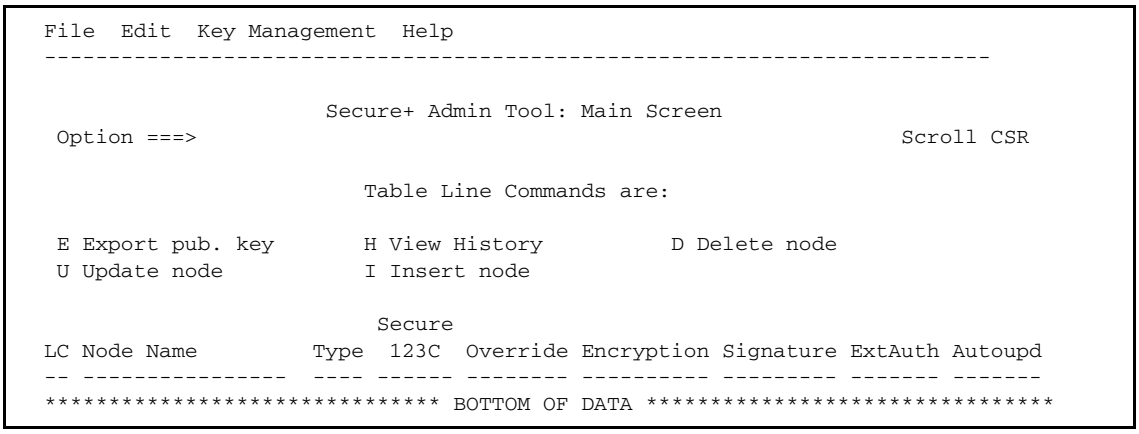
Use the following information to familiarize yourself with the Secure+ Option administration tool and to determine whether using Quickstart to populate the parameters file from the network map or populating the parameters file manually is the most efficient method to create your Secure+ Option parameters file.

Start the Secure+ Option Administration Tool

Use the Administration Tool (Admin Tool) to set up and maintain a Secure+ Option operation. You can start Connect:Direct Secure+ Option from the command line or from the menu.

To start the Secure+ Option Admin Tool:

1. Start the Secure+ Admin Tool:
   - On the Connect:Direct Administrative Options Menu command line, type **SA** and continue with step 3 on page 36.
   - From the **Connect:Direct Administrative Options Menu**, select **Secure+** and press **Enter**.
2. Type **1** to select **Secure+ Admin Tool** and press **Enter** to initialize the Secure+ Option Admin Tool and display the **Secure+ Admin Tool: Main Screen**.



3. To continue configuring Secure+ Option, refer to *Ways to Populate the Parameters File and Configure Nodes* on page 42.

About the Secure+ Option Admin Tool

When you start the Secure+ Option Admin Tool and open a parameters file, the panel displays all node records that are defined in the parameters file including a summary of the attributes for each node, unless you have filtered the records by node name using **Options** on the **Edit** menu. The following table describes the fields that are displayed on the **Secure+ Admin Tool Main Screen**, including a field description and valid values for each field, according to the protocol to which they apply.

Field Name	Field Description	Valid Values
All Protocols		
Node Name	Displays the node record name.	Node name
Override (set in local node record)	Displays the status of override. When override is enabled in the local node record, values set in the the remote node record override the values set in the local node record.	Y = enabled N = disabled
Override (set in remote node record)	Displays the status of override. Enabling override in a remote node record allows values specified in the PROCESS statement to override values set in the remote node record. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.	Y = enabled N = disabled * = default to local node
Type	Displays the current record type.	L = local node record R = remote node record A = alias record Alias is valid only for remote records.

Field Name	Field Description	Valid Values
Secure		
1	Identifies the status of STS security.	Y=Yes
2	Indicates the status of SSL security.	N=No
3	Indicates the status of TLS security.	* = default to local node
C	Identifies the status of client authentication. Client authentication is valid only for the SSL and TLS protocols.	* is not a valid option in the local node record.
STS Protocol-Specific		
Override (set in remote node record for STS)	Displays the status of Override. Enabling Override in a remote node record that uses the STS protocol allows values specified in the COPY statement or the PROCESS statement to override values set in the remote node record. For more information, see *Override STS Functions from the COPY Statement* on page 104 and Chapter 13, *Override Settings in Connect:Direct Processes*.	Y = enabled N = disabled * = default to local node
Encryption	Indicates if data encryption is enabled in the STS protocol.	Y = enabled N = disabled * = default to local node
Signature	Identifies if digital signature is enabled in the STS protocol.	Y = enabled N = disabled * = default to local node
Autoupd	Indicates if the option to automatically update STS key values during communications is enabled.	Y = enabled N = disabled * = default to local
SSL and TLS Protocol-Specific		
ExtAuth	Identifies whether external authentication is enabled for the node. Valid only for the SSL or TLS protocol. For more information, see *Add a Remote Node Record for the EA Server* on page 81.	Y = enabled N = disabled * = default to local node

Protocol-Specific Parameters and Panels

The default Create/Update panel display has changed. In versions prior to 4.6, all fields were displayed in a single panel. In version 4.6, protocol-specific parameters are displayed in separate panels labeled EA Parameters, SSL Parameters, STS Parameters, and TLS Parameters, as illustrated in the following Node Identification panel.

```
 Secure+ Create/Update Panel - Node Identification
 Option:

 EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

 Node
                         1 1. Local
                           2. Remote
 Alias
 Names:                  TCP Information:
                           IPaddr:
                           Port:
Import Remote Keys     Get Record                OK        Cancel
```

The Node Identification panel is the panel displayed when you create a record manually or when you want to display the Node Name and Type fields. Prior to version 4.6, the separate display of protocol-specific parameters was a customization option. The following tables list the Secure+ parameters according to the protocol-specific panel in which they are displayed and the type of record to which they apply.

Node Identification Panel	Valid for Local Node Record?	Valid for Remote Node Record?
Node	Yes	Yes
Local/Remote	Yes	Yes
TCP Information/IP Address and Port	No	No
Note: When you create the Secure+ Parameters file from the NETMAP, the TCP Information field is populated automatically; however, data in the TCP Information field of the Secure+ remote record is not used to initiate Connect:Direct communications sessions. IP address and port number are acquired only from the NETMAP.		
Alias Name	No	Yes

The following table describes the parameters displayed in the STS Parameters panel.

STS Parameters Panel	Valid for the Local Node Record?	Valid for the Remote Node Record?
Override	Yes. Valid for all protocols. Enable to allow turning security on or off in the PROCESS or COPY statement.	Yes. Enable to allow turning security on or off in the PROCESS or COPY statement. Consider the effects of settings for **Signature** and **Encrypt** when you set this parameter.
Autoupdt	Yes. Enable to allow automatic updates of keys used for the STS protocol.	Yes. Enable to allow automatic updates of keys used for the STS protocol.

STS Parameters Panel	Valid for the Local Node Record?	Valid for the Remote Node Record?
Enable STS	Yes	Yes
Signature	Yes. Valid only for nodes that use the STS protocol.	Yes. Valid only for nodes that use the STS protocol.
Encrypt	Yes. Valid only for nodes that use the STS protocol.	Yes. Valid only for nodes that use the STS protocol.
Auth Timeout	Yes. Valid for all protocols.	Yes. Valid for all protocols.
Algorithm	Yes. Valid only for the STS protocol.	Yes. Valid only for the STS protocol.
Create/Reset Auth. Pubkey	Yes. Valid and required for all protocols.	Yes. Valid and required only for remote nodes that use the STS protocol.
Create/Reset Sig. Pubkey	Yes. Valid and required for all protocols.	Yes. Valid and required only for remote nodes that use the STS protocol.
Algorithm Names	Yes. Valid only for the STS protocol.	Yes. Valid only for the STS protocol.
Auth. Rmt.Key	Yes. Valid only for nodes that use the STS protocol.	Yes. Valid only for nodes that use the STS protocol.
Auth.Sig.Key	Yes. Valid only for nodes that use the STS protocol.	Yes. Valid only for nodes that use the STS protocol.
Import Remote Keys	Yes. Valid only for nodes that use the STS protocol.	Yes. Valid only for nodes that use the STS protocol.

Because the **Override**, **Encrypt**, and **Signature** parameters work together, review the following scenarios to determine the values to set for these parameters in a remote node record that uses the STS protocol.

Scenario	Setting for Override Parameter	Setting for Encrypt and Signature
All files must be encrypted and use signature.	Disable Override by setting to 2.	Enable Signature and Encrypt by setting to 1. **Note:** If you disable Override, you cannot disable security in the PROCESS statement.

Scenario	Setting for Override Parameter	Setting for Encrypt and Signature
A few files must be encrypted and use signature.	Enable Override by setting to 1.	Disable Signature and Encrypt by setting to 2. You can change these settings in the COPY statement Process so that the individual files use encryption and signature. See *Override STS Functions from the COPY Statement* on page 104. For additional information, you can also go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.

The following table describes the parameters displayed in the EA Parameters panel. For more information, see *Add a Remote Node Record for the EA Server* on page 81.

Note: If you have configured an .EASERVER remote node record, the following fields are populated but unavailable from any record except the .EASERVER record: External Auth Server Def, External Auth Server Address, and External Auth Server Port. The External Auth field can be modified from any record.

EA Parameters	Valid for Local Node Record?	Valid for Remote Node Record?
External Auth	Yes. Not a good idea to enable this parameter in the local node record.	Yes. Valid only for .EASERVER remote node record.
External Auth Server Def	No	Yes. Valid only for .EASERVER remote node record.
External Auth Server Address	No	Yes. Valid only for .EASERVER remote node record.
External Auth Server Port	No	Yes. Valid only for .EASERVER remote node record.

The following table describes the parameters displayed in the SSL and TLS Parameters panels. The parameters displayed are the same with one exception: the TLS Parameters panel displays the **Enable TLS** field, whereas the SSL Parameters panel displays the **Enable SSL** field.

TLS and SSL Parameters Panels	Valid for the Local Node?	Valid for the Remote Node?
Override	Yes. Valid for all protocols.	Yes. Valid for all protocols to allow Secure+ settings to be overridden in a PROCESS statement. See Chapter 13, *Override Settings in Connect:Direct Processes*.
Enable SSL or Enable TLS	Yes.	Yes.
Client Auth	Not a good idea to enable this parameter in the local node record.	Yes. Valid only for remote nodes that use the SSL or TLS protocol.
Auth Timeout	Yes.	Yes.
TLS/SSL Certificate Label	Yes. Valid only for the SSL or TLS protocol.	Yes. Valid only for the SSL or TLS protocol.
TLS/SSL Cipher Suites	Yes. Valid only for the SSL or TLS protocol.	Yes. Valid only for the SSL or TLS protocol.
TLS/SSL Certificate Pathname	Yes. Valid only for the SSL or TLS protocol.	Yes. Valid only for the SSL or TLS protocol. **Note:** The Certificate Pathname field is automatically set to '*' (Default to Local) in the remote node record. You are not allowed to update this field for a remote node.
TLS/SSL Client Auth. Compare	No	Yes. Requires the certificate common name of the local node certificate when client authentication is enabled. Valid only for the SSL or TLS protocol.

Navigate the Secure+ Admin Tool

Use the following standard function keys to navigate the Admin Tool:

Key	Function
PF8	Move forward
PF7	Move backward
PF12	Back up to a previous panel
PF3	Exit
Enter	To select an option

Secure+ Admin Tool Help

You can access several types of Help information within the **Secure+ Option Admin Tool** as described in the following table:

Help	How to Access
General Help	From any Secure+ Option Admin Tool screen, select **Help** from the action bar and press **Enter**. Type **1** to select the general Help option.
Action Bar Help	Position the cursor on the action bar item and press **PF1**, or position the cursor next to an option of an action bar item and press **PF1**.
Screen and Panel-Level Help	Position the cursor in any uneditable part of the screen or panel and press **PF1**.
Field-Level Help	Position the cursor in the editable part of a field and press **PF1**.

Ways to Populate the Parameters File and Configure Nodes

You must configure Secure+ Option before you begin using it for secure communications. You create and save a parameters file that contains a single local node record and a remote node record for every trading partner that uses Secure+ Option. The way you populate the parameters file depends on your environment. *Decide How to Create the Parameters File* on page 42 and *Decide How to Configure Nodes* on page 43 describe two common scenarios and the most effective method of creating and populating the parameters file and configuring the local and remote nodes records for each scenario.

Decide How to Create the Parameters File

The configuration procedures are based on the scenarios described in this section. Use the following table to help you decide how to create a Secure+ Option parameters file.

Scenario	Method to Create Parameters File	Result
◆ First time to create a parameters file. ◆ Large number of trading partners that use the same protocol.	Use Quickstart to copy the network map file and save it as the Secure+ Option parameters file. See *Populate the Parameters File Using Quick Start* on page 45.	◆ File is created automatically with a single local node record and a record for each remote node in the network map that uses the TCP, UDT, or LU6.2 protocol. ◆ You must configure Secure+ Option for all remote node records, including trading partners that do not use Secure+ Option. ◆ Secure+ Option protocols are disabled for all records created from the network map. ◆ Establishes default settings for most parameters in the local node record.
◆ First time to create a parameters file. ◆ Large number of trading partners. ◆ Few trading partners use Secure+ Option.	Manually create a parameters file and add the local node record and remote node records. See *Create the Parameters File Manually* on page 47.	◆ You create the local node record and a record for each remote node that uses Secure+ Option. ◆ Reduces the number of records to configure. ◆ No default settings are established for parameters in the local node record. You must define all settings.

Decide How to Configure Nodes

After you create and populate the parameters file, you decide how to configure the local node record. The method that you use to configure the local node record then determines how you configure remote node records.

Use the following table to help you decide how to configure the local node:

Scenario	How to Configure Node Records	Result
Most trading partners use the same protocol.	Enable the most commonly used protocol in the local node record. Depending on the protocol, see the relevant procedure in Chapter 9, *Configure the Local Node Record Imported from the Network Map*.	◆ Enables the same protocol in all remote node records. ◆ You have to modify only the records for remote nodes that do not use the settings for the local node.

Scenario	How to Configure Node Records	Result
Most trading partners do not use Connect:Direct Secure+ Option.	Disable the Secure+ Option protocols in the local node record and enable the Override parameter. Depending on the protocol, see one of the following procedures: ◆ *Add the Local Node Record to the Parameters File Manually for the SSL Protocol* on page 50 ◆ *Add the Local Node Record to the Parameters File Manually for the TLS Protocol* on page 66 ◆ *Add the Local Node Record to the Parameters File Manually for the STS Protocol* on page 90 Configure remote node records only for those trading partners who use Secure+ Option.	◆ You define default settings for all protocols (TLS, SSL, STS) in the local node record so remote nodes can use default values. ◆ You configure only those remote node records that use Secure+ Option.
Trading partners need to disable or enable security for a session.	Set OVERRIDE=Y in both the local and remote node records in the parameter files of both trading partners.	Either trading partner can disable or enable security for a particular session by setting SECURE = OFF or SECURE = TLS | SSL | STS in a PROCESS statement.
Some trading partners use Connect:Direct Secure+ Option and the Sterling External Authentication Server application.	Disable external authentication in the local node record and enable the **Override** parameter. Create a .EASERVER remote record. See *Add a Remote Node Record for the EA Server* on page 81.	◆ You can enable external authentication only for those remote nodes that use it with Secure+ Option. ◆ You can verify certificates exchanged during an SSL or TLS session using the Sterling External Authentication Server application.
Nonsecure TCP API connections are not allowed to connect to a Connect:Direct for z/OS server.	Create a .CLIENT remote node record and disable override. See *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84.	◆ Communications from nonsecure connections is not allowed.

To see a scenario for setting up a secure connection between a Connect:Direct for OpenVMS node and a Connect:Direct for z/OS node, see Appendix D, *Configure for a Secure Connection between z/OS and OpenVMS Nodes*. That appendix provides a concrete example for defining a remote node record in both a Connect:Direct for z/OS Secure+ Option parameters file and a Connect:Direct for OpenMVS Secure+ Option parameters file.

Populate the Parameters File Using Quick Start

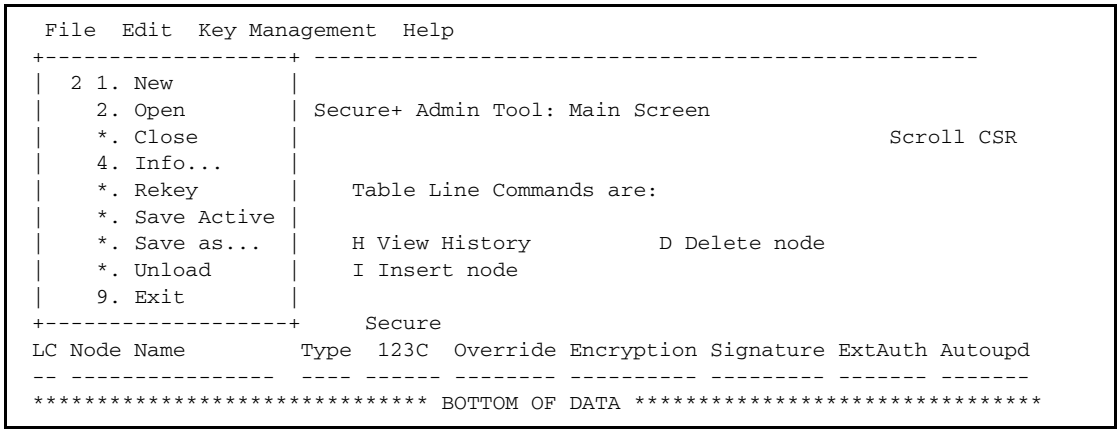
The Quick Start option enables you to create the parameters file by importing information from the Connect:Direct network map and requires that you configure all remote node records, including those of trading partners that do not use Secure+ Option.

Note: You can only use the Quick Start option the first time you create a parameters file.

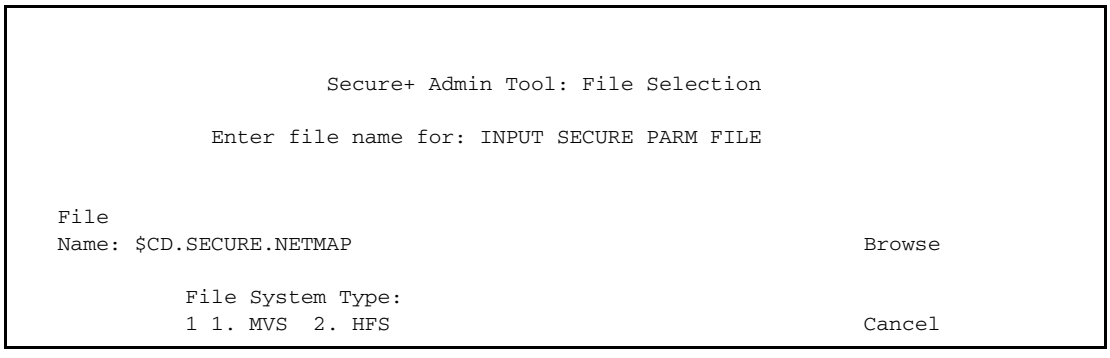
To configure only the nodes that use Secure+ Option, refer to *Create the Parameters File Manually* on page 47.

To import node records to the Secure+ Option parameters file from the Connect:Direct network map:

1. With the **Secure+ Admin Tool Main Screen** open, Select **File** and press **Enter**.



2. Type **2** to select **Open** and press **Enter**.



3. Type the Connect:Direct network map file name prefix or partial prefix followed by an asterisk (*) select **Browse**, and press **Enter**.

Note: You can also type the complete Connect:Direct network map file name and press **Enter**.

4. Type **S** next to the file name of the network map you want to use and press **Enter**.

```
 Secure+ Admin Tool: File Selection                              Row 1 of 3

 Option:  _____________________________________________ Scroll CSR

 Enter "S" on the line of the file for  for MVS.

LC Filename or Directory
 S $CD.NETMAP
 _ $CD.NETMAP.DATA
 _ $CD.NETMAP.INDEX
 ****************************** Bottom of data ******************************
```

5. When the Quick Start prompt screen is displayed, select **Yes** and press **Enter**.

   After a few seconds, the **Secure+ Admin Tool: Main Screen** displays nodes populated from the Connect:Direct network map:

```
 File  Edit  Key Management  Help
 ------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
  Q2A.ZOS.V4600        Secure+ Admin Tool: Main Screen
  Option ===>                                                     Scroll CSR

                          Table Line Commands are:

  E Export pub. key       H View History          D Delete node
  U Update node           I Insert node

                           Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    NNNN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
   Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ******************************
```

6. Update the local and remote node records using the following procedures:
   - Chapter 9, *Configure the Local Node Record Imported from the Network Map*
   - Chapter 10, *Configure Remote Node Records Imported from the Network Map*

Create the Parameters File Manually

If you determine that populating the parameters file manually is most efficient for your environment, refer to the following instructions for configuring the local and remote node records:

- Chapter 5, *Create the Parameters File Manually for the SSL Protocol*
- Chapter 6, *Create the Parameters File Manually for the TLS Protocol*
- Chapter 8, *Create the Parameters File Manually for the STS Protocol*

Chapter 5

Create the Parameters File Manually for the SSL Protocol

If you communicate with a large group of trading partners, but only a few trading partners use Secure+ Option, you can manually create and populate the parameters file by creating a single local node record and a remote node record for each trading partner that uses Secure+ Option. This method minimizes the number of remote node records to configure in the parameters file.

For instructions on additional configuration options, see:

- *Add a Remote Node Record for the EA Server* on page 81
- *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84

To validate and test a Secure+ connection between two business partners, see *Validating and Testing Connections by Session* on page 155.

Configuration Guidelines

When you use the manual method to populate the parameters file, you should disable all protocols and external authentication and allow override in the local node record. Review the table on page 43 to determine the configuration approach that best suits your needs, and use the following guidelines when you configure the local node record manually:

- Disable the Secure+ Option protocols (TLS, SSL, STS) in the local node record. Then configure each remote node record with the protocol used by that trading partner. To disable all protocols and the External Authentication Server application, you must change Default to Local Node settings in the following panels: SSL Parameters, EA Parameters, TLS Parameters, and STS Parameters. Allow overrides in the Local Node settings.
- Disable external authentication.
- Create keys for the STS protocol because this action also creates the key that encrypts the Secure+ parameters file.

- For all environments, you must define required settings in the local node record, including certificate information used with the TLS or SSL protocol. You can also define optional settings in the local node record and use them in all remote node records.
- Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.
- To enable secure connections using Secure+ Option, you must complete the procedures in *Add the Local Node Record to the Parameters File Manually for the SSL Protocol* on page 50, *Add a Remote Node Record to the Parameters File Manually for the SSL Protocol* on page 58, and Chapter 12, *Enable and Validate Secure+ Operation*.

Add the Local Node Record to the Parameters File Manually for the SSL Protocol

When you perform this procedure, refer to the *Local Node Security Feature Definition Worksheet* on page 196 that you completed for the local node.

Note: This procedure assumes that you have allocated the Connect:Direct ISPF libraries in your TSO session that are required to generate the Save As JCL; otherwise, you cannot generate the JCL required to save your parameters file. See *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for a list of the required libraries and *Connect:Direct for z/OS Installation Guide* for information on how to allocate the required libraries.

To add the local node record manually:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------

                     Secure+ Admin Tool: Main Screen
 Option ===>                                                    Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
****************************** BOTTOM OF DATA ********************************
```

2. On the **Edit** menu, select **1** to select **Create/Update Record** and press **Enter** to display the **Secure+ Create/Update Node Identification** panel:

```
 Secure+ Create/Update Panel - Node Identification
 Option:

 EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

 Node
                         1 1. Local
                           2. Remote
 Alias
 Names:                  TCP Information:
                           IPaddr:
                           Port:
Import Remote Keys     Get Record                OK        Cancel
```

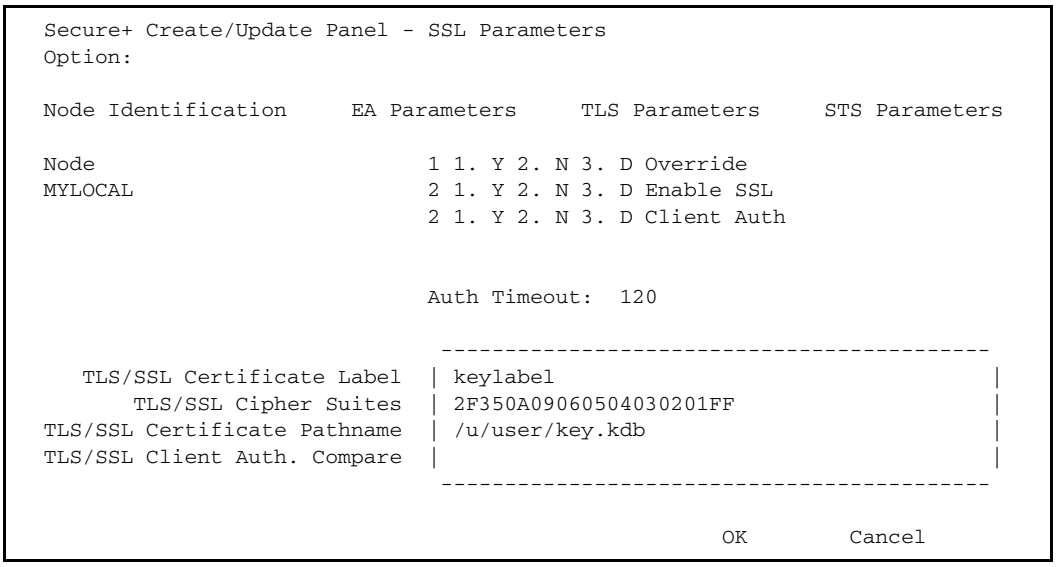
3. On the **Node Identification** panel:
   a. Type a name for the local node in the **Node** field.
   b. Type **1** next to the **Local** field.
   c. Leave the **TCP Information** fields (**IP addr** and **Port**) blank because they do not apply to the local node record.
   d. Leave the **Alias Name** field blank because it is not valid for the local node.
4. Select **SSL Parameters** and press **Enter**.

```
                  Secure+ Create/Update Panel - SSL Parameters
 Option:

 Node Identification     EA Parameters     TLS Parameters     STS Parameters

 Node                          1 1. Y 2. N 3. D Override
 MYLOCAL                       2 1. Y 2. N 3. D Enable SSL
                               2 1. Y 2. N 3. D Client Auth


                               Auth Timeout:  120

                                ------------------------------------------
    TLS/SSL Certificate Label  | *                                        |
        TLS/SSL Cipher Suites  | FF                                       |
 TLS/SSL Certificate Pathname  | *                                        |
 TLS/SSL Client Auth. Compare  |                                          |
                                ------------------------------------------

                                                      OK        Cancel
```

5. In the **SSL Parameters** panel:
   a. Type **1** beside the **Override** field.
   b. Disable the SSL protocol by typing **2** beside the **Enable SSL** field.
   c. Type **2** beside the **Client Auth** field.
   d. Modify the **Auth Timeout** value, if necessary, using the following table as a guide:

Field Name	Description	Valid Value
Override	Allows settings in a remote node record to override settings in the local node record.	1=Yes 2=No
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

6. Specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive; therefore, type the certificate label exactly as you defined it when you generated it using one of the security applications described in Appendix B and press **Enter**.



7. Identify where the certificate information is stored:
   a. Select the **TLS/SSL Certificate Pathname** field and press **Enter**.
   b. Press **F8** to scroll to the **Certificate Path Name** field.

c. Type the UNIX path name of the key database (.kdb) or the security system key ring name that contains all the certificates referred to in the parameters file.

Note: This value is case sensitive. Ensure that you type it exactly as it appears in the certificate file. Refer to the information you recorded in *Local Node Security Feature Definition Worksheet* on page 196.

d. If you are using a key database:

a. Press **F8** to scroll to the password field.

b. Type the password used when the key database was created and press **Enter**.

Note: If you are using a key ring, leave the password field blank.

8. To enable cipher suites:

a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display the **Update Cipher Suites** panel.

```
                                                                More:     +
More:     +

      Update the order field below to enable and order cipher suites.

  O
  r
  d
  e
  r   All Available Cipher-Suites          Enabled Cipher-Suites

  ==  ================================== ==================================
  1   SSL_RSA_AES_128_SHA                  SSL_RSA_AES_128_SHA
  2   SSL_RSA_AES_256_SHA                  SSL_RSA_AES_256_SHA
  3   SSL_RSA_WITH_3DES_EDE_CBC_SHA        SSL_RSA_WITH_3DES_EDE_CBC_SHA
  4   SSL_RSA_WITH_DES_CBC_SHA             SSL_RSA_WITH_DES_CBC_SHA
  5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5
  6   SSL_RSA_WITH_RC4_128_SHA             SSL_RSA_WITH_RC4_128_SHA
  7   SSL_RSA_WITH_RC4_128_MD5             SSL_RSA_WITH_RC4_128_MD5
  8   SSL_RSA_EXPORT_WITH_RC4_40_MD5       SSL_RSA_EXPORT_WITH_RC4_40_MD5
  9   SSL_RSA_WITH_NULL_SHA                SSL_RSA_WITH_NULL_SHA
  10  SSL_RSA_WITH_NULL_MD5                SSL_RSA_WITH_NULL_MD5
  11  DEFAULT_TO_LOCAL_NODE                DEFAULT_TO_LOCAL_NODE
```

b. Type **1** by the cipher you want to enable and give the highest priority.

c. Type **2** by the cipher you want to enable and place second in priority.

d. Continue typing numbers next to the ciphers you want to enable, in order of priority.

The ciphers you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

e. Press **F3** when you have enabled and ordered all necessary ciphers.

Note: To identify the ciphers available, run a trace on the Connect:Direct system. Setting **debug=8C0000AE** in the initialization parameter file dynamically allocates DD R00000001. Available ciphers are listed in the trace DD. Turn global tracing off before you continue.

9. Disable using the External Authentication Server application:
   a. Select **EA Parameters** and press **Enter**.
   b. Type **2** in the **External Auth** field.

      The remaining external authentication fields are unavailable because they are valid only for the .EASERVER remote node record.

Note: Values set for parameters that are displayed in multiple panels (Override, for example) are retained in a record after you set them the first time they are displayed.

```
Secure+ Create/Update Panel - EA Parameters
Option:

Node Identification     SSL Parameters    TLS Parameters     STS Parameters

Node                          1 1. Y 2. N 3. D Override
MYLOCAL                       2 1. Y 2. N 3. D External Auth

External Auth Server Def
External Auth Server Address
External Auth Server Port

                                                  OK        Cancel
```

10. Select **TLS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - TLS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     STS Parameters

Node                          1 1. Y 2. N 3. D Override
MYLOCAL                       2 1. Y 2. N 3. D Enable TLS
                              2 1. Y 2. N 3. D Client Auth

                              Auth Timeout:  120

                               ------------------------------------------
   TLS/SSL Certificate Label  | *                                        |
       TLS/SSL Cipher Suites  | FF                                       |
TLS/SSL Certificate Pathname  | *                                        |
TLS/SSL Client Auth. Compare  |                                          |
                               ------------------------------------------

                                                  OK        Cancel
```

11. In the **TLS Parameters** panel, type **2** beside the **Enable TLS** field to disable the TLS protocol.
12. Select **STS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | *                                        |
Create  / Reset   Sig. Pubkey | *                                        |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                     |
                 Sig. Rmt. Key | 0000                                    |
                               ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

13. In the **STS Parameters** panel:
    a. Disable the STS parameters by typing **2** beside the following fields: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.
    b. Type an asterisk (*****) in the **Algorithm** field.
14. Generate the STS protocol authentication key, which is used to encrypt the parameters file:
    a. Select **Create/Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
                Secure+ Admin Tool: Generate Seed


2 1. Specify Value         Specify the seed value by typing it
                           into the text field.
  2. Sample Value          Generate a seed by processing text
                           entered from the keyboard.

   Random Number
   Seed:
```

    b. Press **Enter** to accept the default value of **2-Sample Value**.
    c. When the following screen is displayed, edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
-------------------------------------------------------------------------------
EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
Command ===>                                                  Scroll ===> PAGE
024: This process cannot proceed if the data in the edit file is unchanged.
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 262144
000002
000003 134217728
000004
000005 32
000006
000007 4
000008
000009 8589934592
000010
000011 131072
000012
000013 8388608
000014
000015 2097152
000016
000017 1073741824
```

d. When the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.

e. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember the pass phrase.

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                                ----------------  <  >  -----------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | *                                         |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                                ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey field** is populated, as shown in the preceding illustration.

15. Generate the signature key, which is part of the key pair used to encrypt the parameters file:
    a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
    b. Press **Enter** to accept the default value (**2-Sample Value**).

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                                ----------------  <  >  -----------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                                ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding.

16. Select **OK** and press **Enter** to display the values for the local node record.
17. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors before you save the parameters file.
18. After you configure the local node record, you can save and submit the parameters file using the procedures in Chapter 12, *Enable and Validate Secure+ Operation*, but if you have not added a remote node record, connections are not secure.

Tip: Before you configure your remote node records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are unable to generate the JCL for the SAVE AS job, verify that you have allocated the ISPF libraries in your TSO session that are required to save the Secure+ Option parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).

Add a Remote Node Record to the Parameters File Manually for the SSL Protocol

Refer to the *Remote Node Security Feature Definition Worksheet* on page 198 that you created for this remote node when you complete this procedure. The following procedure assumes that this remote node uses the SSL protocol and client authentication with Connect:Direct Secure+ Option unless you want to override the Secure+ Option parameter settings from the PROCESS statement. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.

To add a remote node record manually for the SSL protocol:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu. Settings for configured node records are displayed.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------
                                                                  Row 1 of 1
                     Secure+ Admin Tool: Main Screen
 Option ===>                                                    Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   MYLOCAL            L    NNNN     Y         N          N        N       N
****************************** BOTTOM OF DATA *******************************
```

2. On the **Edit** menu, type **1** to select **Create/Update Record** and press **Enter**.

Note: Values set for parameters that are displayed in multiple panels (Override, for example) are retained in a record after you set them the first time they are displayed.

```
Secure+ Create/Update Panel - Node Identification
Option:

EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

Node
REMOTE01                2 1. Local
                          2. Remote
Alias
Names:                  TCP Information:
                          IPaddr:
                          Port:

   Import Remote Keys     Get Record                OK        Cancel
```

3. On the **Node Identification** panel:
   a. In the **Node** field, type the name for the remote node that corresponds to its name in the network map.
   b. Type **2** next to the **Local/Remote** field.
   c. Leave the **TCP Information** fields (**IP addr** and **Port**) blank because Connect:Direct always obtains the IP address and port for a remote node from the network map.
   d. In the **Alias Names** field, type any alternative name for this remote node that uses the same Secure+ Option parameters. This alias name must also exist as a valid remote node entry in the network map.
4. Select **SSL Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - SSL Parameters
Option:

Node Identification     EA Parameters     TLS Parameters     STS Parameters

Node                          2 1. Y 2. N 3. D Override
REMOTE01                      1 1. Y 2. N 3. D Enable SSL
                              1 1. Y 2. N 3. D Client Auth

                              Auth Timeout:  120

                               ------------------------------------------
   TLS/SSL Certificate Label  | *                                        |
       TLS/SSL Cipher Suites  | FF                                       |
TLS/SSL Certificate Pathname  | *                                        |
TLS/SSL Client Auth. Compare  |                                          |
                               ------------------------------------------

                                                    OK        Cancel
```

In the **SSL Parameters** panel:

a. Take one of the following actions, depending on whether you want to use the Secure+ Option parameter settings override feature.

- Type **1** beside the **Override** field to enable the Secure+ Option parameter settings override feature in the PROCESS statement. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.
- Type **2** beside the **Override** field to disable the Secure+ Option parameter settings override feature.

b. Take one of the following actions, depending on how you are implementing SSL–for all data transfers or on a Process-by-Process basis:

- Type **1** beside the **Enable SSL** field to enable the SSL protocol for this remote node.
- Type **2** beside the **Enable SSL** field to disable the SSL protocol but enable it later in a PROCESS statement.

c. To modify the value for the **Auth Timeout** field, use the following table as a guide:

Field	Description	Valid Values
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

5. To enable client authentication:

a. Type **1** in the **Client Auth** field.

b. Type the certificate common name of the local node certificate in the **Client Auth. Compare** field.

> **Note:** This value is case sensitive. Ensure that you type it exactly as it appears in the certificate file.

c. Press **Enter** to display the updated settings.

6. To change the list of ciphers enabled for this remote node record:

a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display the **Update Cipher Suites** panel.

b. Type **1** by the cipher you want to enable and give the highest priority.

c. Continue typing numbers next to the ciphers you want to enable, in order of priority.

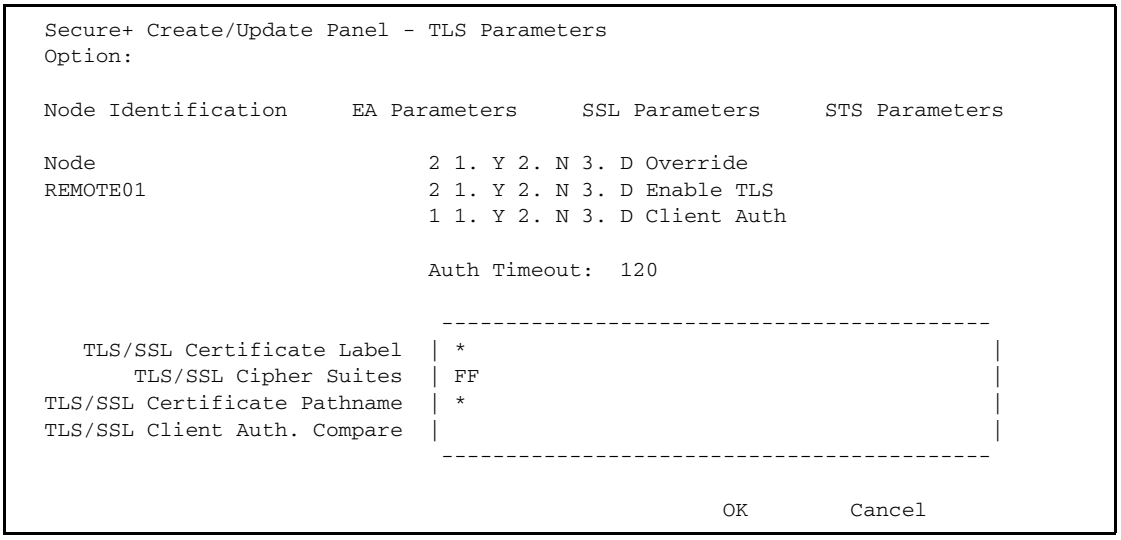
The ciphers you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

d. Press **F3** when you have enabled and ordered all necessary ciphers.

7. To specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive; therefore, type the label of the certificate exactly as you defined it when you generated it using one of the security applications described in Appendix B, or type an asterisk (*****) to specify the same label as the local node record, and press **Enter**.

> **Note:** The TLS/SSL Certificate Pathname field is automatically set to '*****' (Default to Local) in the Remote Node record. You are not allowed to update this field for a remote node.

8. Select **TLS Parameters** and press **Enter.**



9. In the **TLS Parameters** panel:
   a. Type **2** beside the **Enable TLS** field to disable the TLS protocol.
   b. Leave the remaining TLS fields as they are.
   c. Select **STS Parameters** and press **Enter**.
10. In the **STS Parameter**s panel:
   a. Disable the STS protocol by typing **2** in the following fields: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.
   b. Type an asterisk (*) in the **Algorithm** field.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                     2 1. Y 2. N 3. D Override
REMOTE02                                 2 1. Y 2. N 3. D Autoupdt
                                         2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120             2 1. Y 2. N 3. D Signature
          Algorithm     *                2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | *                                        |
Create  / Reset   Sig. Pubkey | *                                        |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                     |
                 Sig. Rmt. Key | 0000                                    |
                               ------------------------------------------
Import Remote Keys     Get Record                OK        Cancel
```

11. Select **EA Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - EA Parameters
Option:

Node Identification     SSL Parameters    TLS Parameters     STS Parameters

Node                           3 1. Y 2. N 3. D Override
REMOTE01                       2 1. Y 2. N 3. D External Auth

External Auth Server Def
External Auth Server Address
External Auth Server Port

                                                    OK        Cancel
```

In the **EA Parameters** panel:

a. Type **3** beside the **Override** field because it is not relevant to External Authentication.

b. Take one of the following actions, depending on whether the remote node validates client certificates using the Sterling External Authentication Server application.

- Type **1** beside the **External Auth** field if this remote node uses the External Authentication Server application.
- Type **2** beside the **External Auth** field if the remote node does not use the External Authentication Server application.
- Type **3** beside the External Auth field if the remote node's use of the External Authentication Server defaults to the Local Node's setting.

  The remaining EA parameters are unavailable because they are valid only for the .EASERVER remote node record.

12. Select **OK** and press **Enter** to close this remote node record.
13. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors before you save the parameters file.
14. Take one of the following actions:
    - To configure an .EASERVER remote node record, continue with *Add a Remote Node Record for the EA Server* on page 81.
    - To configure a .CLIENT remote node record, continue with *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84.
    - To configure records for remote nodes that use a protocol other than SSL, continue with the following appropriate procedures:
      - *Add a Remote Node Record to the Parameters File Manually for the TLS Protocol* on page 74.
      - *Add a Remote Node Record to the Parameters File Manually for the STS Protocol* on page 97.
    - If you have no other remote node records to configure, continue with the procedures in Chapter 12, *Enable and Validate Secure+ Operation*.

Chapter 6

Create the Parameters File Manually for the TLS Protocol

If you communicate with a large group of trading partners, but only a few trading partners use Secure+ Option, you can manually create and populate the parameters file by creating a single local node record and a remote node record for each trading partner that uses Secure+ Option. This method minimizes the number of remote node records to configure in the parameters file.

For instructions on additional configuration options, see:

- *Add a Remote Node Record for the EA Server* on page 81
- *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84

To validate and test a Secure+ connection between two business partners, see *Validating and Testing Connections by Session* on page 155.

Configuration Guidelines

When you use the manual method to populate the parameters file, you should disable all protocols and external authentication in the local node record. Review the table on page 43 to determine the configuration approach that best suits your needs, and use the following guidelines when you configure the local node record:

- Disable the Secure+ Option protocols (TLS, SSL, STS) in the local node record. Then configure each remote node record with the protocol used by that trading partner. To disable all protocols and the External Authentication Server application, you must change Default to Local Node settings in the following panels: SSL Parameters, EA Parameters, TLS Parameters, and STS Parameters.Disable external authentication.
- Create keys for the STS protocol because this procedure also creates the key that encrypts the Secure+ parameters file.
- For all environments, you must define required settings in the local node record, including certificate information used with the TLS or SSL protocol. You can also define optional settings in the local node record and use them in all remote node records.

- Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.
- To enable secure connections using Secure+ Option, you must complete the procedures in *Configuration Guidelines* on page 65, *Add a Remote Node Record to the Parameters File Manually for the TLS Protocol* on page 74, and Chapter 12, *Enable and Validate Secure+ Operation*.

Add the Local Node Record to the Parameters File Manually for the TLS Protocol

When you perform this procedure, refer to the *Local Node Security Feature Definition Worksheet* on page 196 that you completed for the local node .

Note: This procedure assumes that you have allocated the Connect:Direct ISPF libraries in your TSO session that are required to generate the Save As JCL; otherwise, you cannot generate the JCL required to save your parameters file. See *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for a list of the required libraries and *Connect:Direct Platform Installation Guide* for information on how to allocate the required libraries.

To add the local node record manually:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------

                     Secure+ Admin Tool: Main Screen
 Option ===>                                                        Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
****************************** BOTTOM OF DATA ********************************
```

2. On the **Edit** menu, select **1** to select **Create/Update Record** and press **Enter** to display the **Secure+ Create/Update Node Identification** Panel:

```
Secure+ Create/Update Panel - Node Identification
Option:

EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

Node
                        1 1. Local
                          2. Remote
Alias
Names:                  TCP Information:
                          IPaddr:
                          Port:
Import Remote Keys     Get Record                OK        Cancel
```

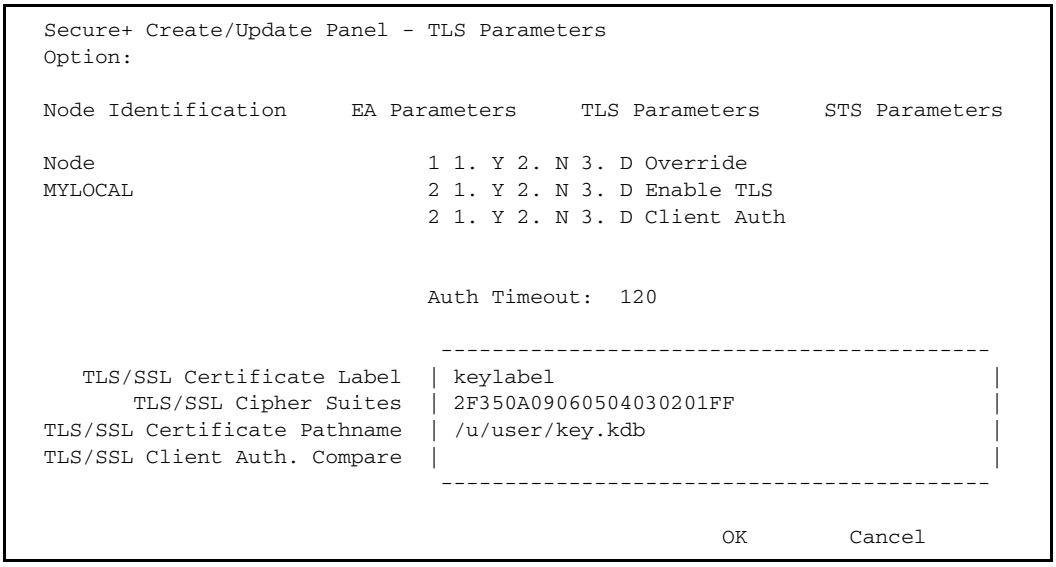
3. On the **Node Identification** panel:
   a. Type a name for the local node in the **Node** field.
   b. Type **1** next to the **Local** field.
   c. Leave the **TCP Information** fields (**IP addr** and **Port**) blank because they do not apply to the local node record.
   d. Leave the **Alias Name** field blank because it is not valid for the local node.
4. Select **TLS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - TLS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     STS Parameters

Node                          1 1. Y 2. N 3. D Override
MYLOCAL                       2 1. Y 2. N 3. D Enable TLS
                              2 1. Y 2. N 3. D Client Auth

                              Auth Timeout:  120

                               -------------------------------------------
   TLS/SSL Certificate Label  | *                                         |
       TLS/SSL Cipher Suites  | FF                                        |
TLS/SSL Certificate Pathname  | *                                         |
TLS/SSL Client Auth. Compare  |                                           |
                               -------------------------------------------

                                                    OK        Cancel
```

5. In the **TLS Parameters** panel:
   a. Type **1** beside the **Override** field.
   b. Disable the TLS protocol by typing **2** beside the **Enable TLS** field.
   c. Modify the **Auth Timeout** value, if necessary, using the following table as a guide:

Field Name	Description	Valid Value
Override	Allows settings in a remote node record to override settings in the local node record.	1=Yes 2=No
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

6. Specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive; therefore, type the label of the certificate exactly as you defined it when you generated it using one of the security applications described in Appendix B and press **Enter**.



7. Identify where the certificate information is stored:
   a. Select the **TLS/SSL Certificate Pathname** field and press **Enter**.
   b. Press **F8** to scroll to the **Certificate Path Name** field.
   c. Type the UNIX path name of the key database (.kdb) or the security system key ring name that contains all the certificates referred to in the parameters file.

Note: This value is case sensitive. Ensure that you type it exactly as it appears in the certificate file. Refer to the information you recorded in *Local Node Security Feature Definition Worksheet* on page 196.

d. If you are using a key database:

   a. Press **F8** to scroll to the password field.

   b. Type the password used when the key database was created and press **Enter**.

Note: If you are using a key ring, leave the password field blank.

8. Type **2** beside the **Client Auth** field.
9. To enable cipher suites:

   a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display the **Update Cipher Suites** panel.

```
                                                                More:     +
More:     +

      Update the order field below to enable and order cipher suites.

  O
  r
  d
  e
  r   All Available Cipher-Suites          Enabled Cipher-Suites

  ==  ================================== ==================================
  1   SSL_RSA_AES_128_SHA                  SSL_RSA_AES_128_SHA
  2   SSL_RSA_AES_256_SHA                  SSL_RSA_AES_256_SHA
  3   SSL_RSA_WITH_3DES_EDE_CBC_SHA        SSL_RSA_WITH_3DES_EDE_CBC_SHA
  4   SSL_RSA_WITH_DES_CBC_SHA             SSL_RSA_WITH_DES_CBC_SHA
  5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5
  6   SSL_RSA_WITH_RC4_128_SHA             SSL_RSA_WITH_RC4_128_SHA
  7   SSL_RSA_WITH_RC4_128_MD5             SSL_RSA_WITH_RC4_128_MD5
  8   SSL_RSA_EXPORT_WITH_RC4_40_MD5       SSL_RSA_EXPORT_WITH_RC4_40_MD5
  9   SSL_RSA_WITH_NULL_SHA                SSL_RSA_WITH_NULL_SHA
  10  SSL_RSA_WITH_NULL_MD5                SSL_RSA_WITH_NULL_MD5
  11  DEFAULT_TO_LOCAL_NODE                DEFAULT_TO_LOCAL_NODE
```

   b. Type **1** by the cipher you want to enable and give the highest priority.

   c. Type **2** by the cipher you want to enable and place second in priority.

   d. Continue typing numbers next to the ciphers you want to enable, in order of priority.

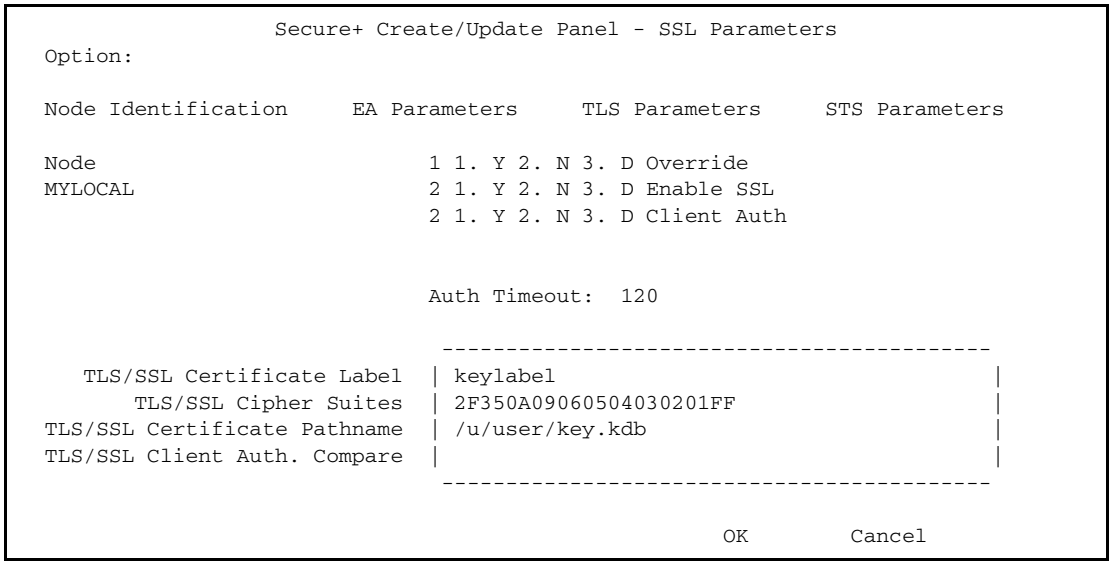
   The ciphers you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

   e. Press **F3** when you have enabled and ordered all necessary ciphers.

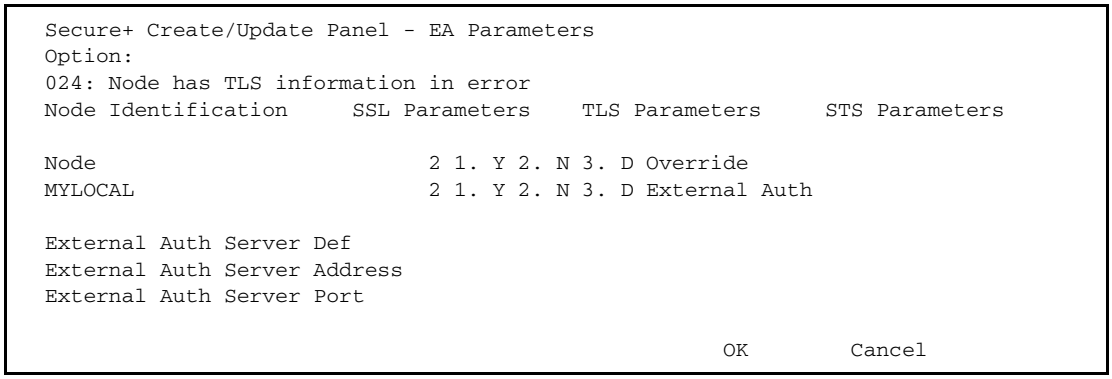
Note: To identify the ciphers available, run a trace on the Connect:Direct system. Setting **debug=8C0000AE** in the initialization parameter file dynamically allocates DD R00000001. Available ciphers are listed in the trace DD. Turn global tracing off before you continue.

10. Select **SSL Parameters** and press **Enter**.
11. In the **SSL Parameters** panel:
    a. Type **2** beside the **Enable SSL** field to disable the SSL protocol.
    b. Leave the remaining fields on the **SSL Parameters** panel as they are.

Note: Values set for parameters that are displayed in multiple panels (Override, for example) are retained in a record after you set them the first time they are displayed.



12. Disable using the External Authentication Server application:
    a. Select **EA Parameters** and press **Enter**.
    b. Type **2** beside the **External Auth** field. The remaining external authentication fields are unavailable because they are valid only for the .EASERVER remote node record.



13. Select **STS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               ----------------  <  >  -----------------
Create  / Reset  Auth. Pubkey | *                                       |
Create  / Reset   Sig. Pubkey | *                                       |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                    |
                Sig. Rmt. Key | 0000                                    |
                               -----------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

14. In the **STS Parameters** panel:
    a. Disable the STS parameters by typing **2** beside the following fields: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.
    b. Type an asterisk (*****) beside the **Algorithm** field.
15. Generate the STS protocol authentication key:
    a. Select **Create/Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
                Secure+ Admin Tool: Generate Seed


2 1. Specify Value         Specify the seed value by typing it
                           into the text field.
  2. Sample Value          Generate a seed by processing text
                           entered from the keyboard.

   Random Number
   Seed:
```

    b. Press **Enter** to accept the default value of **2-Sample Value**.
    c. When the following screen is displayed, edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
------------------------------------------------------------------------------
EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
Command ===>                                                  Scroll ===> PAGE
024: This process cannot proceed if the data in the edit file is unchanged.
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 262144
000002
000003 134217728
000004
000005 32
000006
000007 4
000008
000009 8589934592
000010
000011 131072
000012
000013 8388608
000014
000015 2097152
000016
000017 1073741824
```

d. When the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.

e. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember this number.

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | *                                         |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                               -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey field** is populated, as shown in the preceding illustration.

16. Generate a signature key:
    a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
    b. Press **Enter** to accept the default value (**2-Sample Value**).

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                         Expire Date
Create  / Reset   Sig. Prev. Keys                         Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                               -----------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding.

17. Select **OK** and press **Enter** to display the updated values for the local node record.
18. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors before you save the parameters file.
19. After you configure the local node record, you can save and submit the parameters file using the procedures in Chapter 12, *Enable and Validate Secure+ Operation*, but if you have not added a remote node record, connections are not secure.

Tip: Before you configure your remote node records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are unable to generate the JCL for the SAVE AS job, verify that you have allocated the ISP libraries required to save the Secure+ option parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).

Add a Remote Node Record to the Parameters File Manually for the TLS Protocol

Refer to the *Remote Node Security Feature Definition Worksheet* on page 198 that you created for this remote node when you complete this procedure. The following procedure assumes that this remote node uses the TLS protocol and client authentication with Connect:Direct Secure+ Option unless you want to override the Secure+ Option parameter settings from the PROCESS statement. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.

To add a remote node record manually for the TLS protocol:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu. Settings for configured node records are displayed.

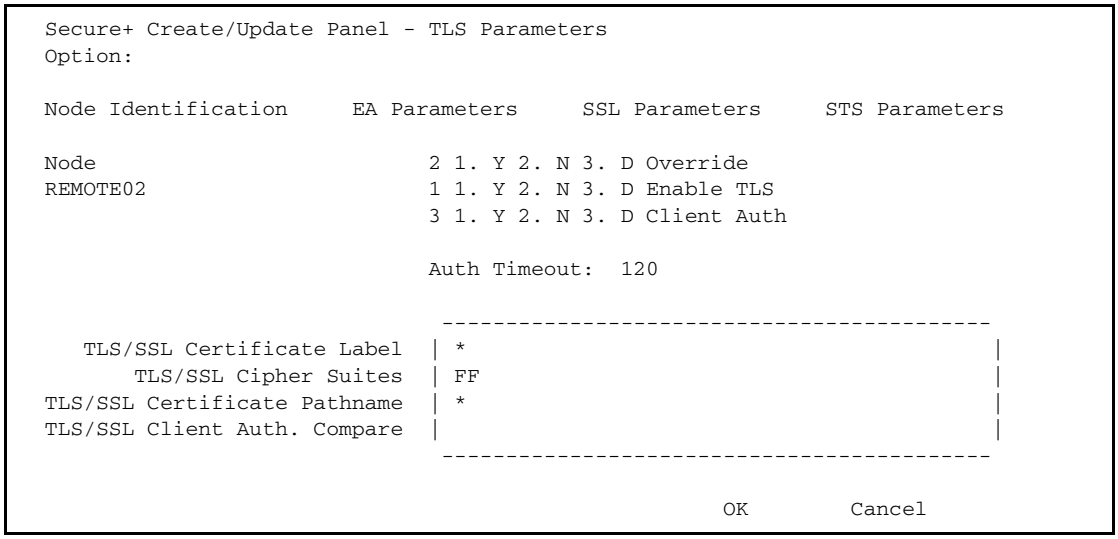
```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                        Row 1 of 2
                     Secure+ Admin Tool: Main Screen
 Option ===>                                                          Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   MYLOCAL            L    NNNN     Y         N          N        N       N
   REMOTE01           R    *YN*     *         *          *        N       *
******************************** BOTTOM OF DATA ********************************
```

2. On the **Edit** menu, type **1** to select **Create/Update Record** and press **Enter**.

Note: Values set for parameters that are displayed in multiple panels (Override, for example) are retained in a record after you set them the first time they are displayed.

```
Secure+ Create/Update Panel - Node Identification
Option:

EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

Node
remote02                2 1. Local
                          2. Remote
Alias
Names:                  TCP Information:
                          IPaddr:
                          Port:

   Import Remote Keys     Get Record               OK        Cancel
```

3. On the **Node Identification** panel:
   a. In the **Node** field, type the name for the remote node that corresponds to its name in the network map.
   b. Type **2** next to the **Local/Remote** field.
   c. Leave the **TCP Information** fields (**IP addr** and **Port**) blank because Connect:Direct always obtains the IP address and port for a remote node from the network map.
   d. In the **Alias Names** field, type any alternative name for this remote node that uses the same Secure+ Option parameters. This alias name must also exist as a valid remote node entry in the network map.
4. Select **TLS** Parameters and press **Enter**.



In the **TLS Parameters** panel:

a. Take one of the following actions, depending on whether you want to use the Secure+ Option parameter settings override feature.
   - Type **1** beside the **Override** field to enable the Secure+ Option parameter settings override feature in the PROCESS statement. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.
   - Type **2** beside the **Override** field to disable the Secure+ Option parameter settings override feature.

b. Take one of the following actions, depending on how you are implementing TLS–for all data transfers or on a Process-by-Process basis:
   - Type **1** beside the **Enable SSL** field to enable the TLS protocol for this remote node.
   - Type **2** beside the **Enable SSL** field to disable the TLS protocol but enable it later in a PROCESS statement.

c. To modify the value for the **Auth Timeout** field, use the following table as a guide.

Field	Description	Valid Values
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

5. To enable client authentication:
   a. Type **1** beside the **Client Auth** field.
   b. Type the certificate common name of the local node certificate in the **Client Auth. Compare** field.
   c. Press **Enter** to display the updated settings.
6. To change the list of ciphers enabled for this remote node record:
   a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display the **Update Cipher Suites** panel.
   b. Type **1** by the cipher you want to enable and give the highest priority.
   c. Continue typing numbers next to the ciphers you want to enable, in order of priority.

      The ciphers you enable appear in the order of priority in the **Enabled Cipher-Suites** list.
   d. Press **F3** when you have enabled and ordered all necessary ciphers.

```
                                                                More:     +
More:     +

      Update the order field below to enable and order cipher suites.

  O
  r
  d
  e
  r   All Available Cipher-Suites          Enabled Cipher-Suites

  ==  ================================== ==================================
  1   SSL_RSA_AES_128_SHA                SSL_RSA_AES_128_SHA
  2   SSL_RSA_AES_256_SHA                SSL_RSA_AES_256_SHA
  3   SSL_RSA_WITH_3DES_EDE_CBC_SHA      SSL_RSA_WITH_3DES_EDE_CBC_SHA
  4   SSL_RSA_WITH_DES_CBC_SHA           SSL_RSA_WITH_DES_CBC_SHA
  5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5 SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5
  6   SSL_RSA_WITH_RC4_128_SHA           SSL_RSA_WITH_RC4_128_SHA
  7   SSL_RSA_WITH_RC4_128_MD5           SSL_RSA_WITH_RC4_128_MD5
  8   SSL_RSA_EXPORT_WITH_RC4_40_MD5     SSL_RSA_EXPORT_WITH_RC4_40_MD5
  9   SSL_RSA_WITH_NULL_SHA              SSL_RSA_WITH_NULL_SHA
  10  SSL_RSA_WITH_NULL_MD5              SSL_RSA_WITH_NULL_MD5
  11  DEFAULT_TO_LOCAL_NODE              DEFAULT_TO_LOCAL_NODE
```

7. To specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive; therefore, type the label of the certificate exactly as you defined it when you generated it using one of the security applications described in Appendix B, or type an asterisk (*) to specify the local node label and press **Enter**.

   Note: The TLS/SSL Certificate Pathname field is automatically set to '*' (Default to Local) in the Remote Node record. You are not allowed to update this field for a remote node.

8. Select **SSL Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - SSL Parameters
Option:

Node Identification     EA Parameters     TLS Parameters     STS Parameters

Node                          2 1. Y 2. N 3. D Override
REMOTE01                      2 1. Y 2. N 3. D Enable SSL
                              1 1. Y 2. N 3. D Client Auth

                              Auth Timeout:  120

                               -------------------------------------------
   TLS/SSL Certificate Label  | *                                         |
       TLS/SSL Cipher Suites  | FF                                        |
TLS/SSL Certificate Pathname  | *                                         |
TLS/SSL Client Auth. Compare  |                                           |
                               -------------------------------------------

                                                      OK        Cancel
```

9. In the **SSL Parameters** panel:
   a. Type **2** beside the **Enable SSL** field to disable the SSL protocol for this remote node.
   b. Select **TLS Parameters** and press **Enter**.
   c. Select **STS Parameters** and press **Enter**.
10. In the **STS Parameters** panel:
   a. Disable the STS protocol by typing **2** beside the following fields: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.
   b. Type an asterisk (*****) beside the **Algorithm** field.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    2 1. Y 2. N 3. D Override
REMOTE02                                2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | *                                        |
Create  / Reset   Sig. Pubkey | *                                        |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                     |
                 Sig. Rmt. Key | 0000                                    |
                               -------------------------------------------
Import Remote Keys     Get Record                OK        Cancel
```

11. Select **EA Parameters** and press **Enter**.

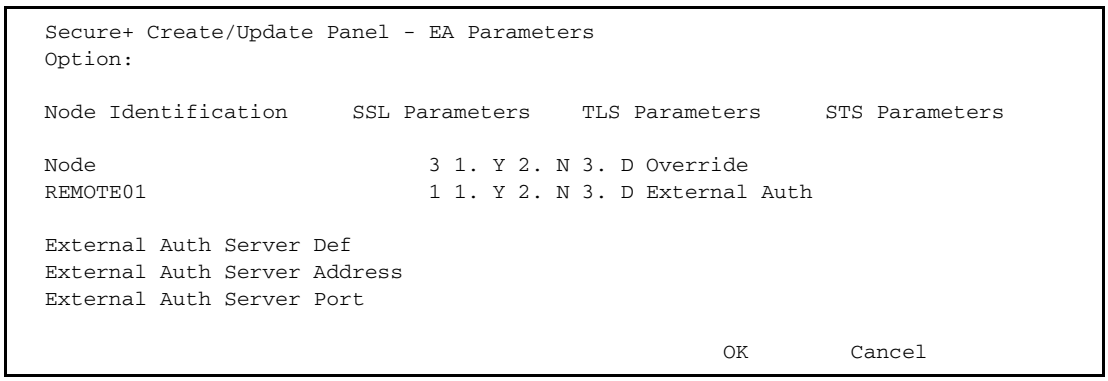
    In the **EA Parameters** panel:

    a. Type **3** beside the **Override** field because it is not relevant to External Authentication.

    b. Take one of the following actions, depending on whether the remote node uses the Sterling External Authentication Server application.

    - Type **1** beside the **External Auth** field if this remote node uses the External Authentication Server application.
    - Type **2** beside the **External Auth** field if the remote node does not use the External Authentication Server application.
    - Type **3** beside the External Auth field if the remote node's use of the External Authentication Server defaults to the Local Node's setting.

      The remaining EA parameters are unavailable because they are valid only for the .EASERVER remote node record.



12. Select **OK** and press **Enter** to close this remote node record.
13. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors before you save the parameters file.
14. From the **Create/Update** panel, press **Cancel** to display this remote node record on the Secure+ Admin Tool Main Screen.
15. Take one of the following actions:

    - To configure an .EASERVER remote node record, continue with *Add a Remote Node Record for the EA Server* on page 81.
    - To configure a .CLIENT remote node record, continue with *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84.
    - To configure records for remote nodes that use a protocol other than TLS, continue with the following appropriate procedures:
      - *Add a Remote Node Record to the Parameters File Manually for the SSL Protocol* on page 58.
      - *Add a Remote Node Record to the Parameters File Manually for the STS Protocol* on page 97.
    - If you have no other remote node records to configure, continue with the procedures in Chapter 12, *Enable and Validate Secure+ Operation*.

Chapter 7

Additional Configuration Options for SSL and TLS

With the SSL and TLS protocols, you can validate certificates using the Sterling External Authentication Server application. To use the Sterling External Authentication Server application, configure your application to connect to the host name and port where the Sterling External Authentication Server application (.EASERVER) resides. Specify a certificate validation definition.

Use only secure TCP API connections to connect to a Connect:Direct for z/OS server. To block nonsecure TCP API connections, define a .CLIENT remote node record, disable override, and identify SSL or TLS as the protocol to use for secure TCP API connections.

For configuration instructions, see:

- *Add a Remote Node Record for the EA Server* on page 81
- *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84

Add a Remote Node Record for the EA Server

To verify certificates using the Sterling External Authentication Server application, create a remote node record for the External Authentication (EA) server in the Connect:Direct Secure+ Option parameters file. Before you begin, complete the *.EASERVER Node Security Feature Definition Worksheet* on page 200.

To add a remote node record for the EA server:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu.
2. On the **Edit** menu, type **1** to select **Create/Update Record** and press **Enter**.

3. In the **Node Identification** panel:
   a. Type **.EASERVER** in the **Node** field.
   b. Type **2** beside the **Local/Remote** field.

> **Note:** Leave the **TCP Information** fields (**IP addr** and **Port)** blank because you define them in the EA Parameters panel.

   c. Select **EA Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - EA Parameters
Option:

Node Identification     SSL Parameters    TLS Parameters     STS Parameters

Node                          3 1. Y 2. N 3. D Override
.EASERVER                     1 1. Y 2. N 3. D External Auth

External Auth Server Def      CertValidateDef
External Auth Server Address  10.20.20.20
External Auth Server Port     54321

                                                    OK        Cancel
```

4. In the **EA Parameters** panel:
   a. Type **3** beside the **Override** field because it is not relevant to External Authentication.
   b. Type **2** beside the **External Auth** field.
   c. Type the information from the worksheet for the .EASERVER record in the following fields:

Field	Description
External Auth Server Def	Name of the certificate validation definition configured on the EA server that defines how to validate certificates. This field is case sensitive.
External Auth Server Address	IP address of server for the Sterling External Authentication Server application.
External Auth Server Port	Number of the port to use to connect to the EA server.

> **Note:** After you create the .EASERVER remote node record, the **External Auth Server Def**, **External Auth Server Address**, and **External Auth Server Port** fields are populated in the EA Parameters panel of all Secure+ parameters file records, but the only field that can be modified from a record other than the .EASERVER record is the **Enable External Auth** field.

   d. Select the protocol to use for connections to the EA server (**TLS Parameters** or **SSL Parameters**) and press **Enter**.

5. In the panel for the selected protocol, enable Secure+ Option by typing **1** beside the **Enable TLS** (or **SSL**) field.
   a. Select the other protocol you are not using for EA server connections (SSL Parameters or TLS Parameters) and press **Enter**.
6. In the panel for the protocol you are not using for EA server connections:
   a. Disable the protocol by typing **2** beside the **Enable SSL** or **Enable TLS** field.
7. To enable client authentication:
   a. Type **1** in the **Client Auth** field.
   b. Type the certificate common name of the local node certificate in the **Client Auth. Compare** field.

   Note: This value is case sensitive. Ensure that you type it exactly as it appears in the certificate file.

8. To enable and define the priority of ciphers:
   a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display the **Update Cipher Suites Panel**.
   b. Type **1** by the cipher you want to enable and give the highest priority.
   c. Continue typing numbers next to the ciphers you want to enable, in order of priority.

      The ciphers you enable appear in the order of priority in the **Enabled Cipher-Suites** list.
   d. Press **F3** when you have enabled and ordered all necessary ciphers.
9. To specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive, therefore, type the label of the certificate exactly as you defined it when you generated it using one of the security applications described in Appendix B, or type an asterisk (*****) to specify the same label as the local node, and press **Enter**.

   Note: The TLS/SSL Certificate Pathname field is automatically set to '*****' (Default to Local) in the Remote Node record. You are not allowed to update this field for a remote node.

10. Select **OK** and press **Enter** to close this remote node record.
11. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors before you save the parameters file.
12. Press **Cancel** to display current settings for the the EA node.

```
File  Edit  Key Management  Help
------------------------------------------------------------------------------
                                                                        Row 1 of 1
                     Secure+ Admin Tool: Main Screen
 Option ===>                                                        Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   .EASERVER          R    NYNY     N          N          N        Y       N
****************************** BOTTOM OF DATA ********************************
```

13. Save the parameters file using the procedure in Chapter 12, *Enable and Validate Secure+ Operation*.

Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server

Connect:Direct servers that use Secure+ Option allow you to allow secure TCP API connections or block nonsecure TCP API connections. Nonsecure API applications include Connect:Direct CICS Option, DMBATCH, ISPF IUI, z/OS Console interface, Interconnect Option (ICO), Sterling Control Center, and Connect:Direct Browser User Interface. The only secure API connection is Sterling Java API.

To prevent nonsecure TCP API connections, define a remote node record called .CLIENT and disable override. Additionally, identify the protocol to use for secure API connections. Defining a remote node called .CLIENT and disabling override prevents nonsecure connections to the Connect:Direct server without disabling override settings in the local node record.

Note: Specifying override=yes in the .CLIENT record allows both secure and non-secure API connections.

If you define a .CLIENT record and disable override, also configure DMBATCH and ISPF IUI programs in Connect:Direct to use the SNA protocol. These programs are nonsecure TCP API connections.

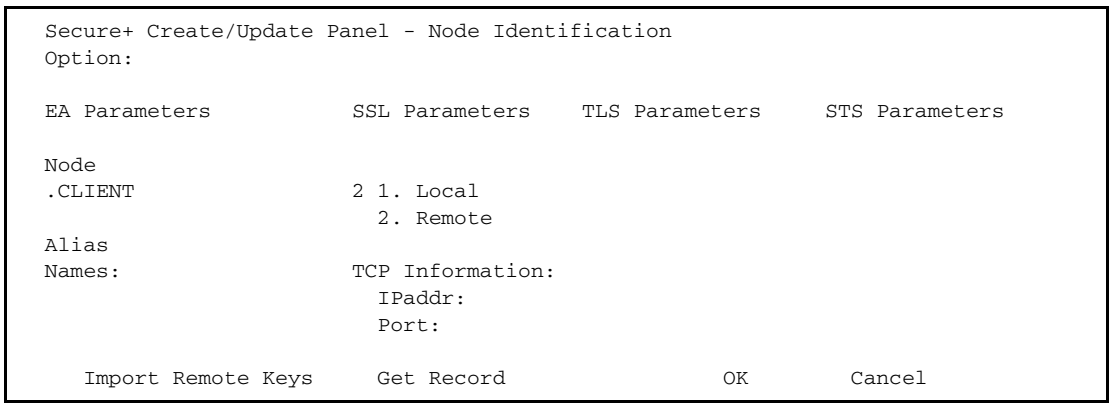
An API configuration follows the same rules as other remote node connections with the following exceptions:

- API connections use either the SSL or the TLS security protocol.

- ✦ The Connect:Direct server supports TCP and defines a TCP API port for these connections. Refer to *Connect:Direct for z/OS Administration Guide* for instructions on setting up TCP API support on the server.
- ✦ Settings in the .CLIENT node definition automatically override the local node.

To configure a .CLIENT remote node record when Secure+ Option is enabled:

1. From the **Secure+ Admin Tool Main Screen,** select **Edit** and press **Enter** to display the **Edit** menu.
2. On the **Edit** menu, type **1** to select **Create/Update Record** and press **Enter**.



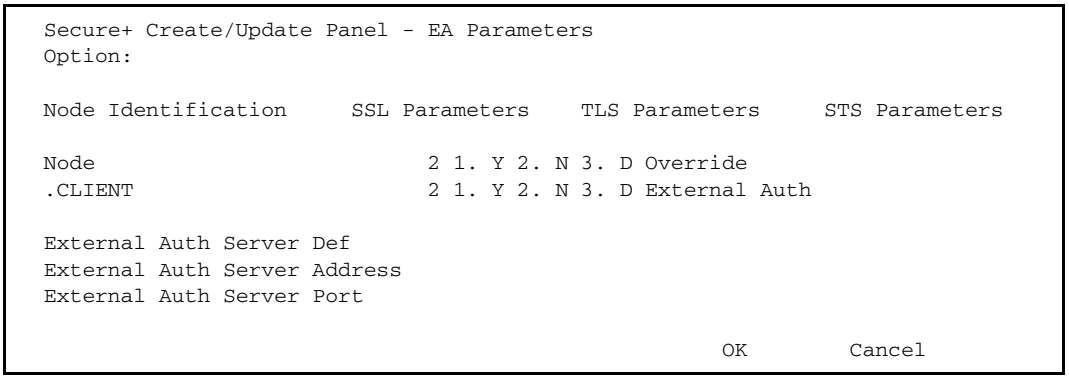
3. On the **Node Identification** panel:
   a. Type .**CLIENT** in the **Node** field.

> **Note:** You must name this node .CLIENT in order for Connect:Direct to read this node and allow secure TCP API connections.

   b. Type **2** next to the **Local/Remote** field.

> **Note:** Leave the **TCP Information** fields (**IP addr** and **Port**) blank because Connect:Direct always obtains the IP address and port for a remote node from the network map. Also, leave the **Alias Names** field blank.

   c. Select **EA Parameters** and press **Enter**.



4. In the **EA Parameters** panel:
   a. Type **2** beside the **Override** field to disable override for the .CLIENT remote node record.
   b. Type **2** beside the **External Auth** field to disable it. The remaining EA parameters are unavailable because they are valid only for the .EASERVER remote node record.
   c. Select the protocol (**SSL** or **TLS**) to use for secure TCP API connections and press **Enter**.
5. In the panel for the selected protcol:
   a. Take one of the following actions, depending on whether you want to use the Secure+ Option parameter settings override feature.
      - Type **1** beside the **Enable TLS** (or **SSL**) field to enable the selected protocol for this remote node.
      - Type **3** beside the **Enable TLS** (or **SSL**) field to default to the local node setting.
   b. Type **2** beside the **Client Auth** field to disable it.
   c. Change the value in the **Auth Timeout** field, if necessary, using the following table as a guide:

Field	Description	Valid Values
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. 120 = Default. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter.

   d. Select the unused protocol (**SSL Parameters** or **TLS Parameters**) and press **Enter**.
6. In the panel for the unused:
   a. Type **2** beside the **Enable SSL** or **Enable TLS** field to disable it.
   b. Select **STS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                     2 1. Y 2. N 3. D Override
.CLIENT                                  2 1. Y 2. N 3. D Autoupdt
                                         2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120             2 1. Y 2. N 3. D Signature
          Algorithm       *              2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | *                                        |
Create  / Reset   Sig. Pubkey | *                                        |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                     |
                 Sig. Rmt. Key | 0000                                    |
                               ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

7. In the **STS Parameter**s panel:
   a. Disable the STS protocol by typing **2** beside the following fields: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.
   b. Type an asterisk (*****) beside the **Algorithm** field.

      The remaining fields are not valid for the .CLIENT record.
8. Click **OK** and press **Enter** to update the .CLIENT node record.
9. Save the parameters file using the procedure in Chapter 12, *Enable and Validate Secure+ Operation*.
10. Ensure that the ISPF IUI and DMBATCH connections define SNA as the connection protocol.

Note: If the .CLIENT node record disables the Override function, ISPF IUI and DMBATCH must use the SNA protocol.

Chapter 8

Create the Parameters File Manually for the STS Protocol

If you communicate with a large group of trading partners, but only a few trading partners use Secure+ Option, you can manually create and populate the parameters file by creating a single local node record and a remote node record for each trading partner that uses Secure+ Option. This method minimizes the number of remote node records to configure in the parameters file. However, because the local node record that you create manually does not specify meaningful default settings (all settings are default to local node), you must configure all parameters.

See *Override STS Functions from the COPY Statement* on page 104 for information about overriding remote node record settings.

In addition to configuring local and remote node records, you must also perform the procedures to manage keys used with the STS protocol. See Chapter 11, *Manage Keys for the STS Protocol*, for instructions.

To validate and test a Secure+ connection between two business partners, see *Validating and Testing Connections by Session* on page 155.

Configuration Guidelines

When you use the manual method to populate the parameters file, you configure the local node record to define the default settings for all protocols. Review the table in *Decide How to Create the Parameters File* on page 42 to determine the configuration approach that best suits your needs, and use the following guidelines to configure node records manually:

- Disable external authentication.
- Because you are configuring only those nodes that use Secure+ Option, disable the Secure+ Option protocols (TLS, SSL, STS) in the local node record. Then configure each remote node record with the protocol used by that trading partner.

- To enable secure connections using Secure+ Option, you must complete the procedures in *Add the Local Node Record to the Parameters File Manually for the STS Protocol* on page 90, *Add a Remote Node Record to the Parameters File Manually for the STS Protocol* on page 97, and Chapter 12, *Enable and Validate Secure+ Operation*.
- You must perform the additional tasks in Chapter 11, *Manage Keys for the STS Protocol*.
- Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.
- See *Override STS Functions from the COPY Statement* on page 104 for information about overriding remote node record settings.

Add the Local Node Record to the Parameters File Manually for the STS Protocol

Refer to the *Local Node Security Feature Definition Worksheet* on page 196 that you completed for the local node when you perform this procedure.

Note: This procedure assumes that you have allocated the Connect:Direct ISPF libraries in your TSO sesssion that are required to generate the Save As JCL; otherwise, you cannot generate the JCL required to save your parameters file. See *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for a list of the required libraries and *Connect:Direct for z/OS Installation Guide* for information on how to allocate the required libraries.

To add the local node record manually:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------

                     Secure+ Admin Tool: Main Screen
 Option ===>                                                    Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
****************************** BOTTOM OF DATA ********************************
```

2. On the **Edit** menu, type **1** to select **Create/Update Record** and press **Enter** to display the **Secure+ Create/Update Node Identification** panel.

```
 Secure+ Create/Update Panel - Node Identification
 Option:

 EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

 Node
                         1 1. Local
                           2. Remote
 Alias
 Names:                  TCP Information:
                           IPaddr:
                           Port:
Import Remote Keys     Get Record                OK        Cancel
```

3. In the **Node Identification** panel:
   a. Type a name for the local node in the **Node** field.
   b. To add the local node record, type **1** next to the **Local/Remote** field.
   c. Leave the **TCP Information** fields (**IP address** and **Port**) blank because they are not valid for the local node record.
   d. Leave the **Alias Names** field blank because it is not valid for the local node.
   e. Select **STS Parameters** and press **Enter.**

```
 Secure+ Create/Update Panel - STS Parameters
 Option:

 Node Identification     EA Parameters     SSL Parameters     TLS Parameters

 Node                                     1 1. Y 2. N 3. D Override
 MYLOCAL                                  2 1. Y 2. N 3. D Autoupdt
                                          2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120              2 1. Y 2. N 3. D Signature
          Algorithm     *                 2 1. Y 2. N 3. D Encrypt

 Create  / Reset  Auth. Prev. Keys                          Expire Date
 Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
 Create  / Reset  Auth. Pubkey | *                                       |
 Create  / Reset   Sig. Pubkey | *                                       |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                    |
                Sig. Rmt. Key | 0000                                    |
                               -----------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

4. In the **STS Parameters** panel:
   a. Type **1** beside the **Override** field.
   b. Disable Secure+ Option by typing **2** beside the following fields: **Autoupdt**, **Enable STS, Signature,** and **Encrypt**.

c. If necessary, change the values for the **Auth Timeout** and **Algorithm** fields using the following table as a guide:

Field Name	Description	Valid Values
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. The default is 120 seconds.
Algorithm	Specifies the data encryption algorithm used. Also set **Encrypt** to Yes.	* = Use first algorithm in list DESCBC56 TDESCBC112 IDEACBC128

5. Generate the authentication key for the STS protocol:
   a. Select **Create/Reset Auth. Pubkey** and press **Enter** to display the Generate Seed screen.

```
Secure+ Admin Tool: Generate Seed


2 1. Specify Value          Specify the seed value by typing it
                            into the text field.
  2. Sample Value           Generate a seed by processing text
                            entered from the keyboard.

   Random Number
   Seed:
```

   b. Press **Enter** to accept the default value of **2-Sample Value**. The following screen is displayed.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 -------------------------------------------------------------------------------
 EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
 Command ===>                                                  Scroll ===> PAGE
 024: This process cannot proceed if the data in the edit file is unchanged.
 ==MSG> -Warning- The UNDO command is not available until you change
 ==MSG>           your edit profile using the command RECOVERY ON.
 000001 262144
 000002
 000003 134217728
 000004
 000005 32
 000006
 000007 4
 000008
 000009 8589934592
 000010
 000011 131072
 000012
 000013 8388608
 000014
 000015 2097152
 000016
 000017 1073741824
```

c. Edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

d. If the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.

e. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember this number.

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                                -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | *                                         |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                                -----------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey** field is populated, as shown in the preceding illustration.

6. To generate the signature key:
   a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
   b. Press **Enter** to accept the default value (**2-Sample Value**).

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                                -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                                -----------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding illustration.

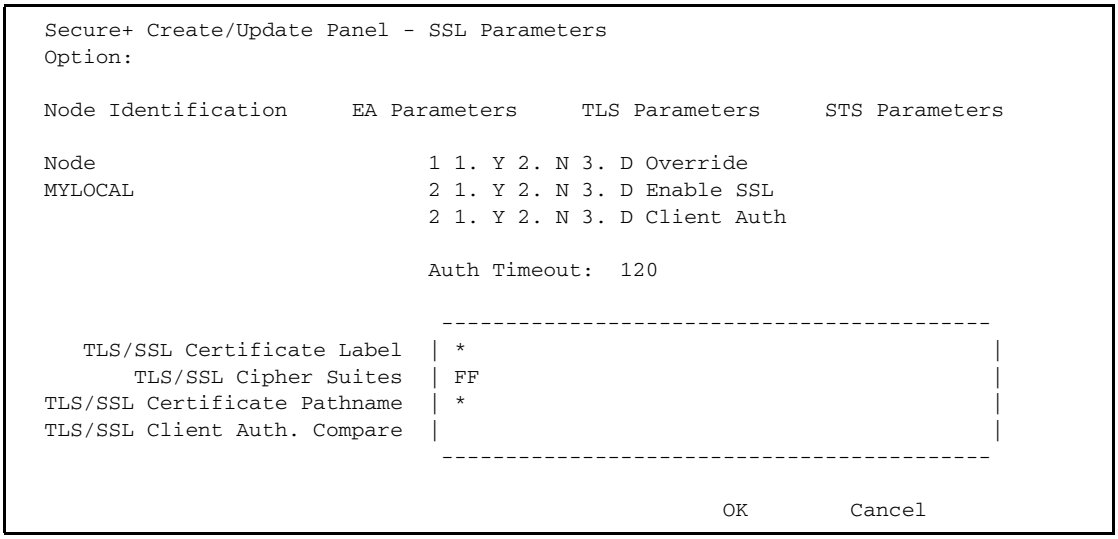
7. Select **EA Parameters** and press **Enter.**
8. In the **EA Parameters** panel:
   a. Type **2** beside the **External Auth** field to disable it. The remaining External Authentication fields are available only from the .EASERVER remote node record.

Note: Values set for parameters that are displayed in multiple panels (Override, for example) are retained in a record after you set them the first time they are displayed.

   b. Select **TLS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - TLS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     STS Parameters

Node                          1 1. Y 2. N 3. D Override
MYLOCAL                       2 1. Y 2. N 3. D Enable TLS
                              2 1. Y 2. N 3. D Client Auth

                              Auth Timeout:  120

                               ------------------------------------------
   TLS/SSL Certificate Label  | *                                        |
       TLS/SSL Cipher Suites  | FF                                       |
TLS/SSL Certificate Pathname  | *                                        |
TLS/SSL Client Auth. Compare  |                                          |
                               ------------------------------------------

                                                      OK        Cancel
```

9. In the **TLS Parameters** panel:
   a. Type **2** beside the **Enable TLS** field to disable the TLS protocol.
   b. Type **2** beside the **Client Auth** field because it is not valid for the STS protocol.
   c. Leave the remaining fields as they are because they are not valid for the STS protocol.
   d. Select **SSL Parameters** and press **Enter**.



10. In the **SSL Parameters** panel:
    a. Type **2** beside the **Enable SSL** field to disable the SSL protocol.
    b. Verify that **Client Auth** is disabled.
    c. Leave the remaining fields as they are because they are not valid for the STS protocol.
11. Select **OK** and press **Enter**.
12. From the **Create/Update** panel, press **Cancel** to display the settings for the local node record.
13. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors that occur before you can save the parameters file.
14. After you configure the local node record, you can save and submit the parameters file using the procedures in Chapter 12, *Enable and Validate Secure+ Operation*, but if you have not added a remote node record, connections are not secure.

Tip: Before you configure your remote node records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are unable to generate the JCL for the SAVE AS job, verify that you have allocated the ISPF libraries in your TSO session that are required to save the Secure+ option parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).

Add a Remote Node Record to the Parameters File Manually for the STS Protocol

Configure a remote node record for each trading partner that uses the STS protocol. Refer to the *Remote Node Security Feature Definition Worksheet* on page 198 that you created for a remote node that uses the STS protocol when you complete this procedure.

To add a remote node record manually for the STS protocol:

1. Select **Edit** from the **Secure+ Admin Tool Main Screen** and press **Enter** to display the **Edit** menu.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                        Row 1 of 1
                      Secure+ Admin Tool: Main Screen
 Option ===>                                                          Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   MYLOCAL            L    NNNN     Y         N          N        N       N
******************************** BOTTOM OF DATA ********************************
```

2. On the **Edit** menu, type **1** to select **Create/Update Record** and press **Enter** to display the **Secure+ Create/Update Node Identification** panel.

```
Secure+ Create/Update Panel - Node Identification
Option:

EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

Node
                        2 1. Local
                          2. Remote
Alias
Names:                  TCP Information:
                          IPaddr:
                          Port:

   Import Remote Keys     Get Record                OK        Cancel
```

3. In the **Node Identification** panel:
   a. Type a name for the node in the **Node** field.
   b. Type **2** next to the **Local/Remote** field.

c. Leave the **TCP Information** fields (**IP addr** and **Port**) blank because Connect:Direct always obtains the IP address and port for a remote node from the network map.

d. In the **Alias Names** field, type any alternative name for this remote node that uses the same Secure+ Option parameters. This alias name must also exist as a valid remote node entry in the network map.

e. Select **STS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
REMOTE01                                1 1. Y 2. N 3. D Autoupdt
                                        1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm       *             2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | *                                         |
Create  / Reset   Sig. Pubkey | *                                         |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                Sig. Rmt. Key | 0000                                      |
                               -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

Because the **Override**, **Encrypt**, and **Signature** parameters work together, use the following table to determine the values to set in this remote node record when you complete step 4 on page 99:

Scenario	Setting for Override Parameter	Setting for Encrypt and Signature
All files must be encrypted and use signature.	Disable Override by setting to 2.	Enable Signature and Encrypt by setting to 1.

Scenario	Setting for Override Parameter	Setting for Encrypt and Signature
A few files must be encrypted and use signature.	Enable Override by setting to 1.	Disable Signature and Encrypt by setting to 2. You can change these settings in the COPY statement Process so that the individual files use encryption and signature. See *Override STS Functions from the COPY Statement* on page 104. For additional information, you can also go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.

4. In the **STS Parameters** panel, set values for the fields listed in the following table to enable the STS protocol:

Field	Description	Valid Values
Enable STS	Enables or disables using the STS protocol for Connect:Direct Secure+ Option. **Note:** To specify that the session for a particular Process is to be secure using STS, disable STS by specifying 2 but enable the remote node to override the default of non-secure sessions by specifying YES for the OVERRIDE field. See Chapter 13, *Override Settings in Connect:Direct Processes*.	1 = Enable STS 2 = Disable STS 3 = Default to local node
Autoupdt	Allows STS keys to be automatically updated when the values change.	1=Yes 2=No 3=Default to local node
Override	Enables or disables the following security override functions on a session-by-session basis: ◆ Allow values in the COPY statement to override values in the remote node record. ◆ Allow the STS protocol to be turned on or off for a particular session overriding the security default in the remote node record.	1=Yes 2=No 3=Default to local node
Signature	Enables digital signatures for use with the STS protocol.	1=Yes 2=No 3=Default to local node

Field	Description	Valid Values
Encrypt	Enables data encryption with the STS protocol, during the COPY operation. If you activate this feature, you must also populate the **Algorithm** field. **Note:** If the SNODE enables encryption, the PNODE cannot disable it.	1=Yes 2=No 3=Default to local node. This is not a valid value for the local node definition.

5. Generate the authentication key as follows:
   a. Select **Create /Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
                  Secure+ Admin Tool: Generate Seed


2 1. Specify Value         Specify the seed value by typing it
                           into the text field.
  2. Sample Value          Generate a seed by processing text
                           entered from the keyboard.

   Random Number
   Seed:
```

   b. Press **Enter** to accept the default value of **2-Sample Value**.
   c. When the following screen is displayed, edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
------------------------------------------------------------------------------
EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
Command ===>                                                  Scroll ===> PAGE
024: This process cannot proceed if the data in the edit file is unchanged.
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 262144
000002
000003 134217728
000004
000005 32
000006
000007 4
000008
000009 8589934592
000010
000011 131072
000012
000013 8388608
000014
000015 2097152
000016
000017 1073741824
```

d. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember the pass phrase.

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey** field is populated, as shown in the following illustration.

6. To generate the signature key:
   a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
   b. Press **Enter** to accept the default value (**2-Sample Value**).

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
REMOTE01                                1 1. Y 2. N 3. D Autoupdt
                                        1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                         Expire Date
Create  / Reset   Sig. Prev. Keys                         Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                Sig. Rmt. Key | 0000                                      |
                               ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding illustration.

7. Set values in one or more of the following fields as required:

Field Name	Field Description	Valid Values
Algorithm	Specifies the data encryption algorithm used. Also set **Encrypt** to Yes.	* = Use first algorithm in list DESCBC56 TDESCBC112 IDEACBC128
Sig. Prev. Keys Expire Date	Identifies the expiration date for previous digital signature public keys used with the STS protocol. This value eliminates the need to update Secure+ Option parameters files across all nodes in the network simultaneously when public keys for the local node are changed.	Format YYYY/MM/DD HH:MM:SS If time is not specified, 00:00:01 is used.
Algorithm Names	Lists the acceptable data encryption algorithms to use when copy file encryption is requested. Listed in order of preference, with the most-preferred algorithm listed first.	DESCBC56 TDESCBC112 IDEACBC128 Not used with the TLS or SSL protocol
Import Remote Keys	Imports keys from the remote trading partner for both the Authorization and Signature functions in the STS protocol.	The name of the key file to import.
Auth. Prev. Keys Expire Date	Identifies the expiration date for previous authentication public keys used with the STS protocol. This value eliminates the need to update Secure+ Option parameters files across all nodes in the network simultaneously when public keys for the local node are changed.	Format YYYY/MM/DD HH:MM:SS If time is not specified, 00:00:01 is used.
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.
TCP Information: IPaddr: Port:	Lists the TCP/IP address and port number. This information is used with the Process parameter SNODE= TCPNAME.	IPaddr=Valid IP address in format xxx.xxx.xxx.xxx Port=Valid 4-digit port number Not valid for the local node

Note: When you create the Secure+ Parameters file from the NETMAP, the TCP Information field is populated automatically; however, data in the TCP Information field of the Secure+ remote record is not used to initiate Connect:Direct communications sessions. IP address and port number are acquired only from the NETMAP.

Field Name	Field Description	Valid Values
Get Record	Opens another node record.	The name of an existing node record.

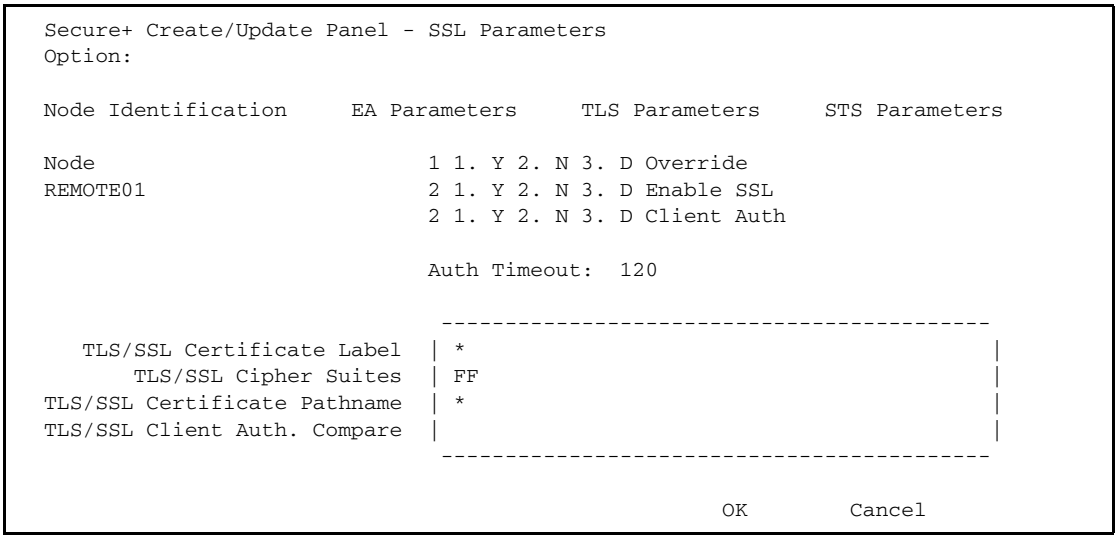
8. Select **EA Parameters** and press **Enter**.
9. In the **EA Parameters** panel:
   a. Type **3** beside the **Override** field because it is not relevant to External Authentication.
   b. Type **2** beside the **External Auth** field to disable it. The remaining External Authentication fields are available only from the .EASERVER remote node record.

Note: Values set for parameters that are displayed in multiple panels (Override, for example) are retained in a record after you set them the first time they are displayed.

   c. Select **TLS Parameters** and press **Enter**.

```
Secure+ Create/Update Panel - TLS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     STS Parameters

Node                          1 1. Y 2. N 3. D Override
REMOTE01                      2 1. Y 2. N 3. D Enable TLS
                              2 1. Y 2. N 3. D Client Auth

                              Auth Timeout:  120

                               ------------------------------------------
   TLS/SSL Certificate Label  | *                                        |
       TLS/SSL Cipher Suites  | FF                                       |
TLS/SSL Certificate Pathname  | *                                        |
TLS/SSL Client Auth. Compare  |                                          |
                               ------------------------------------------

                                                      OK        Cancel
```

10. In the **TLS Parameters** panel:
    a. Type **2** beside the **Enable TLS** field to disable the TLS protocol.
    b. Type **2** beside the **Client Auth** field because it is not valid for the STS protocol.
    c. Leave the remaining fields as they are because they are not valid for the STS protocol.
    d. Select **SSL Parameters** and press **Enter**.

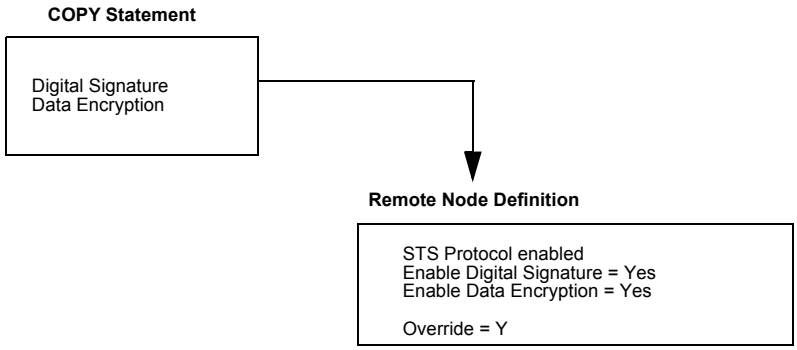


11. In the **SSL Parameters** panel:
    a. Type **2** beside the **Enable SSL** field to disable the SSL protocol.
    b. Leave the remaining fields as they are because they are not valid for the STS protocol.
12. Select **OK** and press **Enter** to display the updated values.
13. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.
14. Take one of the following actions:
    - To configure records for remote nodes that use a protocol other than STS, continue with the following appropriate procedures:
      - *Add a Remote Node Record to the Parameters File Manually for the SSL Protocol* on page 58.
      - *Add a Remote Node Record to the Parameters File Manually for the TLS Protocol* on page 74.
    - If you have no other remote node records to configure, continue with the procedures in Chapter 12, *Enable and Validate Secure+ Operation*.

Override STS Functions from the COPY Statement

After you set up the Secure+ Option environment, security is implemented each time that you use Connect:Direct with any node configured and enabled for Secure+ Option. You can, however, override some Secure+ Option functions for nodes configured to use the STS protocol for a particular session using a COPY statement parameter. By using the COPY statement's SECURE parameter in a Connect:Direct Process to override the settings in the parameters file and enabling the override feature in the remote node record, you can disable security for a particular file transfer. Secure+ Option uses

the most secure connection available. Therefore, if the remote node record enables digital signatures or encryption, the PNODE cannot turn those options off using the COPY statement override. The following illustration shows how the COPY statement overrides the security functions set in a remote node record:



With the SECURE parameters, you can set data encryption and digital signatures features from the Connect:Direct COPY statement. You can always enable these features from the COPY statement, but you cannot necessarily disable them. The SECURE parameters value specified in the COPY statement overrides the value specified in the Secure+ Option remote node record *only* if the override function is **Y** (yes) in that remote node record. After the security settings of the PNODE and SNODE are merged, the strongest setting is always used. Therefore, the value specified from the COPY statement cannot disable data encryption or digital signatures if the SNODE has enabled them.

Note: In addition to the COPY statement's SECURE parameter, you can use the SECURE parameter in the PROCESS statement in a Connect:Direct Process for all protocols (TLS, SSL, and STS) to turn security on or off if OVERRIDE=YES is specified in the remote node record. See Chapter 13, *Override Settings in Connect:Direct Processes*.

For a complete description of the SECURE parameter and how to use it in the COPY statement, go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.

Chapter 9

Configure the Local Node Record Imported from the Network Map

The following procedures assume that you populate the parameters file by importing the network map. The Quick Start method creates a remote node record in the parameters file for each remote node record in the network map and a local node record. Using the Quick Start method to populate the parameters file is most efficient if you have a large number of trading partners that use the same protocol. You can enable that protocol in the local node record and because the remote node records are set automatically to Default to Local Node, they inherit the settings of the local node.

Depending on how you configure the local node record, you may or may not need to modify the remote node records. You must disable the Secure+ Option protocols in the records for all remote nodes that do not use Secure+ Option, and update all remote node records that use a protocol that is different from the protocol defined in the local node record.

Use the following procedures to configure the local node record imported from the network map for the SSL, TLS, and STS protocols:

- *Configure the Local Node Record for the SSL Protocol* on page 108
- *Configure the Local Node Record for the TLS Protocol* on page 114
- *Configure the Local Node Record for the STS Protocol* on page 122

Configuration Guidelines

Observe the following guidelines when you configure node records imported from the network map:

- Secure+ Option protocols are disabled initially for all records created from the network map when you use Quick Start to populate the parameters file.
- You must create keys for the STS protocol because this action also creates the key that encrypts the Secure+ parameters file.

- To enable secure connections using Connect:Direct Secure+ Option, you must complete the following procedures:
  - *Configure the Local Node Record for the SSL Protocol* on page 108, *Configure the Local Node Record for the TLS Protocol* on page 114, or *Configure the Local Node Record for the STS Protocol* on page 122
  - Relevant procedures in Chapter 10, *Configure Remote Node Records Imported from the Network Map*
  - Procedures in Chapter 12, *Enable and Validate Secure+ Operation*
- Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.

Configure the Local Node Record for the SSL Protocol

All Secure+ Option protocols are disabled when you import the network map. This procedure has the following assumptions:

- You have allocated the Connect:Direct ISPF libraries in your TSO session that are required to generate the SAVE AS JCL (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).
- Most trading partners use the SSL protocol.

Therefore, this procedure updates the local node record for the SSL protocol, enables the **Override** parameter, and verifies that the TLS and STS protocols are disabled. Remember that all options set for the local node are inherited by all remote node records.

To update the local node record for the SSL protocol:

1. From the Secure+ Admin Main screen, type **U** next to the local node record and press **Enter** to display the **Secure+ Create/Update Panel** and the current values for the selected node.

Note: When you import the network map, the system enables **Overrride** in the local node record automatically, as shown in the following illustration.

```
File  Edit  Key Management  Help
------------------------------------------------------------------------
                                                          Row 9 to 13 of 13
 Q2A.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                 Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
 u Q2A.ZOS.V4600      L    NNNN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
   Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel, verify that the following STS protocol parameters are disabled: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
CQ2A.ZOS.V4600                          2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                         Expire Date
Create  / Reset   Sig. Prev. Keys                         Expire Date

                              -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey |                                         |
Create  / Reset   Sig. Pubkey |                                         |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128          |
               Auth. Rmt. Key | 0000                                    |
                Sig. Rmt. Key | 0000                                    |
                              -----------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

3. Generate the STS protocol authentication key, which is part of the key pair that is used to encrypt the parameters file:
   a. Select **Create/Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
                  Secure+ Admin Tool: Generate Seed


2 1. Specify Value         Specify the seed value by typing it
                           into the text field.
  2. Sample Value          Generate a seed by processing text
                           entered from the keyboard.

   Random Number
   Seed:
```

   b. Press **Enter** to accept the default value of **2-Sample Value**.
   c. When the following screen is displayed, edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
------------------------------------------------------------------------------
EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
Command ===>                                                  Scroll ===> PAGE
024: This process cannot proceed if the data in the edit file is unchanged.
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 262144
000002
000003 134217728
000004
000005 32
000006
000007 4
000008
000009 8589934592
000010
000011 131072
000012
000013 8388608
000014
000015 2097152
000016
000017 1073741824
```

   d. When the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.
   e. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

> **Note:** You do not need to remember the pass phrase.

```
 Secure+ Create/Update Panel - STS Parameters
 Option:
 024: Seed generation complete.
 Node Identification     EA Parameters     SSL Parameters     TLS Parameters

 Node                                    1 1. Y 2. N 3. D Override
Q2A.ZOS.V4600                            2 1. Y 2. N 3. D Autoupdt
                                         2 1. Y 2. N 3. D Enable STS
           Auth Timeout:  120            2 1. Y 2. N 3. D Signature
           Algorithm     *               2 1. Y 2. N 3. D Encrypt

 Create  / Reset  Auth. Prev. Keys                          Expire Date
 Create  / Reset   Sig. Prev. Keys                          Expire Date

                                 -----------------  <  >  ------------------
 Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
 Create  / Reset   Sig. Pubkey |                                           |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key |                                           |
                Sig. Rmt. Key |                                           |
                                 -------------------------------------------

    Import Remote Keys     Get Record                OK        Cancel
```

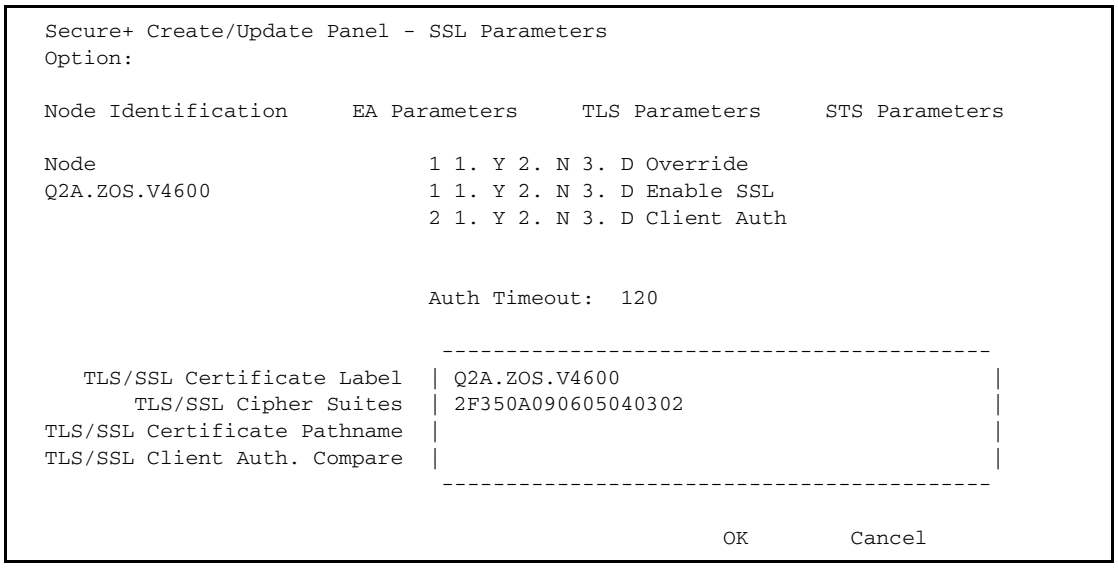
When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey field** is populated, as shown in the preceding illustration.

4. Generate the signature key, which is part of the key pair used to encrypt the parameters file:
   a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
   b. Press **Enter** to accept the default value (**2-Sample Value**).

```
 Secure+ Create/Update Panel - STS Parameters
 Option:
 024: Seed generation complete.
 Node Identification     EA Parameters     SSL Parameters     TLS Parameters

 Node                                    1 1. Y 2. N 3. D Override
Q2A.ZOS.V4600                            2 1. Y 2. N 3. D Autoupdt
                                         2 1. Y 2. N 3. D Enable STS
           Auth Timeout:  120            2 1. Y 2. N 3. D Signature
           Algorithm     *               2 1. Y 2. N 3. D Encrypt

 Create  / Reset  Auth. Prev. Keys                          Expire Date
 Create  / Reset   Sig. Prev. Keys                          Expire Date

                                 -----------------  <  >  ------------------
 Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
 Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                Sig. Rmt. Key | 0000                                      |
                                 -------------------------------------------

    Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding illustration.

5. Select **SSL Parameters** and press **Enter** to display the **SSL Parameters** panel.



6. Type **1** beside the **Enable SSL** field to enable the SSL protocol.
7. Update the value for the **Auth Timeout** field, if necessary, using the following table as a guide:

Field	Description	Valid Values
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

8. Type **2** in the **Client Auth** field.
9. If necessary, update the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.

c. This field is case sensitive; therefore, type the certificate label exactly as you defined it when you generated it using one of the security applications described in Appendix B and press **Enter**.

10. If necessary, update the location where the certificate information is stored:
    a. Select the **TLS/SSL Certificate Pathname** field and press **Enter** to display the **Certificate Pathname** panel.
    b. Press **F8** to scroll to the **Certificate Path Name** field.
    c. Type the UNIX path name of the key database (.kdb) or the security system key ring name that contains all the certificates referred to in the parameters file.

> **Note:** This value is case sensitive. Ensure that you type it exactly as it appears in the certificate file. Refer to the information you recorded in *Local Node Security Feature Definition Worksheet* on page 196.

    d. If you are using a key database:
        a. Press **F8** to scroll to the password field.
        b. Type the password used when the key database was created and press **Enter**.

> **Note:** If you are using a key ring, leave the password field blank.

11. To update the enabled cipher suites:
    a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display **Update Cipher Suites**.

```
                                                                        More:     +
More:     +

      Update the order field below to enable and order cipher suites.

  O
  r
  d
  e
  r   All Available Cipher-Suites          Enabled Cipher-Suites

  ==  ================================== ==================================
  1   SSL_RSA_AES_128_SHA                  SSL_RSA_AES_128_SHA
  2   SSL_RSA_AES_256_SHA                  SSL_RSA_AES_256_SHA
  3   SSL_RSA_WITH_3DES_EDE_CBC_SHA        SSL_RSA_WITH_3DES_EDE_CBC_SHA
  4   SSL_RSA_WITH_DES_CBC_SHA             SSL_RSA_WITH_DES_CBC_SHA
  5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5
  6   SSL_RSA_WITH_RC4_128_SHA             SSL_RSA_WITH_RC4_128_SHA
  7   SSL_RSA_WITH_RC4_128_MD5             SSL_RSA_WITH_RC4_128_MD5
  8   SSL_RSA_EXPORT_WITH_RC4_40_MD5       SSL_RSA_EXPORT_WITH_RC4_40_MD5
  9   SSL_RSA_WITH_NULL_SHA                SSL_RSA_WITH_NULL_SHA
  10  SSL_RSA_WITH_NULL_MD5                SSL_RSA_WITH_NULL_MD5
  11  DEFAULT_TO_LOCAL_NODE                DEFAULT_TO_LOCAL_NODE
```

b. Type **1** by the cipher suite you want to enable and give the highest priority.

c. Type **2** by the cipher suite you want to enable and place second in priority.

d. Continue typing numbers next to the cipher suites you want to enable, in order of priority.

The cipher suites you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

e. Press **F3** when you have enabled and ordered all necessary cipher suites.

Note: If you do not know what cipher suites are available, run a trace on the Connect:Direct system. Setting **debug=8C0000AE** in the initialization parameter file dynamically allocates DD R00000001. Available cipher suites are listed in the trace DD. Turn global tracing off before you continue.

---

12. Select **EA Parameters** and press **Enter**.
13. Verify that External Authentication (**External Auth**) is disabled (set to **2**). The remaining external authentication fields are unavailable because they are valid only for the .EASERVER remote node record.
14. Select **TLS Parameters** and press **Enter**.
15. Verify that the **Enable TLS** and **Client Auth** fields are disabled (set to **2**).
16. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before you can save the parameters file.
17. After you configure the local node record, you can save and submit the parameters file using the procedures in Chapter 12, *Enable and Validate Secure+ Operation*, but if you have not added a remote node record, connections are not secure.

Tip: Before you configure your remote node records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are unable to generate the JCL for the SAVE AS job, verify that you have allocated the ISPF libraries in your TSO session that are required to save the Secure+ option parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).

Configure the Local Node Record for the TLS Protocol

All Secure+ Option protocols are disabled when you import the network map. This procedure has the following assumptions:

- You have allocated the Connect:Direct ISPF libraries in your TSO session that are required to generate the SAVE AS JCL for the Secure+ Options parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).
- Most trading partners use the TLS protocol.

Therefore, this procedure enables the TLS protocol for the local node record, ensures that the **Override** parameter is enabled, and verifies that the SSL and STS protocols are disabled.

To update the local node record for the TLS protocol:

1. From the Secure+ Admin Main screen, type **U** next to the local node record and press **Enter** to display the **Secure+ Create/Update Panel** and the current values for the selected node.

Note: When you import the network map, the system enables **Overrride** in the local node record record automatically, as shown in the following illustration.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
 Q2A.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                     Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name          Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------   ---- ------ -------- ---------- --------- ------- -------
 u Q2A.ZOS.V4600       L    NNNN     Y         N          N        N       N
   Q3A.ZOS.V4600       R    ***N     N         *          *        *       *
   Q3B.ZOS.V4600       R    ***N     N         *          *        *       *
   SOL36SP             R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8    R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel, verify that the following STS protocol parameters are disabled: **Autoupdt**, **Enable STS**, **Signature**, and **Encrypt**.

```
 Secure+ Create/Update Panel - STS Parameters
 Option:

 Node Identification     EA Parameters     SSL Parameters     TLS Parameters

 Node                                     1 1. Y 2. N 3. D Override
Q2A.ZOS.V4600                             2 1. Y 2. N 3. D Autoupdt
                                          2 1. Y 2. N 3. D Enable STS
           Auth Timeout:  120             2 1. Y 2. N 3. D Signature
           Algorithm     *                2 1. Y 2. N 3. D Encrypt

 Create  / Reset  Auth. Prev. Keys                          Expire Date
 Create  / Reset   Sig. Prev. Keys                          Expire Date

                                 -----------------  <  >  ------------------
 Create  / Reset  Auth. Pubkey |                                           |
 Create  / Reset   Sig. Pubkey |                                           |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128             |
               Auth. Rmt. Key | 0000                                       |
                 Sig. Rmt. Key | 0000                                       |
                                 -------------------------------------------

    Import Remote Keys     Get Record                OK        Cancel
```

3. Generate the STS protocol authentication key, which is part of the key pair used to encrypt the parameters file:

   a. Select **Create/Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
                  Secure+ Admin Tool: Generate Seed


 2 1. Specify Value         Specify the seed value by typing it
                            into the text field.
   2. Sample Value          Generate a seed by processing text
                            entered from the keyboard.

    Random Number
    Seed:
```

   b. Press **Enter** to accept the default value of **2-Sample Value**.

   c. When the following screen is displayed, edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
-------------------------------------------------------------------------------
EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
Command ===>                                                  Scroll ===> PAGE
024: This process cannot proceed if the data in the edit file is unchanged.
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 262144
000002
000003 134217728
000004
000005 32
000006
000007 4
000008
000009 8589934592
000010
000011 131072
000012
000013 8388608
000014
000015 2097152
000016
000017 1073741824
```

d. When the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.

e. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember this number.

```
 Secure+ Create/Update Panel - STS Parameters
 Option:
 024: Seed generation complete.
 Node Identification     EA Parameters     SSL Parameters     TLS Parameters

 Node                                    1 1. Y 2. N 3. D Override
Q2A.ZOS.V4600                            2 1. Y 2. N 3. D Autoupdt
                                         2 1. Y 2. N 3. D Enable STS
           Auth Timeout:  120            2 1. Y 2. N 3. D Signature
           Algorithm     *               2 1. Y 2. N 3. D Encrypt

 Create  / Reset  Auth. Prev. Keys                          Expire Date
 Create  / Reset   Sig. Prev. Keys                          Expire Date

                                 -----------------  <  >  ------------------
 Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
 Create  / Reset   Sig. Pubkey |                                           |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                                 -------------------------------------------

    Import Remote Keys     Get Record                OK        Cancel
```

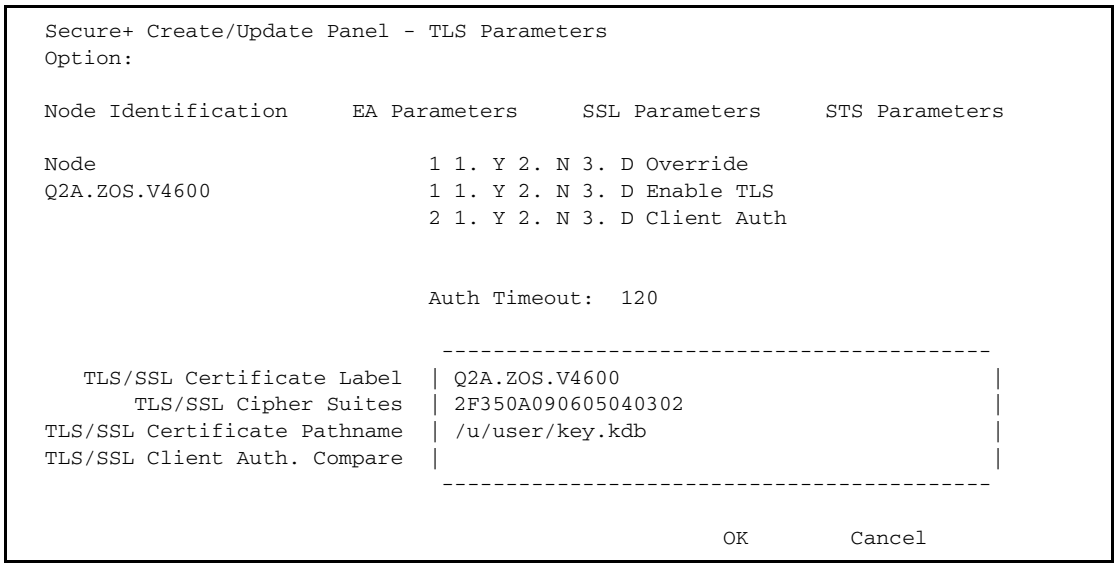
When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey field** is populated, as shown in the preceding illustration.

4. Generate the signature key, which is part of the key pair used to encrypt the parameters file:
   a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
   b. Press **Enter** to accept the default value (**2-Sample Value**).

```
 Secure+ Create/Update Panel - STS Parameters
 Option:
 024: Seed generation complete.
 Node Identification     EA Parameters     SSL Parameters     TLS Parameters

 Node                                    1 1. Y 2. N 3. D Override
Q2A.ZOS.V4600                            2 1. Y 2. N 3. D Autoupdt
                                         2 1. Y 2. N 3. D Enable STS
           Auth Timeout:  120            2 1. Y 2. N 3. D Signature
           Algorithm     *               2 1. Y 2. N 3. D Encrypt

 Create  / Reset  Auth. Prev. Keys                          Expire Date
 Create  / Reset   Sig. Prev. Keys                          Expire Date

                                 -----------------  <  >  ------------------
 Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
 Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                                 -------------------------------------------

    Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel - STS Parameters** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding illustration.

5. Select **TLS Parameters** and press **Enter**.



6. In the **TLS Parameters** panel:
   a. Type **1** beside the **Enable TLS** field to enable the TLS protocol.
   b. Type **2** beside the **Client Auth** field to disable client authentication.
   c. Update the value for the **Auth Timeout** field, if necessary, using the following table as a guide:

Field	Description	Valid Values
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

7. If necessary, update the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. Type the certificate label and press **Enter**.
8. If necessary, update the location where the certificate information is stored:
   a. Select the **TLS/SSL Certificate Pathname** field and press **Enter**. The **Certificate Pathname** panel is displayed.
   b. Press **F8** to scroll to the **Certificate Path Name** field.
   c. Type the UNIX path name of the key database (.kdb) or the security system key ring name that contains all the certificates referred to in the parameters file.

   Note: This value is case sensitive. Ensure that you type it exactly as it appears in the certificate file. Refer to the information you recorded in *Local Node Security Feature Definition Worksheet* on page 196.

   d. If you are using a key database:
      a. Press **F8** to scroll to the password field.
      b. Type the password used when the key database was created and press **Enter**.

      Note: If you are using a key ring, leave the password field blank.

9. To update the enabled cipher suites:
   a. Select the **TLS/SSL Cipher Suites** field and press **Enter** to display **Update Cipher Suites**.

```
                                                                        More:     +
More:     +

      Update the order field below to enable and order cipher suites.

  O
  r
  d
  e
  r   All Available Cipher-Suites          Enabled Cipher-Suites

  ==  ================================== ==================================
  1   SSL_RSA_AES_128_SHA                SSL_RSA_AES_128_SHA
  2   SSL_RSA_AES_256_SHA                SSL_RSA_AES_256_SHA
  3   SSL_RSA_WITH_3DES_EDE_CBC_SHA      SSL_RSA_WITH_3DES_EDE_CBC_SHA
  4   SSL_RSA_WITH_DES_CBC_SHA           SSL_RSA_WITH_DES_CBC_SHA
  5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5 SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5
  6   SSL_RSA_WITH_RC4_128_SHA           SSL_RSA_WITH_RC4_128_SHA
  7   SSL_RSA_WITH_RC4_128_MD5           SSL_RSA_WITH_RC4_128_MD5
  8   SSL_RSA_EXPORT_WITH_RC4_40_MD5     SSL_RSA_EXPORT_WITH_RC4_40_MD5
  9   SSL_RSA_WITH_NULL_SHA              SSL_RSA_WITH_NULL_SHA
  10  SSL_RSA_WITH_NULL_MD5              SSL_RSA_WITH_NULL_MD5
  11  DEFAULT_TO_LOCAL_NODE              DEFAULT_TO_LOCAL_NODE
```

b. Type **1** by the cipher suite you want to enable and give the highest priority.

c. Type **2** by the cipher suite you want to enable and place second in priority.

d. Continue typing numbers next to the cipher suites you want to enable, in order of priority.

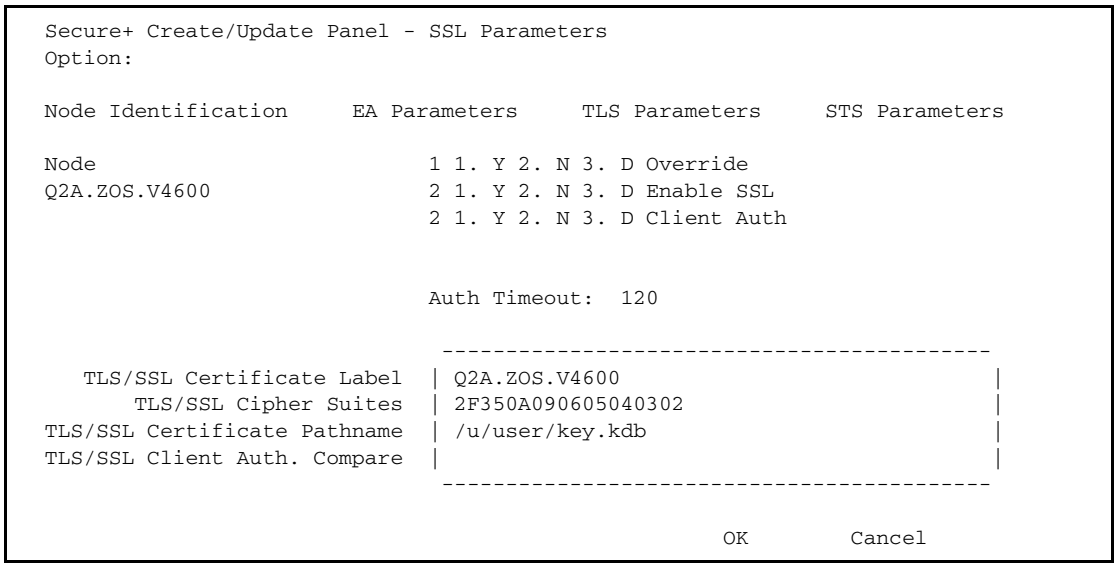
   The cipher suites you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

e. Press **F3** when you have enabled and ordered all necessary cipher suites.

> **Note:** If you do not know what cipher suites are available, run a trace on the Connect:Direct system. Setting **debug=8C0000AE** in the initialization parameter file dynamically allocates DD R00000001. Available cipher suites are listed in the trace DD. Turn global tracing off before you continue.

f. Select **EA Parameters** and press **Enter**.

10. Verify that the **External Auth** parameter is disabled (set to **2**). The remaining external authentication fields are unavailable because they are valid only for the .EASERVER remote node record.
11. Select **SSL Parameters** and press **Enter** to display the **SSL Parameters** panel.



12. Verify that the **Enable SSL** parameter is disabled (set to **2**).
13. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before you can save the parameters file.

14. After you configure the local node record, you can save and submit the parameters file using the procedures in Chapter 12, *Enable and Validate Secure+ Operation*, but if you have not added a remote node record, connections are not secure.

Tip: Before you configure your remote node records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are unable to generate the JCL for the SAVE AS job, verify that you have allocated the ISPF libraries in your TSO session that are required to save the Secure+ option parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).

Configure the Local Node Record for the STS Protocol

All Secure+ Option protocols are disabled when you import the network map. This procedure has the following assumptions:

- You have allocated the Connect:Direct ISPF libraries in your TSO session that are required to generate the SAVE AS JCL for the Secure+ Options parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).
- Most trading partners use the STS protocol.

Therefore, this procedure updates the local node record for the STS protocol, enables the **Override** parameter, and verifies that the TLS and SSL protocols are disabled. Remember that all options set for the local node are inherited by all remote node records.

To update the local node record imported from the network map:

1. Type **U** next to the local node record and press **Enter**. The **Secure+ Create/Update Panel** displays the current values for the selected node.

Note: When you import the network map, the system enables **Overrride** in the local node record record automatically, as shown in the following illustration.

```
File  Edit  Key Management  Help
------------------------------------------------------------------------------
                                                              Row 9 to 13 of 13
 Q2A.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                    Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name          Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------   ---- ------ -------- ---------- --------- ------- -------
 u Q2A.ZOS.V4600       L    NNNN     Y         N          N        N       N
   Q3A.ZOS.V4600       R    ***N     N         *          *        *       *
   Q3B.ZOS.V4600       R    ***N     N         *          *        *       *
   SOL36SP             R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8    R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel:
   a. Type **1** beside the **Enable STS** field to enable the STS protocol.
   b. Set values in one or more of the following fields as required to configure the STS protocol parameters:

Field Name	Field Description	Valid Values
Autoupdt	Allows STS keys to be automatically update when the values change.	1=Yes 2=No 3=Default to local node.
Override	Allows settings in a remote node record to override settings in the local node record.	1=Yes 2=No 3=Default to local node.
Signature	Enables digital signatures for use with the STS protocol.	1=Yes 2=No 3=Default to local node. This is not a valid value for the local node definition.
Encrypt	Enables data encryption with the STS protocol, during the copy operation. If you activate this feature, you must also populate **Algorithm**. If the SNODE enables encryption, the PNODE cannot disable it.	1=Yes 2=No 3=Default to local node. This is not a valid value for the local node definition.
Algorithm	Specifies the data encryption algorithm used. Also set **Encrypt** to Yes.	* = Use first algorithm in list DESCBC56 TDESCBC112 IDEACBC128
Sig. Prev. Keys Expire Date	Identifies the expiration date for previous digital signature public keys used with the STS protocol. This value eliminates the need to update Secure+ Option parameters files across all nodes in the network simultaneously when public keys for the local node are changed.	Format YYYY/MM/DD HH:MM:SS If time is not specified, 00:00:01 is used.
Auth. Pubkey	Generates the public key used for strong authentication with the STS protocol.	Generated by Secure+ Option. See step 3 on page 110.
Sig. Pubkey	Generates the public key used for digital signature with the STS protocol.	Generated by Secure+ Option. See step 4 on page 111.

Field Name	Field Description	Valid Values
Algorithm Names	Lists the acceptable data encryption algorithms to use when copy file encryption is requested. Listed in order of preference, with the most-preferred algorithm listed first.	DESCBC56 TDESCBC112 IDEACBC128 Not used with the TLS or SSL protocol.
Import Remote Keys	Imports keys from the remote trading partner for both the Authorization and Signature functions in the STS protocol.	The name of the key file to import.
Auth. Prev. Keys Expire Date	Identifies the expiration date for previous authentication public keys used with the STS protocol. This value eliminates the need to update Secure+ Option parameters files across all nodes in the network simultaneously when public keys for the local node are changed.	Format YYYY/MM/DD HH:MM:SS If time is not specified, 00:00:01 is used.
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                     1 1. Y 2. N 3. D Override
Q2A.ZOS.V4600                            1 1. Y 2. N 3. D Autoupdt
                                         1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120             1 1. Y 2. N 3. D Signature
          Algorithm     *                1 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                                 -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey |                                            |
Create  / Reset   Sig. Pubkey |                                            |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128             |
               Auth. Rmt. Key | 0000                                       |
                 Sig. Rmt. Key | 0000                                       |
                                 -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

3. Generate the authentication key for use with the STS protocol:
   a. Select **Create/Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
Secure+ Admin Tool: Generate Seed


2 1. Specify Value          Specify the seed value by typing it
                            into the text field.
  2. Sample Value           Generate a seed by processing text
                            entered from the keyboard.

   Random Number
   Seed:
```

   b. Press **Enter** to accept the default value of **2-Sample Value**. The following screen is displayed.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 -------------------------------------------------------------------------------
 EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
 Command ===>                                                  Scroll ===> PAGE
 024: This process cannot proceed if the data in the edit file is unchanged.
 ==MSG> -Warning- The UNDO command is not available until you change
 ==MSG>           your edit profile using the command RECOVERY ON.
 000001 262144
 000002
 000003 134217728
 000004
 000005 32
 000006
 000007 4
 000008
 000009 8589934592
 000010
 000011 131072
 000012
 000013 8388608
 000014
 000015 2097152
 000016
 000017 1073741824
```

c. Edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

d. If the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.

e. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember the pass phrase.

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 1 1. Y 2. N 3. D Autoupdt
                                        1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            1 1. Y 2. N 3. D Signature
          Algorithm     *               1 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0303.ADB4.2924.EADD.FF27.4B7F.B248.E1CA   |
Create  / Reset   Sig. Pubkey |                                           |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                               -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel** displays the message *Seed generation complete*, your public key for strong authentication has been generated and the **Create/Reset Auth. Pubkey** field is populated.

4. To generate the signature key:
   a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
   b. Press **Enter** to accept the default value (**2-Sample Value**).

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
MYLOCAL                                 1 1. Y 2. N 3. D Autoupdt
                                        1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            1 1. Y 2. N 3. D Signature
          Algorithm     *               1 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | 0201.C2DB.B318.1B91.3A11.7FD3.3553.37EA.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                               -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

When the **Secure+ Option Create/Update Panel** displays the message *Seed generation complete*, your public key for digital signature has been generated and the **Create/Reset Sig. Pubkey** field is populated, as shown in the preceding illustration.

5. Select **EA Parameters** and press **Enter**.
6. In the **EA Parameters** panel, type **2** beside the **Enable External Auth** field. The remaining external authentication fields are unavailable because they are valid only for the .EASERVER remote node record.
7. Select **OK** and press **Enter t**o display the updated values.
8. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors that occur before you can save the parameters file.
9. After you configure the local node record, you can save and submit the parameters file using the procedures in Chapter 12, *Enable and Validate Secure+ Operation*, but if you have not added a remote node record, connections are not secure.

Tip: Before you configure your remote node records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are unable to generate the JCL for the SAVE AS job, verify that you have allocated the ISPF libraries in your TSO session that are required to save the Secure+ option parameters file (see *Allocate Connect:Direct ISPF Libraries in TSO* on page 13 for details).

Chapter 10

Configure Remote Node Records Imported from the Network Map

The following procedures assume that you populate the parameters file by importing the network map. The Quick Start method creates a remote node record in the parameters file for each remote node record in the network map and a local node record. Using the Quick Start method to populate the parameters file is most efficient if you have a large number of trading partners that use the same protocol. You can enable that protocol in the local node record and because the remote node records are set automatically to Default to Local Node, they inherit the settings of the local node.

Depending on how you configured the local node record, you may or may not need to modify the remote node records. You must disable the Secure+ Option protocols in the records for all remote nodes that do not use Secure+ Option, and update all remote node records that use a protocol that is different from the protocol defined in the local node record.

Use the following procedures to modify remote node records imported from the network map for the SSL, TLS, and STS protocols, and to disable all protocols for a remote node:

- *Configure a Remote Node Record for the SSL Protocol* on page 130
- *Configure a Remote Node Record for the TLS Protocol* on page 133
- *Configure a Remote Node Record for the STS Protocol* on page 136
- *Disable Secure+ Option in a Remote Node Record* on page 142

Your environment may have one or both of the following requirements:

- Blocking nonsecure TCP API connections
- Verifying certificates using the Sterling External Authentication Server application

For instructions on configuring these special-purpose remote node records for the TLS and SSL protocol, see the following procedures:

- *Establishing Secure TCP API Connections to a Secure+ Option-Enabled Server* on page 84
- *Add a Remote Node Record for the EA Server* on page 81

Configuration Guidelines

Observe the following guidelines when you configure node records imported from the network map:

- Secure+ Option protocols are disabled for all records created from the network map when you use Quick Start to populate the parameters file.
- For all environments, you must define required settings in the local node record. If desired, you can define optional settings in the local node record and use them in all remote node records.
- You must create keys for remote nodes that use the the STS protocol.
- To enable secure connections using Connect:Direct Secure+ Option, you must complete the relevant procedure for configuring the local node record in Chapter 9, *Configure the Local Node Record Imported from the Network Map*, the relevant procedures in this chapter, and the procedures in Chapter 12, *Enable and Validate Secure+ Operation*.
- Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.

Configure a Remote Node Record for the SSL Protocol

After you configure the local node, you can configure remote node records. When you import the network map file, you create a remote node record in the parameters file for each remote node record in the network map. Depending on how you configured the local node record, you may or may not need to update the remote node records.

- If you disabled the Secure+ Option protocols in the local node record, Secure+ Option is disabled for all remote node records. You must update all remote node records that use Secure+ Option to identify which protocol is used by the trading partner.
- If you enabled a protocol in the local node record, that protocol is enabled in all remote node records. You must disable the Secure+ Option protocols in the records for all remote nodes that do not use Secure+ Option, and update all remote node records that use a protocol that is different from the protocol defined in the local node record.

Note: To override security functions for a particular session, you can use the SECURE parameter in the PROCESS statement. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.

The following procedure assumes that you enabled the SSL protocol in the local node record, this remote node uses the SSL protocol, and that you need to modify some SSL parameters for this remote node record.

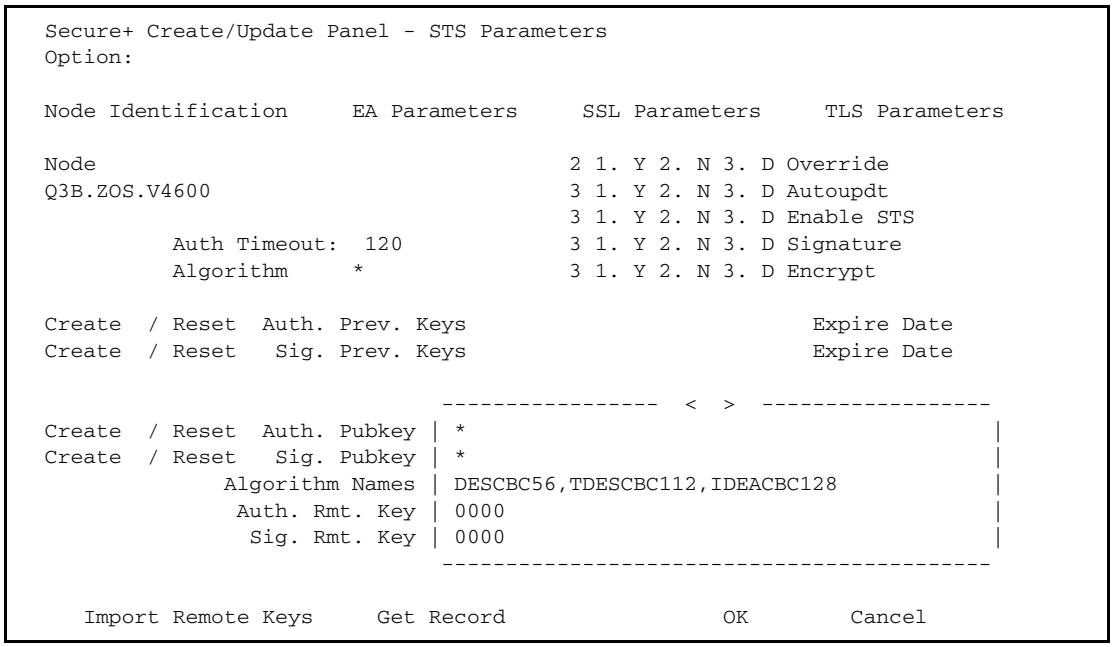
To update a remote node record for the SSL protocol:

1. Type **U** next to the remote node record to update and press **Enter** to display the current values for the selected node in the **Secure+ Create/Update Panel - STS Parameter**s panel.

Note: An asterisk in a field on the Secure+ Admin Main Screen indicates the value Default to Local Node.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
 Q3B.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                      Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    NYNN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
 u Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel:
   a. Verify that the following parameters are disabled (set to **2**): **Override, Autoupdt, Enable STS, Signature,** and **Encrypt**, or set to Default to Local Node (**3**).
   b. Verify that the following fields are set to Default to Local Node (**3**): **Create/Reset Auth. Pubkey**, and **Create/Reset Sig. Pubkey**.



c. Select **EA Parameters** and press **Enter**.

3. In the **EA Parameters** panel:

   a. Specify a value for the External Authentication parameter, if required by your environment, using the following table as a guide:

Field	Description	Valid Values
External Auth	Allows validating certificates for secure sessions using the Sterling External Authentication Server application.	1=Yes 2=No 3=Default to local node

   b. Select **SSL Parameters** and press **Enter**.

4. Take one of the following actions:

   - If you defined default SSL settings in the local node record that this remote node record uses, continue with step 8 on page 133.
   - To modify SSL protocol settings in a remote node record, continue with step 5.

5. To change the list of cipher suites enabled for a remote node record:

   a. Select the **TLS/SSL Cipher Suites** field and press **Enter**. The **Update Cipher Suites** panel is displayed.

   b. Type **1** by the cipher suite you want to enable and give the highest priority.

c. Continue typing numbers next to the cipher suites you want to enable, in order of priority.

   The cipher suites you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

d. Press **F3** when you have enabled and ordered all necessary cipher suites.

6. To enable client authentication:
   a. Type **1** in the **Client Auth** field.
   b. Type the certificate common name of the local node certificate in the **Client Auth. Compare** field.
   c. Press **Enter**. The **Create/Update** panel displays the the current settings for the remote node record.
7. To specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive; therefore, type the certificate label exactly as you defined it when you generated it using one of the security applications described in Appendix B, or type an asterisk (*) to specify the local node label, and press **Enter**.
   d. Select **TLS Parameters** and press **Enter**.
8. In the **TLS Parameters** panel, verify that the **Enable TLS** field is disabled (set to **2**) or set to Default to Local Node (**3**).
9. Select **OK** and press **Enter** to display the updated values.
10. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors that occur before you can save the parameters file.
11. Save the parameters file using the instructions in Chapter 12, *Enable and Validate Secure+ Operation*.

Configure a Remote Node Record for the TLS Protocol

After you configure the local node, you can configure remote node records. When you import the network map file, you create a remote node record in the parameters file for each remote node record in the network map. Depending on how you configured the local node record, you may or may not need to update the remote node records.

- If you disabled the Secure+ Option protocols in the local node record, Secure+ Option is disabled for all remote node records. You must update all remote node records that use Secure+ Option to identify which protocol is used by the trading partner.
- If you enabled a protocol in the local node record, that protocol is enabled in all remote node records. You must disable the Secure+ Option protocols in the records for all remote nodes that do not use Secure+ Option, and update all remote node records that use a protocol that is different from the protocol defined in the local node record.

Note: To override security functions for a particular session, you can use the SECURE parameter in the PROCESS statement. For more information, see Chapter 13, *Override Settings in Connect:Direct Processes*.

The following procedure assumes that you enabled the TLS protocol in the local node record, this remote node uses the TLS protocol, and that you need to modify some TLS parameters for this remote node record.

To update a remote node record for the TLS protocol:

1. Type **U** next to the remote node record to update and press **Enter**. The **Secure+ Create/Update Panel** displays the current values for the selected node.

Note: An asterisk in a field on the Secure+ Admin Main Screen indicates the value Default to Local Node.

```
File  Edit  Key Management  Help
--------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
 Q3B.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                    Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    NNYN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
 u Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel:
   a. Verify that the following parameters are disabled (set to **2**): **Override, Autoupdt, Enable STS, Signature,** and **Encrypt** or set to Default to Local Node (**3**).
   b. Verify that the following fields are set to Default to Local Node (**3**): **Create/Reset Auth. Pubkey**, and **Create/Reset Sig. Pubkey**.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                     2 1. Y 2. N 3. D Override
Q3B.ZOS.V4600                            3 1. Y 2. N 3. D Autoupdt
                                         3 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120             3 1. Y 2. N 3. D Signature
          Algorithm     *                3 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | *                                        |
Create  / Reset   Sig. Pubkey | *                                        |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128           |
               Auth. Rmt. Key | 0000                                     |
                 Sig. Rmt. Key | 0000                                    |
                               ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

3. Select **EA Parameters** and press **Enter**.
4. In the **EA Parameters** panel:
   a. Specify a value for the External Authentication parameter, if required by your environment, using the following table as a guide:

Field	Description	Valid Values
External Auth	Allows validating certificates for secure sessions using the Sterling External Authentication Server application.	1=Yes 2=No 3=Default to local node

   b. Select **TLS Parameters** and press **Enter**.
5. Take one of the following actions:
   - If you defined default settings in the local node record that this remote node record uses, go to step 9 on page 136.
   - To modify TLS protocol settings, continue with step 6.
6. To change the list of cipher suites enabled for a remote node record:
   a. Select the **TLS/SSL Cipher Suites** field and press **Enter**. The **Update Cipher Suites** panel is displayed.
   b. Type **1** by the cipher suite you want to enable and give the highest priority.

c. Continue typing numbers next to the cipher suites you want to enable, in order of priority.

   The cipher suites you enable appear in the order of priority in the **Enabled Cipher-Suites** list.

d. Press **F3** when you have enabled and ordered all necessary cipher suites.

7. To enable client authentication:
   a. Type **1** in the **Client Auth** field.
   b. Type the common name of the local node certificate in the **Client Auth. Compare** field.
   c. Press **Enter**. The Create/Update Panel displays the the current settings for the remote node record.
8. To specify the certificate label:
   a. Select the **TLS/SSL Certificate Label** field and press **Enter**.
   b. Press **F8** to move to the editable portion of the label field.
   c. This field is case sensitive; therefore, type the certificate label exactly as you defined it when you generated it using one of the security applications described in Appendix B, or type an asterisk (*) to specify the local node label, and press **Enter**.
   d. Select **SSL Parameters** and press **Enter**.
9. In the **SSL Parameters** panel, verify that the **Enable SSL** field is disabled (set to **2**) or set to Default to Local Node (**3**).
10. Select **OK** and press **Enter** to display the updated values.
11. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you must resolve all errors that occur before you can save the parameters file.
12. Save the parameters file using the instructions in Chapter 12, *Enable and Validate Secure+ Operation*.

Configure a Remote Node Record for the STS Protocol

After you configure the local node, you can configure remote node records. When you imported the network map file, you created a remote node record in the parameters file for each remote node record in the network map. Depending on how you configured the local node record, you may or may not need to update the remote node record.

- If you disabled Secure+ Option in the local node record, Secure+ Option is disabled for all remote node records. You must update all remote node records that use Secure+ Option to identify which protocol is used by the trading partner.
- If you enabled a protocol in the local node record, that protocol is enabled in all remote node records. You must disable the Secure+ Option protocols in the records for all remote nodes that do not use Secure+ Option, and update all remote node records that use a protocol that is different from the protocol defined in the local node record.

Note: To override security functions for a particular session, you can use the SECURE parameter in the COPY or PROCESS statement. For more information, see *Override STS Functions from the COPY Statement* on page 104 and Chapter 13, *Override Settings in Connect:Direct Processes*.

- ✦ You must perform additional tasks for those nodes that use the STS protocol. Refer to Chapter 11, *Manage Keys for the STS Protocol*.

The following procedure assumes that you enabled the STS protocol in the local node record, this remote node uses the STS protocol, and that you need to modify some STS parameters for this remote node record.

To update a remote node record for the STS protocol:

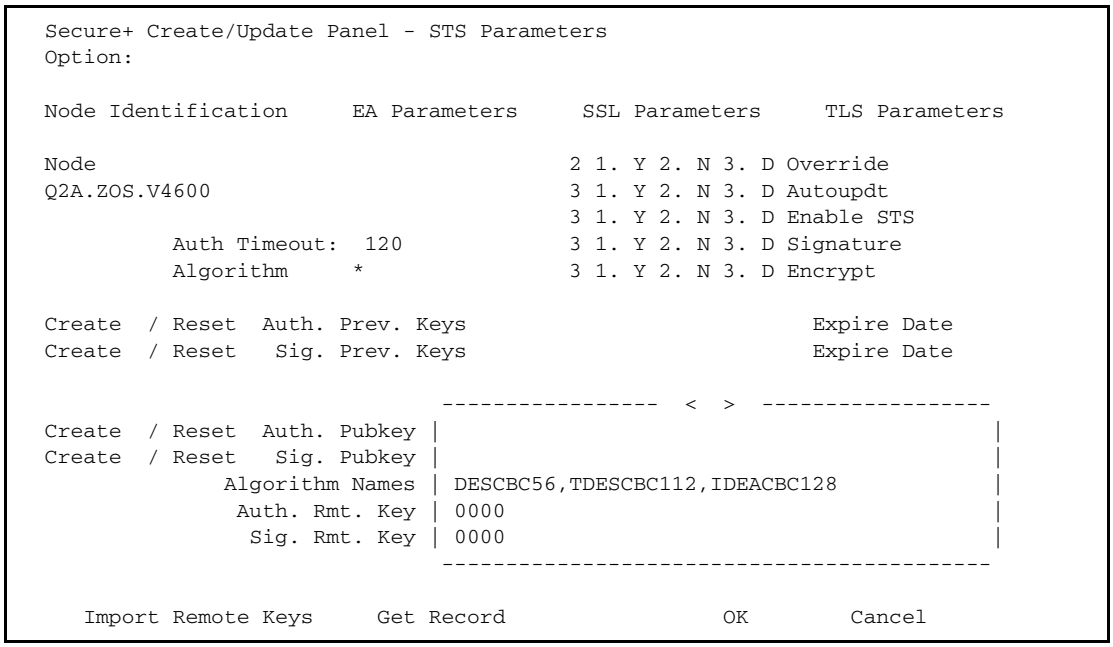
1. Type **U** next to the remote node record to update and press **Enter**. The **Secure+ Create/Update Panel** displays the current values for the selected node.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
 Q3B.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                      Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    YNNN     Y         Y          Y        N       Y
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
 u Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel:
   a. Review the following table to determine the values to set for the **Override**, **Encrypt**, and **Signature** parameters because these parameters work together.

Scenario	Setting for Override Parameter	Setting for Encrypt and Signature
All files must be encrypted and use signature.	Disable Override by setting to 2.	Enable Signature and Encrypt by setting to 1. **Note:** If you disable Override, you cannot disable security in the PROCESS statement.

Scenario	Setting for Override Parameter	Setting for Encrypt and Signature
A few files must be encrypted and use signature.	Enable Override by setting to 1.	Disable Signature and Encrypt by setting to 2. You can override these settings in a COPY statement so that the individual files use encryption and signature. See *Override STS Functions from the COPY Statement* on page 104. For a complete description of the SECURE parameter, go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.



b. Set values for the parameters listed in the following table to enable the STS protocol:

Field	Description	Valid Values
Enable STS	Enables or disables using the STS protocol for Connect:Direct Secure+ Option.	1 = Enable STS 2 = Disable STS 3 = Default to local node
Autoupdt	Allows STS keys to be automatically updated when the values change.	1=Yes 2=No 3=Default to local node

Field	Description	Valid Values
Override	Activating override in a remote node record that uses the STS protocol enables the values in the COPY statement to override values in the remote node record.	1=Yes 2=No 3=Default to local node
Signature	Enables digital signatures for use with the STS protocol.	1=Yes 2=No 3=Default to local node
Encrypt	Enables data encryption with the STS protocol during the COPY operation. If you activate this feature, you must also populate the **Algorithm** field. If the SNODE enables encryption, the PNODE cannot disable it.	1=Yes 2=No 3=Default to local node. This is not a valid value for the local node definition.
Algorithm	Specifies the data encryption algorithm used. Also set **Encrypt** to Yes.	* = Use first algorithm in list DESCBC56 TDESCBC112 IDEACBC128
Auth Timeout	Identifies the maximum time, in seconds, that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.	0=No timeout. Connect:Direct waits indefinitely to receive the next message. Specify a time to prevent malicious entry from taking as much time as necessary to attack the authentication protocol. Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter. The default is 120 seconds.

3. Generate the authentication key for use with the STS protocol:
   a. Select **Create/Reset Auth. Pubkey** and press **Enter**. to display the **Generate Seed** screen.

```
Secure+ Admin Tool: Generate Seed


2 1. Specify Value         Specify the seed value by typing it
                           into the text field.
  2. Sample Value          Generate a seed by processing text
                           entered from the keyboard.

   Random Number
   Seed:
```

   b. Press **Enter** to accept the default value of **2-Sample Value**.
   c. When the following screen is displayed, edit or add data on any line and press **PF3** to save the information. Changing data creates a unique key value.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 ------------------------------------------------------------------------------
 EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
 Command ===>                                                  Scroll ===> PAGE
 024: This process cannot proceed if the data in the edit file is unchanged.
 ==MSG> -Warning- The UNDO command is not available until you change
 ==MSG>           your edit profile using the command RECOVERY ON.
 000001 262144
 000002
 000003 134217728
 000004
 000005 32
 000006
 000007 4
 000008
 000009 8589934592
 000010
 000011 131072
 000012
 000013 8388608
 000014
 000015 2097152
 000016
 000017 1073741824
```

4. Generate the signature key:
   a. Select **Create/Reset Sig. Pubkey** and press **Enter**.
   b. Press **Enter** to accept the default value (**2-Sample Value**).
5. Set values for one or more of the following parameters as required:

Field Name	Field Description	Valid Values
Sig. Prev. Keys Expire Date	Identifies the expiration date for previous digital signature public keys used with the STS protocol. This value eliminates the need to update Secure+ Option parameters files across all nodes in the network simultaneously when public keys for the local node are changed.	Format YYYY/MM/DD HH:MM:SS If time is not specified, 00:00:01 is used.
Algorithm Names	Lists the acceptable data encryption algorithms to use when copy file encryption is requested. Listed in order of preference, with the most-preferred algorithm listed first.	DESCBC56 TDESCBC112 IDEACBC128
Import Remote Keys	Imports keys from the remote trading partner for both the Authorization and Signature functions in the STS protocol.	The name of the key file to import.

Field Name	Field Description	Valid Values
Auth. Prev. Keys Expire Date	Identifies the expiration date for previous authentication public keys used with the STS protocol. This value eliminates the need to update Secure+ Option parameters files across all nodes in the network simultaneously when public keys for the local node are changed.	Format YYYY/MM/DD HH:MM:SS If time is not specified, 00:00:01 is used.
TCP Information: IPaddr: Port:	Lists the TCP/IP address and port number. This information is used with the Process parameter SNODE= TCPNAME.	IPaddr=Valid IP address in format xxx.xxx.xxx.xxx Port=Valid 4-digit port number Not valid for the local node.
Note: When you create the Secure+ Parameters file from the NETMAP, the TCP Information field is populated automatically; however, data in the TCP Information field of the Secure+ remote record is not used to initiate Connect:Direct communications sessions. IP address and port number are acquired only from the NETMAP.		
Get Record	Opens another node record.	The name of an existing node record.

6. Select **EA Parameters** and press **Enter**.
7. Verify that the **External Auth** field is disabled (set to **2**) or set to Default to Local Node (**3**).
8. Select **SSL Parameters** and press **Enter**.
9. Verify that the **Enable SSL** and the **Client Auth** fields are set to Default to Local Node (**3**) or disabled (**2**).
10. Select **TLS Parameters** and press **Enter**.
11. Verify that **Enable TLS** is set to Default to Local Node (**3**) or disabled (**2**).
12. Select **OK** and press **Enter** to display the updated values.
13. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.
14. Save the parameters file using the procedure in Chapter 12, *Enable and Validate Secure+ Operation*.

Disable Secure+ Option in a Remote Node Record

If you have remote nodes that do not use Secure+ Option, then you must disable all protocols for those node.

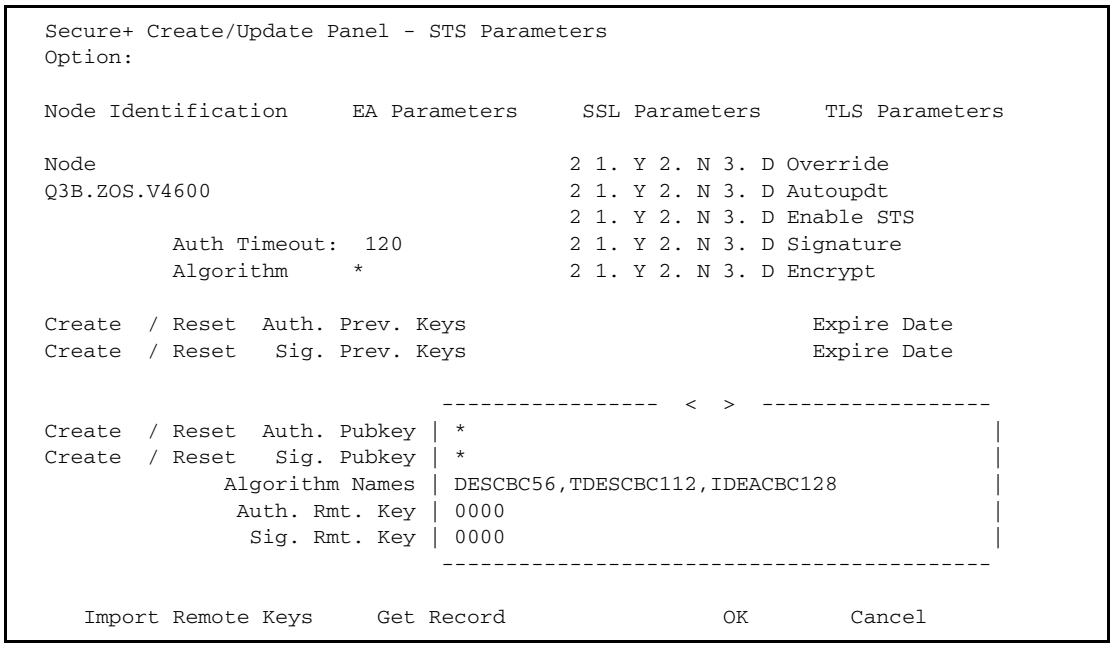
To disable all protocols in a remote node record imported from the network map:

1. Type **U** next to the remote node record to update and press **Enter** to display the current values for the selected node in the **Secure+ Create/Update Panel - STS Parameter**s panel.

Note: An asterisk in a field on the Secure+ Admin Main Screen indicates the value Default to Local Node.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
 Q3B.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                      Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    NYNN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
 u Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

2. In the **STS Parameters** panel:
   a. Disable (set to **2**) the following parameters: **Override, Autoupdt, Enable STS, Signature,** and **Encrypt**, if necessary.
   b. Verify that the following fields are set to Default to Local Node (*****): **Create/Reset Auth. Pubkey**, and **Create/Reset Sig. Pubkey**.



3. Select **EA Parameters** and press **Enter**.
4. In the **EA Parameters** panel, disable the External Authentication parameter by typing **2** beside the **External Auth** field, if necessary. The remaining external authentication parameters are unavailable because they are valid only for the .EASERVER remote node record.
5. Select **SSL Parameters** and press **Enter**.
6. Disable the SSL protocol by typing **2** beside the **Enable SSL** field, if necessary.
7. Select **TLS Parameters** and press **Enter**.
8. Disable the TLS protocol by typing **2** beside the **Enable TLS** field, if necessary.
9. Select **OK** and press **Enter** to display the updated values.
10. Read all warning and error messages. You can continue configuring the environment without resolving warning messages, but you may be unable to perform secure communications. You must resolve all errors before saving the parameters file.
11. Save the parameters file using the instructions in Chapter 12, *Enable and Validate Secure+ Operation*.

Chapter 11

Manage Keys for the STS Protocol

For nodes that use the STS protocol, you are responsible for managing the keys that you create. When you configure a remote node record to use the STS protocol, you must exchange keys with the trading partner before you can use Secure+ Option to establish a secure connection with that node. The first time you use the STS protocol, you manually exchange keys with each trading partner. After you exchange keys for the first communications session with Secure+ Option, if you have enabled the Autoupdate parameter, then the STS public keys are updated automatically for subsequent communications sessions, which simplifies key management for ongoing communications.

To manage the keys for the STS protocol, perform the following tasks:

- Export keys to your trading partner
- Import keys from your trading partner
- Validate the Secure+ Option parameters file

Initial Exchange of STS Keys

The first time you exchange STS keys with your trading partners that use the STS protocol, you must exchange STS keys perform the following steps on both systems where Secure+ Option is installed.

To exchange STS keys the first time:

1. Open the remote node records for the trading partners that use the STS protocol and ensure that the Enable STS parameter is set to **1** on both systems where Secure+ Option is installed.

   Note: The STS protocol must be enabled in the remote node record in order to export the STS keys to a file.

2. Export your STS keys using the procedure *Export STS Keys* on page 146.

3. Open the remote record again and disable Secure+ by typing **2** beside the **Enable STS** field in the STS Parameters panel.

   Note: You must disable Secure+ until you have transferred your keys to your trading partner, imported keys from the remote trading partner, and enabled Secure+ because your sessions will fail if you have enabled the STS protocol but you have not exchanged keys.

4. Save the parameters file.
5. To ensure the integrity of the export file that contains your STS keys, create a Connect:Direct Process to transfer the export key file to your trading partner.

   Note: If you are sending the export key file to a non-mainframe node, you must send it in binary format.

6. Import the STS keys from your trading partner using the procedure *Import STS Keys from a File* on page 148.
7. In the STS Parameters panel for the remote node records of the trading partners that use the STS protocol, set the **Enable STS** parameter to **1** to enable Secure+ Option on both systems where Secure+ Option is installed.
8. Save the parameters files on both systems where Secure+ Option is installed.

After you complete this procedure, all connections that use the STS protocol are made using Secure+ Option unless you have enabled the Override parameter in the remote node record and override the Secure+ Option parameter settings from the COPY statement.

After you exchange keys for the first communications session with Secure+ Option, if you enabled the Autoupdt parameter, then the STS public keys are updated automatically for subsequent communications sessions, which simplifies key management for ongoing communications.

Export STS Keys

After you create signature and authentication keys for a node record, you must send this information to the trading partner. Export the information to a file that you can send to the trading partner.

To export the authentication and digital signature public key values:

1. From the **Secure+ Admin Tool: Main Screen**, select **Key Management** and press **Enter**.

```
File  Edit  Key Management  Help
----------- +------------------------------+ ----------------------------
            | 2  1. Import Public keys     |
            |    *. Export Public Keys     | n Screen
 Option === |    *. Distribute Public Keys |                        Scroll CSR
            +------------------------------+
                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
****************************** BOTTOM OF DATA ********************************
```

2. When the preceding screen is displayed, perform one of the following actions:
   - Type **2** to select **Export Public Keys** and press **Enter**. This option exports keys for all nodes.
   - To export keys from one node, type **E** next to the node and press **Enter**.

   Note: You must correct all error messages before you can export keys.

3. Type the name of this export file or use the default name.

```
                    Secure+ Admin Tool: File Selection

             Enter file name for: Secure Export Prefix


File
Name:     USERID.secure.export                                  Browse

          File System Type:
          1 1. MVS  2. HFS                                      Cancel
```

4. Type **1** to select **MVS** as the file type or type **2** to select **HFS** and press **Enter**.

   The **Secure+ Create/Update Panel** displays the message *Export Successful*.

5. To ensure the integrity of the export file that contains your STS keys, create a Connect:Direct Process to transfer your export key file to your trading partner.

   Note: If you are sending the export key file to a non-mainframe node, you must send it in binary format.

Import STS Keys from a File

When you receive the STS key file from the administrator of the remote node (trading partner), you must import it to the Secure+ Option parameters file. This example illustates how to import the remote node key file named *USERID*.SECURE.EXPQ3A.#CSGPRO.#D390.

To import the authentication and digital signature public key values:

1. From the **Secure+ Admin Tool: Main Screen**, select **Key Management** and press **Enter**.
2. Perform one of the following actions:
   - Type **1** to select **Import Public Keys** and press **Enter**. This option imports keys from your tading partner for all nodes in the parameters file.
   - Type **U** next to the node for which you want to import keys.

```
File  Edit  Key Management  Help
----------- +------------------------------+ ----------------------------
            | 1  1. Import Public keys     |                        Row 1 of 10
 CSG.PROD39 |    2. Export Public Keys     | n Screen
 Option === |    *. Distribute Public Keys |                        Scroll CSR
            +------------------------------+
                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   AIX3601SP          R    ***N     N         *          *        *       *
   CSG.PROD390        L    NNNN     Y         N          N        N       N
   Q1A.ZOS.V4600      R    ***N     N         *          *        *       *
   Q1E.ZOS.V4600      R    ***N     N         *          *        *       *
   Q1G.ZOS.V4600      R    ***N     N         *          *        *       *
   Q2A.ZOS.V4600      R    ***N     N         *          *        *       *
   Q3A.ZOS.V4600      R    Y***     N         N          N        *       N
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
```

3. Type the file name prefix or partial prefix followed by an asterisk (*****), select **Browse**, and press **Enter**, or type the complete file name that you received from your trading partner, as shown in the following illustration.

```
                      Secure+ Admin Tool: File Selection

              Enter file name for: Secure Import File


  File
  Name:     USERID.SECURE.EXPQ3A.#CSGPRO.#D390                    Browse

            File System Type:
            1 1. MVS  2. HFS                                     Cancel
```

4. Type **S** next the file to import, (ensure that the file extension of the import file includes the node name) and press **Enter**.

```
 Secure+ Admin Tool: File Selection                              Row 1 of 1

 Option:  ___________________________________________ Scroll CSR

 Enter "S" on the line of the file for  for MVS.

LC Filename or Directory
 s USERID.SECURE.EXPQ3A.#CSGPRO.#D390
 ****************************** Bottom of data ******************************
```

The message *2 entries imported from othernode* is displayed on the **Secure+ Admin Tool: Main Screen**, indicating that both the authentication and the digital signature public keys have been imported.

```
 File  Edit  Key Management  Help
 ------------------------------------------------------------------------------
                                                                      Row 7 of 10
  CSG.PROD390          Secure+ Admin Tool: Main Screen
 024: 2 entries imported from Q3A.ZOS.V4600

                         Table Line Commands are:

  E Export pub. key       H View History          D Delete node
  U Update node           I Insert node

                           Secure
 LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
 -- ----------------  ---- ------ -------- ---------- --------- ------- -------
    Q3A.ZOS.V4600      R    Y***     N         N          N        *       N
    W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
    135.71.104.3       R    ***N     N         *          *        *       *
    199.0.91.45        R    ***N     N         *          *        *       *
 ****************************** BOTTOM OF DATA ******************************
```

5. Type **U** next to the remote node record name and press **Enter** to verify that the remote public keys are imported. If the keys have been imported, the keys are displayed in the **Auth. Rmt. Key** and the **Sig. Rmt. Key** fields.

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    2 1. Y 2. N 3. D Override
Q3A.ZOS.V4600                           2 1. Y 2. N 3. D Autoupdt
                                        1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                                ----------------  <  >  -----------------
Create  / Reset  Auth. Pubkey | 0303.1C2E.630C.E557.4F27.B1BB.358F.BB3A.  |
Create  / Reset   Sig. Pubkey | 0206.4C8C.575F.5956.35D8.C91F.EB0E.CAE8.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0200.0A7E.686B.49FC.B1E1.1BC3.E844.BA5B.  |
                 Sig. Rmt. Key | 0301.46C6.20A2.0F09.70F0.9C7D.E401.DE1A.  |
                                ------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

After you and your trading partner have imported each other's keys, you can verify that you have imported the keys correctly by displaying the STS Parameters panel for the remote node record on each system and validating that the key values have the correspondence illustrated in the following table. See the STS Parameters panels preceding and following this table for the data used to illustrate the correspondence.

Node Record	Parameter and Value	Node Record	Parameter and Value
Q3A.ZOS.4600	Create / Reset Auth. Pubkey= 0303.1C2E.630C.E557.4F27.B1BB.358F.BB3A.	CSG.PROD390	Auth. Rmt. Key= 0303.1C2E.630C.E557.4F27.B1BB.358F.BB3A.
Q3A.ZOS.4600	Create / Reset Sig. Pubkey= 0206.4C8C.575F.5956.35D8.C91F.EB0E.CAE8.	CSG..PROD390	Sig. Rmt. Key= 0206.4C8C.575F.5956.35D8.C91F.EB0E.CAE8.
CSG..PROD390	Create / Reset Auth. Pubkey 0303.1C2E.630C.E557.4F27.B1BB.358F.BB3A.	Q3A.ZOS.4600	Auth.Rmt. Key= 0303.1C2E.630C.E557.4F27.B1BB.358F.BB3A.
CSG..PROD390	Create / Reset Sig. Pubkey= 0206.4C8C.575F.5956.35D8.C91F.EB0E.CAE	Q3A.ZOS.4600	Sig. Rmt. Key= 0206.4C8C.575F.5956.35D8.C91F.EB0E.CAE

```
Secure+ Create/Update Panel - STS Parameters
Option:

Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                     2 1. Y 2. N 3. D Override
CSG.PROD390                              2 1. Y 2. N 3. D Autoupdt
                                         1 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120             2 1. Y 2. N 3. D Signature
          Algorithm     *                2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                          Expire Date
Create  / Reset   Sig. Prev. Keys                          Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0200.0A7E.686B.49FC.B1E1.1BC3.E844.BA5B.  |
Create  / Reset   Sig. Pubkey | 0301.46C6.20A2.0F09.70F0.9C7D.E401.DE1A.  |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0303.1C2E.630C.E557.4F27.B1BB.358F.BB3A.  |
                 Sig. Rmt. Key | 0206.4C8C.575F.5956.35D8.C91F.EB0E.CAE8.  |
                               -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

Import STS Keys Manually

If you do not have a key file from which to import, but you have a hard copy printout of the keys, you must type the keys into the parameters file.

To type keys into the parameters file:

1. Locate an existing export file.
2. Create a data set with DCB= LRECL=255 BLKSIZE=23200 RECFM=VB and copy the export file from step 1 on page 151 into this data set.

> **Note:** This step provides a guide for preallocation of the file.
> If you get the error *Import fails with "024 0 entries imported*" when the file is preallocated with this DCB information, do not specify DCB information. Use the DCB information defined in the input file.
> If you preallocate the file and the error message is displayed, delete the preallocated file and reallocate the file with larger lrecl and blksize values.

3. Using the DMADR002 display tool, display the existing export file in readable format to create a temporary data set.
4. Use the REPRO command on the temporary data set to copy the data into the data set created in step 2 on page 151.

> **Note:** You can also cut the data from the temporary data set and paste it into the new data set.

5. Edit the new data set, and change the auth.pubkey and sig.pubkey data according to the key file. Also change the export and import node names to match exactly the names of your local and remote nodes.
6. Import the new data set as an export file into your parameters file using the procedure described in *Import STS Keys from a File* on page 148.

Chapter 12

Enable and Validate Secure+ Operation

After you configure the local and remote nodes for Connect:Direct Secure+ Option, you must save and submit the parameters file and prepare Connect:Direct for operation, as described in the following procedures. As a final step, validate and test connections between you and your business partners to establish secure communications and then test to make sure you can change your security defaults for a session.

Save and Submit the Parameters File

This procedure assumes that you have verified that the following required Connect:Direct ISP libraries have been allocated in your TSO session:

- ISPCLIB (must be allocated as SYSPROC)
- ISPLLIB
- ISPPLIB
- ISPSLIB
- ISPMLIB

If these required libraries have not been allocated, or have been allocated incorrectly, when you perform this procedure, the JCL for the SAVE AS job is not generated, and you have to repeat the procedures to configure the local and remote nodes. For information on how to allocate these libraries, see *Connect:Direct for z/OS Installation Guide*.

Tip: After you configure the local node record but before you configure your remote records, you may want to save and submit the parameters file to verify that you can generate the SAVE AS JCL. If you are able to generate the JCL for the SAVE AS job, your Secure+ Option parameters file exists, but connections are not secure until you add a remote node record.

After you make any change to the local or remote node records or add any records, save the parameters file to save the configuration information.

To save the parameters file:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **File** and press **Enter**.

2. Type **7** to select **Save As**.
3. Type a file name and press **Enter**.

> ***Caution:*** The default **Save As** file name is the name of the last file that you opened. When you create the Secure+ Option parameters file from the Connect:Direct network map, you risk overwriting the network map file with the Secure+ Option parameters file if you do not change the name in this field.

4. Type site-specific job card information, allocation information, STEPLIB DSNs, and Access file Dsname, using the library names created when you saved the parameters file.
5. Perform one of the following actions:
   - Type **3** to select **Submit** and press **Enter** to save your parameters file.
   - Type **2** to edit the JCL before submitting the job. Edit the JCL and then submit the job.

> **Note:** Closing the JCL without submitting the job loses all of the changes you made to the parameters file.

6. Research any return code other than zero before closing the parameters file or exiting the Admin Tool.

Prepare Connect:Direct for Secure+ Option Operations

After you set up the Secure+ Option environment, you must prepare Connect:Direct to use Secure+ Option.

To set up Connect:Direct to run with Secure+ Option:

1. Add the following parameter to the Connect:Direct z/OS initialization parameters: **SECURE.DSN=*filename***, where ***filename*** is the name of the Secure+ Option parameters file for that node.
2. If you are operating in a CD/Plex environment, add the **SECURE.SSL.Path.Prefix=*prefix*** parameter, where ***prefix*** is the prefix location of the key database or key ring that contains the certificates for the TLS or SSL protocol.
3. Verify that the correct AP key is in the initialization parameters file.
4. Restart Connect:Direct on that node.
5. To verify that Connect:Direct Secure+ Option initialization is complete, after you restart Connect:Direct with SECURE.DSN, review the started task output for the following messages: *SITA028I Secure+ initialization* and *SITA165I Secure+ initialization complete*, if you are using the TLS or SSL protocol.

Validating and Testing Connections by Session

To validate and test a connection between two business partners, follow this general procedure. After you confirm that the secure connection has been established and that you can change your default security settings for a session, you can finalize the settings in the parameters file of each business partner, save the files, and begin transferring data.

1. For the selected protocol, make sure all prerequisites outside of Secure+ have been taken care of, such as the obtaining of server certificates and exchanging of keys.
2. Make sure each node is defined in the partner's network map.
3. For both the local and remote nodes, specify the protocol to be used when a secure connection is required (TLS, SSL, or STS).
4. For the selected protocol, make sure to define all settings required for a successful connection in the local and remote node records in the parameter files.
5. Perform the procedures in this chapter, namely, *Save and Submit the Parameters File* on page 153, and *Prepare Connect:Direct for Secure+ Option Operations* on page 154.
6. To test the connection, perform a file transfer between the two partners.

   Once you have successfully performed a file transfer using a secure connection, you are ready to finalize the parameters files.
7. Take one of the following actions, depending on whether you want to make your sessions default to secure or non-secure:
   - To have your sessions default to secure, specify OVERRIDE=Y in both the local and remote node records in the parameter files of both business partners.
   - To have your sessions default to non-secure, specify OVERRIDE=Y in both the local and remote node records in the parameter files of both business partners. Disable the selected protocol in the remote node record.
8. To test changing your security defaults for a session, take one of the following actions depending on whether you want to make your sessions default to secure or non-secure. For a complete description of the SECURE parameter and how to use it in the PROCESS statement, go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html. Also, see *Examples of Overriding Security Settings* on page 158.
   - To make a session non-secure, specify SECURE=OFF in the PROCESS statement preceding the COPY statement to transfer the file.
   - To make a session secure, specify SECURE=TLS|SSL|STS in the PROCESS statement.
9. After you valid and test your connections by session, save the parameters files and restart Connect:Direct.

Chapter 13

Override Settings in Connect:Direct Processes

Once you have configured the Secure+ Option environment, security is either turned on or off each time that you use Connect:Direct with a node defined in the parameters file. However, you can override the default security setting in a remote node record from a Connect:Direct Process using the following keyword parameter in the PROCESS statement:

```
SECURE = OFF | STS | SSL | TLS
```

Using this parameter, you can turn on security for a particular session and select the protocol (SSL, TLS, or STS) when non-secure sessions are the default. Conversely, you can turn off security when secure sessions are the default if you had specified OVERRIDE=Y in the Remote Node record settings in the Secure+ parameter file.

For a complete description of the SECURE parameter and how to use it in the PROCESS statement, go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.

A similar feature is also available only for the STS protocol. When you configure a node to use the STS protocol, you can also use the SECURE parameter in a COPY statement to enable or disable digital signatures or encryption to override the settings in the parameters file, if override is enabled in the remote node record. See *Override STS Functions from the COPY Statement* on page 104.

Prerequisites for Overriding Settings in the PROCESS Statement

To allow a business partner to override the default security setting of whether security is turned on or off for another business partner and to choose the protocol for the remote node, the following conditions must be in place:

- Each business partner agrees all sessions are secure or non-secure as the default
- Each business partner agrees to allow the override of the Secure+ parameters by specifying OVERRIDE=Y for both the local and remote nodes in their Secure+ parameter file.
- The remote node definition in each Secure+ parameter file specifies the parameters necessary for a secure session even if the protocol is disabled including all information necessary for exchanging and validating each partner's identity. All parameters related to a protocol are defined, such as STS keys and algorithms or SSL/TLS cipher suites and key databases.
- Secure+ Option is active on both nodes.

Once the Secure+ Option parameter files for both business partners have been set up properly, you can override the default security settings on a Process-by-Process basis to perform exception processing.

Examples of Overriding Security Settings

These examples illustrate how business partners use the PROCESS statement SECURE parameter to override the security defaults for a particular session.

Default is Secure Sessions

The business partners agree by default all sessions are secure and choose SSL as the default protocol. Both partners enable the SSL protocol in the Secure+ parameter files and specify OVERRIDE=Y in both the Local and Remote Node records. To override the default and make a particular session non-secure, they use the following PROCESS statement:

```
SSLOFF PROCESS SNODE=OTHERBP SECURE=OFF
```

Default is Non-Secure Sessions

The business partners agree by default all sessions are non-secure. When a secure communication line is required for a particular session, the non-secure default is overridden and the SSL protocol used. The Remote Node records specify OVERRIDE=Y, but the SSL protocol is not enabled in the parameters files. However, all other parameters required to perform the handshake to establish an SSL session are defined in the Remote Node records. To specify that the session for this PROCESS is to be secure using SSL, the business partners use the following PROCESS statement:

```
SSLON PROCESS SNODE=OTHERBP SECURE=SSL
```

Chapter 14

Maintain Secure+ Option

After you set up the Secure+ Option environment, you perform the following additional maintenance tasks as needed:

- *Display Secure+ Option Information* on page 159
- *Modify Secure+ Option* on page 164
- *Modify STS Keys* on page 167
- *Delete a Secure+ Option Remote Node Record* on page 169

When Connect:Direct for z/OS is running with a Secure+ Option parameters file open, you must stop Connect:Direct to change the configuration for the local node and restart Connect:Direct to put the changes into effect.

Display Secure+ Option Information

Secure+ Option provides many ways to display information to allow you to edit a node record, view all defined nodes, and view history information. Use the following procedures for viewing Secure+ Option information:

- Understanding the Secure+ Option node list
- Displaying a Secure+ Option node record
- Viewing information about the Secure+ Option parameters file
- Viewing Secure+ Option node record change history

Secure+ Option Node List

After you set up node records in Secure+ Option, you can view nodes and their attributes from the **Secure+ Admin Tool: Main Screen**, as illustrated in the following sample node list:

```
File  Edit  Key Management  Help
------------------------------------------------------------------------------
                                                                Row 9 to 13 of 13
 Q2A.ZOS.V4600        Secure+ Admin Tool: Main Screen
 Option ===>                                                      Scroll CSR

                         Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    NNNN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
   Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

The following table describes the fields that are displayed on the **Secure+ Admin Tool:Main Screen** including a field description and valid values for each field.

Field Name	Field Description	Valid Values
Node Name	Displays the node record name.	Node name
Type	Displays the current record type.	L = local node record R = remote node record A = alias
Secure		
1	Indicates the status of STS security.	Y=Yes
2	Indicates the status of SSL security.	N=No
3	Indicates the status of TLS security.	*= default to local node
C	Indicates the status of client authentication.	
Override	Displays the status of override. If override is enabled in the local node record, the remote node values override the values in the local node record. Activating override in a remote node record that uses the STS protocol enables the values in the COPY statement to override values in the remote node record. Override is not valid for remote node records that use the SSL and TLS protocols.	Y = enabled N = disabled * = default to local node
Encryption	Indicates if encryption is enabled in the STS protocol.	Y = enabled N = disabled * = default to local node

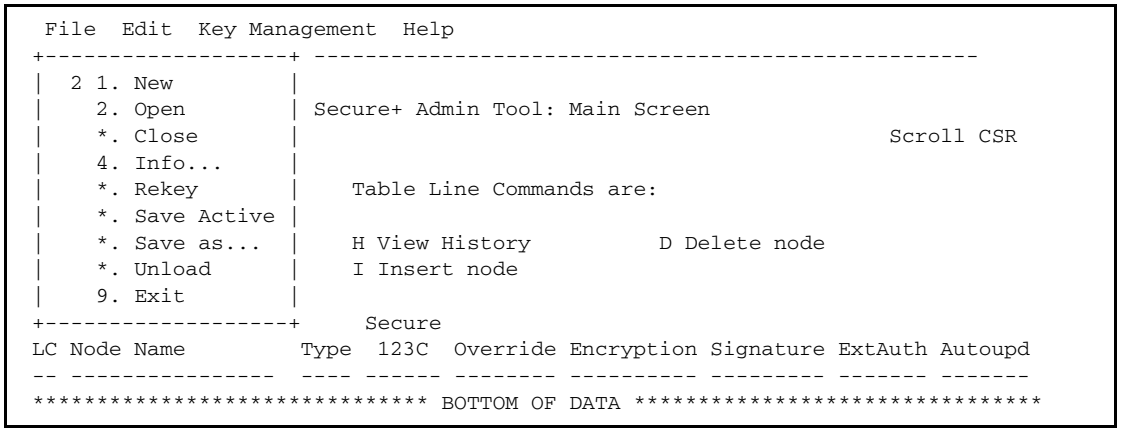
Field Name	Field Description	Valid Values
Signature	Identifies if digital signature is enabled in the STS protocol.	Y = enabled N = disabled * = default to local node
External Auth	Allows validating certificates for secure sessions using the Sterling External Authentication Server application. Valid only for the SSL or TLS protocol.	1=Yes 2=No 3=Default to local node
Autoupd	Indicates if the option to automatically update key values during communications is enabled. Valid only for the STS protocol.	Y = enabled N = disable * = default to local

Open a Parameters File

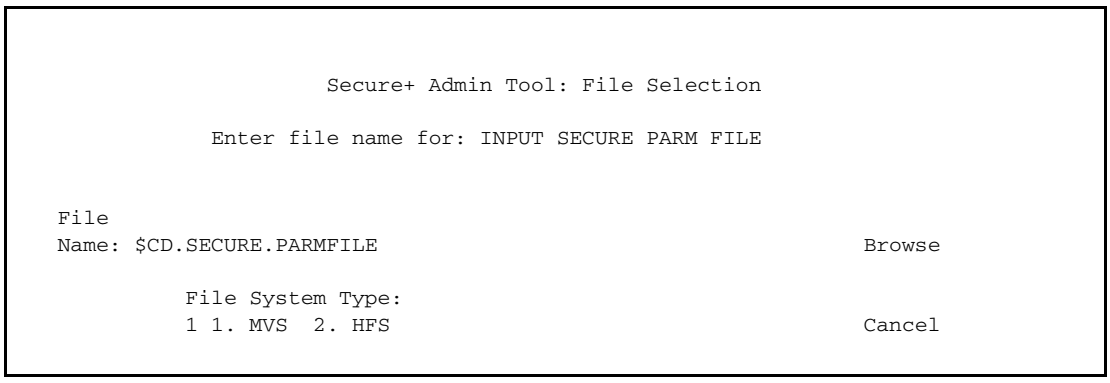
Before you can modify or configure a node record, you must open the parameters file that contains these records.

To open a Secure+ Option parameters file:

1. With the **Secure+ Admin Tool Main Screen** open, Select **File** and press **Enter**:



2. Type **2** to select **Open** and press **Enter** to display the file selection screen:



3. Type the parameters file name prefix or partial prefix followed by an asterisk (*), select **Browse**, and press **Enter**. The following screen is displayed:

```
 Secure+ Admin Tool: File Selection                              Row 1 of 3

 Option:  _____________________________________________ Scroll CSR

 Enter "S" on the line of the file for  for MVS.

LC Filename or Directory
 S $CD.PARMFILE
 _ $CD.PARMFILE.DATA
 _ $CD.PARMFILE.INDEX
 ****************************** Bottom of data ********************************
```

Note: You can also type the complete parameters file name and press **Enter**.

4. Type **S** next to the file name to open and press **Enter**. The **Secure+ Admin Tool: Main Screen** displays nodes populated from the parameters file you opened.

```
 File  Edit  Key Management  Help
 ------------------------------------------------------------------------------
                                                              Row 9 to 13 of 13
  Q2A.ZOS.V4600        Secure+ Admin Tool: Main Screen
  Option ===>                                                    Scroll CSR

                          Table Line Commands are:

  E Export pub. key       H View History          D Delete node
  U Update node           I Insert node

                           Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   Q2A.ZOS.V4600      L    NNNN     Y         N          N        N       N
   Q3A.ZOS.V4600      R    ***N     N         *          *        *       *
   Q3B.ZOS.V4600      R    ***N     N         *          *        *       *
   SOL36SP            R    ***N     N         *          *        *       *
   W2S.4200.CDWOPS8   R    ***N     N         *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

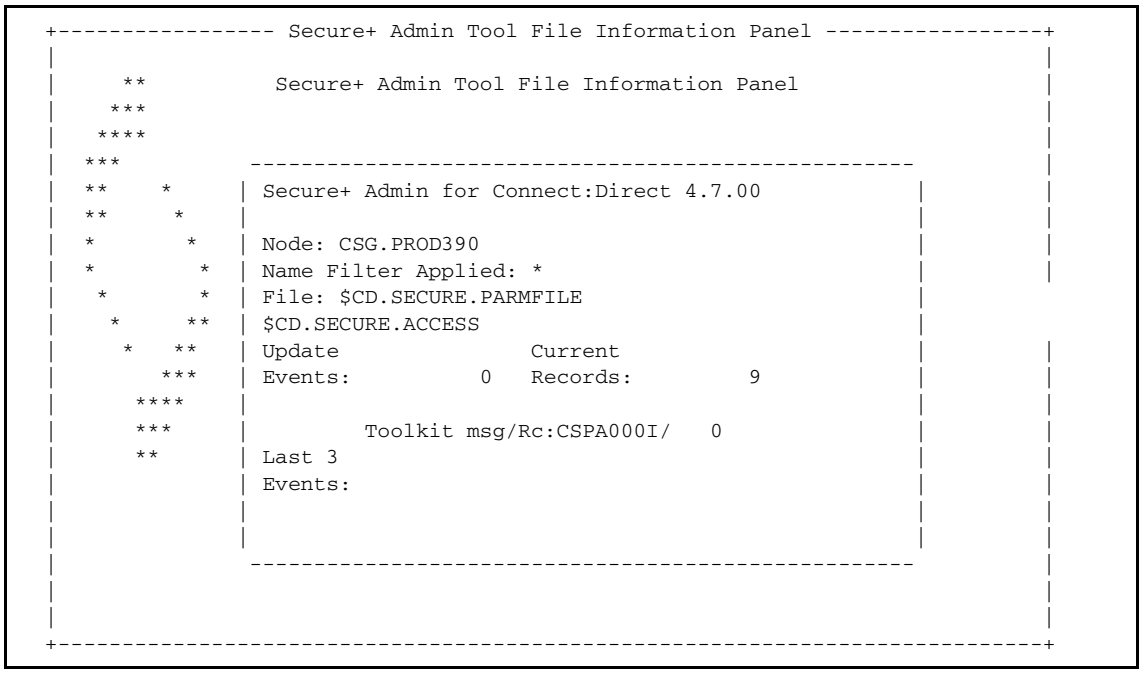
Display a Secure+ Option Node Record

To display an existing Secure+ Option node record, type **U** next to the node to update and press **Enter**. The **Secure+ Create/Update Panel** displays the information for the selected node.

View Information about the Secure+ Option Parameters File

To view information about the Secure+ Option parameters file:

1. Open the Admin Tool.
2. Select **File** and press **Enter**.
3. Type **4** to select **Info**. The **File Information Panel** is displayed:



The fields in the **File Information Panel** are described in the following table:

Field Name	Description
Node	The name of the local node for the parameter file that is open.
Admin Version	The version of Secure+ Admin Tool being used.
Export	Identifies if the limited export version of Secure+ Option is installed on the node.
Name Filter Applied	Name of the filter used to determine which remote node records to display.
File	The name of the current parameters file and the access file.
Update Events	Number of updates to the parameters file.
Current Records	Total number of remote node records.
Toolkit msg/Rc:CSPA0001	Message ID of the last Toolkit call.
Last 3 Events	List of the last 3 updates.

View Secure+ Option Node Record Change History

To view the history of changes to a Secure+ Option node record, type **H** next to the node to view and press **Enter**. The update history of the node is displayed.

Save Changes to Remote Node Records Using the Save Active Option

The **Save Active** option on the Secure+ Admin Tool **File** menu enables you to dynamically save changes to remote node records in an existing Secure+ Option parameters file. Use the following table to determine when to use the **Save Active** option for saving changes to remote node records.

Note: The **Save Active** option is not valid for saving changes to the local node record, nor can it be used to save changes made to a remote node record when Connect:Direct is not running.

Condition	How to Save Remote Node Record Changes
◆ Secure+ Option parameters file exists ◆ Connect:Direct is running ◆ PDS file has been created (for example, the $CD.CNTL library) ◆ The Data Transmission Facility (DTF) application is running	From the **File** menu, type **6** to select the **Save Active** option and perform a dynamice update of the parameters file similar to the dynamic update of the Netmap file. **Note:** You can update only one remote node record at a time. To update multiple remote node records, you must update one, save the changes, exit the Secure+ Admin tool, then open the Secure+ Admin tool and update another remote node record. **Note:** The **Save Active** option allocates the PARMFILE as DISP=SHR and prevents an allocation conflict.
◆ Secure+ Option parameters file exists ◆ Connect:Direct is not running	Use only the **Save As** option. This option deletes, defines, and reloads the Secure+ Option parameters file. See *Save and Submit the Parameters File* in Chapter 12, *Enable and Validate Secure+ Operation*, for instructions.

Modify Secure+ Option

You can modify a Secure+ Option configuration. This section provides the following procedures for modifying Secure+ Option information:

- ✦ Disabling Secure+ Option
- ✦ Deleting a Secure+ Option remote node record
- ✦ Resecuring the Secure+ Option parameters file and access file
- ✦ Changing the cipher suites for an SSL configured node
- ✦ Changing the encryption algorithm names

Disable Secure+ Option

To disable Secure+ Option:

1. Type **U** next to the node to update and press **Enter**. The **Secure+ Create/Update Panel** displays the information for the selected node.
2. Disable all the protocols:
   a. Type **2** beside the **Enable STS** field.
   b. Select **SSL Parameters**, press **Enter**, and type **2** beside the **Enable SSL** field.
   c. Select **TLS Parameters**, press **Enter**, and type **2** beside **Enable TLS** fields.
3. Select **OK** and press **Enter**.
4. Save the Secure+ Option parameters file using the procedure in Chapter 12, *Enable and Validate Secure+ Operation*.

Note: To continue Connect:Direct operations with Secure+ Option disabled, *both* trading partners must disable Secure+ Option.

Resecure the Secure+ Option Parameters File and Access File

Routinely, or if your passphrase is compromised, you should resecure the Secure+ Option parameters and access files. You must open a parameters file before you perform this procedure.

To resecure the Secure+ Option parameters file and access file:

1. From the **Secure+ Option Admin Tool Main Screen**, select **File** and press **Enter**.
2. Type **7** to select **Save As** and press **Enter**.
3. If any warning messages are displayed, read them and press **F3** to close the warning panel.
4. On the **File Selection** panel, the file name of the parameters file that you have open is displayed. Press **Enter**.
5. At the confirmation prompt, select **OK**. The old parameters file is deleted and a new parameters file with the same name is created.
6. On the **Save As** screen, type **2** to select **Edit**, then select **Make Pass Phrase** and press **Enter**.
7. Select **OK** to confirm that you want to create a new passphrase.
8. Type a 32-byte string, using uppercase, lowercase, numeric, and alphabetic characters.
9. On the **Save As** panel, type **3** to select **Submit** and press **Enter**.
10. Select **OK** to submit the job.
11. When the *Job Submitted* message is displayed, press **Enter**.
12. Verify that the job completed with a return code of zero before closing the parameters file or exiting the Secure+ Admin Tool. Research any return codes other than zero.

Change the Cipher Suites

When you activate the SSL or the TLS protocol for a node, cipher suites are used to encrypt transmitted data. The same cipher suite must be defined at both ends of the transmission. Secure+ Option searches the enabled cipher suite list and locates the first cipher suite that is common for

communications at both the PNODE and the SNODE. It then uses this cipher suite to encrypt data. You defined cipher suites when you configured the local node record.

To change the cipher suites enabled for a node:

1. From the **Secure+ Admin Tool Main Screen**, type **U** next to the node to update.
2. Select **SSL Parameters** or **TLS Parameters** and press **Enter** to display the available and enabled cipher suites.

```
                                                                    More:     +
More:     +

      Update the order field below to enable and order cipher suites.

  O
  r
  d
  e
  r   All Available Cipher-Suites          Enabled Cipher-Suites

  ==  ================================== ==================================
  1   SSL_RSA_AES_128_SHA                SSL_RSA_AES_128_SHA
  2   SSL_RSA_AES_256_SHA                SSL_RSA_AES_256_SHA
  3   SSL_RSA_WITH_3DES_EDE_CBC_SHA      SSL_RSA_WITH_3DES_EDE_CBC_SHA
  4   SSL_RSA_WITH_DES_CBC_SHA           SSL_RSA_WITH_DES_CBC_SHA
  5   SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5 SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5
  6   SSL_RSA_WITH_RC4_128_SHA           SSL_RSA_WITH_RC4_128_SHA
  7   SSL_RSA_WITH_RC4_128_MD5           SSL_RSA_WITH_RC4_128_MD5
  8   SSL_RSA_EXPORT_WITH_RC4_40_MD5     SSL_RSA_EXPORT_WITH_RC4_40_MD5
  9   SSL_RSA_WITH_NULL_SHA              SSL_RSA_WITH_NULL_SHA
  10  SSL_RSA_WITH_NULL_MD5              SSL_RSA_WITH_NULL_MD5
  11  DEFAULT_TO_LOCAL_NODE              DEFAULT_TO_LOCAL_NODE
```

   The list on the left side contains all available cipher suites. The active cipher suites are listed on the right side of the screen and are assigned a numerical order in the **Order** column on the left side of the screen.
3. Type **1** by the cipher suite you want to enable and give the highest priority.
4. Type **2** by the cipher suite you want to enable and place second in priority.
5. Continue typing numbers next to the cipher suites you want to enable, in order of priority.

   The cipher suites you enable appear in the order of priority in the **Enabled Cipher-Suites** list.
6. To deactivate a cipher suite, clear the number in the **Order** field and press **Enter**.
7. To change the order of a cipher suite, type new numbers in the **Order** fields of the cipher suites to reorder and press **Enter**.
8. Press **PF3** to return to the **Secure+ Create/Update Panel**.
9. Save the parameters file using the procedure described in Chapter 12, *Enable and Validate Secure+ Operation*.

Change the Encryption Algorithm Names

When you activate the STS protocol for a node, it uses algorithms to encrypt the data being transmitted. A common algorithm must exist on both endpoints of the transmission.

Secure+ Option searches the enabled algorithm list and locates the first algorithm that is common for communications at both nodes.

To enable algorithms for a node record:

1. Type **U** next to the node that you want to update and press **Enter**. The **Secure+ Create/Update Panel** is displayed.

   The **Algorithm Names** field specifies the algorithms being used. They are listed from left to right in priority order.
2. Edit or rearrange the algorithm names by typing over the existing names.
3. Select **OK** and press **Enter**.
4. Save the parameters file using the procedure described in Chapter 12, *Enable and Validate Secure+ Operation*.

Modify STS Keys

If you are using STS protocol with Secure+ Option, you periodically need to update and clear keys. This section provides the following procedures for modifying key files for Secure+ Option.

- ✦ Updating keys in node records configured for STS
- ✦ Resetting keys in node records configured for STS

Update Keys in Node Records Configured for the STS Protocol

In order to maintain communications with a trading partner when you update your keys, you must maintain a copy of the previous keys until your trading partner receives the updated keys. You must perform this procedure for both the local node record and remote nodes that use the STS protocol.

To update your signature and authentication keys:

1. From the **Secure+ Admin Tool Main Screen**, type **U** next to the node record name (local or remote) to update and press **Enter**.
2. From the **Secure+ Create/Update Panel - STS Parameters** panel select **Create Auth. Prev. Keys**.

   Secure+ Option copies the current authentication keys to previous keys and assigns an expiration date of 30 days from the time that you generated the previous key value. Only the expiration date and time are displayed on the screen. The previous keys are stored internally.
3. To change the expiration date, position your cursor in the date field and change any of the information.
4. Select **Create Sig. Prev. Keys**.

Secure+ Option copies the current signature keys to previous keys and assigns an expiration date of 30 days from the time that you generated this previous key value. Only the expiration date and time are displayed on the screen. The previous keys are stored internally.

5. To change the expiration date, position your cursor in the date field and change any of the information.
6. Select **Create Auth. Pubkey** and press **Enter**.
7. On the **Generate Seed** screen, type **2** to select **Sample Value** and press **Enter**.
8. Change some of the text by typing over it. Press **PF3**.

   When the **Secure+ Create/Update Panel** displays the message *Seed generation complete*, your public key for strong authentication is created.
9. Select **Create Sig. Pubkey** and press **Enter**.
10. On the **Generate Seed** screen, type **2** to select **Sample Value** and press **Enter**.
11. Change some of the text by typing over it. Changing the text creates a secure key value. Press **PF3**.

    When the **Secure+ Create/Update Panel** displays the message *Seed generation complete*, your public key for digital signatures is created.
12. Select **OK** and press **Enter**.
13. Save the Secure+ Option parameters file using the procedure in Chapter 12, *Enable and Validate Secure+ Operation*.

Reset Keys in Remote Node Records Configured for STS

To reset the keys in remote node records to default to the settings in the local node record.

1. From the **Secure+ Admin Tool Main Screen**, type **U** next to the node to update and press **Enter**.
2. From the **Secure+ Create/Update Panel - STS Prameters**, select **Reset Auth. Pubkey** and press **Enter**.

   This step resets the public key used for strong authentication to the default value in the local node record.
3. From the **Secure+ Create/Update Panel - STS Parameters**, select **Reset Sig. Pubkey** and press **Enter**.

   This step resets the public key used for the digital signature to the default value in the local node record.

Delete a Secure+ Option Remote Node Record

If you remove a remote node record from the network map in Connect:Direct, you can also remove it from the Secure+ Option parameters file. This process deletes nodes from the Secure+ Option parameters file.

To delete a remote node record:

1. Type **D** next to the node to delete and press **Enter**.

   The Secure+ Option **Confirmation Prompt** displays the message *Are you sure you want to delete 'selected node'?*.

2. Select **OK** and press **Enter** to delete the record.
3. Save the Secure+ Option parameters file using the procedure in Chapter 12, *Enable and Validate Secure+ Operation*.

Chapter 15

Secure+ Option Statistics

Connect:Direct logs statistics for Connect:Direct Process activity. The Connect:Direct statistics include Secure+ Option information for a Process.

The following samples of Connect:Direct Process statistics records contain information for Secure+ Option support. For information about viewing Connect:Direct for z/OS Process statistics, refer to the *Connect:Direct for z/OS User's Guide*.

SSL or TLS Statistics Record

When you use the **Select Statistics** command to view the information about a Connect:Direct Process that uses SSL or TLS security, you see a screen similar to the following. The Secure+ Option fields are in bold. A description for the fields follows the samples.

```
================================================================================
CD.OS390.V40000                 SELECT STATISTICS                    05/04/2007
================================================================================

________________________________________________________________________________
Function     => PROCESS SUBMIT          Start Time => 19:30:00
Process Name => OS3903                  Stop Time  => 19:30:00
Process Num  => 1                       Comp Code  => 00000000
                                        Comp Msg   => SSPA001I

Userid       => MWATL1
Primary Node => SC.DUB.MWATL1           Step Name  =>
Submitted DSN=> MWATL1.NDM.PROCESS.LIB(OS3903)
________________________________________________________________________________
Function     => COPY                    Start Time => 19:30:14
Process Name => OS3903                  Stop Time  => 19:30:14
Process Num  => 1                       Comp Code  => 00000000
                                        Comp Msg   => SCPA000I
Userid       => MWATL1
Secondary Node => SC.DUB.MWATL3         Step Name  => PUSH01
Other addr   => 10.20.201.2
Other port   => 04399

V2 Buffer Size            => 65,536
Negotiated V2 Buffer Size => 65,536
TCP Buffer Size Used      => 262,144
Session Protocol =   TCP
CRC Requested
CRC Not Performed

TLS Enabled         => Yes
TLS/SSL Ciphersuite => SSL_RSA_AES_256_SHA
Subject => (SN=47:b2:1a:10:00:0e:07:72/C=US/ST=a/L=t/O=g/CN=mikey3/)
Issuer  => (C=US/ST=a/L=t/O=g/CN=mikey3/)

***** CHECKPOINTED;    Interval => 1,000
From ( Pnode
 Dsn=>MWATL1.TCPIP.DATA.FILE)
        recs => 0                       blks => 1
    I/O BYTES => 266
   VTAM BYTES => 53
    Cmpr Perc => 80.1%
       VOL=SER=> USER17
To   ( Snode
 Dsn=>MWATL1.FTST.AA1030B)
        recs => 0                       blks => 1
    I/O BYTES => 266
   VTAM BYTES => 53
    Cmpr Perc => 80.1%
       VOL=SER=> WRKPK3
```

The following statistics are displayed for the copy function:

Field	Description	Valid Values
SSL Enabled	Specifies whether SSL x.509 certificate use is enabled.	Yes No
TLS Enabled	Specifies whether SSL x.509 certificate use is enabled.	Yes No
TLS/SSL Ciphersuite	Specifies the cipher suite used in the session.	Any valid cipher suite
Subject	Specifies the subject name on the certificate.	Any valid subject name
Issuer	Specifies the issuer name on the certificate.	Any valid issuer name

SSL or TLS Extended Option Statistics Record

When you use the **Select Statistics** command with the extended option enabled to view the information about a Connect:Direct Process that uses SSL or TLS security, you see a screen similar to the following. The Secure+ Option fields are in bold. A description for the fields follows the sample.

```
================================================================================
CD.OS390.V40000                SELECT STATISTICS                    05/04/2007
================================================================================

_______________________________________________________________________________
Function     => PROCESS SUBMIT             Start Time => 10:26:32
Process Name => STATSAMP                   Stop Time  => 10:26:32
Process Num  => 338                        Comp Code  => 00000000
                                           Comp Msg   => SSPA001I
Userid       => $CD
Primary      => CD.OS390.V40000            Step Name  =>
Submitted DSN=> $CD.CD.PROCESS(SUB1)
_______________________________________________________________________________
Function     => Session Begin              Start Time => 19:30:14
                                           Start Date => 2008.11.17
Process Name => OS3903
Process Num  => 1                          Comp Code  => 00000000
                                           Comp Msg   => SVTM055I
Userid       => MWATL1
Primary Node   => SC.DUB.MWATL1
Secondary Node => SC.DUB.MWATL3
Submitter Node => SC.DUB.MWATL1

TLS Enabled         => Yes
TLS/SSL Ciphersuite => SSL_RSA_AES_256_SHA
Subject => (SN=47:b2:1a:10:00:0e:07:72/C=US/ST=a/L=t/O=g/CN=mikey3/)
Issuer  => (C=US/ST=a/L=t/O=g/CN=mikey3/)

Session Protocol =   TCP
Socket for Origin      => 04199  ; 10.20.201.2
Socket for Destination => 04399  ; 10.20.201.2
Bind Attempts => 0
Remote Node Communications Address => 10.20.201.2
_______________________________________________________________________________
Function     => COPY                       Start Time => 19:30:14
Process Name => OS3903                     Stop Time  => 19:30:14
Process Num  => 1                          Comp Code  => 00000000
                                           Comp Msg   => SCPA000I
Userid       => MWATL1
Secondary Node => SC.DUB.MWATL3            Step Name  => PUSH01
Other addr   => 10.20.201.2
Other port   => 04399

V2 Buffer Size            => 65,536
Negotiated V2 Buffer Size => 65,536
TCP Buffer Size Used      => 262,144
Session Protocol =   TCP
CRC Requested
CRC Not Performed

TLS Enabled         => Yes
TLS/SSL Ciphersuite => SSL_RSA_AES_256_SHA
Subject => (SN=47:b2:1a:10:00:0e:07:72/C=US/ST=a/L=t/O=g/CN=mikey3/)
Issuer  => (C=US/ST=a/L=t/O=g/CN=mikey3/)

***** CHECKPOINTED;    Interval => 1,000
From ( Pnode
 Dsn=>MWATL1.TCPIP.DATA.FILE)
         recs => 0                    blks => 1
    I/O BYTES => 266
   VTAM BYTES => 53
    Cmpr Perc => 80.1%
       VOL=SER=> USER17
To   ( Snode
 Dsn=>MWATL1.FTST.AA1030B)
         recs => 0                    blks => 1
    I/O BYTES => 266
   VTAM BYTES => 53
    Cmpr Perc => 80.1%
       VOL=SER=> WRKPK3
_______________________________________________________________
```

The following fields are included for the Connect:Direct for z/OS extended option statistics:

Field	Description	Valid Values
TLS Enabled	Specifies whether TLS x.509 certificate use is enabled.	Yes No
SSL Enabled	Specifies whether SSL x.509 certificate use is enabled.	Yes No

Field	Description	Valid Values
TLS/SSL Ciphersuite	Specifies the cipher suite used in the session.	Any valid cipher suite
Subject	Specifies the subject name on the certificate.	Any valid subject name
Issuer	Specifies the issuer name on the certificate.	Any valid issuer name

STS Statistics Record

When you use the **Select Statistics** command to view the information about a Connect:Direct Process that uses STS security, you see a screen similar to the following. The Secure+ Option fields are in bold. A description for the fields follows the samples.

```
================================================================================
CD.OS390.V40000                SELECT STATISTICS                    05/04/2007
================================================================================
_______________________________________________________________________________
Function     => PROCESS SUBMIT             Start Time => 10:26:32
Process Name => STATSAMP                   Stop Time  => 10:26:32
Process Num  => 1                          Comp Code  => 00000000
                                           Comp Msg   => SSPA001I
Userid       => $CD
Primary      => CD.OS390.V40000            Step Name  =>
Submitted DSN=> $CD.CD.PROCESS(SUB1)
_____________________________________________________________________
_______________________________________________________________________________
Function     => COPY                       Start Time => 10:26:35
Process Name => STATSAMP                   Stop Time  => 10:26:39
Process Num  => 338                        Comp Code  => 00000000
                                           Comp Msg   => SCPA000I
Userid       => $CD
Secondary    => SC.OS390.V40000            Step Name  => COPYFIL1

From ( Pnode
 Dsn=$CD.SECURE.TESTFILE)
         recs => 0                          blks => 157
    I/O BYTES => 5,000,000
   VTAM BYTES => 5,000,314
    Cmpr Perc => 0.0%
    Digital Signature enabled = Yes
       VOL=SER=> USER05
To   ( Snode
 Dsn=$CD.SECURE.RESTART.OUT1)
         recs => 0                          blks => 157
    I/O BYTES => 5,000,000
   VTAM BYTES => 5,000,314
    Cmpr Perc => 0.0%
    Digital Signature enabled = No
    Merged Signature enabled  = Yes
    Merged Encryption enabled = No
       Verified Signature   = Curr
       VOL=SER=> USER02
```

The following fields are included for the Connect:Direct statistics for the copy function:

Field	Description	Valid Values
Digital Signature enabled	Specifies whether digital signature are enabled in the Secure+ Option parameters file. This information is displayed in the statidtics separtely for the PNODE and SNODE.	Yes No

Field	Description	Valid Values
Merged Signature enabled	Specifies the resulting value of the merge between the PNODE and the SNODE Secure+ Option parameters files and the COPY statement parameters for digital signature.	Yes No
Merged Encryption enabled	Specifies the resulting value of the merge between the PNODE and the SNODE Secure+ Option parameters files and the COPY statement parameters for data encryption.	Algorithm ID No
Verified Signature	Specifies whether the current or previous key verified the digital signature of digital signature is enabled for the session. This information is displayed only if the merged signature value is **Yes**.	Curr Prev

STS Extended Option Statistics Records

When you use the **Select Statistics** command with extended option enabled to view the information about a Connect:Direct Process that uses STS security, you see a screen similar to the following. The Secure+ Option fields are in bold.

Note: You must type ***** in the RECORD field of the Select Statistics Extended Options screen to ensure that the complete information is displayed.

A description of the fields follows the samples.

```
================================================================================
CD.OS390.V40000                 SELECT STATISTICS                    05/04/2007
================================================================================

_____________________________________________________________________________
Function     => PROCESS SUBMIT             Start Time => 10:26:32
Process Name => STATSAMP                   Stop Time  => 10:26:32
Process Num  => 338                        Comp Code  => 00000000
                                           Comp Msg   => SSPA001I
Userid       => $CD
Primary      => CD.OS390.V40000            Step Name  =>
Submitted DSN=> $CD.CD.PROCESS(SUB1)
_____________________________________________________________________________
_____________________________________________________________________________
Function     => Session Begin              Start Time => 10:26:35
                                           Start Date => 05/04/2003
Process Name => STATSAMP
Process Num  => 338                        Comp Code  => 00000000
                                           Comp Msg   => SVTM055I
Userid       => $CD
Primary Node => CD.OS390.V40000
Secondary Node  CD.OS390.V40000            ALT.NODE => CD.DALLAS.OFFICE
Submitter Node  CD.OS390.V40000
                Pnode   Signature Enabled = No
                Snode   Signature Enabled = No
                Merged  Signature Enabled = No
                Pnode Encrypt.Data Algorithms...
                  IDEACBC128
                  TDESCBC112
                  DESCBC56
                Snode Encrypt.Data Algorithms...
                  IDEACBC128
                  TDESCBC112
                  DESCBC56
                System Data Encryption    = IDEACBC128
_____________________________________________________________________________
_____________________________________________________________________________
Function     => COPY STEP START            Time         => 10:26:35
Process Name => STATSAMP                   Process Num  => 338
Primary Node => CD.OS390.V40000            Secondary Node => SC.OS390.V40000
                Pnode   Signature Enabled = No
                Snode   Signature Enabled = No
                Merged  Signature Enabled = No
                Pnode Encryption Enabled  = No
                Snode Encryption Enabled  = No
                Encryption Enabled        = No
_____________________________________________________________________________
Function     => COPY                       Start Time => 10:26:35
Process Name => STATSAMP                   Stop Time  => 10:26:39
Process Num  => 338                        Comp Code  => 00000000
                                           Comp Msg   => SCPA000I
Userid       => $CD
Secondary    => SC.OS390.V40000            Step Name  => COPYFIL1

From ( Pnode
 Dsn=$CD.SECURE.TESTFILE)
         recs => 0                          blks => 157
    I/O BYTES => 5,000,000
   VTAM BYTES => 5,000,314
    Cmpr Perc => 0.0%
    Digital Signature enabled = Yes
       VOL=SER=> USER05
To   ( Snode
 Dsn=$CD.SECURE.RESTART.OUT1)
         recs => 0                          blks => 157
    TYPE      => LRGSAM
    I/O BYTES => 5,000,000
   VTAM BYTES => 5,000,314
    Cmpr Perc => 0.0%
    Digital Signature enabled = No
    Merged Signature enabled  = Yes
    Merged Encryption enabled = No
       Verified Signature   = Curr
       VOL=SER=> USER02
```

Session Begin (SB) Record

The following fields are included for the Connect:Direct extended option statistics in the Session Begin record:

Field	Description	Valid Values
Pnode Signature Enabled	Specifies whether digital signatures are enabled in the Secure+ Option parameters file of the PNODE.	Yes No
Snode Signature Enabled	Specifies whether digital signatures are enabled in the Secure+ Option parameters file of the SNODE.	Yes No
Merged Signature Enabled	Specifies the resulting value of the merge between the PNODE and SNODE Secure+ Option parameters files for digital signature.	Yes No
Pnode Encrypt.Data Algorithms	Specifies the available encryption algorithms of the PNODE. The algorithms are displayed in the priority order set by the Secure+ Option administrator of the PNODE.	Algorithm ID List
Snode Encrypt.Data Algorithms	Specifies the available encryption algorithms of the SNODE. The algorithms are displayed in the priority order set by the Secure+ Option administrator of the SNODE.	Algorithm ID List
System Data Encryption	Specifies the algorithm used for encrypting Connect:Direct control blocks during security-enabled transfers.	Algorithm ID

Copy Step Start (CI) Record

The following fields are included for the Connect:Direct extended option statistics in the Copy Step Start record shown on page 176.

Field	Description	Valid Values
Pnode Signature Enabled	Specifies whether digital signature is enabled in the Secure+ Option parameters file of the PNODE.	Yes No
Snode Signature Enabled	Specifies whether digital signature is enabled in the Secure+ Option parameters file of the SNODE.	Yes No
Merged Signature Enabled	Specifies the resulting value of the merge between the PNODE and SNODE Secure+ Option parameters files for digital signature.	Yes No
Pnode Encryption Enabled	Specifies whether data encryption is enabled in the Secure+ Option parameters file of the PNODE.	Yes No
Snode Encryption Enabled	Specifies whether data encryption is enabled in the Secure+ Option parameters file of the SNODE.	Yes No

Field	Description	Valid Values
Encryption Enabled	Specifies the resulting value of the merge between the PNODE and SNODE Secure+ Option parameters files for data encryption.	Algorithm ID No

Copy Termination (CT) Record

The following fields are included for the Connect:Direct extended option statistics in the Copy Termination record as shown on page 176.

Field	Description	Valid Values
Digital Signature enabled	Specifies whether digital signatures are enabled in the Secure+ Option parameters file. This information is displayed in the statistics separately for the PNODE and the SNODE.	Yes No
Merged Signature enabled	Specifies the resulting value of the merge between the PNODE and SNODE Secure+ Option parameters files *and* the COPY statement parameters for digital signature.	Yes No
Merged Encryption enabled	Specifies the resulting value of the merge between the PNODE and SNODE Secure+ Option parameters files *and* the COPY statement parameters for data encryption.	Algorithm ID No
Verified Signature	Specifies whether the current or previous key verified the digital signature if digital signature is enabled for the session. This information is displayed only if the merged signature value is **Yes**.	Curr Prev

Chapter 16

Troubleshooting

Use the following table to help troubleshoot problems with Secure+ Option:

Problem	Possible Cause	Solution
The following message is received at startup: SITA166I or SITA167I Secure+ SSL or TLS initialization failed. rc=00000134, rs=NO DFLT UNIX PATH.	The Connect:Direct system does not have a default directory created for it in UNIX system services. The DLL files and other facilities related to SSL or TLS require the presence of a default UNIX directory.	Contact your z/OS system programmer.
The following message is received at startup: SITA166I Secure+ SSL or TLS initialization failed. rc=000000002, rs=GSK_KEYFILE_OPEN_FAILED.	The Secure+ Option parameters file, in combination with the SECURE.SSL.PATH.PREFIX initialization parameter, specifies a nonexistent key database, the key database has incorrect file permissions, or the password typed is incorrect.	Correct the name specified in the initialization parameter or the parameters file, the UNIX permissions, or the password.
The following message is received when an SSL or TLS Process is run: SSL or TLS handshake failure, reason= GSK_ERROR_SOCKET_CLOSED.	The trading partners have not enabled a matching cipher suite.	Update the remote node record for the trading partner to enable a cipher suite recognized by the trading partner and resubmit the Process.
The following message is received: CSPA202E SSL handshake failure, reason=GSK_ERROR_BAD_CERTIFICATE.	The certificate is not valid on the system issuing GSK_ERROR_BAD_CERT. This error occurs if the certificate is not validated on any local trusted CA certificate. This error is common if you use self-signed certificates because the remote Connect:Direct system does not have the CA certificate.	Verify that each trading partner can validate the certificates of other trading partners and resubmit the Process. Ensure that the remote node record for the trading partner has enabled the correct protocol.

Problem	Possible Cause	Solution
The following error is received from the SNODE: CSPA202E SSL or TLS handshake failure, reason=GSK_ERROR_UNKNOWN_ERROR.	A conflict within the IBM System SSL toolkit occurred because a certificate being processed did not use version 3 of the toolkit.	Ensure that all certificates and CA certificates are using version 3.
Secure+ Option features are enabled in the Secure+ Option parameters file, but the statistics record indicates that these functions are disabled.	The Connect:Direct network maps do not contain entries for the PNODE and SNODE. The node that you are connecting with is a V1 flow (such as LU0 or Netex). Secure+ Option is not supported for V1 flows because of reliance on XDR support.	Verify that the network map entries for both the PNODE and the SNODE exist, and use a V2 protocol such as LU6.2 ,TCP/IP, or UDT. Check for the existence of the extended statistics record for *Session Begin* (the SB record). This record is only created in V2 flows. The absence of this record indicates V1 flows were used.
Secure+ Option parameters specified from the copy statement cause the copy step to fail with message CSPA077E.	The node that you are connecting with is a V1 flow (such as LU0 or Netex). Secure+ Option is not supported for V1 flows because of reliance on XDR support.	Check for the existence of the extended statistics record for Session Begin (the SB record). This record is only created in V2 flows. The absence of this record indicates V1 flows were used.
An error occurs in ESTAE with a bad return code (RC=3) when running a Process with a remote node and the Process fails.	The value for Secure+ Option Export version is incorrect in the remote node definitions for one or both of the nodes. If one node is EXPORT and the other node is NOT EXPORT, the elliptic curves that enable you to create keys and generate Diffie-Hellman shared secrets are not correct.	Verify that the remote node definitions on both sites accurately state the Secure+ Option Export information.
Running a Process with a remote node fails with an authentication error.	Unique public/private key pairs are generated for the remote node record and the local node record is set to OVERRIDE=N.	Change the local node record to OVERRIDE=Y or do not use unique public/private key pairs in the remote node record.
The **Save Active** option is not selectable.	You can only use the **Save Active** function once each time you open the Secure+ Option parameters file.	Reopen the Secure+ Option parameters file to use the **Save Active** function or use the **Save As** function.

Problem	Possible Cause	Solution
The text entry fields on the **Create/Update** panel of the Secure+ Option Admin Tool are not visible.	The CUA attributes in your ISPF profile are not set correctly.	Change the value for **Normal Text entry** in the CUA attributes of the ISPF profile to **uscore** in the **Highlight** column.
The Secure+ Option parameter, ENCRYPT.DATA specified from the copy statement causes the copy step to fail with an error message CSPA080E.	The algorithm name used in the COPY statement is not in the supported algorithm list for both nodes.	Verify that the algorithm name in the copy statement is in the supported algorithm list for both nodes.
A Process including a COPY statement with a SECURE parameter was submitted and failed. The following CSPA011E error message is displayed: Illegal attempt to override Secure+ parameters	You attempted to use the SECURE parameter in a COPY statement for the STS protocol but did not specify OVERRIDE=Y in the remote node record to enable the security override feature.	Take one of the following actions: ◆ Remove the SECURE= parameter from the COPY statement and resubmit the Process. ◆ Change the OVERRIDE setting in the remote node record in the parameters file and make sure all other necessary protocol settings are specified. Resubmit the Process including the SECURE= parameter. See *Override STS Functions from the COPY Statement* on page 104
An SSL or TLS session was attempted with a Connect:Direct system that does not implement SSL or TLS.	The trading partner does not have the protocol enabled.	Request that the trading partner configure its node for the correct protocol or disable Secure+ Option for the node.
Either the CSPA203E error message or the CSPA204E message is displayed: SSL or TLS send failure, rc=&RC, rsn=&RSN or SSL or TLS receive failure, rc=&RC, rsn=&RSN.	The client cannot validate the server's certificate.	Ensure that client authentication is turned on and certificate information is defined in the remote node record.
The following CSPA205E error message is displayed: SSL or TLS support requires the TCP/IP protocol.	One of the trading partners is not using TCP/IP for communications.	Determine which trading partner does not have TCP/IP enabled and change the configuration of that trading partner.

Problem	Possible Cause	Solution
The following CSPA200E error message is displayed: Secure+ version mismatch.	You are attempting to use the SSL or TLS protocol to securely communicate with a trading partner that does not have the protocol enabled.	Change the configuration of the remote node record to enable the correct protocol.
The following CSPA206E error message is displayed: Remote certificate is invalid.	The root certificate was not found.	Check the parameters file configuration and ensure that the correct certificate is identified in the remote node record.
The following CSPA207E error message is displayed: Root certificate not found.	The remote certificate could not be validated.	Check the parameters file configuration and ensure the correct key database file is identified in the remote node record.
The following SITA1901 error message is displayed: Sec+ Init failed. Secure= No. Override=No.	The local node record has all Secure+ Option protocols disabled and has override set to no.	Either enable the appropriate protocol in the remote node record or enable override=yes in the local node record.
A Process was submitted and failed. The following CSPA078E error message is displayed: Invalid specification of SECURE= on PROCESS statement. SECURE= cannot be specified in a non-Secure+ environment or when the Remote Node record in the Secure+ Parmfile does not specify OVERRIDE=Y.	You attempted to use the SECURE parameter in a PROCESS statement but did not specify OVERRIDE=Y in the remote node record to enable the security override feature.	Take one of the following actions: ◆ Remove the SECURE= parameter from the PROCESS statement and resubmit the Process. ◆ Change the OVERRIDE setting in the remote node record in the parameters file and make sure all other necessary protocol settings are specified. Resubmit the Process including the SECURE= parameter. See Chapter 13, *Override Settings in Connect:Direct Processes*.
The submit within a Process failed with a reason code of 8. The following SCBI514E or SSUB267E error message is displayed: Equal sign required after SECURE keyword. The SECURE keyword in the PROCESS must be followed by an equal sign.	You attempted to use the SECURE parameter in a PROCESS statement but did not include an equal sign after the SECURE keyword.	Correct the PROCESS statement syntax by inserting an equal sign and resubmit the Process.

Problem	Possible Cause	Solution
The submit within a Process failed with a reason code of 8. The following SCBI515E or SSUB268E error message is displayed: A parsing error occurred on the SECURE keyword when processing the SECURE keyword on the PROCESS statement.	You attempted to use the SECURE parameter in a PROCESS statement but the syntax was faulty.	Correct the PROCESS statement and resubmit the Process. For a complete description of the SECURE parameter and how to use it in the PROCESS statement, go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.
The submit within a Process failed with a reason code of 8. The following SCBI516E or SSUB269E error message is displayed: SECURE= Must be OFF|STS|SSL|TLS. The SECURE keyword on the PROCESS statement must specify OFF|STS|SSL|TLS. OFF - Use a non-secure session STS - Use an STS secure session SSL - Use an SSL secure session TLS - Use a TLS secure session	You attempted to use the SECURE parameter in a PROCESS statement but specified a value other than OFF, STS, SSL, or TLS.	Correct the PROCESS statement and resubmit the Process. For a complete description of the SECURE parameter and how to use it in the PROCESS statement, go to the Connect:Direct Processes Web site at http://www.sterlingcommerce.com/documentation/processes/processhome.html.

Appendix A

Definitions of Certificate Parameters

To avoid some problems associated with CA-signed and self-signed certificates, refer to the following information about certificate parameter definitions required to use Connect:Direct Secure+ Option. Minimum parameter definitions for certificates generated with the RACF, gskkyman, CA-ACF2, and CA-Top Secret security applications are provided.

You may also want to record the parameter definitions you configure for certificates on the worksheets provided for the local and remote node records in Appendix B, *Configuration Worksheets*.

Parameter Definitions for Certificates Generated with the RACF Application

This table describes the minimum parameter definitions required for Connect:Direct Secure+ Option. When two parameters are listed in the same row, the first parameter name is used when you create a certificate and the second parameter name is its equivalent, which is used when you display information about the certificate. Consult the RACF documentation for detailed information about all the certificate parameters and commands.

RACF Parameter	Description	Value Used for Secure+ Option
User ID	Security ID used to start the Connect:Direct Job or Started Task.	RACF-defined ID
Label	Certificate label. LABEL keywords are case and blank sensitive; therefore, the values specified for these keywords must be exact.	Information that identifies the certificate, for example, CD Secure Plus **Note:** Specify the exact value in the **TLS/SSL Certificate Label** field in the Local Node record of the Secure+ parameters file.

RACF Parameter	Description	Value Used for Secure+ Option
Status	Status of the certificate.	Status=TRUST All certificates used by Connect:Direct Secure+ Option must be Trusted.
NOTBEFORE Start Date	Specifies the local date and time from which the certificate is valid.	Must be a valid date and time
NOTAFTER End Date	Specifies the local date and time after which the certificate is no longer valid. All certificates used in the SSL/TLS handshake, including issuer certificates, must not be expired.	Must be a valid date and time
Key Usage	Facilitates identification and key exchange during SSL/TLS security handshakes.	HANDSHAKE (**Required**): Indicates that digital signature and key encipherment are enabled. DOCSIGN (Optional): Indicates that non-repudiation is enabled. DATAENCRYPT (Optional): Indicates that data encipherment is enabled. CERTSIGN: Indicates the certificate can sign other digital certificates and CRLs. **Note:** Do not specify CERTSIGN. Only Certificate Authority (Issuer) certificates should have keyCertSign and cRLSign indicators.
X.509 Subject's Distinguished Name Issuer's Name	Specifies the distinguished name of the issuer that issued or signed a certificate. The name identifies the trusted certificate of the issuer or CA that signed the server certificate. The name identifies the trusted certificate of the issuer or CA that signed the server certificate. The CA or entity certificate with that name must be available within the key database or Keyring. The Issuer Name keywords are case and blank sensitive. **Note:** Self-signed certificates display the same information in the Issuer Name and Subject Name parameters.	The following fields, which must be enclosed in single quotes, are attributes of the Issuer's Name parameter and the Subject's Name parameter: CN=Common Name of the certificate in single quotes, for example, 'RACF SELF SIGN COMMON' T='*Title of person creating certificate*' OU='*Organizational Unit associated with the person creating the certificate'* O='*Organization for which the certificate is being created'* L='*Locality (city) of the entity for which the certificate is created'* SP='*State/Province of the locality'* C='*Country of the locality'*

RACF Parameter	Description	Value Used for Secure+ Option
X.509 Subject's Distinguished Name Subject's Name	Specifies the certificate's subject distinguished name. It identifies the certificate. This name can identify certificates that may have issued or signed other certificates and can match to other certificates Issuer's Name.	
Private Key Size	Specifies the size of the private key expressed in decimal bits. Key size of 1024 provides a secure encryption. A larger size provides a more secure encryption but requires more CPU to encrypt.	1024
Private Key Type	Specifies how the private key should be stored for future use. Type can be none, non-ICSF, or ICSF. If Type= none, the certificate does not have a private key.	If ICSF is specified, see *Connect:Direct Access to System Resources for SSL or TLS* on page 20 for requirements.
Ring Name	Specifies the name of the keyring that a certificate is connected with.	If you use a key ring, the exact value in this field must be specified in the **TLS/SSL Certificate Pathname** field for the Local Node record in the Secure+ parameters file.
Usage	Specifies how this certificate should be used in a keyring for the USERID of the person submitting a batch job or signed on to TSO.	PERSONAL
Default	Specifies that the certificate is the default certificate. Only one certificate can be the default certificate. Define the end-user server certificate of the local Connect:Direct node as the default.	YES

Parameter Definitions for Certificates Generated with the GSKKYMAN Utility

This table describes the minimum parameter definitions required for Connect:Direct Secure+ Option. Consult the GSKKYMAN documentation for detailed information about all the certificate parameters and commands.

GSKKYMAN Parameter	Description	Value Required for Secure+ Option
Label	Certificate label. LABEL keywords are case and blank sensitive; therefore, the values specified for these keywords must be exact.	Information to identify the certificate, for example, CD Secure Plus **Note:** Specify the exact Label value in the **TLS/SSL Certificate Label** field in the local node record of the Connect:Direct Secure+ Option parameters file.
Version	X.509 certificates with version number 3 are supported.	3
Trusted	Specifies the certificate status.	Yes
Effective Date	Specifies the local date and time from which the certificate is valid.	Must be a valid date and time
Expiration Date	Specifies the local date and time after which the certificate is no longer valid. All certificates used in the SSL/TLS handshake, including issuer certificates, must not be expired.	Must be a valid date and time
keyUsage	Facilitates identification and key exchange during SSL/TLS security handshakes.	Digital Signature (**Required**) Non-repudiation Key encipherment Data encipherment
Issuer Name	Specifies the distinguished name of the Issuer that issued or signed a certificate. The name identifies the trusted certificate of the issuer or CA that signed the server certificate. The CA or entity certificate with that name must be available within the key database or keyring. The Issuer Name keywords are case and blank sensitive. Self-signed certificates have the same Issuer name and Subject name.	

GSKKYMAN Parameter	Description	Value Required for Secure+ Option
Certificate Subject Name	Specifies the certificate's subject distinguished name. It identifies the certificate. This name can identify certificates that may have issued or signed other certificates and can match to other certificates Issuer's Name.	The following fields are attributes of the Certificate Subject Name parameter: CN=Common Name of the certificate in single quotes, for example, 'RACF SELF SIGN COMMON' T='*Title of person creating certificate*' OU='*Organizational Unit associated with the person creating the certificate'* O='*Organization for which the certificate is being created'* L='*Locality (city) of the entity for which the certificate is created'* SP='*State/Province of the locality'* C='*Country of the locality'*
Public Key Algorithm	Specifies the algorithm used to encrypt data.	rsaEncryption
Public Key Size	Specifies the size of the public key expressed in decimal bits. Key size of 1024 provides a secure encryption. A larger size provides a more secure encryption but requires more CPU to encrypt.	1024
Key database password	Specifies the password used when you created a key database file.	When you specify a gskkyman key database file name in the **TLS/SSL Certificate Pathname** field for the local node record, you must specify the key database password in the **TLS/SSL Certificate Pathname Pass Phrase** field**.**

Parameter Definitions for Certificates Generated with the CA-ACF2 Application

This table describes the minimum parameter definitions required for Connect:Direct Secure+ Option. Consult the CA-ACF2 documentation for detailed information about all the certificate parameters and commands.

CA-ACF2 Parameter	Description	Value Used by Secure+ Option
ACID	Security ID used to start the Connect:Direct Job or Started Task.	CA-ACF2 defined ID

CA-ACF2 Parameter	Description	Value Used by Secure+ Option
Label	Certificate label. LABEL keywords are case and blank sensitive; therefore, the values specified for these keywords must be exact.	Information that identifies the certificate, for example, CD Secure Plus **Note:** Specify the exact value in the **TLS/SSL Certificate Label** field in the Local Node record of the Secure+ parameters file.
Subjsdsn	Specifies the subject's distinguished name. It identifies the certificate. This name can identify certificates that may have issued or signed other certificates and can match to other certificates Issuer's Name.	The following fields, which must be enclosed in single quotes, are attributes of the Issuer's Name parameter and the Subject's Name parameter: CN=Common Name of the certificate in single quotes, for example, 'RACF SELF SIGN COMMON' T='*Title of person creating certificate*' OU='*Organizational Unit associated with the person creating the certificate'* O='*Organization for which the certificate is being created'* L='*Locality (city) of the entity for which the certificate is created'* SP='*State/Province of the locality'* C='*Country of the locality'*
Size	Specifies the size of the private encryption key in bits.	1024
Active	Specifies the local date and time from which the certificate is valid.	Must be a valid date and time
Expire	Specifies the local date and time after which the certificate is no longer valid. All certificates used in the SSL/TLS handshake, including issuer certificates, must not be expired.	Must be a valid date and time

CA-ACF2 Parameter	Description	Value Used by Secure+ Option
Keyusage	KeyUsage certificate extension, of which one or more of the following values might be coded.	HANDSHAKE (**Required**): Indicates that digital signature and key encipherment are enabled. DOCSIGN (Optional): Indicates that non-repudiation is enabled. DATAENCRYPT (Optional): Enables the certificate to be used to. CERTSIGN: Indicates the certificate can sign other digital certificates and CRLs. **Note:** Do not specify CERTSIGN. Only Certificate Authority (Issuer) certificates should have keyCertSign and cRLSign indicators.
KEYRING	Specifies the record key of a KEYRING record to which the certificate is associated.	If you use a keyring, the value in this field must be specified in the **TLS/SSL Certificate Label** field for the Local Node record in the Secure+ parameters file.
RINGNAME	Specifies the ring name of a KEYRING record to which the certificate information is associated.	If you use a keyring, the value in this field must be specified in the **TLS/SSL Certificate Pathname** field for the Local Node record in the Secure+ parameters file.
USAGE	Specifies how this certificate should be used in a keyring for the USERID of the person submitting a batch job or signed on to TSO.	PERSONAL
DEFAULT	Specifies that the certificate is the default certificate. Only one certificate can be the default certificate. Define the end-user server certificate of the local Connect:Direct node as the default.	YES

Parameter Definitions for Certificates Generated with the CA-Top Secret Application

This table describes the minimum parameter definitions required for Connect:Direct Secure+ Option. Consult the CA-ACF2 documentation for detailed information about all the certificate parameters and commands.

CA-Top Secret Parameter	Description	Value Used for Secure+ Option
SUBJECTDSN	Specifies the subject's distinguished name. It identifies the certificate. This name can identify certificates that may have issued or signed other certificates and can match to other certificates Issuer's Name.	The following fields, which must be enclosed in single quotes, are attributes of the Issuer's Name parameter and the Subject's Name parameter: CN='*Common Name of the certificate in single quotes*,' for example, 'RACF SELF SIGN COMMON' T='*Title of person creating certificate*' OU='*Organizational Unit associated with the person creating the certificate'* O='*Organization for which the certificate is being created'* L='*Locality (city) of the entity for which the certificate is created'* SP='*State/Province of the locality'* C='*Country of the locality* UID='*userid'*
UID	Security ID used to start the Connect:Direct Job or Started Task.	CA-Top Secret defined ID
NBDATE/NBTIME	Specifies the local date and time from which the certificate is valid.	Must be a valid date and time
NADATE/NATIME	Specifies the local date and time after which the certificate is no longer valid. All certificates used in the SSL/TLS handshake, including issuer certificates, must not be expired.	Must be a valid date and time
KEYSIZE	Specifies the size of the private encryption key in bits.	1024
LABLCERT	Certificate label. LABEL keywords are case and blank sensitive; therefore, the values specified for these keywords must be exact. This parameter is specified when you associate a certificate with an ACID.	Information to identify the certificate, for example, CD Secure Plus **Note:** Specify the exact value in the **TLS/SSL Certificate Label** field in the Local Node record of the Secure+ parameters file.
ICSF	If Private Key type is ICSF, the private key is stored in the ICSF PKDS (public key data set). Access to the private key then requires that the ICSF application be executing and Connect:Direct have access authority to the ICSF application	If ICSF is specified, see *Connect:Direct Access to System Resources for SSL or TLS* on page 20 for requirements.

CA-Top Secret Parameter	Description	Value Used for Secure+ Option
TRUST | NOTRUST	Specifies the status of the certificate when you associate a certificate with an ACID.	TRUST
KEYRING	Specifies the key ring being added to the user's ACID.	If you use a keyring, the value in this field must be specified in the **TLS/SSL Certificate Label** field for the Local Node record in the Secure+ parameters file.
LABLRING	Specifies the label to be associated with the keyring being added to the user, which is used as the identifier of the digital certificate.	If you use a keyring, the value in this field must be specified in the **TLS/SSL Certificate Pathname** field for the Local Node record in the Secure+ parameters file.
DEFAULT	Specifies how this certificate should be used in a keyring for the USERID of the person submitting a batch job or signed on to TSO.	PERSONAL
USAGE	Specifies that the certificate is the default certificate. Only one certificate can be the default certificate. Define the end-user server certificate of the local Connect:Direct node as the default.	YES

Appendix B

Configuration Worksheets

Use the worksheets in this appendix to record the configuration information for Connect:Direct Secure+ Option.

- The *Local Node Security Feature Definition Worksheet* records the security functions defined for the local Connect:Direct node.
- The *Remote Node Security Feature Definition Worksheet* records the security functions defined for connections with remote nodes with which the local Connect:Direct node communicates. Make a copy of the blank *Remote Node Security Feature Definition Worksheet* for each remote node that you are configuring for Secure+ Option operations.
- The *.EASERVER Node Security Feature Definition Worksheet* on page 200 records information for the Sterling External Authentication Server remote node record.
- The *.CLIENT Node Security Feature Definition Worksheet* on page 201 records information for the remote node record used to allow secure TCP API connections.

Local Node Security Feature Definition Worksheet

Record the security feature definitions for the Secure+ Option local node record on this worksheet. Refer to this worksheet as you configure the local node record.

Local Node Name:_____	
TLS protocol enabled:	Yes _____ No _____
SSL protocol enabled:	Yes _____ No _____
STS protocol enabled:	Yes _____ No _____
Configured Security Functions	
Override enabled:	Yes _____
Autoupd enabled: Applies only to STS protocol	Yes _____
Authorization Timeout: Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter.	_____(Numeric value equal to or greater than 0 seconds)
Certificate Label (label specified when the certificate was generated using one of the security applications; may be called LABLCERT):	_____ Valid only for SSL or TLS
Certificate Pathname: key database or key ring	_____ Valid only for SSL or TLS
Password: Valid only for certificates created in a gskkyman database; leave blank for key rings.	_____
Cipher Suite(s) to Enable: Applies only to the SSL and TLS protocols	_____
Enable Digital Signatures: Applies only to the STS protocol	Yes _____ No _____
Create Public Auth and Sig Key: Applies to all protocols	Yes _____ No _____
Enable Encryption: Applies only to STS protocol	Yes _____ No _____
Algorithm Names: Applies only to the STS protocol	_____
Algorithms Enabled Applies only to STS protocol	___ DES ___ TDES ___ IDEA

Local Node Name:_____
Enable External Authentication: Yes _____ No _____ Applies only to the SSL and TLS protocols

Remote Node Security Feature Definition Worksheet

Record the security feature definitions for a remote node record on this worksheet. Make a copy of this worksheet for each remote node defined in the Secure+ Option parameters file that you are configuring for Secure+ Option operations. Refer to this worksheet when you configure a remote node record.

Remote Node Name:	_____
Security Options	
TLS protocol enabled:	Yes _____ No _____
SSL protocol enabled:	Yes _____ No _____
STS protocol enabled	Yes _____ No _____
Enable Override: When override is enabled in a remote node record, ◆ Values in the COPY statement override values in the remote node record that uses the STS protocol ◆ Values in the PROCESS statement override values in the remote node record that uses the STS, SSL, or TLS protocol.	Yes _____ No _____ Default to local node _____
Enable External Authentication: Valid only for the SSL or TLS protocol	Yes _____ No _____ Default to local node _____
Authorization Timeout: Set the value equal to or greater than the value set for the Connect:Direct TCP.TIMER initialization parameter.	_____(Numeric value equal to or greater than 0 seconds)
TLS or SSL Protocol Functions	
If you enabled the TLS or SSL protocol and you did not define this information in the local node record, set one or more of the following functions:	
Certificate Label: Label specified when the certificate was generated using one of the security applications; may be called LABLCERT.	_____ You can type an asterisk (*) to default to the local node record.
Cipher Suite(s) Enabled:	_____

Ask the trading partner which cipher suites are enabled. ◆ SSL_RSA_WITH_AES_128_SHA (can only be used TLS) ◆ SSL_RSA_WITH_AES_256_SHA (can only be used TLS) ◆ SSL_RSA_WITH_3DES_EDE_CBC_SHA ◆ SSL_RSA_WITH_DES_CBC_SHA ◆ SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5 ◆ SSL_RSA_WITH_RC4_128_SHA ◆ SSL_RSA_WITH_RC4_128_MD5 ◆ SSL_RSA_EXPORT_WITH_RC4_40_MD5 ◆ SSL_RSA_WITH_NULL_SHA ◆ SSL_RSA_WITH_NULL_MD5	
Certificate Pathname key database or key ring	_____ You can type an asterisk (*) to default to the local node record.
To add a second level of security by enabling Client Authentication, set the following two options:	
Enable Client Authentication:	Yes _____ No _____
If client authentication is enabled, specify the certificate common name of the local node certificate in the **Client Auth. Compare** field.	_____
STS Protocol Functions	
If you enabled the STS protocol, set one or more of the following functions:	
Enable Digital Signatures:	Yes _____ No _____
Enable Public Key Auto Updates:	Yes _____ No _____
Note: If the trading partner uses an earlier version of Secure+ Option, you need identify the version of Secure+ Option the partner is using.	
Enable Encryption:	Yes _____ No _____
Algorithm Names:	_____
Algorithms Enabled:	___ DES ___ TDES ___ IDEA

.EASERVER Node Security Feature Definition Worksheet

Use the following worksheet to record information to configure the remote node record for .EASERVER node. Refer to this worksheet when you configure the .EASERVER remote node record.

Remote Node Name:	**.EASERVER (Required)**
TLS protocol enabled:	Yes _____ No _____
SSL protocol enabled	Yes _____ No _____
Note: You must enable either SSL or TLS to communicate with the EA server.	
External Auth Server Def	_____ Name of the certificate validation definition configured on the EA server that defines how to validate certificates. This parameter is case sensitive.
External Auth Server Address	_____ IP address of server for the Sterling External Authentication Server application
External Auth Server Port	_____ Number of the port to use to connect to the EA server
Client Authentication enabled:	Yes _____
Client Authentication Common Name: If client authentication is enabled, specify the certificate common name of the local node certificate in the **Client Auth. Compare** field.	_____
Certificate Label:	_____ You can type an asterisk (*) in the Certificate Label field to default to the local node record.
Certificate Pathname key database or key ring	_____ You can type an asterisk (*) in the Certificate Pathname field to default to the local node record.

.CLIENT Node Security Feature Definition Worksheet

Record the security feature definitions for a remote node record named .CLIENT that you create to allow secure connections. Refer to this worksheet when you configure the .CLIENT node record.

Remote Node Name:	**.CLIENT (Required)**
Note: The node name must be defined as .CLIENT to allow secure connections.	
Security Options	
Autoupd enabled:	Yes _____ No _____
TLS protocol enabled:	Yes _____ No _____
SSL protocol enabled:	Yes _____ No _____
Enable Override:	Yes _____ No _____
ISPF IUI and DMBATCH Options	
ISPF IUI protocol defined as SNA:	Yes _____ No _____
DMBATCH protocol defined as SNA	Yes _____ No _____

Appendix C

Test Secure+ Option with the STS Protocol

This appendix describes the steps for testing Connect:Direct Secure+ Option with the STS protocol. To test an STS configuration and verify that Secure+ Option is working as intended, you must install and set up Connect:Direct and Secure+ Option on two different nodes. You can define two new test nodes as described in the following procedures (Node A and Node B) or you can use two existing nodes. Each node must be defined in the partner's Connect:Direct network map. These existing nodes can be two nodes within your enterprise or you can coordinate testing with a trading partner.

For the initial setup and testing, define *only* the minimum required fields for both nodes as described in the procedures in this section. Specific settings are provided to create nodes to test.

Task Summary

The following list summarizes the order of the tasks necessary to test Secure+ Option with the STS protocol.

1. Define Secure+ Option for Node A
    a. Create the Secure+ Option local node record and keys
    b. Create the Secure+ Option remote node record (Node B) and keys
    c. Export the public keys of Node A for Node B
    d. Save the parameters file
2. Define Secure+ Option for Node B
    a. Create the Secure+ Option local node record and keys
    b. Create the Secure+ Option remote node record (Node A) and keys
    c. Export the public keys of Node B for Node A
    d. Import the public keys from Node A to Node B
    e. Save the parameters file
3. Import public keys from Node B to Node A

4. Save the parameters file for Node A
5. Update Connect:Direct network maps for Node A and Node B
6. Add the **SECURE.DSN=*filename*** parameter to the Connect:Direct for z/OS initialization parameters file of Node A and Node B (where *filename* is the name of the Secure+ Option parameters file for that node)
7. Restart Connect:Direct (Node A and Node B)
8. Verify that Secure+ Option is enabled (Node A and Node B)
9. Exchange data and compare results
   a. Send data from Node A to Node B
   b. Review statistics records for transaction

Access the Secure+ Option Admin Tool

Use the Secure+ Option Administration Tool to set up Secure+ Option to test an STS installation.

To access the Secure+ Option Admin tool:

1. From the **Connect:Direct Administrative Options Menu**, select **Secure+ Option** in the Action Bar.
2. Type **1** to select **Secure+ Admin Tool** and press **Enter**.

Define Secure+ Option for Node A

Defining Secure+ Option for Node A involves:

- Creating the Secure+ Option local node record and generating the public keys
- Creating the Secure+ Option remote node record and generating the public keys
- Exporting the public keys of Node A
- Saving the parameters file

Create the Secure+ Option Local Node Record and Keys for Node A

To create the local node record:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **Edit** and press **Enter**.
2. Type **1** to select **Create/Update Record** and press **Enter** to display the **Node Identification** panel.

```
 Secure+ Create/Update Panel - Node Identification
 Option:

 EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

 Node
 NODEA                   1 1. Local
                           2. Remote
 Alias
 Names:                  TCP Information:
                           IPaddr:
                           Port:
Import Remote Keys     Get Record                OK        Cancel
```

3. To define values for Node A:
   a. Select each of the panels listed in the following table.
   b. Type the sample values in the fields listed for each panel.

      Fields that are either not valid for the STS protocol or for the type of record being configured are identified and should be left blank.

Panel	Field	Value
Node Identification	Node	Name of Node A (NODEA for this example)
	Local/Remote	Local (1)
	TCP Information	Not valid for local node
	Alias Names	Not valid for local node
STS Parameters	Auth Timeout	90
	Autoupdt	No (2)
	Override	Yes (1)
	Enable STS	Yes (1)
	Signature	Yes (1)
	Encrypt	Yes (1)
	Algorithm	* to provide access to all available algorithms defined in the local node record
EA Parameters	Enable Auth	No (2)
SSL Parameters	Enable SSL	No (2)
	Client Auth	No (2)
TLS Parameters	Enable TLS	No (2)
	Client Auth	No (2)

4. When you finish setting the sample values, select **STS Parameters** and press **Enter**.
5. Generate the authentication key for the STS protocol:
   a. Select **Create / Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
 Secure+ Admin Tool: Generate Seed


 2 1. Specify Value         Specify the seed value by typing it
                            into the text field.
   2. Sample Value          Generate a seed by processing text
                            entered from the keyboard.

    Random Number
    Seed:
```

   b. Press **Enter** to accept the default value (**2 - Sample Value**).
   c. On the **Command Prompt** screen, select **OK** and press **Enter**.
   d. When the following screen is displayed, if the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.
   e. Press **PF3** to save the information.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 ------------------------------------------------------------------------------
 EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
 Command ===>                                                  Scroll ===> PAGE
 024: This process cannot proceed if the data in the edit file is unchanged.
 ==MSG> -Warning- The UNDO command is not available until you change
 ==MSG>           your edit profile using the command RECOVERY ON.
 000001 262144
 000002
 000003 134217728
 000004
 000005 32
 000006
 000007 4
 000008
 000009 8589934592
 000010
 000011 131072
 000012
 000013 8388608
 000014
 000015 2097152
 000016
 000017 1073741824
```

f. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember this number.

When the **Secure+ Option Create/Update Panel** displays the message *Seed generation complete*, your public key for strong authentication is created, as illustrated in the following sample.

```
Secure+ Create/Update Panel - STS Parameters
Option:
024: Seed generation complete.
Node Identification     EA Parameters     SSL Parameters     TLS Parameters

Node                                    1 1. Y 2. N 3. D Override
NODEA                                   2 1. Y 2. N 3. D Autoupdt
                                        2 1. Y 2. N 3. D Enable STS
          Auth Timeout:  120            2 1. Y 2. N 3. D Signature
          Algorithm     *               2 1. Y 2. N 3. D Encrypt

Create  / Reset  Auth. Prev. Keys                         Expire Date
Create  / Reset   Sig. Prev. Keys                         Expire Date

                               -----------------  <  >  ------------------
Create  / Reset  Auth. Pubkey | 0203.093F.5D89.9024.5080.FE6D.7574.F55B.  |
Create  / Reset   Sig. Pubkey | *                                         |
              Algorithm Names | DESCBC56,TDESCBC112,IDEACBC128            |
               Auth. Rmt. Key | 0000                                      |
                 Sig. Rmt. Key | 0000                                     |
                               -------------------------------------------

   Import Remote Keys     Get Record                OK        Cancel
```

6. Select **Create Sig. Pubkey** and press **Enter**.
7. Press **Enter** to accept the default value (**2 - Sample Value**).

   When the message *Seed generation complete* is displayed on the **Secure+ Option Create/Update Panel**, your public key for digital signature is created.
8. Select **OK** and press **Enter**. The node field clears.

Create the Secure+ Option Remote Node Record and Keys for Node B

To create the remote node record:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **Edit** and press **Enter**.
2. Type **1** to select **Create/Update Record** and press **Enter** to display the **Node Identification** panel.

```
 Secure+ Create/Update Panel - Node Identification
 Option:

 EA Parameters           SSL Parameters    TLS Parameters     STS Parameters

 Node
 NODEB                   2 1. Local
                           2. Remote
 Alias
 Names:                  TCP Information:
                           IPaddr:
                           Port:
Import Remote Keys     Get Record                OK        Cancel
```

3. Select each of the panels listed in the following table and type the sample values in the fields listed for each panel. Fields that are either not valid for the STS protocol or for the type of record being configured should be left blank.

Panel	Field	Value
Node Identification	Node	Name of Node B (NODEB for this example)
	Local/Remote	Remote (2)
	TCP Information	Leave blank because Connect:Direct gets IP address information from the network map
	Alias Names	Leave blank
STS Parameters	Auth Timeout	90
	Autoupdt	Default to local (3)
	Override	Default to local (3)
	Enable STS	Default to local (3)
	Signature	Default to local (3)
	Encrypt	Default to local (3)
	Algorithm	* to provide access to all available algorithms defined in the local node record
EA Parameters	Enable Auth	Default to local (3)
SSL Parameters	Enable SSL	Default to local (3)
	Client Auth	No (2)
TLS Parameters	Enable TLS	Default to local (3)
	Client Auth	No (2)

4. Select **STS Parameters** and press **Enter** when you finish setting these values.
5. Generate the authentication key for the STS protocol:
   a. Select **Create / Reset Auth. Pubkey** and press **Enter** to display the **Generate Seed** screen.

```
 Secure+ Admin Tool: Generate Seed


 2 1. Specify Value         Specify the seed value by typing it
                            into the text field.
   2. Sample Value          Generate a seed by processing text
                            entered from the keyboard.

    Random Number
    Seed:
```

   b. Press **Enter** to accept the default value (**2 - Sample Value**).
   c. On the **Command Prompt** screen, select **OK** and press **Enter**.
   d. When the following panel is displayed, if the message *This is Loop 2 of 10* is displayed, type over data on any line and press **PF3** up to 10 times. This step is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file. Repeating the process increases the randomness of keys.
   e. Press **PF3** to save the information.

```
File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 ------------------------------------------------------------------------------
 EDIT       SYS06254.T160411.RA000.SSCHR1.R0207298          Columns 00001 00072
 Command ===>                                                  Scroll ===> PAGE
 024: This process cannot proceed if the data in the edit file is unchanged.
 ==MSG> -Warning- The UNDO command is not available until you change
 ==MSG>           your edit profile using the command RECOVERY ON.
 000001 262144
 000002
 000003 134217728
 000004
 000005 32
 000006
 000007 4
 000008
 000009 8589934592
 000010
 000011 131072
 000012
 000013 8388608
 000014
 000015 2097152
 000016
 000017 1073741824
```

f. When the **Pass Phrase Generation** panel is displayed, type a string at least 32 characters long containing at least one uppercase character, one lowercase character, and one numeric value and press **Enter**.

Note: You do not need to remember this number.

When the **Secure+ Option Create/Update Panel** displays the message *Seed generation complete*, your public key for strong authentication is created.

6. Select **Create Sig. Pubkey** and press **Enter**.
7. On the **Generate Seed** screen, press **Enter** to accept the default value (**2 - Sample Value**).
8. Change some of the text by typing over it and press **PF3**.

   On the **Secure+ Option Create/Update Panel**, the message *Seed generation complete* is displayed when your public key for digital signature is created.
9. Select **OK** and press **Enter**.
10. Select **Cancel** and press **Enter** to return to the **Secure+ Option Admin Tool: Main Screen** and display the two node records you defined.

```
File  Edit  Key Management  Help
-------------------------------------------------------------------------------
                                                                        Row 1 of 2
                     Secure+ Admin Tool: Main Screen
 Option ===>                                                          Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   NODEA              L    YNNN     Y          Y          Y        N       N
   NODEB              R    *NNN     *          *          *        *       *
****************************** BOTTOM OF DATA ********************************
```

Export Node A's Public Keys

To export the local node authentication and digital signature public key values to the remote node you are testing with:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **Key Management** and press **Enter**.
2. Type **2** to select **Export Public Keys** and press **Enter**.

Note: If warning messages are displayed, read them. Press **PF3** to continue.

```
                    Secure+ Admin Tool: File Selection

             Enter file name for: INPUT SECURE PARM FILE


File
Name: $CD.SECURE.EXPORT                                        Browse

          File System Type:
          1 1. MVS  2. HFS                                     Cancel
```

3. Press **Enter** to accept the default file name and MVS file system type.
4. Select **OK** and press **Enter**.

   The **Secure+ Option Admin Tool: Main Screen displays t**he message *Export Successful*.

Save the Parameters File for Node A

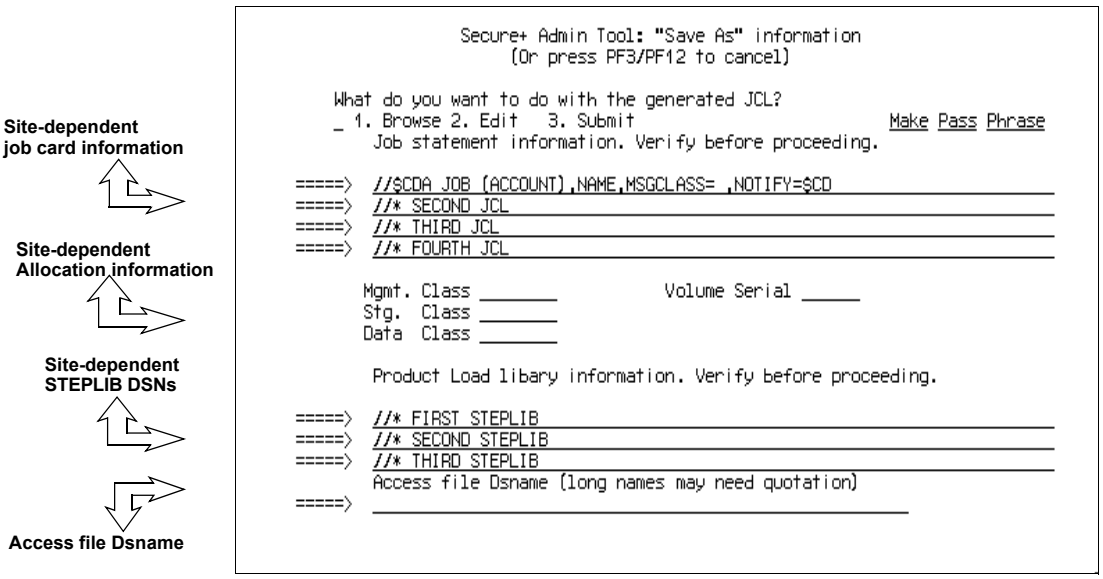
When you save the parameters file you created for Node A, the access file is also created.

To save the parameters file:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **File** and press **Enter**.
2. Type **7** to select **Save As** and press **Enter**.

   Note: If warning messages are displayed, read them. Press **PF3** to continue.

   The **File Selection** screen is displayed.
3. Press **Enter** to accept the default file name or type a file name of your choice.
4. Type your site-specific job card information, allocation information, STEPLIB DSNs, and Access file Dsname as in the following example, using the library names created in your installation.



5. Type **3** to select **Submit** and press **Enter** to save your parameters file.
6. After the job is submitted, a screen similar to the following is displayed:

```
JOB $CDH(JOB01111) SUBMITTED
***
```

7. Press **Enter** to return to the **Secure+ Option Admin Tool: Main Screen**.
8. Verify that you get a return code of 0 (zero). Research any return code other than zero to determine the cause of the error condition.
9. Press **PF3** to return to the **Connect:Direct Administrative Options Menu**.

Define Secure+ Option for Node B

Defining Secure+ Option for Node B involves:

- Creating the Secure+ Option local node record and generating the public keys
- Creating the Secure+ Option remote node record and generating the public keys
- Exporting the public keys of Node B
- Importing the public keys from Node A
- Saving the parameters file

Create the Secure+ Option Local Node Record and Keys for Node B

At the second location you are using to test your setup of Secure+ Option, you must configure a local node record for Node B.

To configure Node B as the local node.

1. Start the Secure+ Option Admin Tool.
2. From the **Secure+ Option Admin Tool: Main Screen**, select **Edit** and press **Enter**.
3. Type **1** to select **Create/Update Record** and press **Enter** to display the **Secure+ Option Create/Update Panel - Node Identification** panel.
4. Select each of the panels listed in the following table and type the sample values in the fields listed for each panel. Fields that are either not valid for the STS protocol or for the type of record being configured are identified and should be left blank.

Panel	Field	Value
Node Identification	Node	Name of Node B (NODEB for this example)
	Local/Remote	Local (1)
	TCP Information	Leave blank because Connect:Direct gets IP address information from the network map
	Alias Names	Leave blank
STS Parameters	Auth Timeout	90
	Autoupdt	No (2)
	Override	Yes (1)
	Enable STS	Yes (1)
	Signature	Yes (1)
	Encrypt	Yes (1)
	Algorithm	* to provide access to all available algorithms defined in the local node record
EA Parameters	Enable Auth	No (2)
SSL Parameters	Enable SSL	No (2)
	Client Auth	No (2)
TLS Parameters	Enable TLS	No (2)
	Client Auth	No (2)

5. Select **Create Auth. Pubkey** and press **Enter**.
6. On the **Generate Seed** screen, press **Enter** to accept the default value (**2 - Sample Value**).
7. On the **Command Prompt** screen, select **OK** and press **Enter**.

8. When the message *This is Loop 2 of 10* is displayed, type over the data on any line and press **F3** up to 10 times. This is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file, and it increases the randomness of your keys.
9. Press **F3** to save the changes.
10. When the **PassPhrase Generation** panel is displayed, type a 32-byte character string with uppercase, lowercase, numeric, and alphabetic characters. Press **Enter**.

    Note: You do not need to remember this number.

    When the message *Seed generation complete* is displayed on the **Secure+ Option Create/Update Panel**, your public key for authentication is created.
11. Select **Create Sig. Pubkey** and press **Enter**.
12. On the **Generate Seed** screen, press **Enter** to accept the default value (**2 - Sample Value**).

    When the message *Seed generation complete* is displayed On the **Secure+ Option Create/Update Panel**, your public key for digital signature is created.
13. Select **OK** and press **Enter**. The node field clears.

Create the Secure+ Option Remote Node Record and Keys for Node A

To configure a remote node record for Node A on Node B:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **Edit** and press **Enter**.
2. Type **1** to select **Create/Update Record** and press **Enter** to display the **Node Identification** panel.
3. Select each of the panels listed in the following table and type the sample values in the fields listed for each panel. Fields that are either not valid for the STS protocol or for the type of record being configured should be left blank.

Panel	Field	Value
Node Identification	Node	Name of Node A (NODEA for this example)
	Local/Remote	Remote (2)
	TCP Information	Leave blank because Connect:Direct gets IP address information from the network map
	Alias Names	Leave blank
STS Parameters	Auth Timeout	90
	Autoupdt	Default to local (3)
	Override	Default to local (3)
	Enable STS	Default to local (3)

Panel	Field	Value
	Signature	Default to local (3)
	Encrypt	Default to local (3)
	Algorithm	* to provide access to all available algorithms defined in the local node record
EA Parameters	Enable Auth	Default to local (3)
SSL Parameters	Enable SSL	No (2)
	Client Auth	No (2)
TLS Parameters	Enable TLS	No (2)
	Client Auth	No (2)

4. Select **STS Parameters** and press **Enter** when you finish setting these values.
5. Select **Create Auth. Pubkey** and press **Enter**.
6. On the **Generate Seed** screen, press **Enter** to accept the default value (**2 - Sample Value**).
7. On the **Command Prompt** screen, select **OK** and press **Enter**.
8. When the message *This is Loop 2 of 10* is displayed, type over the data on any line and press **F3** up to 10 times. This is only necessary the first time you generate keys within the Secure+ Option Admin Tool for each parameters file, and it increases the randomness of your keys.
9. Press **F3** to save the changes.
10. When the **PassPhrase Generation** panel is displayed, type a 32-byte character string with uppercase, lowercase, numeric, and alphabetic characters. Press **Enter**.

    Note: You do not need to remember this number.

    When the message *Seed generation complete* is displayed on the **Secure+ Option Create/Update Panel**, your public key for authentication is created.
11. Select **Create Sig. Pubkey** and press **Enter**.
12. On the **Generate Seed** screen, press **Enter** to accept the default value (**2 - Sample Value**).
13. Change some of the text by typing over it. Press **PF3**.

    On the **Secure+ Option Create/Update Panel**, the message *Seed generation complete* is displayed. Your public key for digital signatures is created.
14. Select **OK** and press **Enter**.
15. Select **Cancel** and press **Enter** to return to the **Secure+ Option Admin Tool: Main Screen**. Your screen should have two nodes populated, as shown in the following example.

```
File  Edit  Key Management  Help
------------------------------------------------------------------------------
                                                                      Row 1 of 2
                     Secure+ Admin Tool: Main Screen
 Option ===>                                                        Scroll CSR

                        Table Line Commands are:

 E Export pub. key       H View History          D Delete node
 U Update node           I Insert node

                          Secure
LC Node Name         Type  123C  Override Encryption Signature ExtAuth Autoupd
-- ----------------  ---- ------ -------- ---------- --------- ------- -------
   NODEA              R    *NNN     *          *          *        *       *
   NODEB              L    YNNN     Y          Y          Y        N       N
****************************** BOTTOM OF DATA ******************************
```

Export the Public Keys of Node B

To export the Node B public keys for Node A:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **Key Management** and press **Enter**.
2. Type **2** to select **Export Public Keys** and press **Enter.**

> **Note:** If warning messages are displayed, read them. Press **PF3** to continue.

3. Press **Enter** to accept the default file name and MVS file system type.

   On the **Secure+ Option Create/Update Panel**, the message *Export Successful* is displayed.

Import the Public Keys from Node A

To import your authentication and digital signature public key values from the remote node you are testing with (Node A):

1. From the **Secure+ Option Admin Tool: Main Screen**, select **Key Management** and press **Enter**.
2. Type **1** to select **Import Public Keys** and press **Enter**.
3. Type the file name prefix or partial prefix followed by an asterisk (*****), select **Browse** and press **Enter**.
4. Type **S** next to the export file name with an extension for this node name (for example, $CD.SECURE.EXPORT.#NODEB) and press **Enter**.

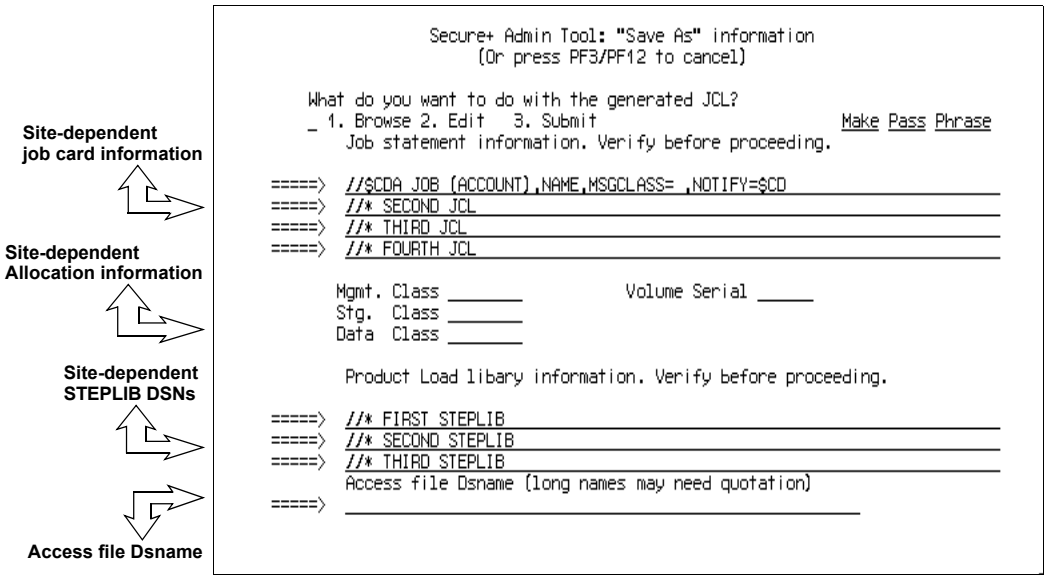
   The message *2 entries imported from NODEA* is displayed on the **Secure+ Option Admin Tool: Main Screen**, indicating that both the authentication and the digital signature public keys have been imported.
5. Type **U** next to NODEA and press **Enter** to ensure that you now have keys for the remote (RMT).

Save the Parameters File for Node B

When you save the parameters file you created for Node B, the access file is also created.

To save the parameters file for Node B:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **File** and press **Enter**.
2. Type **7** to select **Save As** and press **Enter**.
3. Press **Enter** to accept the default file name.
4. Type your site-specific job card information, allocation information, STEPLIB DSNs, and Access file Dsname as in the following example, using the library names created in your installation.



5. Type **3** to select **Submit** and press **Enter** to save your parameters file.
6. After the job is submitted, a screen similar to the following is displayed:

```
JOB $CDH(JOB01111) SUBMITTED
***
```

7. Press **Enter** to return to the **Secure+ Option Admin Tool: Main Screen**.
8. Verify that you get a return code of 0 (zero). Research any return code other than zero to determine the cause of the error condition.
9. Press **PF3** to return to the **Connect:Direct Administrative Options Menu**.

Import the Public Keys of Node B to Node A

To import the authentication and digital signature public keys from Node B:

1. Start the Secure+ Option Admin Tool.

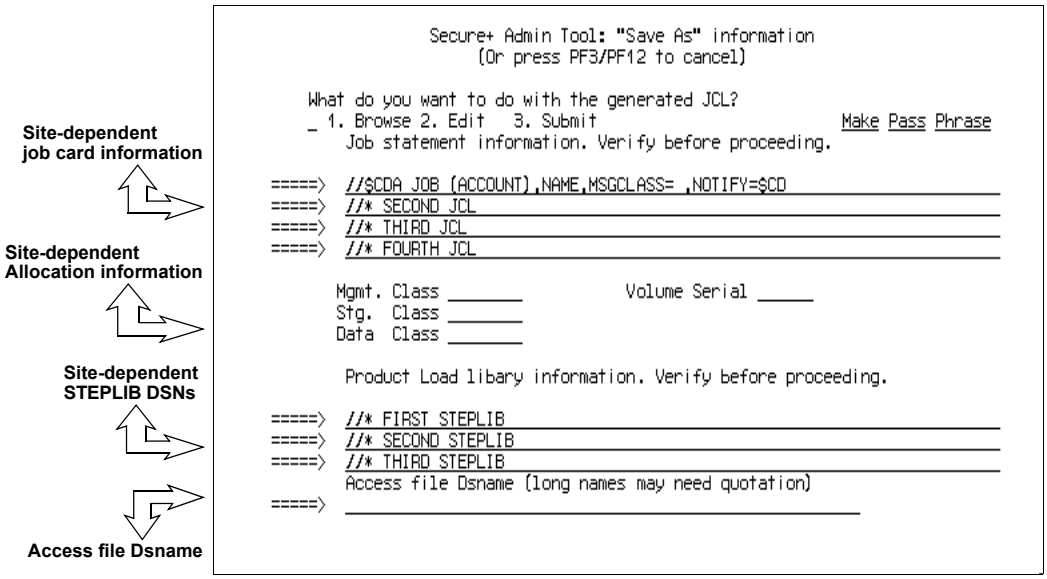
2. From the **Secure+ Option Admin Tool: Main Screen**, select **File** and press **Enter**.
3. Type **2** to select **Open** and press **Enter**.
4. Type the complete file name of the parameters file that you created for Node A and press **Enter**.
5. Select **Key Management** and press **Enter**.
6. Type **1** to select **Import Public Keys** and press **Enter**.
7. Type the file name prefix or partial prefix followed by an asterisk (*), select **Browse**, and press **Enter**.
8. Type **S** next to the export file name with an extension for this node name (for example, $CD.SECURE.EXPORT.#NODEA) and press **Enter**.

   The message *2 entries imported from NODEB* is displayed on the **Secure+ Option Admin Tool: Main Screen**, indicating that both the authentication and the digital signature public keys have been imported.
9. Type **U** next to NODEB and press **Enter** to ensure that you now have keys for the remote node record (RMT).

Save the Parameters File for Node A

To save the Node A parameters file:

1. From the **Secure+ Option Admin Tool: Main Screen**, select **File** and press **Enter**.
2. Type **7** to select **Save As** and press **Enter**.
3. Press **Enter** to accept the default file name.
4. Type your site-specific job card information, allocation information, STEPLIB DSNs, and Access file Dsname as in the following example, using the library names created in your installation.



5. Type **3** to select **Submit** and press **Enter** to save your parameters file.
6. After the job submits, a screen similar to the following is displayed:

```
JOB $CDH(JOB01111) SUBMITTED
***
```

7. Press **Enter** to return to the **Secure+ Option Admin Tool: Main Screen**.
8. Verify that you get a return code of 0 (zero). Research any return code other than zero to determine the cause of the error condition.
9. Press **PF3** to return to the **Connect:Direct Administrative Options Menu**.

Update Connect:Direct Network Maps for Node A and Node B

If you used existing nodes for testing, this step is not necessary. If you created new test nodes (Node A and Node B), update Connect:Direct network maps (netmaps) that you created during the initial installation of Connect:Direct.

To add these test nodes to the Connect:Direct network map:

1. Update the network map of Node A to add Node B.
2. Update the network map of Node B to add Node A.

Note: Refer to the *Connect:Direct for z/OS Administration Guide* for specific instructions for updating the Connect:Direct network map.

Modify Connect:Direct Initialization Parameters

For both nodes, add the parameter **SECURE.DSN=*filename*** to the Connect:Direct for z/OS initialization parameters, where ***filename*** is the name of the Secure+ Option parameters file for that node.

Restart Connect:Direct

Restart Connect:Direct for both nodes.

Verify Secure+ Option is Enabled

When you have successfully finished the preceding procedures, verify that Secure+ Option is enabled.

- If you are using Connect:Direct Secure+ Option Limited Export version, the following message is displayed:

```
SITTA028I Secure+ Initialization Complete
```

- If you are using Connect:Direct Secure+ Option Export version, the following message is displayed:

```
SITA0461 Secure+ Initialization Complete
```

Exchange Data and Compare Results

To verify installation of Secure+ Option and test the configuration created in the preceding procedures:

1. Create and run the following sample Connect:Direct Process to send data from Node A to Node B.

```
SAMPLE   PROCESS SNODE=NODEB
*
COPYFILE COPY FROM ( PNODE                                    -
                     DSN='TEST.INPUT.DATASET'                 -
                     DISP=SHR                                 -
                   )                                          -
              TO   ( SNODE                                    -
                     DSN='TEST.OUTPUT.DATASET'                -
                     DISP=(NEW,CATLG)                         -
                   )                                          -
                   SECURE=(ENC=Y,SIG=Y)
```

2. Review the statistics record for the transaction to verify the success of the sample Process by selecting the extended record type for session begin (SB), as shown in the following sample record.

```
Function      =>  Session Begin         Start Time => 18:49:58
                                      Start Date => 04/28/2003
Process Name => SAMPLE
Process Num  => 7                      Comp Code  => 00000000
                                       Comp Msg   => SVTM055I
Userid       => $CD
Primary Node => NODEA
Secondary Node  NODEB
Submitter Node  SC.MVS.$CD3
                Pnode   Signature Enabled = Yes
                Snode   Signature Enabled = Yes
                Merged  Signature Enabled = Yes
                Pnode Encrypt.Data Algorithms...
                  DESCBC56
                  TDESCBC112
                  IDEACBC128
                Snode Encrypt.Data Algorithms...
                  TDESCBC112
                  DESCBC56
                  IDEACBC128
                System Data Encryption    = DESCBC56
```

Appendix D

Configure for a Secure Connection between z/OS and OpenVMS Nodes

This appendix provides a detailed example for defining a remote node record in both a Connect:Direct for z/OS Secure+ Option parameters file and a Connect:Direct for OpenMVS Secure+ Option parameters file to set up a secure connection between the two nodes.

In this example, two nodes have set up records in their respective Connect:Direct Secure+ Option parameters files:

- The Connect:Direct for z/OS node is named Q1A.ZOA.V4700 and is defined in a remote node record in the Connect:Direct for OpenVMS Connect:Direct Secure+ Option parameters file and in the Connect:Direct for OpenVMS network map.
- The Connect:Direct for OpenVMS node is named Q1A.ITAN.V3400 and is defined in a remote node record in the Connect:Direct for z/OS Connect:Direct Secure+ Option parameters file and in the Connect:Direct for z/OS network map.

The Connect:Direct Secure+ Option records are defined to allow each node to act as either the client (PNODE) or the server (SNODE), depending on which one initiates the session.

Defining Records in the z/OS Connect:Direct Secure+ Option Parameters File

In the Connect:Direct for z/OS Connect:Direct Secure+ Option parameters file, the local node record has the following settings:

- **Y** in the Override field
- **N** in the Enable TLS (or SSL) field
- **N** in the Client Auth field

The settings for the local node record have the following effects: Disabling Connect:Direct Secure+ Option in the local node record means that the protocol and other settings for secure connections must be defined in each remote node record; enabling the Override parameter allows settings in remote node records to override those in the local node record; client authentication is not enabled for all remote nodes.

The remote node record defined for the OpenVMS node named Q1A.ITAN.V3400 in the z/OS Connect:Direct Secure+ Option parameters file has the following settings:

- Node Identification is Q1A.ITAN.V3400. This value must correspond to the node name specified in the Connect:Direct for z/OS network map.
- Override is not applicable in the remote record and defaults to N.
- The TLS protocol is enabled for sessions to connect to this node.
- This OpenVMS node will not request client authentication of z/OS nodes with which it communicates.
- Auth Timeout is set to the two-minute default to identify the maximum time that the system waits to receive Connect:Direct control blocks exchanged during the authentication protocol.

The following Secure+ Create/Update Panel - TLS Parameters panel for Connect:Direct Secure+ Option for z/OS illustrates the settings for the OpenVMS node named Q1A.ITAN.V3400 and commentary on the values set for the parameters.

```
 Secure+ Create/Update Panel - TLS Parameters
 Option:

 Node Identification     EA Parameters     SSL Parameters     STS Parameters

 Node                          2 1. Y 2. N 3. D Override     ===> Disables Override parm (N/A)
 Q1A.ITAN.V3400=remote node     1 1. Y 2. N 3. D Enable TLS   ===> Enables TLS for OpenVMS
                name            2 1. Y 2. N 3. D Client Auth  ===> No OpenVMS Client auth


                                Auth Timeout:  120

                                 -------------------------------------------
    TLS/SSL Certificate Label   | mfcert_a  ==> certificate for z/OS node   |
        TLS/SSL Cipher Suites   | 352F04050A09030601 ==> z/OS cipher suites |
 TLS/SSL Certificate Pathname   | *  ==> default to path in local node rec  |
 TLS/SSL Client Auth. Compare   |                                           |
                                 -------------------------------------------




                                                    OK        Cancel

------------------------------------------------------------------------------
4-©             1    Sess-1    10.20.129.4              CSGETN37          7/32
```

The information in the bottom half of the screen pertains to the key certificate for the z/OS node. The OpenVMS remote node record for the z/OS node has enabled client authentication, as shown in *Defining the z/OS Remote Node Record in the OpenVMS Connect:Direct Secure+ Option Parameters File* on page 225. Therefore, when the z/OS node initiates the session, the OpenVMS node (the server) requests that the client send its ID certificate so that the OpenVMS node can authenticate the client by validating the key certificate defined on this panel (mfcert_a) against the key certificate specified in the Root Certificate file field (mfcert_a.txt) of the z/OS remote node record in the OpenVMS Connect:Direct Secure+ Option parameters file, as illustrated on page 225. When the z/OS node is the server, it must send its public key, which is stored in the mfcert_a file, to the OpenVMS node during server authentication.

In this example, the z/OS key certificate resides in the default key database defined for the local node (indicated by *). If the certificate location does not default to the local node, the remote node definition must point to the absolute path. Definitions for the default key database are stored in the local node record. Certificate information identifying the z/OS node to remote nodes and remote nodes to the z/OS node is stored in the GSKKYMAN database. When certificates are exchanged, trading partners send the ID certificate portion of their keys to each other. In the z/OS system, this information must be imported into the GSKKYMAN database.

Note: In the OpenVMS system, fully qualified paths are always required for file locations.

The TLS ciphers previously selected are shown using the standard two-byte IBM convention for displaying ciphers (352F04050A09030601). The systems negotiate a cipher suite common to both the z/OS and OpenVMS nodes to encrypt information during the handshake and when actual data is being transmitted.

Defining the z/OS Remote Node Record in the OpenVMS Connect:Direct Secure+ Option Parameters File

The following example shows the remote node record that defines the Connect:Direct for z/OS node named Q1A.ZOA.V4700. The OpenVMS network map contains an adjacent (remote) node record with the exact same name.

```
                Node Name:    Q1A.ZOS.V4700
                Node type:    R
1.               Protocol:    T
2.  Client Authentication:    y
3. Authentication timeout:    100
4.Certificate common name:    mfsscert_a
5.  Root Certificate file:    disk$data:[qaitan.q1a]mfcert_a.txt
6.   Key Certificate file:    disk$data:[qaitan.q1a]2048sskeycert.txt
7.             Passphrase:    ****
8.          Cipher suites:  EXP_RC4_MD5,RC4_MD5,RC4_SHA,EXP_RC2_CBC_MD5,IDEA_CBC_SHA,
                              EXP_DES_CBC_SHA,DES_CBC_SHA,DES_CBC3A
```

When the OpenVMS node is the server, it requests that the client authenticate itself (Client Authentication = Y) and send its certificate common name (mfsscert_a) for an extra layer of authentication. The public key information for the z/OS node is stored in the Root Certificate file named mfcert_a.txt; its location is specified (disk$data:[qaitan.qla]).

The key certificate file contains the information that identifies the OpenVMS node to other nodes (disk$data:[qaitan.q1a]2048sskeycert.txt). In order for the OpenVMS system to access its private key to send information to the other node, the passphrase must be entered as well. The z/OS node validates this key certificate information against the information stored in its GSKYYMAN database.

The cipher suites are listed in the order of preference, and the first one that matches a cipher suite defined for the other node is used to establish a session.

Appendix E

Customize Secure+ Option Panels

Many of the Secure+ Option panels can be customized to suit your needs or to establish your site standards. You change the look and feel of panels by modifying the variables that define color, highlighting, capitalization, and text on the Secure+ Option panels.

Before customizing the information, review the standard panels and become familiar with them. The DMADPSYS file defines the settings in the default panel. For more information on customizing Secure+ panels, refer to the Help provided with Secure+ Option.

Create a Custom Panel

To create and use a custom panel, perform the following tasks:

- Make a copy of the member called DMADPSYS in the Connect:Direct ISPPLIB data set and save it in a locally accessible ISPPLIB concatenated data set.
- Modify the variables in the member you created. Refer to the tables in this chapter for a list of variables.
- Update the member called DMADPSTD in the Connect:Direct ISPPLIB data set and identify the name of the file you created.
- Use the ISPF Dialog Test option to test the panel. If any errors are reported, correct them and resave the panel. Resolving errors may require getting out of ISPF and getting back in.

The following panels are distributed with Connect:Direct Secure+ Option and provide sample customized panels. If you want to use one of these panels, identify its use in the DMADPSTD file.

- DMADPUSR—Identical to DMADPSYS.
- DMADPUS1—Sample panel for laptop usage.
- DMADPUS2—Sample panel for international usage.

Customize Capitalization

Modify the following variables to customize the capitalization of panel components:

Variable	Description	Valid Values
DMADLICA	List item capitalization	caps(on) caps(off)
DMADITCA	Important title capitalization	caps(on) caps(off)
DMADNTCA	Normal title capitalization	caps(on) caps(off)
DMADBOCA	Border text capitalization	caps(on) caps(off)
DMADBUCA	Button text capitalization	caps(on) caps(off)
DMADSTCA	Simple text capitalization	caps(on) caps(off)

Customize Colors

Modify the following variables to customize the colors used by panel components:

Variable	Description	Valid Values
DMADLICO	List Item Color	color (pink, turq, white, yellow, green)
DMADBUCO	Button Text Color	color (pink, turq, white, yellow, green)
DMADSTCO	Simple Text Color	color (pink, turq, white, yellow, green)
DMADBOCO	Border Text Color	color (pink, turq, white, yellow, green)
DMADIFCO	Input Field Color	color (pink, turq, white, yellow, green)
DMADNTCO	Normal Title Color	color (pink, turq, white, yellow, green)
DMADITCO	Important Title Color	color (pink, turq, white, yellow, green)

Customize Highlighting

Modify the following variables to customize highlighting:

Variable	Description	Valid Values
DMADBUHI	Button text highlighting	blink, reverse, uscore
DMADLIHI	List item highlighting	blink, reverse, uscore
DMADSTHI	Simple text highlighting	blink, reverse, uscore
DMADBOHI	Border text highlighting	blink, reverse, uscore
DMADIFHI	Input field highlighting	blink, reverse, uscore
DMADITHI	Important title highlighting	blink, reverse, uscore
DMADNTHI	Normal title highlighting	blink, reverse, uscore

Customize Text

Modify the following variables to customize text on the Create/Update panel:

Variable	Default Text
dmadalg1	Algorithm
dmadalg2	Algorithm Names
dmadal1	Alias
dmadal2	Names
dmadat1	Auth Timeout:
dmadauo1	Autoupdt
dmadl2	Export
dmadtc1	TCP Information:
dmadtc2	IPaddr:
dmadtc3	Port:
dmadl1	Limited
DMADRE1	Reset
DMADRE2	Reset
DMADRE3	Reset
DMADRE4	Reset
dmadark1	Auth. Rmt. Key

Variable	Default Text
dmadenc1	Encrypt
dmadovr1	Override
dmadsrk1	Sig. Rmt. Key
dmadsslc	Client Auth
dmadsec1	Enable STS
dmadsig1	Signature
dmadssl	Enable SSL
dmadtls	Enable TLS
DMADTa	TLS/SSL Certificate Label
DMADTb	TLS/SSL Cipher Suites
DMADTC	TLS/SSL Certificate Pathname
dmadty1	Local
dmadty2	Remote
DMADCL1	TLS/SSL Client Auth. Compare
dmadapk2	Auth. Pubkey
dmadspk2	Sig. Pubkey
dmadex1	Expire Date
dmadex2	Expire Date
dmadapk1	Auth. Prev. Keys
dmadspk1	Sig. Prev. Keys
DMADCAN1	Cancel
dmadcr1	Create
dmadcr2	Create
dmadcr3	Create
dmadcr4	Create
DMADOK1	OK
DMADGRU1	Get Record
DMADIRK1	Import Remote Keys
dmadxae	External Auth
dmadxa1	External Auth Server Def

Variable	Default Text
dmadxa2	External Auth Server Address
dmadxa3	External Auth Server Port
dmadnd1	Node

Customize Key Responses

On certain Secure+ Option panels, function key can be customized. Define the following variables to modify key behavior:

Variable	Panel	Valid Values	Description
dmadf3ba	Create/Update	Cancel OK	Determines how the PF3 key responds on the Create/Update panel.
dmadf306	Data set selection panel (DMADP106)	Browse Cancel	Determines how the PF3 key responds on the Dataset Selection panel.
dmadf303	Netmap Quick-Start panel (DMADP103)	Yes No	Determines how the PF3 key responds on the Netmap Quick-Start panel.
dmadf307	File Save Prompt panel (DMADP107)	Yes No	Determines how the PF3 key responds on the File Save Prompt panel.
dmadf309	Confirmation prompt panel (DMADP109)	OK Cancel	Determines how the PF3 key responds on the Confirmation prompt panel.
dmadf317	Information acknowledgement panel (DMADP317)	OK	Determines how the PF3 key responds from the Information acknowledgement panel.
dmadded1	JCL Creation panel (DMADP111 and DMADP112)	Continue	Determines how the browse, edit, or submit actions perform from the Secure+ Admin Tool.

Customize the Data Set Prefix Values

Modify the following variables to define the data set prefix values:

Variable	Description
dmaddso1	Data set file open prefix
dmaddsa1	Data set saveAs prefix
dmaddse1	Data set export prefix
dmaddte1	Data set export type
dmaddsi1	Data set import prefix
dmaddti1	Data set import type

Customize the Create/Update Panel Display

In version 4.6, protocol-specific parameters are displayed in separate panels labeled EA Parameters, SSL Parameters, STS Parameters, and TLS Parameters; the Node Identification panel displays the Node Name and Type fields. Prior to version 4.6, the Create/Update panel DMADP105 was the standard used to display all the Secure+ Option configuration information in a single panel. Using multiple panels to display protocol-specific parameters was a customization option.

- The current multiple-panel display of Secure+ Option configuration parameters has the following setting: dmadres1= DMADP126.
- To implement the single-panel display of all the configuration parameters in the Create/Update panel, set dmadres1=DMADP105.

The following table lists the Create/Update panels available in the Connect:Direct ISPPLIB data set. Use the table as a guide to the ISPPLIB member names of the Secure+ Create/Update panels when you customize them:

Member Name of Panel	Description
DMADP126	Create/Update Panel - Node Identification
DMADP127	Create/Update Panel - SSL Parameters
DMADP128	Create/Update Panel - STS Parameters
DMADP129	Create/Update Panel - TLS Parameters
DMADP130	Create/Update Panel - EA Parameters
DMADP105	Create/Update Panel - Combined Parameters

Modify Text on Connect:Direct Panels

In addition to customizing information on the Secure+ Option panels, you can also change settings on selected Connect:Direct panels. Modify the following variables to update the text on the Connect:Direct Primary options panel, DMI@PRIM:

Variable	Default Text
dmadcaf1	Copy a file
dmadsap1	Submit a predefined Process
dmaddap1	Define a Process using ISPF edit
dmadvsp1	View statistics for a completed Process
dmadccp1	Change characteristics of a Process
dmaddnp1	Delete a non-executing Process
dmadfep1	Flush an executing Process
dmadvep1	View data about an executing Process
dmadsep1	Suspend an executing Process
dmadvmt1	View Connect:Direct message text
dmadvin1	View information in the Connect:Direct network map
dmadvie1	View characteristics of your Connect:Direct IUI environment
dmadvfa1	View your Connect:Direct function authorization
dmadpaf1	Perform Connect:Direct administrative functions
dmadswa1	Swap among concurrent Connect:Direct sessions
dmadccs1	View/change your Connect:Direct signoff information defaults
dmadeip1	ENTER ISPF/PDF
dmadsom1	Sign on to multiple Connect:Direct nodes concurrently

Modify the following variables to customize the Connect:Direct Admin Functional panel, DMI@PRI2:

Variable	Default Text
dmadvtr1	View Type Record
dmaditr1	INSERT/UPDATE TYPE RECORD

Variable	Default Text
dmaddtr1	DELETE TYPE RECORD
dmadvua1	VIEW USER AUTHORIZATION RECORD
dmadiua1	INSERT/UPDATE USER AUTHORIZATION RECORD
dmaddua1	DELETE USER AUTHORIZATION RECORD
dmadvct1	View Connect:Direct tasks
dmadfct1	Flush a Connect:Direct task
dmadmct1	Modify Connect:Direct trace characteristics
dmadecn1	Enter a native Connect:Direct command
dmadtcd1	Terminate Connect:Direct
dmadvin2	View the contents of the Connect:Direct network map
dmadunm1	Update the Connect:Direct network map
dmadids1	INQUIRE ABOUT DTF INTERNAL STATUS
dmadpsf1	Perform statistics functions
dmadars1	ARS reporting facility

Glossary

A

Access File

A file that is generated automatically when you create the Secure+ Option parameters file for the first time and contains the Secure+ Option passphrase to encrypt and decrypt the private keys in the Secure+ Option parameters file. Your Secure+ Option administrator must secure the access file. This file can be secured with any available file access restriction tools. Availability of the access file to unauthorized personnel can compromise the security of data exchange.

Administration Tool (Admin Tool)

The Secure+ Option tool that enables configuring and maintaining the Secure+ Option environment. This is the only tool you can use to configure and maintain Secure+ Option.

Asymmetric Keys

A separate but integrated user key pair comprised of one public key and one private key. Each key either encrypts information or decrypts information but does not perform both functions.

Authentication

The process of verifying that a particular name really belongs to a particular entity and assurance that a message is not modified in transit or storage.

C

Certificate

A self-issued document or one obtained from a certificate authority by generating a certificate signing request (CSR) that contains specific information in a specific format about the requester. It typically contains (1) distinguished name and public key of the server or client; (2) distinguished name and digital signature of the certificate authority; (3) period of validity (certificates expire and must be renewed); and (4) administrative and extended information.

The certificate authority analyzes the CSR fields, validates the accuracy of the fields, generates a certificate, and sends it to the requester.

Certificate Authority

An organization that issues digitally-signed certificates. The certificate authority authenticates the certificate owner's identity and the services that the owner is authorized to use, issues new certificates, renews existing certificates, and revokes certificates belonging to users who are no longer authorized to use them. The CA digital signature is assurance that anybody that trusts the CA can also trust that the certificate that it signs is an accurate representation of the certificate owner.

Certificate Common Name

A part of the certificate, which can be used in client authentication to enable the remote node (secondary node or SNODE) to verify the identify of the primary node (PNODE) when a secure connection is being established.

Certificate Revocation List

A list of certificates that have been revoked.

Certificate Signing Request

An output file sent through E-mail to a certificate authority to request an X.509 certificate.

Cipher Suite

A cryptographic key exchange algorithm that enables you to encrypt and decrypt files and messages with the SSL protocol.

Cipher Text

Data that is encrypted. Cipher text is unreadable until it is converted into plain text (decrypted) with a key.

Client

The entity that initiates a communication session. See also Primary Node.

Client Authentication

A level of authentication that requires the client to authenticate its identity to the server by sending its certificate. The server must request a certificate before the client sends it.

Configuration File

A file that contains instructions and definitions upon which the system bases its processing.

D

Data Confidentiality

Ensuring that data remains private during transmission.

Data Integrity

Ensuring that information is not altered during transmission.

Decryption

The process of converting encrypted data back into meaningful information.

Digital Certificate

A type of asymmetric cryptography used to simulate the security properties of a signature in digital, rather than written, form for verifying participant identity in the exchange of electronic information. The process involves using a private key for creating signatures and a public key for verifying signatures.

E

Encryption

The process of converting meaningful data into a meaningless form to protect the confidentiality of sensitive information.

Encryption Algorithm

The set of mathematical logic that encrypts or decrypts data.

F

FTP

Internet application and network protocol for transferring files between host computers. File transfer protocol.

I

Integrity

Assurance that data is not modified (by unauthorized persons) during storage or transmittal.

J

Java

A programming language that allows development of applications that can run from any kind of device or machine—a PC, a Macintosh computer, a network computer, the Internet, or a mobile phone. The Java language makes it possible to develop software that is portable, modular, and secure.

JDK

The Java Development Kit (JDK) contains the software and tools that developers need to compile, debug, and run applets and applications written using the Java programming language.

JRE

The Java Runtime Environment (also known as the Java Runtime or JRE) consists of the Java virtual machine, the Java platform core classes, and supporting files. It is the runtime part of the Java Development Kit and provides no compiler, debugger, or tools. The JRE is the smallest set of executable files that constitute the standard Java platform.

K

Key

A unique numerical value which feeds into an encryption algorithm, setting the encryption or decryption process into motion.

Key Certificate File

A file that contains the encrypted private key and the ID (public key) certificate, which is used to authenticate an entity.

L

License Management Key (AP Key)

A file containing definitions that Connect:Direct and Secure+ Option use to enable the software. You must have a license management key to use either of these applications.

Local Node Record

The base record in a parameters file that defines the Connect:Direct server. It includes the most commonly used settings at a site and is the central node through which all communication is filtered. Depending upon how each remote node record is configured, trading partner node records may use settings that are defined in the local node record.

N

Network Map (Netmap)

The file that identifies all valid Connect:Direct nodes in the network. One network map file is associated with each Connect:Direct local node. The network map has one entry for each of the other Connect:Direct nodes to which the local Connect:Direct node communicates. The network map entries also contain the rules or protocol that the nodes adhere to when communicating.

Nonrepudiation

Providing undeniable proof of origin of transmitted data.

P

Passphrase

Similar to a password but can be any characters, including spaces. A passphrase is stronger than a password, although not many programs support the use of a passphrase.

Password

A character-limited word or phrase that establishes identity to allow access to a system. Generally, a password is composed of letters, numbers, or both.

Primary Node (PNODE)

The Connect:Direct node that initiates a session and is the controlling node. Every Process has one primary node and one secondary node.

Private Key

String of characters used as the private, “secret” part of a complementary public-private key pair. The asymmetric cipher of the private key is used to sign outgoing messages and decrypt data that is encrypted with its complementary public key. Data that is encrypted with a Public Key can only be decrypted using its complementary Private Key. The private key is never transmitted.

Proof of Data Origin

A method of verifying the identity of the sender and that information is not altered during an electronic exchange.

Public Key

String of characters used as the publicly distributed part of a complementary public-private key pair. The asymmetric cipher of the public key is used to confirm *signatures* on incoming messages and encrypt data for the session key that is exchanged between server and client during negotiation for an SSL/TLS session. The public key is part of the ID (public key) certificate. This information is stored in the key certificate file and read when authentication is performed.

R

Remote Node Record

An entry in the parameters file that defines the security settings used to communicate with a trading partner. A remote node record must be defined for every trading partner you communicate with.

Root Certificate File

File which contains one or more trusted root certificates used to authenticate ID (public) certificates sent by trading partners during the Secure+ protocol handshake.

S

Secondary Node (SNODE)

The Connect:Direct node that interacts with the primary node (PNODE) during Connect:Direct Process execution and is the non-controlling node. Every Process has one secondary node and one primary node.

Secure Sockets Layer (SSL)

A protocol that provides secure communications with transport protocols, including FTP, over TCP/IP. It is an open, non-proprietary Internet protocol that is widely adopted as standard. SSL

ensures point-to-point security, meaning that the data is secured as it is transmitted across a single socket.

Self-Signed Certificate

A self-generated certificate that identifies your organization. It is often used during the period between your request and receipt of a certificate from a public certificate authority. If self-signed certificates are used, the trusted root signing certificate must be installed in the client manually.

Server

The location that receives communication from a client.

Session Key

Cryptography key intended to encrypt data for a limited period of time, typically only for a single communications session between a pair of entities. When the session is over, the key is discarded and a new one established when a new session takes place.

SMP/E

IBM System Modification Program Extended, used to simplify the installation of software.

Station-to-Station Protocol (STS)

A three-pass variation of the basic Diffie-Hellman protocol. It allows you to establish a shared secret key between two nodes with mutual entity authentication. Nodes are authenticated using digital signatures to sign and verify messages or control blocks.

Sterling External Authentication Server

Application used to validate certificates that are passed to the external authentication server during an SSL or TLS session. You can configure the Sterling External Authentication Server application for certificate chain validation, including the option to validate certificates against one or more Certificate Revocation Lists (CRLs) that are stored on an LDAP server. The Sterling External Authentication Server application can also return attributes associated with the incoming certificate, such as group information, that are stored on an LDAP server.

T

Third-Party Certificate

A certificate, other than those that are preconfigured for the application, that identifies an organization. If third-party certificates are used by the server, the corresponding trusted certificate must be installed in the client manually.

Transport Layer Security (TLS)

A protocol that provides secure communications with transport protocols, including FTP, over TCP/IP. It is an open, non-proprietary Internet protocol that is widely adopted as standard. TLS ensures point-to-point security, meaning that the data is secured as it is transmitted across a single socket.

Trusted Root Certificate File

See *Root Certificate File*.

U

Unsecure Connection

An FTP connection that has no security.

X

X.509 Certificate

Public key certificate specification developed as part of the X.500 directory specification, and often used in public key systems.

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