SeeBeyond™ eBusiness Integration Suite

Secure Messaging Extension User's Guide

Release 4.5.2

Monk Version

Version 20020308150853.

Contents

Chapter 1

Introduction

This document describes how to install and configure the Secure Messaging Extension.

1.1 Overview

The Secure Messaging Extension enables e*Gate to process Events utilizing the S/MIME (Secure Multipurpose Internet Mail Extensions) message format. The Secure Messaging Extension supports encryption, decryption and authentication of messages and is interoperable with any other client applications that support the S/MIME standard.

This adds the following features to a transaction:

- privacy
- message (Event) authentication
- sender authentication
- nonrepudiation

1.1.1 Intended Reader

The reader of this guide is presumed to be a developer or system administrator with responsibility for maintaining the e*Gate system; to have expert-level knowledge of Windows NT and/or UNIX operations and administration; and to be thoroughly familiar with Windows-style GUI operations.

1.1.2 Components

The following components comprise Secure Messaging Extension:

- Secure Messaging Extension Monk function scripts
- Dynamically loaded libraries (DLLs)
- Monk collaborations that load and call their functions.

A complete list of the installed files appears in **Table 1 on page 13**.

1.2 Introducing S/MIME

Secure Multipurpose Internet Mail Extension (S/MIME) is a type of MIME message format that supports digital signatures and encryption of messages. The new form is based on the public-key encryption technology created by RSA Data Security, Inc. The RSA algorithm is based on the fact that there is no efficient way to factor very large numbers, making nearly it impossible to derive the private key based solely on the public key.

The public-key encryption system uses two keys: a public key known to everyone and a private key known only to the recipient of the message. For example, if JaneDoe wants to send a secure message to JohnDoe, JaneDoe uses JohnDoe's public key to encrypt the message. JohnDoe then utilizes his own private key to decrypt it.

Only the public key can be used to encrypt messages, and only the corresponding private key can be used to decrypt them (and vice versa).

Similarly, the sender utilizes his/her private key to include a signature on the message, while the recipient uses the sender's public key to verify the signature.

MIME offers a standardized way to represent and encode a wide variety of media types for transmission via the internet. Many e-Mail clients now support MIME, which enables sending and receiving of graphics, audio, and video files via the Internet. MIME also supports messages in character sets other than ASCII.

When using MIME, messages can contain the following data types:

- Text messages in US-ASCII
- Character sets other than US-ASCII
- Multi-media: Image, Audio, and Video messages
- Multiple objects in a single message
- Messages of unlimited length
- Binary files.

With the implementation of S/MIME, the protocol is available that adds digital signatures and encryption to these messages. These messages consist of two parts: the header and the body. The header forms a collection of field/value pairs structured to provide information necessary for the transmission of the message. MIME defines how the body of a message is structured. This format permits the inclusion of the above mentioned datatypes in a standardized manner. S/MIME defines the security services, adding digital signatures and encryption, thus preventing forgery and interception.

For more information regarding S/MIMIE, please see *RSA Laboratories' Frequently Asked Questions About Today's Cryptography*, available online at: **http://www.rsasecurity.com/rsalabs/faq/**. Also available is *Internet Engineering Task Force S/MIME Message Specification (proposed standard)* at: **http://www.ietf.org/rfc/rfc2633.txt**.

1.3 Introducing Secure Messaging Extension

The Secure Messaging Extension provides security features, allowing the secure transmission of exchanges over public domains such as the Internet. Secure Messaging Extension adds the ability to use Public Key Infrastructure (PKI) technology to ensure the confidentiality of exchanges by digitally signing and encrypting messages as they are sent, and decrypting and authenticating messages when they are received.

The Secure Messaging Extension performs the encryption and decryption of messages using the S/MIME standard. The standard one-way hash algorithms ensure data integrity by verifying that no modifications are made to the message while in transit. The identity of the sender of a message is verified through the use of digital signatures, proving that the message actually originated from the entity who claims to have sent it.

The following flowcharts show the processing of the data from receipt to destination.

Figure 1 Inbound Signed/Encrypted Message

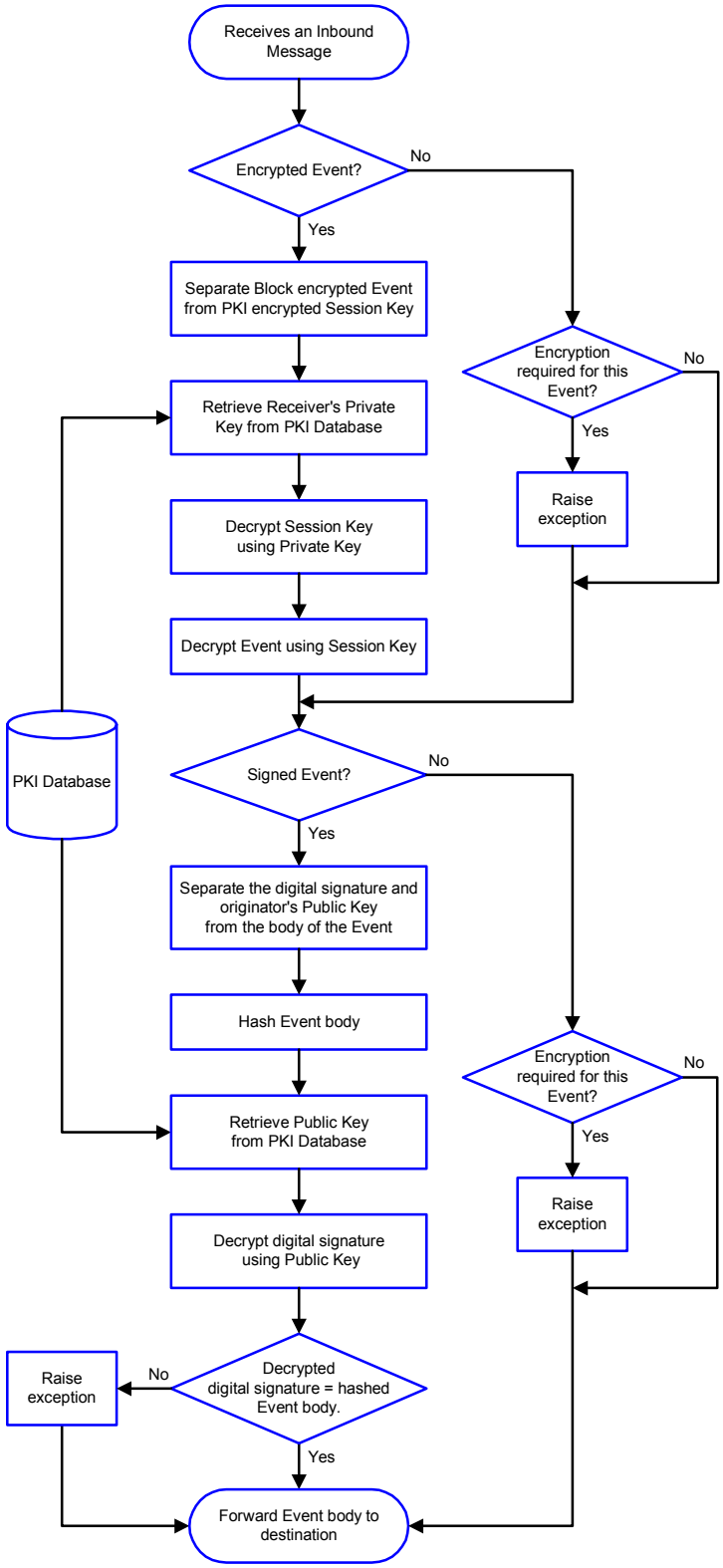
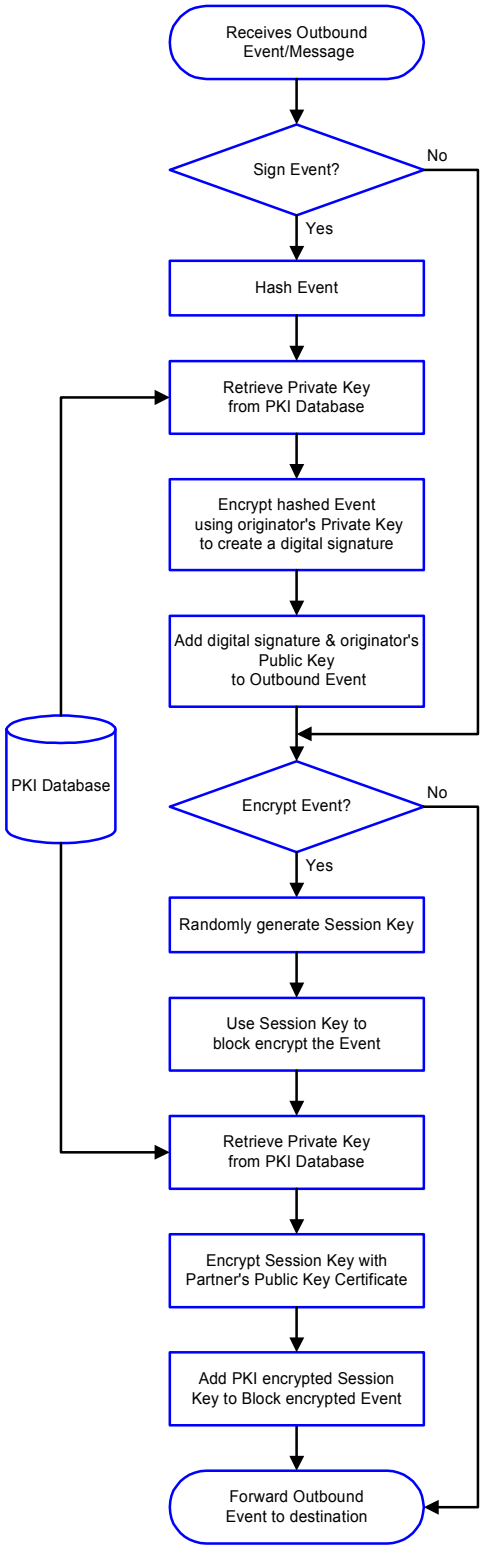


Figure 2 Outbound Signed/Encrypted Message



1.4 Supported Operating Systems

The Secure Messaging Extension (Java) is supported on the following operating systems:

- Windows 2000, Windows 2000 SP1, and Windows 2000 SP2
- Windows NT 4.0 SP6a
- Solaris 2.6, 7, and 8
- AIX 4.3.3
- HP-UX 11.0 and HP-UX 11i

1.5 System Requirements

To use the Secure Messaging Extension, you need the following:

- An e*Gate Participating Host, version 4.5.1 or higher.
- 9 MB free disk space on both the Participating and the Registry Hosts.

Note: *Additional disk space will be required to process and queue the data that the Secure Messaging Extension processes; the amount necessary will vary based on the type and size of the data being processed, and any external applications performing the processing.*

- A TCP/IP network or other network connection.
- A fast CPU, if secure message volume is expected to be high. (The public-key operations associated with encryption and signing are computationally expensive.)

1.5.1 Environment Variable Settings

The user must set the MONK_LIBRARY_PATH environment variable.

If using bash:

```
export MONK_LIBRARY_PATH=/home/someuser/egate/client/bin
```

or if using csh or tcsh:

```
setenv MONK_LIBRARY_PATH /home/someuser/egate/client/bin
```

Chapter 2

Installation

This chapter describes how to install the Secure Messaging Extension.

2.1 Windows

2.1.1 Pre-installation

- Exit all Windows programs before running the setup program, including any anti-virus applications.
- You must have Administrator privileges to install this extension.

2.1.2 Installation Procedure

To install the Secure Messaging Extension on a Windows system:

1. Log in as an Administrator on the workstation on which you want to install the extension.
2. Insert the installation CD-ROM into the CD-ROM drive.
3. If the CD-ROM drive's "Autorun" feature is enabled, the setup application should launch automatically; skip ahead to step 4. Otherwise, use the Windows Explorer or the Control Panel's **Add/Remove Applications** feature to launch the file **setup.exe** on the CD-ROM drive.
4. The InstallShield setup application will launch. Follow the on-screen instructions to install the extension.

Note: *Be sure to install the extension files in the suggested "client" installation directory. The installation utility detects and suggests the appropriate installation directory.* ***Unless you are directed to do so by SeeBeyond support personnel, do not change the suggested "installation directory" setting.***

2.2 UNIX

2.2.1 Pre-installation

- You do not require root privileges to install this e*Way. Log in under the user name that you wish to own the e*Way files. Be sure that this user has sufficient privilege to create files in the e*Gate directory tree.

2.2.2 Installation Procedure

To install the Secure Messaging Extension on a UNIX system:

1. Log in on the workstation containing the CD-ROM drive, and insert the CD-ROM into the drive.
2. If necessary, mount the CD-ROM drive.
3. At the shell prompt, type

   cd /cdrom
4. Start the installation script by typing:

   ./setup.sh
5. A menu of options will appear. Select the "install e*Way" option. Then, follow any additional on-screen directions.

Note: *Be sure to install the extension files in the suggested "client" installation directory. The installation utility detects and suggests the appropriate installation directory.* ***Unless you are directed to do so by SeeBeyond support personnel, do not change the suggested "installation directory" setting.***

2.3 Files/Directories Created by the Installation

The Secure Messaging Extension installation process will install the following files within the e*Gate directory tree. Files will be installed within the "egate\client" tree on the Participating Host and committed to the "default" schema on the Registry Host.

Table 1 Files created by the installation

e*Gate Directory	File(s)
bin\	stc_monksmime.dll
bin\AIX\	libsmt.a libldapssl30.so
bin\HP-UX\	libsmt.sl
bin\Solaris\	libsmt.so
bin\Win32\	smt32.dll nsldap32vll.dll

Chapter 3

Implementation

This chapter includes information pertinent to implementing the Secure Messaging Extension in a production environment.

3.1 Sample Configuration

The sample on the CD demonstrates a simple S/MIME execution:

- Load S/MIME extension
- Define test for error
- Display the encryption and/or signature algorithms returned by the sign-encrypt and verify-decrypt functions
- Read sample files into memory
- Set preliminary variables and begins the session
- Import keys and certificates into cache
- Authenticate the signature of an inbound message
- Attempt to authenticate the signature of a corrupt inbound message
- Encrypt an outbound message
- Sign an outbound message
- Decrypt an inbound message
- Decrypt an inbound message that has been corrupted
- Decrypt and authenticate an inbound message
- Fail to decrypt and authenticate a corrupt inbound message

3.2 Sample Implementation

`A sample Monk script for setting up` Secure Messaging Extension is provided on the e*Gate installation CD-ROM in the directory

samples/ewsmime

1 Copy all the files from the e*Gate installation CD-ROM samples directory **samples/ewsmime** to a temporary working directory on the system on which the Secure Messaging Extension is installed.

3.3 Sample Monk Scripts

The samples on the CD can be run using the **stctrans** command-line utility once they are copied onto a working directory. They do not require a complete e*Gate schema configuration to function, and are designed to illustrate the principles involved in creating your own custom Monk scripts. The library (dll) files to be loaded and the script to be tested must be in the load path (or, for simplicity's sake, may be placed in the connected directory). See the *Monk Developer's Reference* for more information about the load path.

The syntax of the **stctrans** utility is

```
stctrans monk_file.monk
```

Additional command-line flags are available; enter **stctrans -h** to display a list, or see the *e*Gate Integrator System Administration and Operations Guide* for more information.

3.4 Certificate Formats

The SMIME/C library accepts certificates in PKCS#7 format. DER encoded binary X.509 and Base64 encoded X.509 format certificates are also popular.

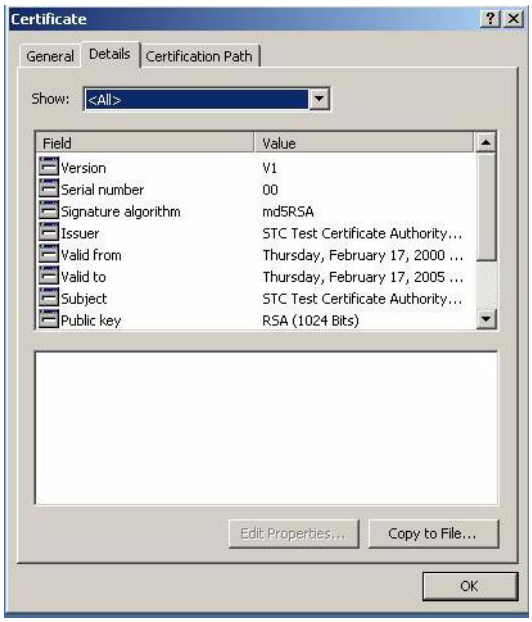
Windows 2000 and Internet Explorer provide a tool to transfer between formats. To change formats, perform the following:

1 On Windows 2000, double click the certificate file.

Figure 3 Windows 2000 Certificate Files

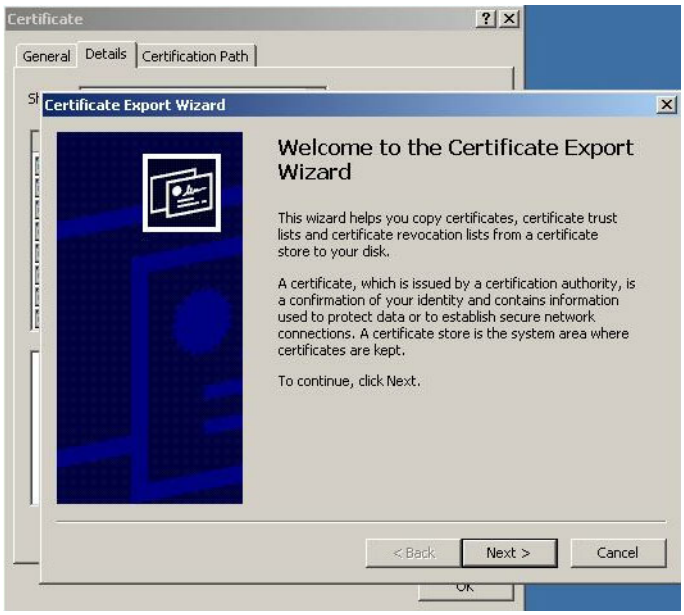
2 Select the Detail tab.

Figure 4 Windows 2000 Detail Tab



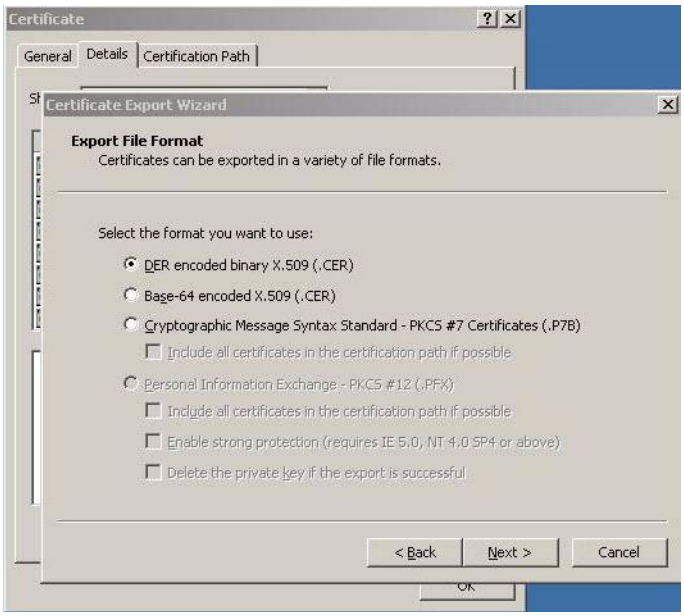
3 Click on “copy to file” button.

Figure 5 Windows 2000 Copy to File



4 Click Next. Choose the format.

Figure 6 Windows 2000 Copy to File

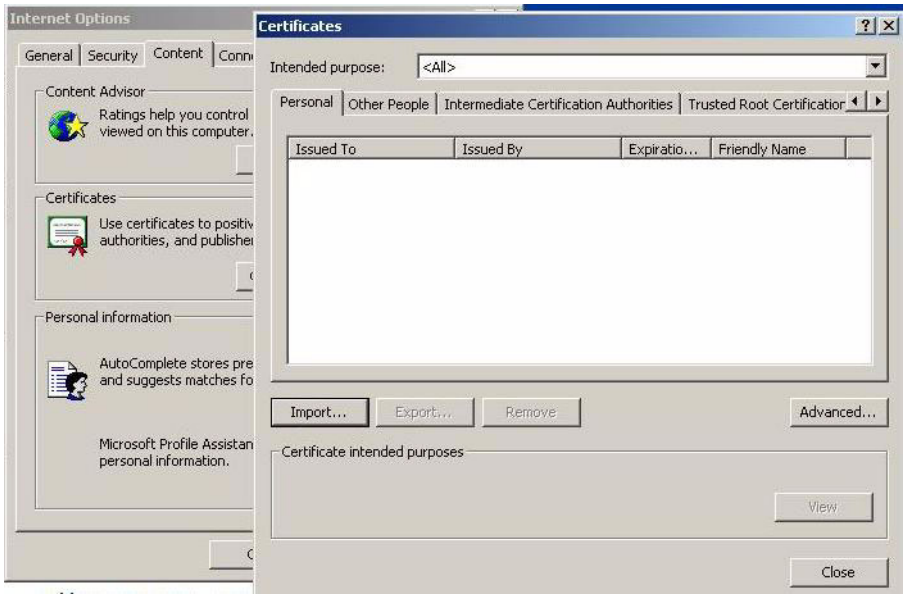


For Internet Explorer:

1 Select Tools-->Internet option.

2 Choose Content Tab, click on Certificates.

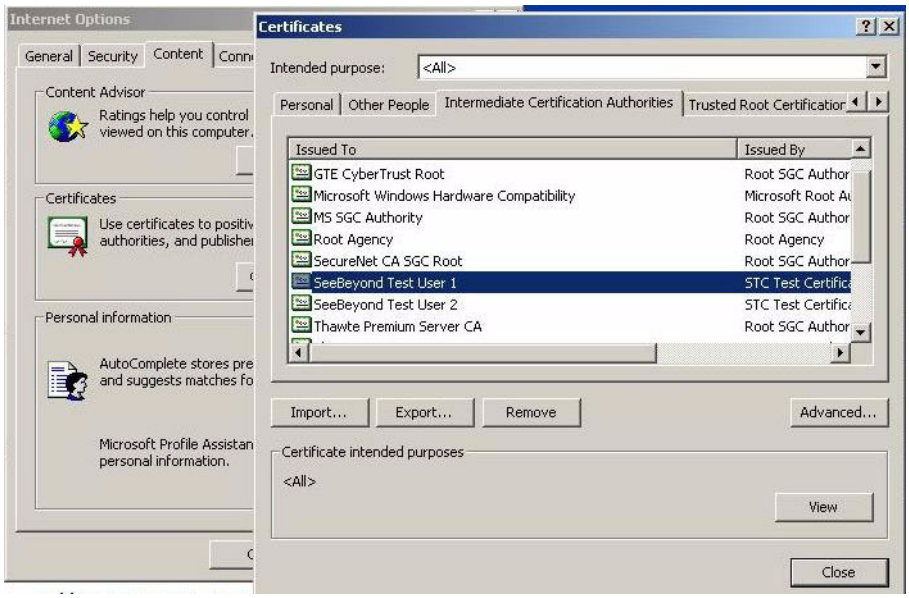
Figure 7 Windows 2000 Copy to File



3 Click on Import, to import your certificate.

4 Click on “Intermediate Certification Authorities” Tab to choose the certificate to import, and click on the “export” button.

Figure 8 Windows 2000 Copy to File



5 Select the format, and save the file.

Chapter 4

Secure Messaging Extension Functions

This chapter details the Secure Messaging Extension Functions. Prior to use it is neccessary to load the extension into any Monk environment:

```
(define SMIMEH (load-interface "stc_monksmime.dll" "init_smimeext"))
```

SMIMEH is then a handle used for all subsequent method calls.

4.1 Secure Messaging Extension Functions

The current suite of Secure Messaging Extension functions are:

begin-session

Syntax

```
(SMIMEH "begin-session")
```

Description

begin-session prepares the SMIMEH handle to accept further instructions. It requires that "**db-pathname**" and "**username**" parameters be set prior to calling, and is itself required before calling any "**db-store**", "**sign-encrypt**", or "**verify-decrypt**" functions.

Parameters

None.

Return Values

vector

Returns a two element vector:

Element	Contents	Description
0	**t#** or **#f**	(true) if successful, otherwise (false).
1	string error message, if applicable. SMT_E_INVALID_PARAMETER	Either the username or db-pathname has not been set or both.
	SMT_E_CALL_FAILED	Internal call failed. username or db-pathname has been set to illegal values, such as one that contains the following characters: *, ? “, <, >, and | on Windows, or ~, \ on UNIX.
	SMT_E_NOT_ENOUGH_MEMORY	Failed to allocate memory.
	SMT_E_LOW_DISK_SPACE (Windows only)	Available disk space is below the 100K threshold.

Throws

None.

Location

stc_monksmime.dll

See Also

set-param on page 24 “db-pathname” and “username” must be set before calling “begin-session”.

end-session on page 23 must be called to release the resource for this session.

db-query

Syntax

```
(SMIMEH “db-query” key-cert-type key-cert-name)
```

Description

db-query tests whether it is necessary to use “db-store” to add a key or certificate.

Parameters

key-cert-type	Value Type	Description
“signature-key”	string	The binary contents of the string signature-key in PKCS#12 format.
“decryption-key”	string	The binary contents of the string decryption-key in PKCS#12 format.
“CA-cert”	string	The binary contents of the string CA-cert in PKCS#7 format.
“signature-cert”	string	The binary contents of the string signature-cert in PKCS#7 format.

key-cert-type	Value Type	Description
“encryption-cert”	string	The binary contents of the string encryption-cert in PKCS#7 format.

Parameters	Value Type	Description
key-or-cert-name	string	The exact display name of the key or certificate being loaded.

Return Values

vector

Returns a two element vector:

Element	Contents	Description
0	**#t** or **#f**	(true) if found, otherwise (false).
1	string error message, SMT_E_INVALID_PARAMETER	begin-session has not been called or failed.
	SMT_E_CALL_FAILED	Internal error encountered, possibly due to missing or corrupt
	SMT_E_FILENOTFOUND	Entry does not exist in the data source.
	SMT_E_NOT_ENOUGH_MEMORY	Fail to allocate sufficient memory.

Additional Information

The function takes one of the parameters from the key-cert-type column.

(db-query *key-cert-type key-cert-name*)

See Also

begin-session on page 19 must be called before the query.

db-store

Syntax

```
(SMIMEH “db-store” key-or-cert-type key-or-cert-name key-or-cert-data
trust-model)
```

Description

db-store loads X.509 certificates and keys into the cache for future use.

Parameters

key-or-cert-type	Value Type	key-or-cert-data
“signature-key”	string	The binary contents of the string signature-key in PKCS#12 format.
“decryption-key”	string	The binary contents of the string decryption-key in PKCS#12 format.
“CA-cert”	string	The binary contents of the string CA-cert in PKCS#7 format.
“signature-cert”	string	The binary contents of the string signature-cert in PKCS#7 format.
“encryption-cert”	string	The binary contents of the string encryption-cert in PKCS#7 format.

Parameter Name	Value Type	Description
key-or-cert-name	string	The exact display name of the key or certificate being loaded.
key-or-cert-data	string	The binary representation of the key or certificate to store.
trust-model	string	Required when selecting signature-cert or encryption-cert. Valid options are **CA-trust** or **direct-trust**.

Return Value

vector

Returns a two element vector:

Element	Contents	
0	**#t** or **#f**	(true) if successful, otherwise (false).

Element	Contents	
1	string error message, if applicable. SMT_E_INVALID_PARAMETER	begin-session has not been called, or failed.
	SMT_E_CALL_FAILED	Internal error encountered, possibly due to missing or corrupt data store files or a failed system call.
	SMT_E_LOW_DISK_SPACE (Windows Only)	Disk space is getting low.
	SMT_E_NOT_ENOUGH_MEMORY	Fail to allocate memory.
	SMT_E_NOT_FOUND	Can not find the certificate
	SMT_E_FILENOTFOUND	Function could not find user information. The data store may be corrupt.
	SMT_E_ERROR	Either certificate was not found or data store files are missing or corrupt.
	SMT_S_FALSE	Could not import the root, because it was rejected by the callback function.
	SMT_E_NO_ROOT_IN_CERTLIST	Could not find a root in the certificate list in the file that could be imported as a root certificate.

Throws

None.

Location

stc_monksmime.dll

Additional Information

The function takes one of the parameters from the key-cert-type column.

(db-store *key-or-cert-type key-or-cert-name key-or-cert-data trust-model*)

See Also

begin-session on page 19 must be called before using the **db-store** api.

end-session

Syntax

```
(SMIMEH “end-session”)
```

Description

end-session closes the SMIMEH handle created by **begin-session**.

Parameters

None.

Return Values

vector

Returns a two element vector:

Element	Contents	
0	**#t** or **#f**	(true) if successful, otherwise (false).
1	string error message, if applicable. SMT_E_INVALID_PARAMETER	begin-session has not been activated or failed.
	SMT_E_CALL_FAILED	Function unsuccessful. An I/O error occurred during the persistent saving of the user's security preferences. Check disk space and file access permissions.

Throws

None.

Location

stc_monksmime.dll

See Also

begin-session on page 19 must be successfully activated. **end-session** must be called to release the resource for this session.

set-param

Syntax

```
(SMIMEH "set-param" param-name param-value)
```

Description

set-param sets the parameter names and values to be used by SMIME for sending and receiving data.

Parameters

param-name	Value Type	param-value
"db-pathname"	string	The directory in which to store the S/MIME certificate and key cache. The value should not contain illegal characters like: *, ?, ", <, <, and | on Windows, and ~ or \ on UNIX.
"username"	string	The name of the certificate to be used for signing. The value should not contain illegal characters like: *, ?, ", <, <, and | on Windows, and ~ or \ on UNIX.

param-name	Value Type	param-value
“key-passphrase”	string	The passphrase (password or PIN) used to protect S/MIME key cache. The password must be at least 8 characters in length and no more than 64 characters.
“encryption-alg”	string	The algorithm-string used for encryption. The possible choices are: “DES_EDE3_CBC”, “RC2_128”, “DES_CBC”, or “RC2_40”.
“signature-alg”	string	The algorithm-string used to attach the signature. The possible choices are: “RSA_MD5” or “RSA_SHA1”.
“signature-type”	string	Specifies the signature type. The possible choices are “detached” or “inline”.
“output-encoding”	string	Specifies the encoding type for the input/output. The possible choices are “base64” (default) or “binary”.
“recipient-list”	string	A vector of certificate names for one or more recipient identifiers, determines which certificates to use for encryption.
“sender”	string	Specifies the sender identifier, and determines which certificate to use for decryption.
“message-type”	string	Specifies the message format for input/output. The possible choices are “smime2” or “pkcs7” (default).
pkcs12-passphrase	string	The passphrase associated with a signature-key or decryption-key. Can be any length and must be ASCII characteers. Must be set when the passphrase is required for a particular signature-key or decryption-key (PKCS12). It should be set just before db-store

Return Value

vector

Returns a two element vector:

Element	Contents	Description
0	**#t** or **#f**	(true) if successful, otherwise (false).
1	string error message, if applicable. SMT_E_INVALID_PARAMETER	Message object is corrupt.
	SMT_E_NOT_ENOUGH_MEMORY	Memory allocation failed.
	SMT_E_NOT_FOUND	Properties for message object can not be found.

Throws

None.

Additional Information

The function takes one of the parameters from the param-name column.

(set-param *param-name param-value*)

Location

stc_monksmime.dll

See Also

Before calling **begin-session** on page 19, username and **db-pathname** must be set using **set-param**.

sign-encrypt

Syntax

```
(SMIMEH "sign-encrypt" outbound-message)
```

Description

sign-encrypt signs and/or encrypts outbound-messages. The result is the ciphertext (or signed only) message, stored in vector-ref 2.

Parameters

Name	Type	Description
outbound message	string	The outgoing message.

Return Value

vector

Returns a four element vector:

Element	Contents	Description
0	**#t** or **#f**	(true) if successful, otherwise (false).
1	string error message or output message if no error. SMT_E_INVALID_PARAMETER	 begin-session has not been successfully activated or message object is corrupt.
	SMT_E_NOT_FOUND	Function did not find properties for this message object.
	SMT_E_NOT_ENOUGH_MEMORY	Fail to allocate memory.
	SMT_E_CALL_FAILED	Function could not create an internal object.
	SMT_E_BUSY	Other thread or process are using same resource.
	SMT_E_INVALID_RECIPS	One or more recipients has an untrusted encryption certificate.
	SMT_E_NO_KEYS	No private key for authenticating a signature or no certificate.
	SMT_E_NOT_FOUND	The recipients for the encrypte message are not specified or properties for the message object can not be found.
	SMT_E_NOT_ENOUGH_MEMORY	Memory allocation failed.
	SMT_E_FILENOTFOUND	No recipient exists for encryption.
	SMT_E_CALL_FAILED	Internal call failed or passphrase of signing operation is incorrect.
	SMT_E_UNSUPPORTED_MIME_TYPE	Invalid combinations of settings for MIME tagging. The valid combinations are: 1 message-type="smime2" signature-type="detached" 2 message-type="smime2" signature-type="inline" 3 message-type="smime2" signature-type="detached" 4 message-type="smime2" signature-type="detached" encoding-type="binary" 5 message-type="pkcs7" signature-type="detached" 6 message-type="pkcs7" signature-type="inline"

Element	Contents	Description
2	string indicating encryption algorithm used; **#f** (false) if error or no encryption used.	
3	string indicating signature algorithm used; **#f** (false) if error or no signature used.	

Throws

None.

Location

stc_monksmime.dll

Additional Information

The current version of the RSA Security libraries that the Secure Messaging Extension uses, requires that a private key be located in the cache before allowing any encryption to occur. The username for encryption must match with the private key's value for username.

The db-path must be set to:

```
./tmp/smimecache  or monk/smime/tmp/smimecache
```

See Also

verify-decrypt on page 28, values for " output-encoding", "message-type" and "signature-type" must be matched with values used for **sign-encrypt** if they have been assigned.

verify-decrypt

Syntax

```
(SMIMEH "verify-decrypt" inbound-message)
```

Description

verify-decrypt decrypts and/or verifies signature authenticity of the inbound-message. The result is the plaintext message, (upon successful authentication), stored in vector-ref 2.

Parameters

Name	Type	Description
inbound-message	string	The inbound message previously signed and/or encrypted.

Return Value

vector

Returns a four element vector:

Element	Contents	Description
0	**#t** or **#f**	(true) if successful, otherwise (false).
1	string error message or output message if no error. SMT_E_INVALID_PARAMETER	begin-session has not been successfully activated or message object is corrupt.
	SMT_E_NOT_ENOUGH_MEMORY	Fail to allocate memory.
	SMT_E_CALL_FAILED	Function could not create an internal object.
	SMT_E_BUSY	Other thread or process using the same resource.
	SMT_S_FALSE	Function successfully verified the message, but either the address book entry was not added or the certificate trust data store was not updated.
	SMT_E_CORRUPT	The message is corrupt. Ensure the values for “output-encoding” and “message-type” are the same as specified during encryption/signing.
	SMT_E_ERROR	Fail to verify signature because the message has been tampered with.
	SMT_E_NO_KEYS	No private key to decrypt the message.
	SMT_E_FILENOTFOUND	Function could not locate necessary information for the user, possibly as a result of the data store being corrupt.
2	string indicating encryption algorithm used; **#f** (false) if error or no encryption used.	
3	string indicating signature algorithm used; **#f** (false) if error or no signature used.	

Throws

None.

Location

stc_monksmime.dll

See Also

See **sign-encrypt** on page 26 values for “output-encoding”, “message-type” and “signature_type” must be matched with values used for **verify-decrypt** if they have been assigned.

wipe-handle

Syntax

```
(SMIMEH “wipe-handle”)
```

Description

wipe-handle deletes temporary variables stored in the object handle.

Parameters

None.

Return Value

vector

Returns a two element vector:

Element	Contents	Description
0	**#t** or **#f**	(true) if successful, otherwise (false).
1	string error message, if applicable. SMT_E_INVALID_PARAMETER	**begin-session** has not been successfully activated or message object is corrupt.

Throws

None.

Location

stc_monksmime.dll

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