

How to setup WebSphere MQ for z/VSE V3.0 and WebSphere MQ for Windows V7.0 with secured connections using SSL/TLS

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Changes

Nov, 12, 2008 – initial version. Feb 2009 – updates for WMQ for z/VSE 3.0 March 2009 – info about remote configuration using the MQ Explorer January 2016 – added section 2 on page 5 February 2017 – added section 9.1 on page 63

1 Introduction

This paper describes the setup of a secure connection between MQSeries for VSE and WebSphere MQ 7.0 on a Windows XP.

The following software has been used in the test setup.

- z/VSE 4.2.0 GA version
- MQSeries for VSE V2.1.2 and V3.0.0
- TCP/IP for VSE/ESA 1.5F as part of z/VSE 4.2 GA version
- VSE Connector Server as part of z/VSE 4.2 (job STARTVCS)
- Java 1.6.0 from Sun Microsystems
- MQSeries for Windows V7.0
- MQSeries for Windows Explorer V7.0 (part of MQSeries for Windows V7.0)

In fact two VSE test systems have been setup, one with MQSeries for VSE 2.1.2 and the other one with WebSphere MQ for z/VSE V3.0. In the following, the shown panels were taken from WMQ V3.0 but there is absolutely no difference in the setup compared to MQ for VSE V2.1.2.

Note: WebSphere MQ for z/VSE V3.0 is out of service since Sept 30, 2015.

2 Check for latest information

The information contained in this White Paper is also available in IBM Redbook *Security on IBM z/VSE*, SG24-7691. The book is available online at:

http://www.redbooks.ibm.com/abstracts/sg247691.html?Open

Check the publication dates to see which information is newer. The latest technical information in this White Paper is from February 2017.

3 Installing the prerequisite programs

Note that MQ Security cannot be activated when using the Basic Security Manager (BSM), because BSM does not support all needed CICS resource classes. For Security we would need an ESM, like CA TopSecret.

3.1 MQ installation on VSE

A detailed description of the installation of MQSeries on VSE is beyond the scope of this document. I was using Redbook "Using MQSeries for VSE, SG24-5647" and followed the steps as described in chapter 1 "Installation". I used the following resources:

- PRD2 .MQSERIES: contains all members restored from tape
- MQ.USER.CATALOG with name MQMCAT on volume SYSWK2

After creating all necessary resources and doing all the definitions, transaction MQSU must be invoked in order to initialize the MQSeries configuration file. Before being able to invoke any MQ transaction, we have to define a generic security profile to the Basic Security Manager (BSM).

The next section shows how all MQ transactions, starting with the two letters MQ, are defined to the BSM via a generic security profile. Further transactions, like the TST2 transaction used to send some test messages, must be defined in the same way.

3.2 Maintaining security profiles

Enter dialog "Maintain Transaction Profiles" (fastpath 2.8.1.1) and add a new security profile.

IESADMBSLE BSM RESOUR START	CE CLASS: TC	MAINTAIN SECUR ICSTRN	ITY PROFILES	ACTIVE SENSITIVE)
OPTIONS:	1 = ADD	2 = CHANGE	5 = DELETE	6 = ACCESS LIST
OPT	PROFILE NAME		DESCRIPTION	UNIVERSAL AUDIT
1	ftp		IBM SUPPLIED	22
_	iccf		IBM SUPPLIED	12
_	lpr		IBM SUPPLIED	12
PF1=HELP PF7=BACKWA	RD 8=FORWARD	3=END 9=PRINT		

Define a generic profile MQ* as shown below.

```
IESADMBSAE
                            MAINTAIN SECURITY PROFILES
BSM RESOURCE CLASS: TCICSTRN
Add Profile:
  PREFIX....
                                        CICS region
  RESOURCE NAME..... MQ
                                        Maximum length is 4 characters.
  GENERIC..... 1
                                        (1=yes, 2=no)
  UNIVERSAL ACCESS...
                                        (_=None, 2=Read, 3=Update, 4=Alter)
  AUDIT-LEVEL 1 ..... 1
                                         (_=None, 1=Failure, 2=Success, 3=All)
  ACCESS-LEVEL 1 .... 2
                                        (2=Read, 3=Update, 4=Alter, _=default)
                                        (_=None, 1=Failure, 2=Success, 3=All)
(2=Read, 3=Update, 4=Alter, _=default)
  AUDIT-LEVEL 2 .....
  ACCESS-LEVEL 2 ....
  DESCRIPTION..... IBM SUPPLIED
                                            Optional remark
PF1=HELP
                             3 = END
                                                        5=UPDATE
```

Define an access list for the generic profile.

IESADMBSLE BSM RESOU START OPTIONS:	RCE CLASS: TCI M 1 = ADD	MAINTAIN SECURI CSTRN 2 = CHANGE	TY PROFILES (CASE 5 = DELETE	ACTIVE SENSITIVE) 6 = ACCESS LIST
OPT	PROFILE NAME		DESCRIPTION	UNIVERSAL AUDIT
				ACCESS VALUE
6	*MQ		IBM SUPPLIED	12
_	NEWC		IBM SUPPLIED	12
_	OLPD		IBM SUPPLIED	12
PF1=HELP PF7=BACKW	ARD 8=FORWARD	3=END 9=PRINT		

Press Enter.

IESADMBSLA BSM CLASS: TCICSTRN START	MAINTAIN ACCES PROFILE: MQ	S LIST NUMBER OF ENTRIES ON LIST:	00000
OPTIONS: 1 = ADD	2 = CHANGE	5 = DELETE	
1			
PF1=HELP PF7=BACKWARD 8=FORWARD	3=END		

Enter option 1 (Add) and press Enter. Now add the profile to GROUP01 with access 2.

Press PF5 (Update). You must then rebuild the security tables via dialog 2.8.3

Now the MQSU transaction can be invoked. An output similar to the below should be displayed.

MQSU: MQSeries install completed, 6457 input records read.

3.3 MQ installation on Windows

A 90-days trial version of WebSphere MQ V7.0 has been downloaded from

https://www14.software.ibm.com/webapp/dswdown/dswdown.wss/web/searchDescription

The install file WMQv700Trial-x86_nt.zip comprises about 569 MB.

Launching the setup.exe shows an install dialog that allows checking for some prerequisites:

- Windows XP + SP2
- WebSphere Eclipse Platform V3.3

On the Network Configuration tab I selected NO.

Note: If WebSphere Eclipse Platform is not installed on your PC, you can install it from the downloaded WebSphere MQ package. "WebSphere Eclipse" must not be mixed up with the standard "Eclipse" IDE as downloaded from <u>www.eclipse.org</u>.

Enter directory Prereqs/IES and launch the setup.exe. This is also described on following web page:

http://www.ibm.com/support/docview.wss?uid=swg21206995

After installing WebSphere Eclipse, WebSphere MQ 7.0 can now be installed. After copying files, WebSphere MQ does some network configuration.

I again answered NO to the question if there are any domain controllers running Windows 2000

WebSphere MQ Default Configuration tions	
ueue manager	
Name: [None]	
Remote administration	
Allow Prevent	
efault duster membership	
Cluster Name: [None]	
Repository location:	
Repository computer name:	
Toin default cluster	
Status at 17:37:29	
Olick "Set up Default Configuration" to get	<u> </u>
up the default configuration.	-
x) L
Set up Default Configuration.	Help

Click button Setup Default Configuration.

Default Configuration Wizard	<u>- ×</u>
Set up Default Configuration	
Click Next to begin setting up the default configuration	_
WebSphere MQ can set up a default configuration to link this computer with other computers.	
A queue manager is added to this computer, and joined to the default cluster.	
A cluster is a network of queue managers that can exchange messages with each other without the need to configure the connections between them manually.	
< Back Next >>> Can	cel

Press Next.

fault Configuration Wizard	
elect Options	
Choose options for setting up the default configuration	
WebSphere MQ will create a queue manager on this computer called	
QM_BL3XGHHE	
Allow remote administration of the queue manager	
WebSphere MQ can optionally join this queue manager to the default duster cal	lled
DEFAULT_CLUSTER	
I loin the augus manager to the default duster	
	< Back Next > Cancel
	- 0
Next.	
fault Configuration Wizard	_
ain default cluster	
Identify whether the cluster repository is on this or another computer	

A repository is a queue manager in the cluster that holds information about all the other members.

Is this the first computer in the default cluster?

Yes, make it the repository for the duster.

 $\ensuremath{\mathbb{C}}$ No, another computer has already joined the cluster as the repository.

 D	2.60	ł	1000	1000
DOL	11	юп		Ν.
			-	

If this computer uses DHCP (dynamic allocation of IP address), then you should not put a repository on it. If the IP address changes, other queue managers, even on this computer, will no longer be able to find the repository. However, if this will be the only queue manager in the cluster, then the change of IP address will not have an effect on the repository.

More information

Press Next.

Next >

Cancel

< Back

ocation of th	e repository comput	ler	
i The auto	computer selected t matically from a DH	o hold the repository for the default cluster can be configured to either obtain an IP a CP server or have a fixed IP address.	ddress
f this comput ixed IP addre	er is configured to o ess, that can be use	btain an IP address automatically from a DHCP server, then is there another compute d to hold the repository?	with a
C Var	G No.	C Not applicable	
If you want might have t	to continue using th	is computer as the repository, dick 'Next'. Remember that other members of the clust when the IP address of this computer changes.	er
If you want might have t	to continue using the to be reconfigured v	is computer as the repository, click 'Next'. Remember that other members of the clust when the IP address of this computer changes.	er
If you want might have t	to continue using the to be reconfigured v	is computer as the repository, dick 'Next'. Remember that other members of the clust when the IP address of this computer changes.	er
If you want might have t	to continue using the to be reconfigured v	is computer as the repository, dick 'Next'. Remember that other members of the dust when the IP address of this computer changes.	r
If you want might have t More informa	to continue using the to be reconfigured v	is computer as the repository, dick 'Next'. Remember that other members of the dust when the IP address of this computer changes.	r

Press Next.

Default Configuration Wizard	_ 0
Repository location	
Location of the repository computer	
The queue manager on this computer will be the repository for the default duster.	
This computer's name:	
J DL JAOHINE	
joining additional computers to the cluster	
You must install the default configuration on the computer that you want to join to the default cluster. The must enter this computer's name as the location of the repository.	n you
< Back Next > N	Cancel

Press Next.

aut computation summary	
Check the selected options, then click Finish	
WebSphere MQ has enough information to set up the default configuration.	
Configuration summary:	Print
A default configuration will be set up. The queue manager name is 'QM_BL3XGHHE'	
Remote administration of the queue manager: Allowed	
Joining the default duster DEFAULT_CLUSTER	
Location of repository for cluster: This computer ('BL3XGHHE')	

Press Finish.

WebSphere MQ Default Configuration	×
Options	
Queue manager	
Name: QM_BL3XGHHE	
Remote administration The queue manager can be administered remotely. Allow Prevent	
Default duster membership	
Cluster Name: DEFAULT_CLUSTER	
Repository location: This computer	
Repository computer name: BL3XGHHE.boeblingen.de.ibm.com	_
Repository IP Address: 9.152.216.85	
Join default cluster	
Status at 17:42:00	1
Default configuration is complete.	
Set up Default Configuration Help	

Now the default configuration is complete. Press Close.

ebSphere MQ You have completed the Prepare We	
and the second se	bSphere MQ wizard.
Close and re-open any Command Pro	mpt windows.
You can choose one or more of these Finish:	e options before you click
Options	
Hemove the shortcut to this wiz	ard from the desktop
Launch Web Sphere MQ Explor	er
Launch Notepad to view the rel	lease notes
A A A A A A A A A A A A A A A A A A A	

Press Finish to launch the WebSphere MQ Explorer.

IBM WebSphere MQ Explorer			-0×
File Window Help			
😪 WebSphere MQ Explorer - Navigator 🕴 📟 🗖	1 🖉 WebSphere MQ Explorer - Content 🕴		■ ◎ ▽ □ □
Image: Subscriptions Image: Subscription	WebSphere. MQ Version 7.0 Welcome to WebSphere MQ Explorer In WebSphere MQ Explorer you can administer local and remote queue r and their resources, such as queues, channels, and lateners. WebSphere MQ Explorer Preferences	nanagers	Help on WebSphere MQ Explorer
Partial Repositories MS Administered Objects	Queue manager icons The following icons are used in the Navigator view to indicate queue man Local queue manager; running and connected to WebSphere MQ Es Local queue manager; unning but disconnected from WebSphere Local queue manager; stopped and disconnected from WebSphere Remote queue manager; connected to WebSphere MQ Explorer Remote queue manager; disconnected from WebSphere MQ Explorer	nager status: kplorer IQ Explorer MQ Explorer er	
			Help on WebSphere MQ icons
	R WebSphere MQ Explorer - Test Results 23		≱ % ⊽ ⊓ ⊡
	0 errors, 0 warnings, 0 infos		
	Description	Object name	Category
		1	

4 Configuring MQ

This chapter describes how to configure MQ on both sides.

4.1 MQ configuration on VSE

As described in Redbook "Using MQSeries for VSE" in section 1.4 "Initial configuration", we have to

- Define the VSE queue manager
- Define the system queues
- Define the sender and receiver channels

There is a good picture in Redbook "WebSphere V5 for Linux on zSeries Connectivity Handbook - SG24-7042", Chapter 8, section 8.4, showing the relations of the various queues and channels.



Figure 1: MQ queues and channels

We will use the following names for the various queues and channels:

	VSE	Windows
Queue Manager	QMGR.VSE	QM_BL3XGHHE
Local Q-Name	VSE42	WINXP
Remote Q-Name	WINXP	VSE42
Transmit Q-Name	XMT.WINXP	XMT.VSE42
Sender channel	VSE.TO.WIN	WIN.TO.VSE
Receiver channel	WIN.TO.VSE	VSE.TO.WIN

Table 1: MQ queue and channel names

First we have to establish the MQSeries environment in CICS via the MQSE transaction. At this point you should have made the necessary security definitions as described in MQ installation on VSE on page 5.

4.1.1 Defining the queue manager

After running MQSE, you can now invoke the MQ Master terminal transaction MQMT to define the VSE queue manager. Select option **1** (Configuration) and again option **1** (Global System Definition).

12/16/2008 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCTCS 11:17:41 Global System Definition CIC1 MQWMSYS Queue Manager Information A000 Queue Manager QMGR.VSE Description Line 1. Description Line 2.: Queue System Values System Wait Interval : 00000030 Maximum Connection Handles.: 00000100 Maximum Concurrent Queues .: 00000100 Max. Recovery Tasks : 0000 Local Code Page . . : 01047 Subsystem id . . . : MQV1 Allow TDQ Write on Errors : Y CSMT Allow Internal Dump . . . : Y Queue Maximum Values Maximum Q Depth : 00100000 Maximum Global Locks.: 00001000 Maximum Message Size. . . .: 00002048 Maximum Single Q Access . .: 00000100 Maximum Local Locks .: 00001000 Global QUEUE /File Names Configuration File. : MQFCNFG LOG Queue Name. . . : SYSTEM.LOG Dead Letter Name. . : SYSTEM.DEAD.LETTER.QUEUE Monitor Queue Name. : SYSTEM.MONITOR Requested record displayed. PF2=Return PF3=Quit PF4/Enter=Read PF9=Com PF10=Log PF11=Evt PF12=Ext

At this point we just define the Queue Manager name and keep all other defaults.

Press **PF6** to permanently update your queue manager definition.

4.1.2 Defining the local queue

Define the local queue via MQMT, option 1.2.

```
12/16/2008
                  IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                     DBDCCICS
11:19:05
                        Queue Main Options
                                                                     CIC1
MQWMQUE
                                                                     A000
                            SYSTEM IS ACTIVE
       Default Q Manager. : QMGR.VSE
       Object Type. . . . :
                                   L = Local Queue
                                   M = Model Oueue
                                   R = Remote Queue
                                   AQ = Alias Queue
                                   AM = Alias Queue Manager
                                   AR = Alias Reply Queue
       Object Name. . . . : VSE42
PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update
                                      PF9=List PF12=Delete
```

Press PF5 (Add) to continue.

12/16/2008 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCTCS 11:18:44 Queue Definition Record CIC1 MQWMQUE QM - QMGR.VSE A000 Local Queue Definition Object Name. VSE42 Description line 1 : Description line 2 : Y=Yes, N=No Put Enabled Y Get Enabled Y Y=Yes, N=No Default Inbound status . . : A A=Active,I=Inactive Outbound status. . : A A=Active,I=Inactive Dual Update Queue. . . . : Automatic Reorganize (Y/N) : N Start Time: 0000 Interval: 0000 VSAM Catalog : PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update PF9=List PF10=Queue PF12=Delete

Press **PF5** to get to the queue extended definition panel.

12/16/2008 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCICS 11:20:55 Queue Extended Definition CIC1 MOWMOUE A000 Object Name: VSE42 General Maximums Events Type . . : Local Max. Q depth . : 00100000 Service int. event: N File name : MQFI001 Max. msg length: 00002048 Service interval : 00000000 Usage . . : N Max. Q users . : 0000100 Max. depth event : N Shareable : Y Max. gbl locks : 00001000 High depth event : N Shareable : YMax. gbl locks : 00001000High deptn event : NDist.Lists : YMax. lcl locks : 00001000High depth limit : 000 Low depth event . : N Triggering Low depth limit . : 000 Enabled: NTransaction id.:Type. . :Program id . . :Max. starts: 0001Terminal id . : Restart . : N Channel name . : User data : : PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update PF9=List PF10=Queue

During the MQ installation several VSAM files have been created that can be used for the various queues. Enter the name of a VSAM file to be used for this queue (e.g. MQFI001) and press **PF5** again to finish.

4.1.3 Defining the transmission queue

Use MQMT, path 1.2 to add another local queue with name XMT.WINXP. Press PF5 to get to the below panel.

12/16/2008 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCTCS 09:52:02 Queue Definition Record CIC1 MQWMQUE QM - QMGR.VSE A000 Local Queue Definition Object Name. XMT.WINXP Description line 1 : Description line 2 : Y=Yes, N=No Put Enabled Y Get Enabled Y Y=Yes, N=No Default Inbound status . . : A A=Active,I=Inactive Outbound status. . : A A=Active,I=Inactive Dual Update Queue. : Automatic Reorganize (Y/N) : N Start Time: 0000 Interval: 0000 VSAM Catalog : PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update PF9=List PF10=Queue PF12=Delete

Press **PF10** (Queue) to get to the queue extended definition panel.

```
12/16/2008
                           IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                                                      DBDCCICS
09:49:51
                                Queue Extended Definition
                                                                                                      CIC1
MOWMOUE
                                                                                                      A000
Object Name: XMT.WINXP
General
                               Maximums
                                                                       Events
Type . . : Local Max. Q depth . : 00100000 Service int. event: N
File name : MQF0001 Max. msg length: 00002048 Service interval : 00000000
Usage. : TMax. Q users. : 00000100Max. depth event : NShareable: YMax. gbl locks : 00001000High depth event : NDist.Lists: YMax. lcl locks : 00001000High depth limit : 000
                                                                       Low depth event . : N
Triggering
                                                                        Low depth limit . : 000
Enabled . : Y Transaction id.:
Type . . : E Program id . . : MQPSEND
Max. starts: 0001 Terminal id . :
Restart . : N Channel name . : VSE.TO.WIN
User data :
PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update
                 PF9=List PF10=Queue
```

Change the USAGE parameter to T (transmission). Press PF5 to finally add the new queue.

4.1.4 Defining the remote queue

Now let's define the remote queue for processing outgoing messages to Windows. Use MQMT path 1.2 to define a remote queue with name WINXP. Press **PF5** to get to the below panel.

```
12/16/2008
               IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                    DBDCCTCS
                       Queue Definition Record
11:22:41
                                                                    CIC1
MQWMQUE
                 QM - QMGR.VSE
                                                                    A000
                     Remote Queue Definition
Object Name. . . . . . . . . . WINXP
Description line 1 . . . . :
Description line 2 . . . :
Put Enabled . . . . . . . . Y
                               Y=Yes, N=No
Get Enabled . . . . . . . . Y
                               Y=Yes, N=No
Remote Queue Name. . . . : WINXP
Remote Queue Manager Name. : QM BL3XGHHE
Transmission Queue Name. . : XMT.WINXP
PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update
                                      PF9=List PF12=Delete
```

Enter the system specific parameters for Remote Queue Name, Remote Queue Manager Name, and Transmission Queue name.

Press **PF5** to add the remote queue.

4.1.5 Defining the sender channel

Channels are defined via MQMT, options 1 (Configuration) and 3 (Channel Definitions).

```
12/16/2008
                   IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                        DBDCCICS
11:24:03
                             Channel Record
                                                                         CIC1
MQWMCHN
                                                                         A000
Channel : VSE.TO.WIN
Desc. . : SENDER CHANNEL TO WINXP
 Protocol: T (L/T) Type : S (S=Snd/R=Rcv/V=Srv/Q=Req/C=svrConn) Enabled : Y
Sender/Server
Remote TCP/IP port . . . . : 01414
                                           Short/Long retry count . : 00000000
                                          Short retry interval . . : 00000000
Long retry interval . . : 00000000
 Get retry number . . . . . : 00000000
 Get retry delay (secs) . . : 00000000
 Convert msgs(Y/N). . . . . : N
                                           Batch interval . . . . : 00000000
 Transmission queue name. . : XMT.WINXP
 TP name. .
Sender/Receiver/Server/Requester
 Connection : 9.152.222.125
 Max Messages per Batch . . : 000001
                                           Message Sequence Wrap . . : 000999999
 Max Message Size . . . . . : 0002048
                                           Dead letter store(Y/N) % \left( {{\rm N}} \right) . : N
 Max Transmission Size . . : 032766
                                           Split Msg(Y/N) . . . . . . . N
 Max TCP/IP Wait . . . . . : 000000
F2=Return PF3=Quit PF4=Read PF5=Add PF6=Upd PF9=List PF10=SSL PF11=Ext PF12=Del
```

Parameter "Connection" specifies the IP address of the Windows PC. It should have a static IP address. When using DHCP, make sure you always have the same IP address. Parameter **Message sequence wrap** must match with the corresponding definition on Windows, refer to section Defining the receiver channel on page 28.

4.1.6 Defining the receiver channel

12/16/2008 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCTCS 11:24:42 Channel Record CIC1 MQWMCHN A000 Channel : WIN.TO.VSE : RECEIVER CHANNEL FROM WINXP TO VSE Desc. . Protocol: T (L/T) Type : R (S=Snd/R=Rcv/V=Srv/Q=Req/C=svrConn) Enabled : Y Sender/Server Remote TCP/IP port : 01414 Short/Long retry count . : 00000000 Get retry number : 00000002 Short retry interval . . : 00000000 Get retry delay (secs) . . : 00000010 Long retry interval . . : 000000000 Convert msgs(Y/N).... N Batch interval : 00000000 Transmission queue name. . : TP name. . : Sender/Receiver/Server/Requester Connection : Max Messages per Batch . . : 000050 Message Sequence Wrap . . : 000999999 Dead letter store(Y/N) . : N Max Message Size : 0002048 Max Transmission Size . . : 032766 Split Msg(Y/N) N Max TCP/IP Wait : 000000 F2=Return PF3=Quit PF4=Read PF5=Add PF6=Upd PF9=List PF10=SSL PF11=Ext PF12=Del

Press **PF5** to add the new definition. Parameter **Message sequence wrap** must match with the related value in the sender channel on Windows, refer to section Defining the sender channel on page 26.

4.1.7 Defining batch communications

Batch communications are necessary when you want to access MQ from batch.

Start MQMT and enter options 1 (Configuration) and 1 (Global System Definition). Then press **PF9** (PF9=Comms).

```
12/16/2008
                 IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                      DBDCCTCS
11:25:32
                           Global System Definition
                                                                      CIC1
MQWMSYS
                            Communications Settings
                                                                      A000
    TCP/IP settings
                                            Batch Interface settings
                                     Batch Int. identifier: MQBISERV
   TCP/IP listener port : 01414
    Licensed clients . . : 00000
                                            Batch Int. auto-start: Y
    Adopt MCA . . . . . . N
   Adopt MCA Check . . : N
                                            Channel Auto-Definition
                                            Auto-definition . . : Y
    SSL parameters
                                            Auto-definition exit :
    Key-ring sublibrary : CRYPTO.KEYRING
    Key-ring member . . : MQ02
    PCF parameters
    System command queue : SYSTEM.ADMIN.COMMAND.QUEUE
    System reply queue . : SYSTEM.ADMIN.REPLY.QUEUE
    Cmd Server auto-start: N
    \ensuremath{\texttt{Cmd}} Server convert . : N
    Cmd Server DLQ store : N
PF2=Queue Manager details PF3=Quit PF4/Enter=Read PF6=Update
```

Specify Y for batch auto-start, adopt MCA, and adopt MCA check. Then press PF6 to update the definition.

4.1.8 Defining Log settings

Sometimes it is convenient to have all MQ messages on the operator console. To define the Log settings, start MQMT, path 1.1 and press **PF10**. Column "C" specifies whether MQ messages are written to the console also.

```
12/16/2008
                    IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                                DBDCCICS
11:26:03
                               Global System Definition
                                                                                CTC1
MQWMSYS
                                Log and Trace Settings
                                                                                A000
            Log Settings
                                                     Trace Settings
                                O C
      Informational . . . : Y Y
                                               MQI calls . . . . . . N
      Warning . . . . . . . . Y Y
Error . . . . . . . . Y Y
                                               Communication . . . : N
                                               Reorganization . . . : N
      Critical . . . . : Y Y
                                               Data conversion . . . : {\tt N}
                                               System . . . . . . . . . \ensuremath{\mathsf{N}}
             - and/or -
      Communication . . . : Y Y
      Reorganization . . : Y Y
System . . . . . : Y Y
PF2=Queue Manager details PF3=Quit
                                          PF4/Enter=Read
                                                               PF6=Update
```

4.1.9 Starting MQ on VSE

Now MQ can be started on VSE via MQMT, option 2 (Operations) and 4 (Initialization / Shutdown of System). You should get the following messages on the console.

```
MQI0030I - WMQ for z/VSE system starting

MQI0035I - WMQ for z/VSE licensed support for 0000 clients

MQI0040I - WMQ for z/VSE system started

MQI0200I - MQI000000I Queue manager started

MQI0200I - MQI006041I TCP/IP listener started

MQI0100I - WMQ Batch Interface (MQBISERV) started
```

You should now check the CICS job output for any security violations, caused by transactions not defined to BSM.

4.2 MQ configuration on Windows

Basic network configuration was already done during the WebSphere MQ installation. Now start the MQ Explorer to continue with the VSE specific definitions.

4.2.1 Defining the local queue

Select Queues - New - Local Queue.



Enter the local queue name WINXP.

💠 New Local Queue	<u>_ ×</u>
Create a Local Queue	1
Enter the details of the object you wish to create	1
	-
Name: WINXP	
Select an existing object from which to copy the attributes for the new object. SYSTEM.DEFAULT.LOCAL.QUEUE When this wizard completes, another wizard can be started automatically to create a matching of Start wizard to create a matching JMS Queue	Select
Omega Seck Next > Finish	Cancel

Press Next.

General Extended	General		
Cluster	Queue name:	WINXP	
Events	Queue type:	Local	
Storage Statistics	Description:	Local queue for Win XP	
	Put messages:	Allowed	
	Get messages:	Allowed	
	Default priority:	0	2
	Default persistence:	Not persistent	2
	Scope:	Queue manager	2
	Usage:	Normal	

Sciect Lingstring	Select	Trigg	gering
-------------------	--------	-------	--------

🕀 New Local Que	ue						_ 🗆 🗙
Change proper Change the proper	ties rties of the new Local Queue						
General Extended Cluster Triggering Events Storage Statistics	Triggering Trigger control: Trigger type: Trigger depth: Trigger message priority: Trigger data: Initiation queue: Process name:	On Every 1 0					
0]	< Back	Next >	Fir	nish	Cancel

Select Trigger control **On** and Trigger type **Every**.

Press Finish.

4.2.2 Defining the transmit queue

Select Queues – New – Local queue.

🕀 New Local Queue				
Create a Local Queue				
Enter the details of the object y	you wish to create			
Name:				-
XMT.VSE42				
Select an existing object from W	hich to copy the attribute	s for the new object		Select
When this wizard completes, and Start wizard to create a ma	nother wizard can be star atching JMS Queue	ted automatically to	create a matchi	ng object.
0	< Back	Next >	Finish	Cancel

Press the **Select** button and select SYSTEM.CLUSTER.TRANSMIT.QUEUE as the model for the queue. Then enter the name of the transmit queue: **XMT.VSE42**

Press Next.

General Extended	General		
eluster	Queue name:	XMT.VSE42	
ivents	Queue type:	Local	
Storage Statistics	Description:	WebSphere MQ Cluster Transmission Queue	
	Put messages:	Allowed	1
	Get messages:	Allowed	1
	Default priority:	0	2
	Default persistence:	Not persistent	2
	Scope:	Queue manager	-
	Usage:	Transmission	

Usage should display Transmission. Then select the Triggering tab.

General	Triggering	
Extended Cluster	Trigger control: On	
Triggering Events	Trigger type: Every	
Storage Statistics	Trigger depth: 1	
	Trigger message priority: 0	
	Trigger data:	
	Initiation queue:	
	Process name:	
	Process name:	

On tab Triggering specify Trigger control **On** and Trigger type **Every**. Press **Finish**.

4.2.3 Defining the remote queue

Select Queues - New - Remote Queue Definition.

🔁 WebSphere MQ Explorer - Navigat 🛛 🖇	U WebSphere MQ Explorer	- Content
A → Ø	≥ [▽] Queues	
	Filter: Default for Queue	s
	Oueue name	Queue t
Topics New	Local Queue	Local
Subscri Status	Alias Queue	Local
T C Advance Tests	Model Queue	Local
E C Queue Manage Object Authorities	Remote Queue Definition	Local
		45-
E C Full Repositories		
Partial Repositories		
> IMS Administered Objects		

Enter the name of the remote queue: VSE42.

New Remote Queue Definition			
Create a Remote Queue Definition Enter the details of the object you wish to cr	reate		- 6
Name:			-
VSE42			
Select an existing object from which to copy SYSTEM.DEFAULT.REMOTE.QUEUE	the attributes f	or the new object.	Select
When this wizard completes, another wizard	l can be started Jueue	automatically to create	e a matching object.
0	< Back	Next >. Fin	ish Cancel
	- ar ar ar a		

Press Next.

On the next box specify the remote queue name (VSE42), the remote queue manager (QMGR.VSE), and the transmission queue name (XMT.VSE42).

General	General	
Extended Cluster	Queue name: VSE42	
	Queue type: Bemote	
	Description: Remote queue on VSE 4.2	
	Put messages: Allowed	•
	Default priority: 0	÷
	Default persistence: Not persistent	•
	Scope: Queue manager	•
	Remote queue: VSE42	
	Remote queue manager: QMGR.VSE	
	Transmission queue: XMT.VSE42	

Press Finish.

We now have following queues:

IBM WebSphere MQ Explorer					_0
<u>File Window H</u> elp					
🕾 WebSphere MQ Explorer - N 🕺 🛡 🗖 🛛	WebSphere MQ Explorer - Content			± 1 5	• 🛷 🕆 🗖 E
	Queues				
IBM WebSphere MQ Oucue Managers	Filter: Default for Queues				~
	Queue name	Queue type	Definition type	Open input count	Open output c
Courses	BL3XGHHE.DEAD.LETTER.QUEUE	Local	Predefined	0	0
- Ca Suberrintinge	dq_default_BL3XGHHE	Local	Predefined	0	0
E C Advanced	🔯 default	Local	Predefined	0	0
- Chappele	o postcard	Local	Predefined	0	0
Client Connections	VSE42	Remote			
Callictanare	WINXP	Local	Predefined	0	0
Services	Bro XMT.VSE42	Local	Predefined	0	0
Process Definitions Namelists	•				×
	Scheme: Default for Queues - Distribut	ed			4
	Last updated: 12:58:13			1	
p		1] # (P.

Now let's define the sender and receiver channel.

4.2.4 Defining the sender channel

Select Channels - New - Sender Channel

😪 WebSphere MQ Explorer - Navigat 🐰		WebSphere MQ Explore	r - Content 🕄
<u>ن</u> + ش	¢ [®] ▼	Channels	
IBM WebSphere MQ Oueue Managers		Filter: Default for Chann	nels
		Channel name	Channel type
Queues		S BL3XGHHE	Server-connect
Subscriptions		TO_QM_BL3XGHHE	Cluster-receiver
Channel New	•	Sender Channel	
Client Co Statu:	; •	Server Channel 15	
Custener Custen	t Authorities >	Receiver Channel Requester Channel Server-connection Cha Cluster-sender Channe Cluster-receiver Channe	annel al

Enter the name of the sender channel: WIN.TO.VSE.

🕀 New Sender Channel				
Create a Sender Channe	el			
Enter the details of the object	you wish to create			1
Name:				
WIN.TO.VSE				
Select an existing object from a	which to conv the a	ttributes for the r	ew object	
			ien objecti	Select
Jaratemberiaender				Jeleeun
0	< Back	Next > N	Finish	Cancel

Press Next.

- General - Extended	General	WIN TO VSE
- Exits - LU6.2 - Retry - SSL - Statistics	Type: Description: Transmission protocol: Connection name: Transmission queue:	Sender Sender channel to VSE 4.2 9.152.85.115 XMT.VSE42

Specify the IP address of your VSE system and the related transmission queue name.

Now select the **Extended** tab.

New Sender C	hannel
Change prope Change the prop	rties erties of the new Sender Channel
General Kended MCA Exits LU6.2 Retry SSL Statistics	Extended Maximum message length: 2048 Heartbeat interval: 300 Sequence number wrap: 000999999 Message compression: None Image:
1	< Back Next > Finish Cancel

The values for **Maximum message length** and **Sequence number wrap** must match the values of the corresponding receiver channel on the VSE side. Refer to section Defining the receiver channel on page 17.

4.2.5 Defining the receiver channel

Select Channels – New – Receiver Channel.

El	e <u>W</u> indow <u>H</u> elp	0	_	
	S WebSphere MQ Explorer - Navigat X	WebSphere MQ Explorer Channels Filter: Default for Channel	- Content 🛛	
	QM_BL3XGHHE Queues Copy Topics Copy Subscriptions Copy Advanced	Channel name	Channel type Server-connection Cluster-receiver Sender	Ove Inac Inac Inac
	Clien Clien Clien Status Clien Status Servi Tests Proce Object Authorities Namelists Authentication Information Queue Manager Clusters	Sender Channel Server Channel Requester Channel Server-connection Channel Cluster-sender Channel Cluster-receiver Channel		

Enter the name of the receiver channel: VSE.TO.WIN.

🕀 New Receiver Channe		
Create a Receiver Ch	annel	
Enter the details of the ob	ect you wish to create	
Name:		
VSE.TO.WIN		
Select an existing object fro	on which to copy the attributes for the new object	rt.
SYSTEM.DEF.RECEIVER		Select
,		
3	< Back Next > Finish	n Cancel
	N	

Press Next and select Extended.

🕀 New Receiver Cha	nnel	<u>_ ×</u>
Change properties Change the properties	of the new Receiver Channel	
General 	Extended Maximum message length: 2048 Heartbeat interval: 300 Sequence number wrap: 000999999 Message compression: None Image:	×
0	< Back Next > Finish	Cancel

The values for **Maximum message length** and **Sequence number wrap** must match the values of the corresponding sender channel on the VSE side. Refer to section Defining the sender channel on page 17.

We now have the following channels:

IBM WebSphere MQ Explorer						
jle <u>Wi</u> ndow <u>H</u> elp						
🛠 WebSphere MQ Explorer - Navigat 🖇 📃	U WebSphere MQ Explorer	- Content 23			석기	🔅 🗸 🗖 🕻
<u>h</u> ← → ∲	Channels					
General IBM WebSphere MQ General IBM	Filter: Default for Channe	els				~
E-OI QM_BL3XGHHE	Channel name	Channel type	Overall channel status	Conn name	Xmit protocol	Transmission
- Queues	S_BL3XGHHE	Server-connection	Inactive		TCP	1
- Constantions	TO_QM_BL3XGHHE	Cluster-receiver	Inactive	BL3XGHHE(1414)	TCP	
E-C- Advanced	O ^{DIVSE.TO.WIN}	Receiver	Inactive		TCP	
- Channels	WIN.TO.VSE	Sender	Inactive	9.152.85.115(1414)	TCP	XMT.VSE42
Client Connections						
- Calisteners						1
- Concilional - Concernational - Concern						<u> </u>
- Process Definitions	Scheme: Default for Char	nnels - Distributed				4
- 🔁 Namelists						
	Last updated: 13:14:50					
L	1					
						8

Note that the sender channel must be started before any message can be sent.

C- WebSphere MQ Explorer - Navigato 🕅	U WebSphere M	Q Explorer	- Content 2	3		
<u>h</u> ← → �	Channels					
🖃 🜐 IBM WebSphere MQ			(4))			
E Queue Managers	Filter: Default	for Channe	els			
	Channel	Channel name		Channel type		Overall channel sta
Queues	S_BL3XGH	ΗE	Server-co	onnection	Inactive	
	TO_QM_BL	3XGHHE	Cluster-re	eceiver	Inactive	
	VSE.TO.W	IN	Receiver		Inactive	
Channels	WIN.TO.VS	SE	Sender	Comp	bare with	
Client Connections				Start		
				Stop	VS	
Process Definitions Namelists				Reso	lve	

The new Overall channel status should now be Running.

4.3 Testing the setup

Now let's test our setup by sending some test messages from Windows to VSE and vice versa.

4.3.1 Sending a test message to VSE

First start MQMT on VSE and enter **3** (Monitoring) and **1** (Monitor queue). Then select the local queue VSE42. Currently there are no messages on the queue, i.e. QDEPTH is zero.

12/16/2008 11:30:38 MQWMMOQ	I	BM WebSphere Monitor	MQ for z/ Queues	VSE Version	3.0.0		DBDCCICS CIC1 A000	3
		OUEUING	SYSTEM I	S ACTIVE				
		DETAIL	OUEUE INF	ORMATION				
VSE42			~					
INBOUND:	STATUS B	ENABLED Y	OPEN Q	1				
OUTBOUND:	STATUS I	ENABLED Y	OPEN Q	0				
BOTH:	FIQ	0 LIQ	0	GETS	0	QDEPTH	0	
Enter=Refre	esh PF2=Re	turn PF3=Exi	t PF10=L	ist				

On Windows start the sender channel, if not already started.

Then right-click the remote queue VSE42 and select **Put Test Message**.



In the following box enter some message text.

Put test message	
Put message to:	
Queue manager:	
QM_BL3XGHHE	
Queue:	
VSE42	
Message data:	
This is a message from Win XP!	
(1) The queue which will receive the test message is on this computer. The message wi	I be put directly on the queue.
	Put message Close

Press Put message.

On the VSE side you should see the message by pressing Enter to refresh the panel.

```
12/16/2008
                   IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                     DBDCCICS
11:30:38
                          Monitor Queues
                                                                     CIC1
MQWMMOQ
                                                                     A000
                           QUEUING SYSTEM IS ACTIVE
                           DETAIL QUEUE INFORMATION
VSE42
INBOUND:
           STATUS B ENABLED Y
                                 OPEN Q
                                                 1
                                 OPEN Q
OUTBOUND: STATUS I ENABLED Y
                                                 0
                           LIQ
                                                              QDEPTH
BOTH:
          FIQ
                      0
                                       1
                                           GETS
                                                         0
                                                                            1
Enter=Refresh PF2=Return PF3=Exit PF10=List
```

The QDEPTH value has increased by one. You may now browse the queue to see the message.

Press PF2 twice to return to the main MQMT panel and select **4** (Browse Queue Records). Enter the queue name to browse (VSE42).

IBM WebS	DBDCCICS CIC1 A000								
e: VSE42 : 00000001	LR-	0, LW-	1, DD-	MQFI001					
: Written.	PUT da	te/time : 200	81215131509						
Message Size : ASCII Offset +! +! +! 00000 This is a message from WinXP! +!									
PF2=Return	PF3=Quit	PF4=Next	PF5=Prior	רדם – MD					
	IBM WebS e: VSE42 : 00000001 Queu : Written. : 00000011 .!+ a message f PF2=Return PF7-ID	IBM WebSphere MQ for Browse Queu SYSTEM IS e: VSE42 : 00000001 LR- Queue Data Recor : Written. PUT da : 00000011 GET da .1+!	IBM WebSphere MQ for z/VSE Version Browse Queue Records SYSTEM IS ACTIVE e: VSE42 : 00000001 LR- 0, LW- Queue Data Record : Written. PUT date/time : 200 : 00000011 GET date/time : .1+!+ a message from WinXP! PF2=Return PF3=Quit PF4=Next DF7=Up PF2=Dorm PF3=Hax	IBM WebSphere MQ for z/VSE Version 3.0.0 Browse Queue Records SYSTEM IS ACTIVE e: VSE42 : 00000001 LR- 0, LW- 1, DD- Queue Data Record : Written. PUT date/time : 20081215131509 : 00000011 GET date/time : .1+1+1+1+ a message from WinXP! PF2=Return PF3=Quit PF4=Next PF5=Prior DF7_UP PF2=Dorm PF3=Hax PF10=Hdr	IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCICS Browse Queue Records CIC1 SYSTEM IS ACTIVE A000 e: VSE42 : 00000001 LR- 0, LW- 1, DD-MQFI001 Queue Data Record : Written. PUT date/time : 20081215131509 : 00000011 GET date/time : ASCII .1+!+!+!+! a message from WinXP! PF2=Return PF3=Quit PF4=Next PF5=Prior PF2=LP PF3=Quit PF4=Next PF5=Prior				

4.3.2 Sending a test message to Windows

You can use the TST2 transaction to send a number of test messages to VSE (the TST2 transaction must be defined to BSM, refer to section 3.2 on page 6). On a clear CICS screen enter:

TST2 PUT 10 WINXP

The output should be similar to:

On the Windows side, you should see the 10 messages in the local queue WINXP.

					4241 1954	
Vebsphere MQ Explorer - Navigato 23	Websphere MQ Explorer - Content 20				R 1 - 10	ψ
0 0	Queues					
IBM WebSphere MQ	Filter: Default for Queues					~
E-OL QM_BL3XGHHE	A Queue name	Queue type	Definition type	Open input count	Open output count	Current qu
Contraction Tracker	BL3XGHHE.DEAD.LETTER.QUEUE	Local	Predefined	0	0	0
Charge Schereinterer	dq_default_BL3XGHHE	Local	Predefined	0	0	0
Subscriptions	default	Local	Predefined	0	0	0
Channels	bostcard	Local	Predefined	0	0	0
Client Connections	VSE42	Remote			(
	WINXP	Local	Predefined	0	0	10
- Catolicia	MT.VSE42	Local	Predefined	0	0	1
C Process Definitions						
- Namelicto						
Authentication Information						
E Concerne Manager Chiefere	4					•
	Cohamar Dafa It for Ourses Dahih I					~
	Scheme: Default for Queues - Distribut	eu				
	Last updated: 13:34:26					

5 Configuring for SSL/TLS

SSL/TLS in general has two flavors:

- SSL/TLS server authentication and
- SSL/TLS client authentication.

Which type to use is configured at the server side (receiver channel). With MQSeries both sides can be server or client at the same time when messages shall be exchanged. Whenever sending an MQ message, the sender is the client, whenever receiving an MQ message the receiver is the server. This must be considered when implementing SSL with MQSeries.

In the following setup, first a set of keyring members (PRVK, ROOT, and CERT) is created with Keyman/VSE and uploaded to VSE. Then the two certificates are stored in a MQ key database file on Windows XP.



Figure 2: Keyring setup on VSE and Windows

With this setup both sides can be SSL server or SSL client. When VSE is the server (receiver), the certificate contained in the CERT member is sent to the client (sender). When Windows is the server, the user certificate in the key database is sent to VSE.

5.1 Creating the keys and certificates

Start the Keyman/VSE tool and create a new RSA key pair.

🛃 К	eyman/\	/SE - C:\	vkeyn	nan411\Keyrin	g.JKS				-OX
File	Options	Actions	Help						
					<u>R</u>		🧼 🄶		
	Alias			Certificate Item	Gene	Longth	tev pair	VSE User	Valid
					Cont		ing y pair		
J								VSEP09: 9.152.8	35.115

Specify the key length of the RSA key pair. Note that you would need a PCIXCC or Crypto Express2 card for processing 2048 bit keys on VSE.

Specify Key L	ength For New RSA Key	×
Alias	vseKey	
Key length	1024	
	Generate key Close	Help

Now create a new self-signed root certificate.

	Keyman/\	SE - C:\vkey	/man411\Keyrin	g.JKS *				
File	Options	Actions Hel	p					
]						🔶 🔶 👘		
	Alias		Certificate Item	1	Longth	Certificate	VSE User	Valid
A	vseKey	1024-bit R	SA Key Pair		1024	Ney Pair	-	-
J							VSEP09: 9.152.8	85.115

Specify some personal information to identify this ROOT certificate.

Organizational Unit	IBM Germany						
Organization	IBM						
City/Location	Boeblingen						
State/Province	Baden-Wuerttemberg						
Country	DE Germany (DE)						
e-mail	zvse@de.ibm.com						
Expires	2009-10-30 1 year						
Key length	1024						
Alias	rootCert						

Press Generate cert to create the certificate.

The next step is now to create a certificate request for the server certificate. This request will later be signed by the already created ROOT certificate, which creates the VSE server certificate. Now right-click the RSA key and select **Create VSE server cert request**.

4	Keyman/\	/SE - C:\vkeyman411\Keyr	ing.JKS *				
File	Options	Actions Help					
			8 🔳		> 🔶 👘		
	Alias	Certificate Ite	m	Length	Туре	VSE User	Valid
*	vseKey rootCert	1024-bit RSA Key Pair z/VSE Development CA RO	OT Sett Dele Uplo	ings ete pad to VSE ate VSE server c	ert request	_	/es
╞─						VSEP09 : 9.152.8	35.115

As said above, the server certificate is created by signing the certificate request with your root certificate. In the following box enter some personal information to identify the VSE server certificate.

Personal Informatio	on for X509 User Certificate	×							
Common name	VSE Server Certificate								
Organizational unit	Development								
Organization	IBM								
City/Location	Boeblingen	1							
State/Province	Baden-Wuerttemberg								
Country	DE Germany (DE)]							
e-mail	zvse@de.ibm.com								
Hint: in some cases (e.g. secure Telnet with the Attachmate emulator) it is required that the IP address of your VSE system is specified as the Common Name (currently: 9.152.85.115).									
G	ienerate Close View output Help								

Press **Generate** to create the certificate request.

4	Keyman/VSI	E - C:\vkeyman411\Keyring.	JKS *				_ 🗆 🗙
File	Options A	ctions Help					
			1		🧼 🔶 👘		
	Alias	Certificate Item		Length	Туре	VSE User	Valid
A	vseKey	1024-bit RSA Key Pair		1024	Key Pair	-	-
-	rootCert	z/VSE Development CA ROOT		1024	ROOT	-	Yes
	-	- 1024-bit Certificate Request		gs e	juest		-
			Expor	t text form t binary form.			
			Copy	to clipboard		VSEP09: 9.152	.85.115

The next step is to copy the certificate request to the clipboard. Right-click the certificate request and select **Copy to clipboard**.

🛃 Keyman/VSE	- C:\vkeyman411\Keyring.J	KS *			
File Options Ad	tions Help				
		8 🔳 🖬 📋	۰ 🔶		
Alias	Certificate Item	Length	Туре	VSE User	Valid
🐴 vseKey	1024-bit RSA Key Pair	1024	Key Pair		
<pre>rootCert 2 - </pre>	z/VSE Development CA ROOT 1024-bit Certificate Request	Settings Delete Export text form Export binary form. Copy to clipboard Upload to VSE Create VSE certifica Create VSE cert via Create user certifica	ate) CIALCREQ ate		/es
		Sign certificate requ	uest	P09 : 9.152.8	35.115

Now right-click the ROOT certificate and select **Sign certificate request**. Then paste the clipboard content into the text area of the next box as shown below.

ign Certifica	ate Request		×
AQEFAAOI WZnXRSxi CdoO4q6I AwEAAaAJ H+MJzAmJ qSwUgGB: PEPnya7V ENI	3jQAwgYkCgYEAzL+T 14qHhc11FVAT9MMYq 2GqgvDyDGTeJDviIa MAOGCSqGSIb3DQEB KmdcCEC8PgYQCcN/8 zsZA4GsaRjF812TMf /3W18 D NEW CERTIFICATE	61xLShmVR9Wd8PV/ nH2a/RCwcy5dmzm0 W+wF329atsUt4WVp BQUAA4GBAAdzM/k5 a1QfakFJx4KkU40N Q0ipjpEpKXx2aDOB REQUEST	2RR/D 98PwZ asRnc DWq9Q 11LFaI eMObf
4	2242.0.4		<u> </u>
=xpires Alias	vseCert	5 years	<u> </u>
Paste the t area (Shift selected RO	ext form of your certificate +Insert or Ctrl+V). The requ DOT certificate.	request into the above tex uest will be signed with the	ĸt
	Gene	rate cert Close	Help

Press Generate cert to create the VSE server certificate. The certificate request can be deleted now.

Options	Actions Help				
			🔶 🔶		
Alias	Certificate Item	Length	Туре	VSE User	Valid
vseKey	1024-bit RSA Key Pair	1024	Key Pair	•	-
rootCert	z/VSE Development CA ROOT	1024	ROOT	-	Yes
vseCert	VSE Server Certificate	1024	User	-	Yes
				VSED09 - 9 153	95 115

You should now have these three items in Keyman/VSE. The next step is uploading these three items to VSE.

5.1.1 Uploading the certificate items to VSE

In the Keyman/VSE main window open the VSE Host properties window and enter a name for the VSE library members that are uploaded. This is the name of the VSE keyring.

Name	VSEP09	*	New
IP Address	9.152.85.115		Add
Port	2893		Delete
VSE User	ЈЗСН		Change
VSE Job Class	A		
VSE Password	*****	****	****
VSE Crypto Library	CRYPTO	. KEYR	ING
Cert. Member Name (MQVSE	. PRVK	/ CERT / ROOT
Cert. Mapping Member	BSSDCUID	. MAPP	ING
TCP/IP Library	PRD1	. BASE	
TCP/IP System ID	00		

Press OK to return to the Keyman/VSE main window.

Now upload all three items to VSE by right-clicking an item and selecting Upload to VSE.

Г

🛃 Keyman/V	SE - C:\vkeyman411\Keyring.J	KS *			_0
File Options	Actions Help				
		💫 🔳 📼 📋	> 🔶 👘		
Alias	Certificate Item	Length	Туре	VSE User	Valid
🔧 vseKey	1024-bit RSA Key Pair	1004	Kau Dain	ŀ	
rootCert	z/VSE Development CA ROOT	Settings		1	Yes
vseCert	VSE Server Certificate	Delete		1	Yes
		Upload to VSE			
		Create VSE server ce	rt request	EP09 : 9.152.8	85.115

Repeat this step for all three items in the list. Finally, there are three library members cataloged in the VSE keyring library. Don't close the Keyman/VSE tool for now.

DIRECTORY DISPLAY	SUBLIB	RARY=CRYP	TO.KEYRING	DATE: 2008-11-05 TIME: 11:38
MEMBER NAME TYPE	CREATION DATE	LAST UPDATE	BYTES RECORDS	LIBR CONT SVA A- R- BLKS STOR ELIG MODE
MQVSE CERT	08-11-05		707 B	1 YES
MQVSE PRVK	08-11-05		2048 B	3 YES
MQVSE ROOT	08-11-05		710 B	1 YES
L113I RETURN CODE	OF LISTDI	RIS O		

5.1.2 Specifying the correct certificate label for MQ

After uploading the keyring members to VSE, the two certificates must be stored in a local keyring file. This file will later be imported into the MQ key database.

Before storing the two certificates in the local keyring file, you have to change the certificate label of the VSE certificate. WebSphere MQ requires the following naming convention:

• ibmwebspheremq in lowercase letters, concatenated with the MQ queue manager name, also in lowercase letters.

In our example the label is therefore: ibmwebspheremqqm_bl3xghhe

In the Keyman/VSE tool open the settings box of the VSE certificate.

4	Keyman/V	SE - C:\vkeyman411\Keyring	JKS *				
File	Options	Actions Help					
] [1		۰ ا		
	Alias	Certificate Item		Length	Туре	VSE User	Valid
R	vseKey	1024-bit RSA Key Pair		1024	Key Pair	-	-
	rootCert	z/VSE Development CA ROOT		1024	ROOT	-	Yes
	vseCert	VSE Server Certificate	Settings		User	•	Yes
			Delete	~			
			Export tex	d form		VSEP09 : 9.15	2.85.115

Change the label to the applicable string in your installation.

Issuer name	: cn=z/VSE Development CA ROOT, ou=IBM Germa
Subject name	: cn=VSE Server Certificate, ou=Development,
Type	: public
Serial no.	: 1912370702
Key algorithm	: RSA 1024-bit
e-mail	: zvse@de.ibm.com
Has public key	: Yes
Has private key	: No
112	· · · · · · ·
Certificate Alias	xghhe

Press Change.

You can now delete the RSA key and save the keyring file.

🛃 Keyman/VSE - C:\vkeyman4	11\Keyring.PFX			- 🗆 ×
File Options Actions Help				
	🖻 <u>८</u> 🔳 🗔 1	>		
Save Alias	Certificate Item	Length	Туре	VSE Us
rootCert	z/VSE Development CA ROOT	1024	ROOT	-
ibmwebspheremqqm_bl3xghhe	VSE Server Certificate	1024	User	-
4				Þ
		VSEF	9.152.85	.115

On the next box select PFX and enter a keyring file password.

e Name	Keyring.PFX	
e Type: C JKS (PFX	Browse
yring File Password	*****	
etype the password	*****	
FX-specific options (Op	otional)	
Encryption of public i	tems	No encryption
Encryption of private	e items	No encryption
Password protection		1 2000
Use internal encrypti	on only with an IBM	Java, if you plan to use this PFX file
for SSL with the Java	a-based connector.	Press help for more information.

Press OK.

In the next sections this keyring file will be imported into the MQ key database.

Note: it is vital to import the complete PFX file into the key database to not loose the private key of the self-signed root certificate.

5.1.3 Creating an MQ key database

In the MQ Explorer, select **IBM WebSphere MQ** – **Manage SSL Certificates**. The IBM Key Management GUI opens.



In the IBM Key Management GUI, select **Key Database File** – **New**. On the next box enter the file name and location of the database and click OK.

New		×
Key database type	CMS 💌	
File Name:	key.kdb	Browse
Location:	C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM_BL3XGHHE\ssl\	
	OK Cancel	

Select Key Database File - Change Password to specify the key database password.

Change Password	×
New Password:	*****
Confirm New Password:	****
Set expiration time?	60 Days
Stash the pa	assword to a file?
Password Strength:	
	eset Cancel

Note: it is vital to create a password stash file. When opening an SSL session, MQ needs to access the key database and therefore needs the password. The stash file contains an encrypted copy of the password and is accessed by MQ at runtime. It is located in the same directory as the key repository, with the same filename, but with an .sth extension.

5.1.4 Storing the certificate items in the MQ key database

In the IBM Key Management GUI select Personal Certificates from the listbox and press the Import button.

Ľ		
	Key database information	
B-Type:	CMS key database file	
le Name:	C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM_BL3XG	3HHE\ssl\key.kdb
oken Label	:[
	Key database content	
Personal C	ertificates	▼ Receive
		Delete
		View/Edit
		Import 💦
		Recreate Reg Import
		New Colf Signad
		New Sell-Signed

On the Import Key dialogbox, select PKCS12 and browse to the previously saved keyring file.

Import Key		×
Key file type	PKCS12	
File Name:	Keyring.pfx	Browse
Location:	C:/wkeyman411\	
	OK R Cancel	

Press OK. On the next box enter your keyring file password.

Password	l to open the	source	kev datab	ase:	*****		
						1	

On the next box you should see the two certificates previously created with Keyman/VSE. The VSE certificate should display the required label ibmwebspheremq concatenated with your queue manager name.

Change Labels	×
Would you like to change any of these labels before completing the import process? Select a label to change:	OK Cancel
rootcert ibmwebspheremqqm_bl3xghhe	
Enter a new label: Apply	

Press OK.

The two certificates are now imported into the MQ key database.

IBM Key Mai	nagement - [C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM_B	L3XGHHE\ssl\key.kdb]
Key Database	<u>file C</u> reate <u>V</u> iew <u>H</u> elp	[
🗅 🚄		
	Key database information	
DB-Type:	CMS key database file	
File Name:	C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM_BL3XGHHE\ssl\	key.kdb
Token Label:		
	Key database content	
Personal Ce	rtificates 💌	Receive
* rootcert	heremaam bl3xabhe	Delete
	in and the Two Brits	View/Edit
		Export/Import
		Recreate Request
		New Self-Signed
		Extract Certificate
he requested	action has successfully completed!	

You can now close the IBM Key Management GUI.

5.2 SSL/TLS configuration on VSE

You have to configure SSL in the queue manager definition and in the MQ channels. MQ queues are not affected by SSL.

5.2.1 Configuring the queue manager for SSL/TLS

Enter the VSE keyring library and the name of the keyring members.

12/16/2008 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCTCS 11:33:40 Global System Definition CIC1 MQWMSYS Communications Settings A000 TCP/IP settings Batch Interface settings
 TCP/IP listener port:
 01414
 Batch Int. identifier:
 MQBISERV

 Licensed clients
 .
 :00000
 Batch Int. auto-start:
 Y
 Adopt MCA : N Channel Auto-Definition Adopt MCA Check . . : N Auto-definition . . : Y SSL parameters Auto-definition exit : Key-ring sublibrary : CRYPTO.KEYRING Key-ring member . . : MQVSE PCF parameters System command queue : SYSTEM.ADMIN.COMMAND.QUEUE System reply queue . : SYSTEM.ADMIN.REPLY.QUEUE Cmd Server auto-start: N $\ensuremath{\texttt{Cmd}}$ Server convert . : N Cmd Server DLQ store : N PF2=Queue Manager details PF3=Quit PF4/Enter=Read PF6=Update

5.2.2 Checking for available SSL/TLS cipher suites

Table 2 shows the list of currently supported SSL cipher suites on VSE.

Hex Code	VSE Cipher Suite Name	Encryption strength
01	SSL_RSA_WITH_NULL_MD5	None
02	SSL_RSA_WITH_NULL_SHA	None
08	SSL_RSA_EXPORT_WITH_DES40_CBC_SHA	40 bits
09	SSL_RSA_WITH_DES_CBC_SHA	56 bits
0A	SSL_RSA_WITH_3DES_EDE_CBC_SHA	112 bits
2F	TLS_RSA_WITH_AES_128_CBC_SHA	128 bits
35	TLS_RSA_WITH_AES_256_CBC_SHA	256 bits

Table 2: Supported SSL cipher suites on VSE

Notes:

• When using 2048-bit or 4096-bit RSA keys you need a Crypto Express card.

To make sure SSL is licensed on your VSE system, issue a Q PROD,ALL to the TCP/IP partition to see your current TCP/IP license keys.

```
100 g prod,all
F7 0097 IPN253I << TCP/IP Product Keys >>
F7 0097 IPN885I CPU ID: 0572AF (057216)
F7 0097 IPN886I Stack..... (IBM)
F7 0097 IPN886I Base..... included in Stack
F7 0097 IPN886I Telnet..... included in Stack
F7 0097 IPN886I FTP..... included in Stack
F7 0097 IPN886I LPR..... included in Stack
F7 0097 IPN886I HTTP..... included in Stack
F7 0097 IPN886I CAF..... Not licensed
F7 0097 IPN886I NFS..... Not licensed
F7 0097 IPN886I SSL..... included in Stack <-- SSL must be included.
F7 0097 IPN886I GPS..... Not licensed
F7 0097 IPN886I SecureFTP... included in Stack
F7 0097 IPN886I SeeVSE..... Not licensed
F7 0097 IPN886I HFS..... Not licensed
F7 0097 IPN886I eMail..... Not licensed
F7 0097 IPN886I AES..... Not licensed
```

Note: At the time of writing this document, the output of the Q PROD,ALL command is misleading, because AES is included in the SSL component, but displayed separately as not licensed. If SSL is licensed, also AES is available.

In this test setup the following combinations of cipher suites on VSE and Windows worked.

VSE cipher suite hex code	WebSphere MQ 7.0 cipher suite name	Encryption strength
01	NULL_MD5	None
02	NULL_SHA	None
09	DES_SHA_EXPORT	56 bits
0A	TRIPLE_DES_SHA_US	112 bits

Note: The two AES cipher suites did not work for some unknown reason. An update to this document will describe how to use AES when this problem is solved.

I could not find any matching cipher suite in the WebSphere MQ Explorer for the VSE cipher specs 08 and 62. Also note that the names of the cipher suites in WebSphere MQ are different from the names used on VSE. Table 3 shows the combinations that must be used in the WebSphere MQ 7.0 Explorer.

5.2.3 Configuring the channels for SSL/TLS

To define the SSL parameters for the sender channel press **PF10** at the "Maintain Channel Record" screen (MQMT option 1.3).

```
11/04/2008
                  IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                       DBDCCTCS
15:13:04
                            Channel SSL Parameters
                                                                       CIC1
MOWMCHN
                                                                       A000
     Channel Name: VSE.TO.WIN
                                           Type: S
     SSL Cipher Specification. : OA
                                           (2 character code)
     SSL Client Authentication : O
                                           (Required or Optional)
     SSL Peer Attributes:
                                                                          <
     >
     >
                                                                          <
     >
                                                                          <
     >
SSL channel parameters displayed.
F2=Return PF3=Quit PF4=Read F6=Update
```

The definition for the receiver channel is identical. Now you should restart MQ on VSE.

5.3 SSL/TLS configuration on Windows

At this point we assume that you already have setup the MQ key database as described in section 5.1.3 on page 41.

5.3.1 Configuring the queue manager for SSL/TLS

Select your Windows queue manager and display its properties. Select tab SSL.

General	551				
Extended					
Exits	SSL key repository				
Cluster	Certificates used by this queue manager are held in a key repository				
Repository	Key separatery Culture Files/TRM/WebCobers MO/separatoM BI 2VCHHE/sell/sey				
Communication	Key repository: [C: Program Hies (LDM (Websphere MQ)(Imgrs (QM_DLSXGHHE)(SS) (Key				
Events	C Authentication information				
SSL	Check certificates received by this queue manager against Certification Revocation Lists				
Statistics					
Online monitorini	CRL namelist:				
Statistics monito	- Cruntegraphic barduara				
Accounting moni	Cryptographic hardware				
Log	No encryption hardware specified				
XA resource mar					
Chappels	Configure				
TCP					
106.2	SSL reset count: 0				
NetBIOS					
SPX	SSL FIPS required: No				
Publish/Subscribe					
1 1	Apply				

Enter the full path to the key database, including the name of the key database file without the ending .kdb.

5.3.2 Configuring the channels for SSL/TLS

vtended	SSL
CA	CipherSpec
xits	Set message security for this end of the channel
J6.2 etrv	SSL CipherSpec: TRIPLE_DES_SHA_US
SL tatistics	Secure Hash Algorithm, 168-bit Triple DES encryption Accept only certificates with Distinguished Names matching these values:
	Authentication of parties initiation connections Required
	Page of Address (Integer g contraction)

Display the properties of the sender channel and select tab SSL.

Select a cipher suite that is also supported by VSE and press **OK**. Refer to Table 3 on page 47 for a list of valid combinations of cipher suites. Then restart the channel.

The definition for the receiver channel is identical.

6 Implementing SSL/TLS client authentication

SSL client authentication is always configured for the receiver channel, which is the SSL server.

6.1 Configuring for client authentication on VSE

When VSE is the receiver (server), SSL client authentication is defined for the receiver channel by changing parameter "SSL Client Authentication" to R (Required). On Windows, the sender channel can be left unchanged.

SSL client authentication means that the client authenticates itself by sending a client certificate to the SSL server. In this case, the client certificate is given by the user certificate with label ibmwebspheremqqm_bl3xghhe in the key database. No additional setup is necessary.

6.2 Configuring for client authentication on Windows

When Windows is the receiver (server), SSL client authentication is defined for the receiver channel by selecting "Required" from the drop-down listbox "Authentication of parties initiating connections". On VSE, the sender channel can be left unchanged.

In this case, the client certificate is given by the CERT member in the VSE keyring library. No additional setup is necessary.

7 Using SSL/TLS peer attributes

When creating a certificate, you have to specify some personal information, which becomes part of the certificate as the "subject name". When signing the certificate, the name of the signer becomes part of the certificate as the "issuer name". These "names" are called "Distinguished Names" and are strings consisting of a series of keyword/value pairs.

Supported keywords are:

CN	Common name
С	Country
ST	State or province
L	Locality
0	Organization
OU	Organization Unit
SERIAL	Serial number

The SSL peer attributes field in the channel definition is a 256-character case-sensitive field that can be used to ensure a remote partner's certificate contains identifiable attributes. This requires that the remote partner provided a certificate during SSL initial negotiation. If the remote partner fails to provide a certificate, then any check against the SSL Peer Attributes field will fail, and the channel will be terminated. The SSL Peer Attributes field expects a value (if any) in the form:

key=value, key=value, etc.

where key is one of the supported keywords (see above). For more information about specifying peer attributes, including the use of wildcards and white space characters, refer to the "MQSeries for VSE System Management Guide, GC34-5364".

You can display the subject name of your certificates either via Keyman/VSE or using the IBM Key Management tool.

In Keyman/VSE just double-click a certificate to display its properties. You can directly view the certificates on VSE by clicking on the Show keyring library toolbar button.

🕌 Keyman/VSE - C:\vkeyman411\Keyring.PFX	- 🗆 🗙
File Options Actions Help	
Alias Certifica Show keyring library Length Type VSE User	Valid
	E 11E
V5EP09 : 9.152.8	5.115

In the next window, double-click a certificate to view its properties.

Member Na	me Size	Туре	Creation	Last Upd
MQVSE	70	7 CERT	05.11.2008 - 11:38:31	
MQVSE VS	204	8 PRVK	05.11.2008 - 11:38:15	
MQVSE	71	0 ROOT	05.11.2008 - 11:38:24	
1				

The next box shows the certificate properties.

Issuer name	: cn=zVSE Development self-signed ROOT, ou	1=D_
Subject name	: cn=VSE Server Certificate, ou=Development	nt,
Туре	: public	
Serial no.	: 1814226374	
Key algorithm	: RSA 1024-bit	
e-mail	: zvse@de.ibm.com	
Has public key	: Yes	
Has private key	: No	
4		Ì
Certificate Alias		

The subject name string shows the attributes that can be specified on the VSE side as peer attributes. The next sections show how to specify peer attributes on the VSE side.

7.1 Example 1: specifying matching peer attributes

In a first test let's specify some peer attributes that match with the partner's client certificate. On VSE display the properties of the receiver channel and add following peer attributes. You have to stop the channel before you can specify any peer attributes.

```
12/16/2008
                   IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                          DBDCCTCS
11:35:17
                             Channel SSL Parameters
                                                                          CIC1
MQWMCHN
                                                                          A000
     Channel Name: WIN.TO.VSE
                                             Type: R
     SSL Cipher Specification. : \mathbf{0}\mathbf{A}
                                             (2 character code)
     SSL Client Authentication : R
                                             (Required or Optional)
     SSL Peer Attributes:
     > C=DE,O=IBM
                                                                              <
     >
                                                                             <
                                                                             <
     >
     >
Channel record updated OK.
F2=Return PF3=Quit PF4=Read F6=Update
```

With this setup, the SSL connection can be established.

7.2 Example 2: specifying peer attributes which do not match

Now let's enter some peer attributes on Windows which do not match with the certificate sent from VSE. Display the properties of the receiver channel and change the SSL peer properties as shown in the following picture.

General	SSL		
Extended MCA Exits Message retry SSL Statistics	CipherSpec Set message security for this end of the channel SSL CipherSpec: TRIPLE_DES_SHA_US Secure Hash Algorithm, 168-bit Triple DES end	ryption matching these values:	<u> </u>
	C=DE,O="SOME OTHER COMPANY"		
	Authentication of parties initiating connections:	Required	_
			Apply
•			OK Cancel

In this case the connection cannot be established. The SYSTEM.LOG shows:

```
Receiver responded with error
CHANNEL ID: VSE.TO.WIN
SSL Peer Name mismatch
NEGOTIATIONS FAILED TO COMPLETE.
```

8 Configuring a remote queue manager

Configuring a VSE queue manager remotely is a new feature with WMQ for z/VSE V3.0. The process is described in the WebSphere MQ for z/VSE V3.0 System Management Guide, chapter 4.

Additional software requirements are:

- WebSphere MQ Explorer V6.0.2.6, or later
- WebSphere MQ Explorer V7.0.0.1, or later

Updates to the WebSphere MQ Explorer are available at

http://www.ibm.com/software/integration/wmq/support/

8.1 What you can do remotely

Using the remote configuration functionality of the MQ Explorer, you can

• Display and change queue manager attributes

- Display VSE queues, channels, and namelists
- Display and change the queue, channel and namelist properties
- Put test messages on both sides, Windows and VSE
- Configure the channels for SSL

You cannot

• Start the WebSphere MQ environment on VSE. This must be done with MQMT on VSE.

The following sections describe the additional steps needed to enable remote configuration.

8.2 Preparing the VSE side for PCF

Remote administration of WebSphere MQ for z/VSE is done using Programmable Command Format (PCF) messages. Therefore, you have to define and start a PCF command server.

```
12/16/2008
                 IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                    DBDCCICS
12.10.45
                          Global System Definition
                                                                    CTC1
MQWMSYS
                           Communications Settings
                                                                    A000
    TCP/IP settings
                                           Batch Interface settings
   TCP/IP listener port : 01414
                                           Batch Int. identifier: MQBISERV
   Licensed clients . . : 00000
                                           Batch Int. auto-start: Y
    Adopt MCA . . . . . . N
   Adopt MCA Check . . : N
                                           Channel Auto-Definition
                                           Auto-definition . . : N
    SSL parameters
                                           Auto-definition exit :
    Key-ring sublibrary : CRYPTO.KEYRING
    Key-ring member . . : MQVSE
    PCF parameters
    System command queue : SYSTEM.ADMIN.COMMAND.QUEUE
    System reply queue . : SYSTEM.ADMIN.REPLY.QUEUE
    Cmd Server auto-start: Y
    Cmd Server convert . : Y
    Cmd Server DLQ store : N
Record updated OK.
PF2=Queue Manager details PF3=Quit PF4/Enter=Read
                                                      PF6=Update
```

Specify Y for Cmd Server auto-start and Cmd server convert. Channel auto-definition or an auto-definition exit is not required for MQ Explorer. By default MQ Explorer uses the SYSTEM.ADMIN.SVRCONN channel which is a default definition, so auto-definition is not required. However, using auto-definition would pose a security risk and an exit should be used in this case.

When restarting WebSphere MQ on VSE, the following line should appear in the SYSTEM.LOG or on the console if optional logging to console is enabled.

MQI0200I - MQI007000I PCF command server started

Now you have to define some additional queues. You can use the MQJINSG.Z sample MQSC job to create these queues, but you must define the system command and reply queues (explained above) before you can run the job.

8.3 Defining additional queues

Following default queues must be defined on the VSE side before you can use the MQ Explorer to remotely administer your z/VSE queue manager. The default names for these queues and their default CICS filenames are:

SYSTEM.DEFAULT.ALIAS.QUEUE n/a

SYSTEM.DEFAULT.LOCAL.QUEUEMQFDEFSSYSTEM.DEFAULT.MODEL.QUEUEMQFDEFSSYSTEM.DEFAULT.REMOTE.QUEUEn/aSYSTEM.MQEXPLORER.REPLY.MODELMQFADMN

Refer to section Open of file MQFADMN failed on page 64 for how to define the MQFADMN file.

8.4 Defining the MQ Explorer reply model queue

The SYSTEM.MQEXPLORER.REPLY.MODEL queue should be defined as a temporary queue so that the queue is deleted when the queue is closed. Defining it as a dynamic queue would lead to the VSAM file defined for the model queue filling up. In the test setup the reply model queue has been first defined as dynamic, which caused the problem described in section 9.5 on page 64.

The size of the VSAM file that holds the MQ Explorer reply queue has to be large enough to hold all the reply messages for the duration of the MQ Explorer session. A temporary dynamic queue is not deleted until the queue handle is closed i.e. when MQ Explorer disconnects from the z/VSE system. In WebSphere MQ for z/VSE, messages stay in the VSAM file marked as "Deleted" after they are gotten from the queue. The message records are physically deleted only when the queue is deleted or reorganized.

To change the queue definition, either use the queue maintenance transaction MQMQ or MQMT (options 1.2) and edit the SYSTEM.MQEXPLORER.REPLY.MODEL queue. The Def. type sets the model's definition type to T or P.

```
02/26/2009
                           IBM WebSphere MQ for z/VSE Version 3.0.0
                                                                                                        DBDCCICS
08.35.48
                                    Oueue Extended Definition
                                                                                                        CTC1
MOWMOUE
                                                                                                        A000
Object Name: SYSTEM.MQEXPLORER.REPLY.MODEL
General
                                Maximums
                                                                          Events
         . . : Model Max. Q depth . : 00100000 Service int. event: N
Type
Tile name: NQFADMNMax. msg length: 00002048Service interval: 00000000Usage: NMax. Q users: 00000100Max. depth event : NShareable: YMax. gbl locks: 00001000High depth event : NDef. type: TMax. lcl locks: 00001000High depth limit : 000
                                                                         Low depth event . : N
Low depth limit . : 000
Triggering
TriggeringEnabled . : NTransaction id.:Type . . :Program id . . :Max. starts: 0001Terminal id . :Restart . : NChannel name . :
User data :
Requested record displayed.
PF2=Return PF3=Quit PF4/Enter=Read PF5=Add PF6=Update
                  PF9=List PF10=Oueue
```

The picture in section 8.7 on page 58 still shows the wrong definition.

8.5 Defining a server-connection channel

In our setup we defined a server-connection channel, by default named SYSTEM.ADMIN.SVRCONN. However, the MQ Explorer can be configured to use any channel name which should map to an SVRCONN channel on VSE, or you can use channel auto-definition.

02/20/2009 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCTCS 11:57:56 Channel Record DISPLAY CIC1 MQWMCHN A000 Channel : SYSTEM.ADMIN.SVRCONN Desc. . : MQ Explorer server-connection channel Protocol: T (L/T) Type : C (S=Snd/R=Rcv/V=Srv/Q=Req/C=svrConn) Enabled : Y Sender/Server Remote TCP/IP port . . . : 00000 Short/Long retry count . : 00000000 Get retry number : 00000000 Short retry interval . . : 000000000 Get retry delay (secs) . . : 00000000 Long retry interval . . : 000000000 Batch interval : 00000000 Convert msgs(Y/N). : N Transmission queue name. . : TP name. . : Sender/Receiver/Server/Requester Connection : Max Messages per Batch . . : 000001 Message Sequence Wrap . . : 999999999 Max Message Size : 0018000 Dead letter store(Y/N) . : N Split Msg(Y/N) N Max Transmission Size . . : 065535 Max TCP/IP Wait : 000000 Channel record displayed. F2=Return PF3=Quit PF4=Read PF5=Add PF6=Upd PF9=List PF10=SSL PF11=Ext PF12=Del

The VSE side is now ready. We can now add the VSE queue manager as remote queue manager in MQ Explorer.

8.6 Defining a remote queue manager

Before you can define a remote queue manager using the MQ Explorer, MQ must be started on VSE. To define a remote queue manager, select **Queue Managers – Add remote Queue Manager**.



In the next box enter the name of the VSE queue manager.

🕀 Add Queue Manage		- 🗆 🗵
Select the queue m Identify the queue mana	anager and connection method ger to add and choose the connection method to use	A
Queue manager name:	QMGR.VSE	
How do you want WMQ E Connect directly WMQ Explorer crea	explorer to connect to this queue manager?	
C Connect using an inte WMQ Explorer uses (Recommended wh	rmediate queue manager s an existing connection from another queue manager en new connections are restricted)	
More information.	•••	
	< Back Next > Finish	Cancel

Press Next.

In the following box enter the IP address or host name of your VSE system.

🕀 Add Queue Manager		_ _ _ _ _
Specify new connection details Provide details of the connection you we	ant WMQ Explorer to set up	
Queue manager name: QMGR.V	ε	
Specify connection details		
C Use dient channel definition table		
Host name or ID address	0 152 85 120	
Port number:	1414	
Server-connection channel:	SYSTEM.ADMIN.SVRCONN	
Autoreconnect Automatically refresh information sho Refresh interval (seconds): 300	own for this queue manager	
	< Back Mext >	Einish Cancel

Press Finish.

The MQ Explorer should now display the VSE queue manager with its queues and channels.

Below picture shows the VSE queues.

Note: the picture still shows the MQ Explorer reply model queue defined as permanent/dynamic, which caused some problems. Refer to section Defining the MQ Explorer reply model queue on page 54.

WebSphere MQ Explorer - N 🛛 🗖	💋 WebSphere MQ Explorer - Content 🕄			4 1 🖷 🍪 🤇	7 🗆
	Queues				
IBM WebSphere MQ Geue Managers	Filter: [Not Available]				4
QM_BL3XGHHE CMCP VSE on '9 152 85 120(14	🛆 Queue name	Queue type	Definition type	Open input count	Op
	AMQ.MQEXPLORER.090212161231859	Local	Permanent dynamic		
E C Advanced	AMQ.MQEXPLORER.090213085119322	Local	Permanent dynamic		
- Oueue Manager Clusters	AMQ.MQEXPLORER.090213102142863	Local	Permanent dynamic		
- MS Administered Objects	AMQ.MQEXPLORER.090213121419197	Local	Permanent dynamic		
Carbon Service Definition Repositories	AMQ.MQEXPLORER.090213122357201	Local	Permanent dynamic		
	AMQ.MQEXPLORER.1311002148	Local	Permanent dynamic		
	AMQ.MQEXPLORER. 1382175330	Local	Permanent dynamic		
	AMQ.MQEXPLORER. 1414419534	Local	Permanent dynamic		
	AMQ.MQEXPLORER. 1570 135446	Local	Permanent dynamic		
	AMQ.MQEXPLORER. 1878290420	Local	Permanent dynamic		
	VSE42	Local	Predefined		
	U WINXP	Remote	Predefined		
	KMT.WINXP	Local	Predefined		
					•
	Scheme: Default for Queues - Distributed				
1	Last updated: 13:27:55				

Below picture shows the VSE channels.

WebSphere MQ Explorer - N 🛛 🗖	WebSphere MQ Explore	r - Content 🕄			\$1 🍪	
	Channels					
UBM WebSphere MQ	Filter: [Not Available]					~
OMCR VSE on 10 152 SE 120/14	Channel name	Channel type	Overall channel status	Conn name	Xmit protocol	Trans
Chever	VSE.TO.WIN	Sender	Inactive	9.152.222.125	TCP	XMT.
Advanced	Ø [₽] WIN.TO.VSE	Receiver	Inactive		TCP	
- Channels - Channels						
- 😂 Queue Manager Clusters						
JMS Administered Objects Sequine Definition Dependingles						
Service Definition Repositories						
						•
	Scheme: Default for Cha	innels - Distributed				
	Last undated: 13:28:55			- 7 9		

When MQ on VSE is stopped, the remote queue manager gets automatically disconnected. After restarting MQ on VSE, you can reconnect the remote queue manager. No other actions are possible until the queue manager is connected.

8.7 Exchanging test messages

You can now exchange test messages between VSE and Windows via the MQ Explorer. The following example shows how to send a test message from VSE to Windows.



Enter some message text in the next box.

🖬 Put test message	<u> </u>
Put message to: Queue manager:	
QMGR.VSE	
Queue:	
WINXP	
Message data:	
A message from VSE to Windows via remote config	
	•
Putmessage	Close

Press Put message to send the message from VSE to Windows via remote configuration in the MQ Explorer.

WebSphere MQ Explorer - 🛛 🗖 🗍	WebSphere MQ E	xplorer - Content 🕄			±1 1%e	0 v -
0 + → 🛷 🍸	Queues					
IBM WebSphere MQ Deve Managers	Filter: Default for	Queues				~
E-QU QM_BL3XGHHE	Queue name		Queue type	Definition type	Open input count	Open outpu
Queues	tions		Local	Predefined	0	0
C Suberintione			Local	Predefined	0	0
E C Advanced			Local	Predefined	0	0
- Channels			Local	Predefined	0	0
Channels			Remote			
- Calence connections	MINXP Compare with.	Compare with		Predefined	0	0
Services				Predefined	1	1
- Composition Process Definitions		Status Delete				
Authentication Inform		Clear Messages				
- Coucues		Browse Messages				
E 😂 Advanced		Create JMS Queue	e 15			
Channels		Object Authorities				
Queue Manager Clusters	•	Properties				•
Service Definition Repositories	Scheme: Default f	or Queues - Distribute	ed			Q
	Last updated: 11:1	8:37				

The next box shows that the message arrived in the WINXP queue on Windows.

_	User identifier	Put application name	Format	Data length	Message data
3:23 AM	jsch	DBDCCICSMQPX	MQSTR	47	A message from VSE to Windows via remote co
•					
Scheme:	Default for Mes	sages			
Last upda	ated: 11:19:01				
ast upd	ated: 11:19:01				

Press **Close** to leave the box.

8.8 Defining SSL/TLS

In previous chapters we discussed the problem of finding the right SSL cipher suites, so that the defined hex code on VSE matches with the defined cipher suite on Windows. Refer to Table 3 on page 47.

With the remote configuration via the MQ Explorer, this is now easy, because you now just define the same cipher suite name on both sides and the MQ Explorer translates the cipher suite name into the hex code used on the VSE side.

8.8.1 Defining SSL/TLS for the Windows side

First let's check again that the Windows queue manager has the right definitions.

Display the Windows queue manager properties and select the SSL tab.

General	SSL
Extended	
Exits	SSL key repository
Cluster	Certificates used by this queue manager are held in a key repository
Repository Communication	Key repository: C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM_BL3XGHHE\ssl\key2
Events	- Authantication information
SSL	
Statistics	Check certificates received by this queue manager against Certification Revocation Lists
Online monitoring Statistics monitoring	CRL namelist:
Accounting monitoring	Cryptographic hardware
.og	No encryption hardware specified
(A resource managers	
Installable services	Configure
Channels	
TCP	
.06.2	SSL reset count: 0
VEIDIOS	SSL FIPS required: No
Dublich /Subccribe	
ubisi ij Subscribe	
	Apply

Verify that the displayed information is correct and press OK.

Now let's define SSL for the sender channel. Before doing so, the sender channel must be stopped. The new SSL properties will become active when restarting the channel.

Then display the sender channel properties window and select the SSL tab. Select one of the SSL cipher suites that can be used together with VSE, refer to Table 3 on page 47.

General Extended MCA	SSL CinherSpec	
Exits	Set message security for this end of the channel	
Retry	SSL CipherSpec: TRIPLE_DES_SHA_US	
SSL Statistics	Secure Hash Algorithm, 168-bit Triple DES encryption	
0.000000		
	Accept only certificates with Distinguished Names matching these val Authentication of parties initiating connections Required	ues:
	Accept only certificates with Distinguished Names matching these val	ues:

Press OK.

Don't restart the sender channel at this point, because we first have to define SSL for the VSE receiver channel.

8.8.2 Defining SSL/TLS for the VSE side

Check that the VSE queue manager has the right definitions. Display the VSE queue manager properties and select the SSL tab. Without remote configuration this step would have to be done on VSE using the MQMT transaction.

General Extended	SSL		
Communication	Key-ring library:	CRYPTO.KEYRING	
Events			
SSL	Key-ring member:	MQ02	
Statistics			
Command server			
Log			
Trace			
Channels			
TCP			
Batch Interface			Apply

Press OK.

Now let's define the SSL cipher suite for the VSE receiver channel. Display the receiver channel properties window and select the SSL tab.

Extended	SSL	
Exits	SSL CipherSpec:	TRIPLE DES SHA US
LU6.2		
Retry		
SSL	Accept only certificates with Distinguished Names matching these values:	
Statistics		
	Authentication of parties initiating connections:	Optional
		Analy
		Apply

Press OK.

Note: the AES-based cipher suites that do not work together with VSE (refer to Table 3 on page 47) are not displayed in the drop-down list box for selecting the SSL CipherSpec.

Just for completeness, let's now check on the VSE side, how the MQ Explorer made the definitions remotely on the VSE side.

Start the MQMT transaction and display the properties of the receiver channel.

02/19 11:43 MQWMC1	/2009 IBM WebSphere MQ for z/ :58 Channel SSL Pa HN	VSE Version 3.0.0 rameters	DBDCCICS CIC1 A000
(Channel Name: WIN.TO.VSE	Type: R	
:	SSL Cipher Specification. : OA SSL Client Authentication :	(2 character code) (Required or Optional)	
:	SSL Peer Attributes:		
	>		<
	>		<
	>		<
	>		<
SSL cl F2=Rei	nannel parameters displayed. turn PF3=Quit PF4=Read F6=Update		

MQ Explorer has correctly used the hex code of the cipher suite TRIPLE_DES_SHA_US.

You can now put a test message from Windows to VSE via SSL.

9 Troubleshooting

This chapter describes some problems encountered during the test setup.

9.1 Ciphers 2F and 35 do not work

As described in section 5.2.2 on page 46, the two AES cipher suites did not work for some unknown reason. This problem is currently unsolved and will probably ever be. Use cipher suite 0A instead although the use of Triple-DES makes you vulnerable by the SWEET32 issue. Refer to our security bulletin on http://www.ibm.com/systems/z/os/zvse/support/preventive.html#security

9.2 Message sequence number error

Symptom:

When starting the sender channel on Windows, or when trying to put a message to VSE, following messages appear on the VSE console.

MQI0200I - MQI501028W Channel re-synchronization error MQI0200I - MQI000003E Channel Message Sequence Number error

Reason:

There is a mismatch of the message sequence numbers on both ends. In our test setup this is most likely caused by the fact that we already exchanged messages between Windows and the first VSE system running MQ 2.1.2. To resolve the problem you have to reset the message sequence number on the sending end.

The problem showed up a second time after upgrading the MQ Explorer to V7.0.0.1. This time the receiver channel had to be reset.

On Windows just right-click the sender channel and perform a Reset.

File Window Help						
🔁 WebSphere MQ Explorer - Navigator 🛛 🗖	WebSphere MQ Explorer	- Content 🕅				
<u>h</u> ← ⇒ ∲ ▼	Channels					
Oueue Managers	Filter: Default for Channe	els				
E QM_BL3XGHHE	Channel name	Channel type		Overall channel status	Conn	
Queues	S_BL3XGHHE	Server-con	nection	Inactive		
- Subscriptions	TO_QM_BL3XGHHE Cluster-receive		eiver	Inactive	Conn BL3X0 9.152	BL3X0
Advanced	VSE.TO.WIN	Receiver		Inactive		
Channels	WIN.TO.VSE	Sender	Compare with		9.15	
Client Connections			Stop	p		
- Comparison Services			Res	olve		
- 🗁 Namelists			Res	et		
			Sta	tus V 🕨		

9.3 RC =2092 when sending a test message to Windows

Symptom:

When sending a test message to Windows via TST2, an rc = 2092 is issued. TST2 displays following message.

MQ ERROR: LEVEL =INIT , FUNC =OPEN , CC =0002, RC =2092****

Reason:

The USAGE parameter of the transmission queue is invalid. This error often happens, because the default USAGE when defining a local queue is set to N (normal). For the transmission queue you have to change the value to T (transmission). See section Defining the transmission queue on page 15.

9.4 Open of file MQFADMN failed

Symptom:

Following messages appear on the VSE console when trying to define the VSE queue manager as remote queue manager in MQ Explorer.

```
F2 0110 4228I FILE MQFADMN OPEN ERROR X'DC'(220) CAT=MQMCAT
(OPNRP-20) THE BUFFERS IN BLDVRP TOO SMALL OR CI SIZE TOO LARGE
F2 0109 DFHFC0964 DBDCCICS Open of file MQFADMN failed. VSAM codes - 8502,
0008,00DC
```

Reason:

The MQFADMN file is defined by job skeleton MQJQUEUE.Z with a max record size of 16000, which leads to a too large CI size of 16384. Delete the file and define it again with following values.

```
* $$ JOB JNM=MQJADMN, DISP=D, CLASS=A
* $$ LST DISP=H, CLASS=Q, PRI=3
// JOB MQJADMN DEFINE ADMN FILE
// EXEC IDCAMS, SIZE=AUTO
    DELETE (WMQZVSE.MQFADMN) CL NOERASE PURGE
       CATALOG (MQ.USER.CATALOG)
    SET MAXCC = 0
DEF
  CLUSTER (NAME (WMQZVSE.MQFADMN)
    FILE (MQFADMN)
     VOL(SYSWK2)
    RECORDS (1000 400)
     RECORDSIZE (200 8000)
     INDEXED
    KEYS(56 0 )
    SHR(2))
  DATA (NAME (WMQZVSE.MQFADMN.DATA) CISZ(4096)) -
  INDEX (NAME (WMQZVSE.MQFADMN.INDEX) CISZ(512)) -
       CATALOG (MQ.USER.CATALOG)
/*
/&
* $$ EOJ
```

The same problem showed up for file MQFDEFS. Redefining the file as shown above solved the problem.

9.5 No space available for PUT request

Symptom:

Following messages repeatedly appear on the VSE console.

MQI0200I - MQI102091E No space available for PUT request

MQI00200I - MQI007022W PCF command processor could not send response message

Reason:

In our setup we first defined the MQFADMN file with RECORDS (300 200) which caused this problem. Obviously, the number of records should be increased. Redefining the file with RECORDS (1000 400) solved the problem.

The error occurs when an inbound queue is full. There are two ways to check which queue is full:

Use transaction MQQM and page through the display looking for FULL inbound status. This will also display the VSAM file that needs to be DELETE/DEFINE.

bSphere MQ for z/VSE Versi	on 3.0.0	DBDCC	ICS	
Monitor Queues		C	IC1	
		A	000	
QUEUING SYSTEM IS ACTIVE				
FILE T INBOU	ND OUTBOUND	LR	Depth	
MQFO001 Y IDLE	IDLE	32	0	
MQFADMN N FULL	ACTIVE	0	2	
	bSphere MQ for z/VSE Version Monitor Queues QUEUING SYSTEM IS ACTIVE FILE T INBOU MQFO001 Y IDLE MQFADMN N FULL	bSphere MQ for z/VSE Version 3.0.0 Monitor Queues QUEUING SYSTEM IS ACTIVE FILE T INBOUND OUTBOUND MQFO001 Y IDLE IDLE MQFADMN N FULL ACTIVE	bSphere MQ for z/VSE Version 3.0.0 DBDCC Monitor Queues C A QUEUING SYSTEM IS ACTIVE FILE T INBOUND OUTBOUND LR MQFO001 Y IDLE IDLE 32 MQFADMN N FULL ACTIVE 0	bSphere MQ for z/VSE Version 3.0.0 DBDCCICS Monitor Queues CIC1 A000 QUEUING SYSTEM IS ACTIVE FILE T INBOUND OUTBOUND LRDepth MQF0001 Y IDLE IDLE 32 0 MQFADMN N FULL ACTIVE 0 2

A second way is to browse the SYSTEM.LOG queue. Press PF1 to display last messages and then PF5 to display previous messages until you get the MQI102091E msg. You can then either use MQMQ to display the queue details to obtain the VSAM file. If the SYSTEM.LOG queue is full then messages are sent to CICS log so the MQI102091E messages may be there.

02/20/2009 IBM WebSphere MQ for z/VSE Version 3.0.0 DBDCCICS 08:44:45 Browse Oueue Records CIC1 SYSTEM IS ACTIVE MOWDISP A000 Object Name: SYSTEM.LOG QSN Number : 00000172 LR-0, LW-173, DD-MQFLOG Queue Data Record Record Status : Written. PUT date/time : 20090220084421 Message Size : 00000711 GET date/time : MQI102091E PRG:MQPQUE1 TRN:MQCX TRM:.... TSK:00500 02/20/2009 08:44:21 No space available for PUT request QUEUE ID : AMQ.MQEXPLORER.29884872 2100-PUT-SET-OSN - OFULL status 9999-NOSPACE EIBFN: 1206 EIBRCODE: 0000000000 EXEC LINE: 000000 EIBRESP: 00000000 EIBRESP2: 00000000 EIBRSRCE: ABCODE: Information displayed. 5655-U97 Copyright IBM Corp. 2008. All rights reserved. Enter=Process PF2=Return PF3=Quit PF4=Next PF5=Prior PF11=MD PF12=Explain

10 More information

MQSeries for VSE System Management Guide, GC34-5364 http://www.ibm.com/support/docview.wss?rs=171&uid=swg21230557

WebSphere MQ for z/VSE V3.0 System Management Guide, GC34-6981 http://www.ibm.com/software/integration/wmq/library/library3x.html

Using MQSeries for VSE, SG24-5647, Redbook http://www.redbooks.ibm.com/abstracts/sg245647.html?Open

Service summary for MQSeries for VSE 2.1.2 http://www.ibm.com/support/docview.wss?rs=171&context=SSFKSJ&context=SSWHKB&dc=DB500&q1=M <u>QSeries+for+VSE&q2=MQSeries+for+VSE+2.1.0&uid=swg21230557&loc=en_US&cs=utf-8&lang=en</u>

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WebSphere MQ Security - SC34-6588 http://www.elink.ibmlink.ibm.com/publications/servlet/pbi.wss?CTY=US&FNC=SRX&PBL=SC34658802

WebSphere MQ library http://www.ibm.com/software/integration/wmg/library/library6x.html

WebSphere MQ Version 6 and Web Services. SG24-7115, Redbook http://www.redbooks.ibm.com/abstracts/sg247115.html?Open

WebSphere V5 for Linux on zSeries Connectivity Handbook - SG24-7042, Redbook <u>http://publib-b.boulder.ibm.com/Redbooks.nsf/RedpieceAbstracts/sg247042.html?Open</u>

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