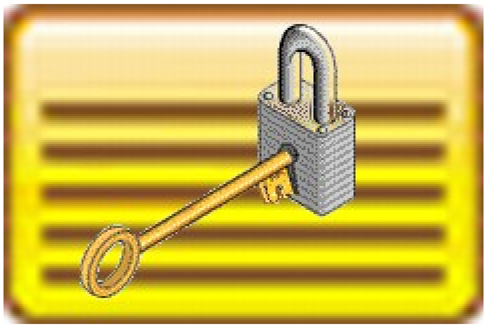
MQ Channel Encryption Overview



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1 Introduction

1.1 Overview

MQ Channel Encryption (MQCE) provides encryption for MQ message data. In cryptography, encryption is the process of transforming information into an unreadable form (encrypted data). Decryption is the reverse process. It makes the encrypted information readable again. Only those with the key (PassPhrase) can successfully decrypt the encrypted data.

MQCE provides encryption for message data, which flows between IBM MQ resources. MQCE operates with IBM MQ v7.1, v7.5, v8.0, v9.0, v9.1 and v9.2 in Windows, Unix, IBM i (OS/400) and Linux environments. It operates with Sender, Receiver, Server, Requester, Cluster-Sender, Cluster-Receiver, Server Connection and Client Connection channels of the MQ queue managers.

MQCE is a simple drop-in solution that provides cryptographic protection for MQ queue managers. The protection can be queue manager to queue manager or client application to queue manager.

- Queue manager to queue manager protection means all messages flowing over a channel between 2 queue managers will be encrypted.

- Client application to queue manager protection means application-level message data flowing between a MQ client application and queue manager will be encrypted.

The MQCE can be configured as a queue manager channel message exit or as a channel send/receive exit pair.

MQCE uses Advanced Encryption Standard (AES) to encrypt the data. AES is a data encryption scheme, adopted by the US government, that uses three different key sizes (128-bit, 192-bit, and 256-bit). AES was announced by National Institute of Standards and Technology (NIST) as U.S. FIPS PUB 197 (FIPS 197) on November 26, 2001 after a 5-year standardization process.

MQCE uses the SHA-2 to create a cryptographic hash function (digital signature) for the message data.

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

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

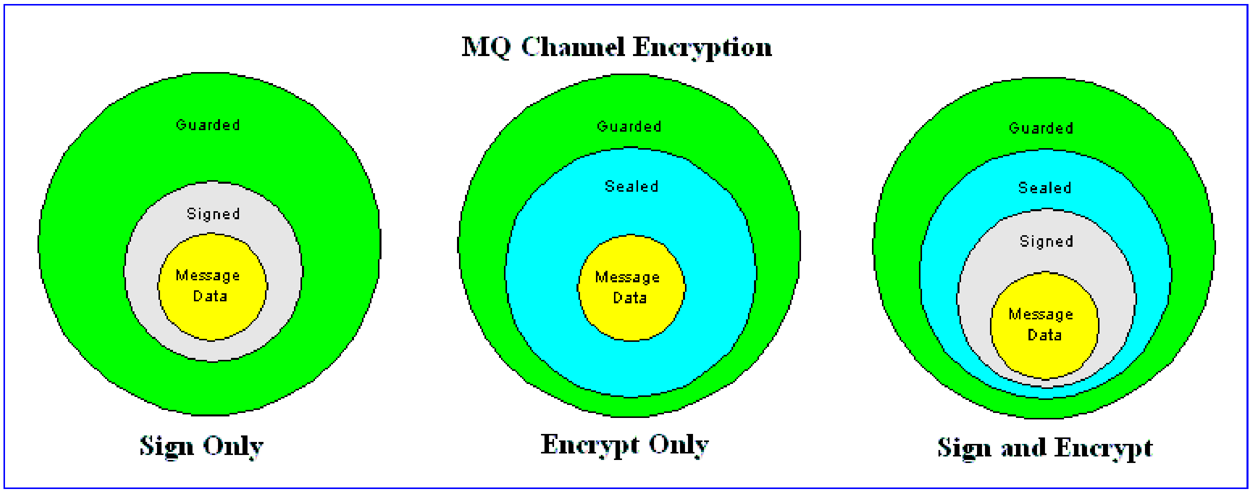
1.2 Executive Summary

The MQCE solution is an MQ encryption exit. It is available for a wide range of platforms: AIX, HP-UX, IBM i, Linux, Solaris and Windows.

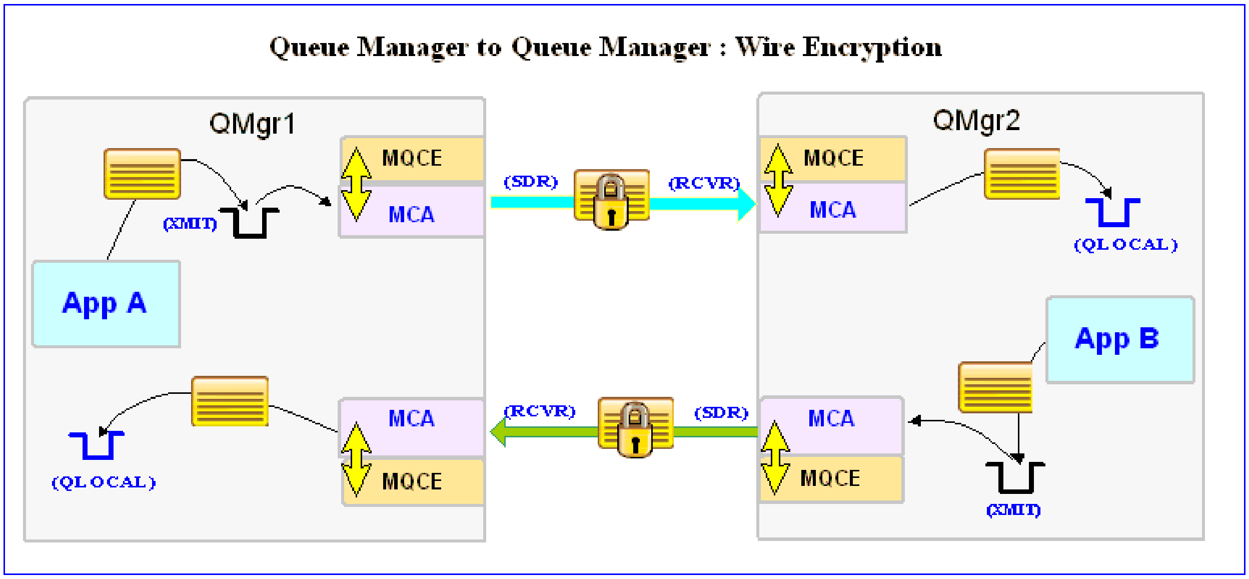
Major Features of MQCE:

- Easy to set up and configure (unlike SSL)
- No application changes required
- Can be configured as either queue manager to queue manager or client application to queue manager solution
- For both modes, all message data flowing over a channel will be encrypted (nothing missed or forgotten)
- Secure encryption/decryption methodology using AES with 128, 192 or 256-bit keys
- Uses the SHA-2 to create a cryptographic hash function (digital signature)
- Standard MQ feature, GET-with-Convert, is supported
- Provides high-level logging capability for encryption / decryption processing

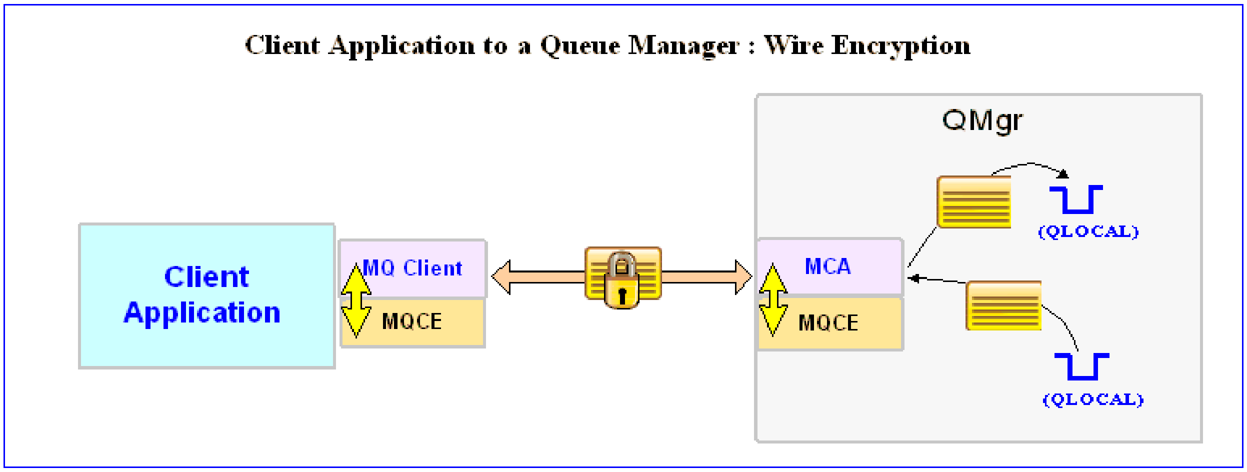
1.3 Message Diagram (Logical View)



1.4 Context Diagram (Logical View)



Queue Manager to Queue Manager : Wire Encryption



Client Application to a Queue Manager : Wire Encryption

1.5 Prerequisites

This section details the minimum supported software levels. These prerequisites apply to both client-side and server-side installations of MQ Channel Encryption.

1.5.1 Operating System

MQ Channel Encryption can be installed on any of the following supported servers:

1.5.1.1 IBM AIX

- IBM AIX 6L version 6.1 or higher

1.5.1.2 HP-UX IA64

- HP-UX v11.23 or higher

1.5.1.3 IBM i (OS/400)

- IBM i V6R1 or higher

1.5.1.4 Linux x86

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

1.5.1.5 Linux x86_64 (64-bit)

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

1.5.1.6 Linux on POWER

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

1.5.1.7 Linux on zSeries (64-bit)

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

1.5.1.8 Raspberry Pi (Linux ARM 32-bit)

- Raspberry Pi OS v9 or higher

1.5.1.9 Sun Solaris

- Solaris SPARC v10 & v11
- Solaris x86_64 v10 & v11

1.5.1.10 Windows

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

1.5.2 IBM MQ

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

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

1.5.3 Windows 32-bit

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

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

1.5.4 Windows 64-bit

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

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