AMQ7280 IBM MQ queue manager appears unresponsive, Probeid ZX155001 component zxcFileLockMonitorThread error lrcE_S_Q_MGR_UNRESPONSIVE

https://www.ibm.com/support/pages/node/473409

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Angel Rivera, IBM MQ Support
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+++ Question +++

You have an IBM MQ multi-instance queue manager and you noticed that FDC files were generated after a failover from the Active instance to the Standby instance.
One of the FDC files shows the following:

```
| Probe Id          :- ZX155001
| Component         :- zxcFileLockMonitorThread
| Major Errorcode   :- lrcE_S_Q_MGR_UNRESPONSIVE
| Probe Description :- AMQ7280: WebSphere MQ queue manager 'x' appears
unresponsive.
+-----------------------------------------------------
MQM Function Stack
zxcFileLockMonitorThread
xcsFFST
```

+ Similar probe ids

```
XY511000 xcsReadFileLock  xecF_E_UNEXPECTED_SYSTEM_RC
ZI305020 zifHealthThread
ZL080000 zllWaitForAsyncProcess
ZT376000 zutVerifyQMFileLocks lpiRC_Q_MGR_LOCK_UNAVAILABLE
ZT376002 zutVerifyQMFileLocks       xecF_E_UNEXPECTED_RC
ZT376006 zutVerifyQMFileLocks       xecF_E_UNEXPECTED_RC
ZX028001 zxcHealthThread
ZX028090 zxcHealthThread
ZX085131 amqzmuc0
ZX086131 amqzmur0
ZX131006 zmuQPubsubDaemonController
ZX135131 amqzmuf0
ZX136016 zmuPubSubNamelistCacheTask
ZX155001 zxcFileLockMonitorThread lrcE_S_Q_MGR_UNRESPONSIVE
ZX156001 zxcFileLockVerifyThread lrcE_S_Q_MGR_LOCK_LOST
ZX159002 zxcLivenessMonitorThread lrcE_S_Q_MGR_UNRESPONSIVE
ZX155001 zxcFileLockMonitorThread
ZX154004 zxcStopFileLockMonitorThread
xecN_E_FILE_ERROR
xecN_E_LOCK_NOT_GRANTED
```

++ Cause ++

The main reason for this problem is because the MQ queue manager had a problem with accessing a file from the file system (via the operating system) in a timely manner, such as to open a file, to get a lock for a file, to write or to read.

Since MQ is reliant on having access to its files in order to run, then any interruption to file accesses can cause the queue manager to fail.

The queue manager has a Lock Verification thread which reads the contents of the "master" file every 20 seconds.

The queue manager also has Health Check thread which checks the health of the queue manager and also monitors the Lock Verification thread.

If the lock verification thread did not complete the verification in 10-20 seconds or if it is hung, then then Health Check thread waits for a maximum of 40 seconds before initiating the shutdown, then it issues STOP.
When the queue manager ends, the standby instance becomes active.

The FDC with probe id ZX155001 is from the health-check thread which detected that the file lock monitor thread had not responded for 20 seconds.

The FDC with probe id ZX028001 zxcHealthThread lrcE_S_Q_MGR_UNRESPONSIVE is generated by the MQ queue manager when MQ detects a problem in checking the status of the file locks used by the MQ multi-instance queue manager.

Subsequent FDCs may result due to MQ processes being unable to access files over the network.

The unresponsiveness is due to the underlying file system and not caused by MQ.

MQ is making use of facilities provided by the operating system and the file system.
MQ is NOT aware of what are the specifics for the underlying file system.
Because NFS is a typical file system, it is the one mentioned in this document.
But the information in this document apply to any file system that is used by MQ.

It is worth noting that MQ does NOT interact directly with the File System.
Let's explore the common situation when the File System is reporting an Input/Output error (EIO, error 5):

- MQ asks the Operating System (OS) to read a file.

- In turn, the OS interacts with the appropriate components to request to read a file. For example, if the file resides in an NFS mounted directory, then the OS will ask the NFS Client to read the file.

- In turn, the NFS client will interact with the network layer to talk to the remote NFS server to read a file.

- In turn, the remote NFS server will interact with the File System.

- The File System is reporting an error EIO and passes it to the NFS server.

- In turn, the NFS server passes the error EIO to the NFS client.

- In turn, the NFS client passes the error EIO to the OS.

- In turn, the OS passes the error EIO to the MQ queue manager, which is NOT expecting this error and thus, generates an FDC.
When the FDC is generated, MQ is in fact not doing anything fancy, it is simply asking for a lock on a file, or opening that file and reading/writings its contents.
There is nothing that can be done from the perspective of IBM MQ Support, either to investigate further, or to fix this problem, because the real problem is due to some fault in the operating system, or the disk system, or some intermediate routing system.

When using NFS, the file locking feature that MQ needs is "leased locks", which is only available in NFS V4 (that is, NFS V3 does NOT provide this critical feature).

If using other networked file systems, the equivalent feature is needed.
MQ is not interacting directly with NFS to request a lock on the file, instead, MQ asks the Operating System (OS) to lock a file, and the OS in turn is the one that directly interact with NFS or whatever else is providing the network file system functions.

++ Resolving The Problem ++

1) You need to check with your operating system administrator, file system administrator, and your network administrator to determine if there are any known defects fixed in the operating system or in the file system server or file system client and to ensure that all the latest file system and OS patches are applied on the system.

2) If you are using NFS, a common problem is that NFS V3 is being used, which is not supported for multi-instance queue managers; if you use NFS, then the required version for NFS is V4.

3) If you are using the NFS V4 file system as the shared file system, you must use hard mounts and disable write caching, to fulfill these requirements.

++ References

https://www.ibm.com/support/pages/node/792023
Can IBM MQ do something about errors from the underlying resources such as EIO (Input/Ouput errors from disk)?

https://www.ibm.com/support/pages/node/247895
How to verify that the NFS server and NFS client are at version 4

https://www.ibm.com/support/pages/node/6348636
MQ Distributed: collection of articles regarding multi-instance queue managers

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