

Install MQ 9.2 + Fix Pack 9.2.0.6 + HA RDQM

<https://www.ibm.com/support/pages/node/6830209>

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+++ Objective +++

The purpose of this tech doc is to provide the basic steps for:

- installing IBM MQ (manufacturing refresh 9.2.0.5 LTS),
- applying a Fix Pack (9.2.0.6), and
- configuring a High Availability (HA) setup for Replicated Data Queue Managers (RDQM).

To know the basics for the RDQM architecture, refer to the following page from the online manual:

<https://www.ibm.com/docs/en/ibm-mq/9.3?topic=configurations-rdqm-high-availability>

IBM MQ / 9.3

RDQM high availability

NOTE:

1. Run the commands in all 3 nodes (except when noted). Few commands are only for primary node (NODE 1) (It is mentioned in the step).
2. You need to use your IP address while running the commands.
3. Parallely run each command in all 3 nodes.
4. This tech doc is optimized for the "fyre" domain, but it is also be useful for non-fyre users also. Please read the NOTE of step 20) carefully.

Create /Nodes/Server/Ember:

Only for IBMers:

GO TO THE FYRE AND CREATE AN EMBER FOR RHEL 8.6 OF SIZE 3

<https://fyre.ibm.com/embers>

Create Embers

Additional Options

Ember Configuration

Platform	Image	Size	Quantity
x	RedHat 8.6	2 Core 4GB 250GB	3

Create Embers

deffest Stack Information X RTP

Product Group: MQ - All

Name	Status	IP 1	IP 2	Actions
deffest1	deployed	9.46.79.230	10.21.2.57	
deffest2	deployed		10.21.5.133	
deffest3	deployed		10.21.5.235	

Close

For Non-IBMers:

You need three node/servers to configure HA RDQM setup.

Prerequisites:

Notes:

- The groupid 501 and userid 1001 are used here for illustration purposes.
- If you do not create the group "mqm" and user "mqm" before the installation of MQ, the MQ installer in the rpm fileset will create these groupid and userid, and potentially the numeric id might be different which will cause problems at runtime. Thus, you must ensure to have the same numeric id for group mqm and user mqm across the 3 servers.

P0) Create group "mqm", such as: **groupadd mqm -g 501**

P1) Create mqm user: [root@deffest1 ~]# **useradd mqm -u 1001 -g mqm**

P2) Set password for mqm: [root@deffest1 ~]# **passwd mqm**

P3) Install bc: [root@deffest1 ~]# **yum install bc**

P4) Check that the firewall is disabled: [root@deffest1 ~]# **systemctl status firewalld**

The output should include:

Active: inactive (dead)

P5) Check that selinux is disabled: [root@deffest1 ~]# **sestatus**

The output should be:

SELinux status: disabled

P6) Fix system resource settings:

- vi /etc/sysctl.conf

Add following 2 lines

fs.file-max=524288

kernel.threads-max=32768

- Use 'sysctl -p' to verify parameters took.

- vi /etc/security/limits.conf

Add following 2 lines

* **hard nofile 10240**

* **soft nofile 10240**

- Reboot node: **reboot**

P7) [root@deffest1 ~]# **yum upgrade libstdc++**

P8) [root@deffest1 ~]# **yum install libstdc++.i686**

P9) [root@deffest1 ~]# **yum install bc cifs-utils libtool-ldl libxslt net-snmp-libs nfs-utils perl-TimeDate psmisc python36 python3-lxml**

INSTALL IBM MQ:

1) Download MQ 9.2.0.5 LTS from IBM Passport Advantage

For IBMers:

Download MQ 9.2.0.5 LTS (IBM_MQ_9.2.0.5_LINUX_X86-64.tar.gz) from ibm site : <https://w3-03.ibm.com/software/xl/download/ticket.wss>

(Part Number: M04V3ML)

For Non-IBMers:

The site IBM distributes its software to customers is linked below:

https://www.ibm.com/software/passportadvantage/pao_customer.html

Once you log in, search for the following part number for IBM MQ 9.2.0.5 LTS: M04V3ML

2) Send IBM_MQ_9.2.0.5_LINUX_X86-64.tar.gz to the **Primary Linux server i.e. NODE1 (directory: `/home/mqm`) via FileZilla (You can use other utilities instead of FileZilla for transferring files to or from a remote computer by a standard method known as FTP)**

(NOTE: Mention your IP address while running the commands)

(NOTE: scp does not supports host names, it only supports IP address)

Send to Node2 from Node1: `scp /home/mqm/IBM_MQ_9.2.0.5_LINUX_X86-64.tar.gz root@node2 IP address:/home/mqm`

Send to Node3 from Node1: `scp /home/mqm/IBM_MQ_9.2.0.5_LINUX_X86-64.tar.gz root@node3 IP address:/home/mqm`

3) Unzip the compressed file: `tar -xf IBM_MQ_9.2.0.5_LINUX_X86-64.tar.gz`

4) Go to the directory `/home/mqm/MQServer`:

```
[root@deffest1 ~]# cd /home/mqm/MQServer
```

5) Accept MQ license:

```
[root@deffest1 MQServer]# ./mqlicense.sh
```

(Note: From IBM MQ 9.2.0 you have the option to accept the license before or after product installation)

6) Install MQ:

```
[root@deffest1 MQServer]# rpm -ivh MQSeries*.rpm
```

7) [root@deffest1 MQServer]# `/opt/mqm/bin/setmqinst -i -p /opt/mqm`

144 of 144 tasks have been completed successfully.

'Installation1' (/opt/mqm) set as the primary installation.

(NOTE: After running this command, all commands of MQ will work like dspmq, dspmqver etc.)

INSTALL FIX PACK:

8) Create folder FP in /home/mqm:

8.1) Go to this directory: **cd /home/mqm**

8.2) Create FP directory: **mkdir FP**

9) Download fix pack (**9.2.0-IBM-MQ-LinuxX64-FP0006.tar.gz**) from ibm site and send to Linux server (**Primary Node**, directory: **/home/mqm/FP**) via FileZilla.

Download

link: https://www.ibm.com/support/fixcentral/swg/selectFixes?parent=ibm~WebSphere&product=ibm/WebSphere/WebSphere+MQ&release=9.2.0.0&platform=All&function=fixid&fixids=-IBM-MQ-*FP*

Send to Node2 from Node1: **scp /home/mqm/FP/9.2.0-IBM-MQ-LinuxX64-FP0006.tar.gz root@node2 IP_address:/home/mqm/FP**

Send to Node3 from Node1: **scp /home/mqm/FP/9.2.0-IBM-MQ-LinuxX64-FP0006.tar.gz root@node3 IP_address:/home/mqm/FP**

unpack fix pack: **tar -xf 9.2.0-IBM-MQ-LinuxX64-FP0006.tar.gz**

10) Install fixpack:

[root@deffest1 FP]# rpm -ivh MQSeries*.rpm

11) **[root@deffest1 ~]# ./opt/mqm/bin/setmqenv -n Installation1**

(It temporarily set the environmental variables)

12) Install these additional packages as well for future:

[root@deffest1 ~]# yum install zip unzip rpm-build redhat-lsb

INSTALL RDQM:

13) The DRBD and Pacemaker packages are signed with the LINBIT GPG key. Use the following command to import the public LINBIT GPG key:

```
[root@deffest1 ~]# rpm --import https://packages.linbit.com/package-signing-pubkey.asc
```

14) check OS kernel and RDQM kernel: <https://www.ibm.com/support/pages/node/1087143>

14.1) Go to this directory: `cd /home/mqm/FP/Advanced/RDQM/PreReqs/el8/kmod-drbd-9/`

14.2) List all items: `ls`

14.3) `uname -a`

Compare the kernel versions of points 14.2) and 14.3)

Make sure that the RDQM kernel version is compatible with OS.

For ex:

```
[root@deffest1 MQServer]# ls  
kmod-drbd-9.0.32_4.18.0_372.9.1-1
```

```
[root@deffest1 MQServer]# uname -a
```

```
Linux deffest1.fyre.ibm.com 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux
```



15) Install the appropriate DRBD kernel module:

```
[root@deffest1 kmod-drbd-9]# yum install /home/mqm/FP/Advanced/RDQM/PreReqs/el8/kmod-drbd-9/kmod-drbd-9.0.32_4.18.0_372.9.1-1.x86_64.rpm
```

16) Install the required DRBD utilities:

```
[root@deffest1 drbd-utils-9]# yum install /home/mqm/FP/Advanced/RDQM/PreReqs/el8/drbd-utils-9/*
```

17) Install Pacemaker:

```
[root@deffest1 drbd-utils-9]# yum install /home/mqm/FP/Advanced/RDQM/PreReqs/el8/pacemaker-2/*
```

18) Install RDQM (NOTE: This is the RDQM of MQ 9.2.0.5 LTS, not of fix-pack)

```
[root@deffest1 RDQM]# cd /home/mqm/MQServer/Advanced/RDQM
```

```
[root@deffest1 RDQM]# rpm -ivh MQSeriesRDQM-9.2.0-5.x86_64.rpm
```

19) Install/upgrade RDQM of fixpack:

```
[root@deffest1 /]# yum install /home/mqm/FP/Advanced/RDQM/MQSeriesRDQM-U9206-9.2.0-6.x86_64.rpm
```

20) See the "NOTES" section to learn more about 6 scripts.

Send below scripts to Linux server (Primary Node) via FileZilla. These scripts are attached with this technote.

setup1.sh - sets up logdir.. for commands..

setup2.sh - setup home dir for mqm user

setup3.sh - setup passwordless ssh

setup4.sh - creates drbdpool VG and updates rdqm.ini

(You can create drbdpool before or after you have installed the RDQM HA solution, but you must create drbdpool before you actually create any RDQMs)

setup5.sh - add MQ commands for SUDO

rdqmcommon.sh - this script is used by other scripts. Do not run this (rdqmcommon.sh) script.

NOTES:

- Run these scripts in **primary node only**.

- These scripts are specially made for the fyre domain. They do not work for other domains.

It only worked for the URL of type: `basehostname.fyre.ibm.com`

For other URLs than this, you need to make minor change in the script according to your host name (or URL).

Variables used for fyre host:

node1=\${basehostname}1.fyre.ibm.com // mentioned in rdqmCommon.sh

node2=\${basehostname}2.fyre.ibm.com // mentioned in rdqmCommon.sh

node3=\${basehostname}3.fyre.ibm.com // mentioned in rdqmCommon.sh

basehostname=\$(cat /etc/hostname | sed 's/[[:digit:]]\.\.fyre\.ibm\.com//') // mentioned in setup1.sh, setup2.sh, setup3.sh, setup4.sh, setup5.sh. It reads the base hostname from the file /etc/hostname by excluding the remaining content i.e. {digit}.fyre.ibm.com

- Change variables node1, node2, node3 and basehostname according to your hostname. You can also directly put your host names in the variables node1, node2 and node3 and comment/delete the variable basehostname.

21) Create new directory (In primary node only) to save scripts as mentioned in step 20):

```
[root@deffest1 ~]# cd /home/mqm/  
[root@deffest1 mqm]# mkdir rdqm_setup_shFiles
```

22) Run this again:

```
[root@deffest1 bin]# cd /opt/mqm/bin  
[root@deffest1 bin]# ./setmqinst -n Installation1 -i
```

23) Make these scripts executable (In primary node only):

```
[root@deffest1 ~]# cd /home/mqm/rdqm_setup_shFiles  
[root@deffest1 rdqm_setup_shFiles]# chmod +x setup*.sh
```

24) Run all scripts one by one (In primary node only):

These are the setup scripts and their purpose:

- setup1.sh - sets up logdir for commands.
- setup2.sh - setup home dir for mqm user
- setup3.sh - setup passwordless ssh
- setup4.sh - creates drbdpool VG and updates rdqm.ini
- setup5.sh - add MQ commands for SUDO

Run the scripts:

```
[root@deffest1 rdqm_setup_shFiles]# ./setup1.sh  
[root@deffest1 rdqm_setup_shFiles]# ./setup2.sh  
[root@deffest1 rdqm_setup_shFiles]# ./setup3.sh  
[root@deffest1 rdqm_setup_shFiles]# ./setup4.sh  
[root@deffest1 rdqm_setup_shFiles]# ./setup5.sh
```

(NOTE: Run the above scripts only on **primary node**)

25) [root@deffest1 ~]# cd ~

```
[root@deffest1 ~]# ls -l  
total 69868  
-rw-----. 1 root root 1465 May 19 08:48 anaconda-ks.cfg  
-rw-r--r-- 1 root root 10737418240 Aug 3 02:27 disk1.img
```

Mount the file system:

```
[root@deffest1 ~]# mount
```

26) Add mqm in haclient group: **usermod -G haclient mqm**

27) Delete the password for mqm because if the user can SSH to each server without a password, then you only need edit the rdqm.ini file and run rdqmadm on one of the servers to create the Pacemaker cluster.

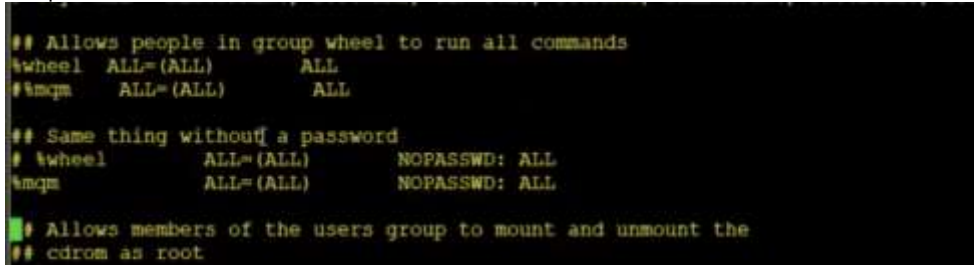
```
[mqm@deffest1 root]$ passwd -d mqm
```

28) Run this command: **visudo**

Add the following 2 lines. See the screen capture below for the location where to add the lines.

```
# %mqm ALL=(ALL) ALL
```

```
%mqm ALL=(ALL) NOPASSWD: ALL
```



```
## Allows people in group wheel to run all commands
%wheel ALL=(ALL) ALL
#%mqm ALL=(ALL) ALL

## Same thing without a password
# %wheel ALL=(ALL) NOPASSWD: ALL
# %mqm ALL=(ALL) NOPASSWD: ALL

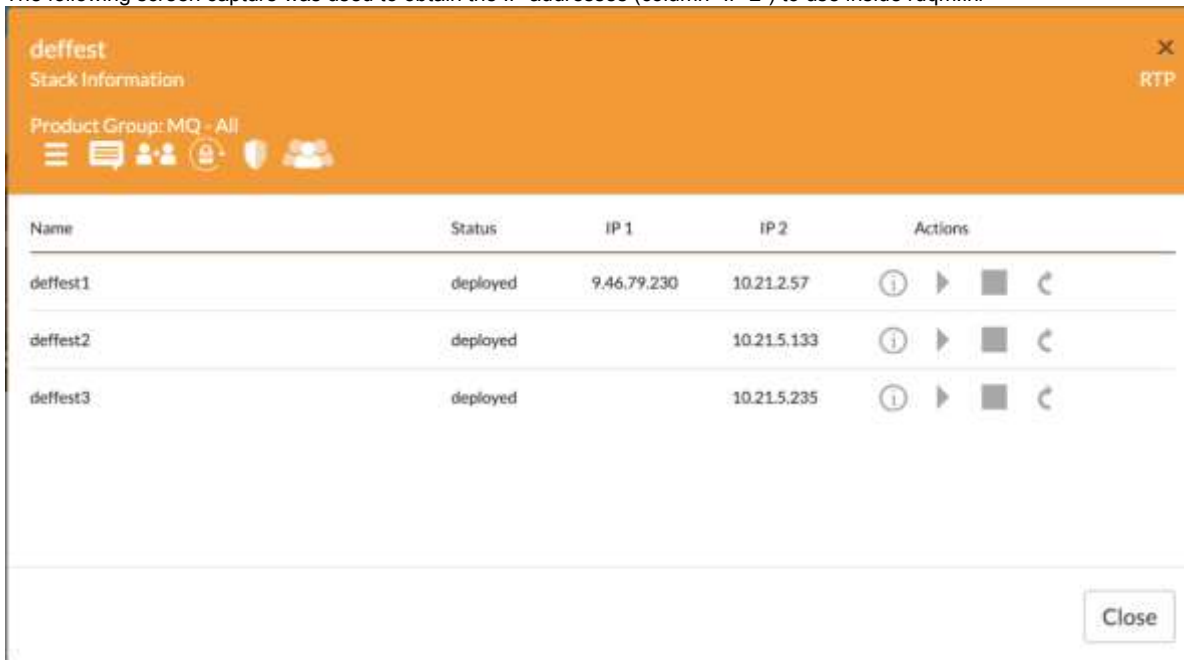
## Allows members of the users group to mount and unmount the
## cdrom as root
```













29) Edit rdqm.ini file according to the fyre host name and IP address in primary node:

```
[root@deffest1 bin]# cd /var/mqm
```

```
[root@deffest1 mqm]# vi rdqm.ini
```

The rdqm.ini is a text file. There is a template that is provided by the MQ RDQM fileset, but it is updated via "setup4.sh" in the primary node. The following screen capture was used to obtain the IP addresses (column "IP 2") to use inside rdqm.ini



Name	Status	IP 1	IP 2	Actions
deffest1	deployed	9.46.79.230	10.21.2.57	   
deffest2	deployed		10.21.5.133	   
deffest3	deployed		10.21.5.235	   

Close

Each stanza "Node" must have the following attributes:

Name
HA_Replication

```
[root@deffest2 mqm]# cat rdqm.ini
# The configuration in this file is not dynamic.
# The HA configuration is read when an HA group is created.
# The DR configuration is read when when a DR/HA queue manager is created.

Node:
  Name=deffest1.fyre.ibm.com
  HA_Replication=10.21.2.57
#  HA_Primary=
#  HA_Alternate=
#  DR_Replication=
Node:
  Name=deffest2.fyre.ibm.com
  HA_Replication=10.21.5.133
#  HA_Primary=
#  HA_Alternate=
#  DR_Replication=
Node:
  Name=deffest3.fyre.ibm.com
  HA_Replication=10.21.5.235
#  HA_Primary=
#  HA_Alternate=
#  DR_Replication=

#DRGroup:
#  Name=
#  DR_Replication=
#  DR_Replication=
#  DR_Replication=
[root@deffest2 mqm]# su mqm
```

30) Copy the rdqm.ini file (from node1) to node2 and node3:

```
scp /var/mqm/rdqm.ini root@node2\_IP\_address:/var/mqm/
scp /var/mqm/rdqm.ini root@node3\_IP\_address:/var/mqm/
```

31) Initialize the cluster:

It established the authenticity of hosts and permanently add hosts(ECDSA) to the list of known hosts.

31.1) Go to NODE1:

```
su mqm
ssh node2_host_name
logout
```

```
ssh node3_host_name
logout
```

31.2) Go to NODE2:

```
su mqm
ssh node1_host_name
logout
```

```
ssh node3_host_ame
logout
```

```
31.3) Go to NODE3:  
su mqm  
ssh node1_host_name  
logout  
  
ssh node2_host_name  
logout
```

32) Run "rdqmadm -c" as either mqm or root **on primary node only**.
This command initializes the Pacemaker cluster using the settings specified in /var/mqm/rdqm.ini.
Verify the rdqm.ini file contains the correct IP addresses in the HA_Replication declaration.
Example output is below and may take 30-60 seconds to complete.

```
[mqm@deffest1 mqm]# rdqmadm -c  
Configuring the replicated data subsystem.  
The replicated data subsystem has been configured on this node.  
The replicated data subsystem has been configured on 'deffest1.fyre.ibm.com'.  
The replicated data subsystem has been configured on 'deffest2.fyre.ibm.com'.  
The replicated data subsystem configuration is complete.  
Command '/opt/mqm/bin/rdqmadm' run with sudo.
```

NOTE: If you get AMQ3693E error, then you need to run this command (**rdqmadm -c**) in all 3 nodes.

33) Create rdqm on node1:
[mqm@deffest1 mqm]# **crtmqm -sx -fs 550M RDQM1**

Where:
-sx => Indicates that the initial HA role is primary.
-fs size => Optionally specifies the size of the logical volume that is created in the drbdpool volume group.

Notes:
The queue manager will be started in node1 (thus, there is an implicit strmqm)
The queue manager will be created in the other nodes.

Example:

```
[mqm@deffest1 ~]$ crtmqm -sx -fs 550M RDQM1  
Creating replicated data queue manager configuration.  
Secondary queue manager created on 'deffest2.fyre.ibm.com'.  
Secondary queue manager created on 'deffest3.fyre.ibm.com'.  
IBM MQ queue manager created.  
Directory '/var/mqm/vols/rdqm1/qmgr/rdqm1' created.  
The queue manager is associated with installation 'Installation1'.  
Creating or replacing default objects for queue manager 'RDQM1'.  
Default objects statistics : 83 created. 0 replaced. 0 failed.  
Completing setup.  
Setup completed.  
Enabling replicated data queue manager.  
Replicated data queue manager enabled.  
Command '/opt/mqm/bin/crtmqm' run with sudo.
```

34) Run `dspmqr` or "`dspmqr -o all`" in all nodes to check the above created rdqm queue manager.

```
[mqm@deffest1~]$ dspmqr
QMNAME (RDQM1)                                STATUS (Running)

[mqm@deffest1 ~]$ dspmqr -o all
QMNAME (RDQM1)                                STATUS (Running)  DEFAULT (no)
STANDBY (Not permitted) INSTNAME (Installation1) INSTPATH (/opt/mqm) INSTVER (9.2.0.6)
HA (Replicated) DRROLE ()
```

35) Check rdqm status: `rdqmstatus -m RDQM1`

```
[mqm@ deffest1 ~]$ rdqmstatus
Node:                                           deffest1.fyre.ibm.com

Queue manager name:                            RDQM1
Queue manager status:                         Running
HA current location:                          This node
```

```
[mqm@deffest1 ~]$ rdqmstatus -n
Node deffest1.fyre.ibm.com is online
Node deffest2.fyre.ibm.com is online
Node deffest3.fyre.ibm.com is online
```

```
[mqm@deffest1 ~]$ rdqmstatus -m RDQM1
Node:                                           deffest1.fyre.ibm.com
Queue manager status:                         Running
CPU:                                           0.00%
Memory:                                        134MB
Queue manager file system:                   50MB used, 0.6GB allocated [9%]
HA role:                                      Primary
HA status:                                    Normal
HA control:                                  Enabled
HA current location:                         This node
HA preferred location:                       This node
HA floating IP interface:                    None
HA floating IP address:                      None

Node:                                           deffest2.fyre.ibm.com
HA status:                                    Normal

Node:                                           deffest3.fyre.ibm.com
HA status:                                    Normal
```

+++ end +++