# IBM MQ Interview Flashcards - Top 50 Must-Know

## CORE CONCEPTS (15 cards)

### Card 1: Queue Manager

**Q:** What is a Queue Manager? **A:** The primary MQ component that manages queues, channels, and message flow. Controls access, provides transaction support, handles security, and manages network connections.

### Card 2: Local vs Remote Queue

**Q:** Difference between local and remote queue? **A:**

* **Local:** Physical storage for messages on local queue manager
* **Remote:** Local definition pointing to queue on another queue manager (contains RNAME, RQMNAME, XMITQ)

### Card 3: Transmission Queue (XMITQ)

**Q:** What is a transmission queue? **A:** Special local queue that temporarily holds messages destined for remote queue managers. Sender channel reads from XMITQ and transfers messages to remote system.

### Card 4: Channel Types

**Q:** SENDER/RECEIVER vs SVRCONN channels? **A:**

* **SENDER/RECEIVER:** QM-to-QM communication, unidirectional, reads from XMITQ
* **SVRCONN:** App-to-QM connection, bidirectional, allows PUT and GET

### Card 5: MCA

**Q:** What is MCA? **A:** Message Channel Agent - the program that actually moves messages through channels. Think: Channel = highway (definition), MCA = truck (actual worker process).

### Card 6: Message Flow

**Q:** Message flow from App A to App B across two QMs? **A:**

1. App puts to remote queue → 2. Routes to XMITQ → 3. Sender channel picks from XMITQ → 4. Sends via network (port 1414) → 5. Receiver channel accepts → 6. Places in local queue → 7. App B consumes

### Card 7: Point-to-Point vs Pub/Sub

**Q:** Key differences? **A:**

* **Point-to-Point:** One-to-one, guaranteed delivery, uses queues, message consumed once
* **Pub/Sub:** One-to-many, publishers to topics, subscribers receive copies, decoupled

### Card 8: Persistent vs Non-Persistent

**Q:** Persistent vs non-persistent messages? **A:**

* **Persistent:** Written to logs, survives restart, guaranteed delivery, higher overhead
* **Non-Persistent:** Memory only, better performance, lost on restart, use for replaceable data

### Card 9: Dead Letter Queue

**Q:** Why do messages go to DLQ? **A:** Queue doesn't exist, queue full, wrong queue name, authorization failure, bad message format, destination app not consuming, network issues.

### Card 10: Circular vs Linear Logging

**Q:** Which for production and why? **A:**

* **Linear for production:** Media recovery, point-in-time restore, audit trail, compliance
* **Circular:** Only restart recovery, no backup restore, dev/test only

### Card 11: Syncpoint

**Q:** What is syncpoint messaging? **A:** Transaction control - message + database update in one atomic operation. If either fails, both rollback. Uses MQBEGIN, MQCOMMIT, MQBACK. Example: debit account AND send payment message.

### Card 12: Durable Subscription

**Q:** What is durable subscription? **A:** Pub/sub subscription that survives when subscriber disconnects. Has subscription name, messages queued for offline subscribers, guarantees message delivery.

### Card 13: Alias Queue

**Q:** What is alias queue? **A:** Alternative name for existing local or remote queue. Provides application flexibility and queue redirection without code changes.

### Card 14: Listener

**Q:** What is a listener? **A:** Process that monitors ports for incoming connections. Default: SYSTEM.DEFAULT.LISTENER.TCP on port 1414. Must be started for channels to accept connections.

### Card 15: Triggered Queue

**Q:** What is triggering? **A:** Automatic process initiation when message arrives on queue. Uses trigger monitor, process definition, and initiation queue. For automated message processing.

## INSTALLATION & CONFIGURATION (15 cards)

### Card 16: Kernel Parameters

**Q:** Critical kernel parameters for MQ? **A:**

kernel.shmmni = 4096 (shared memory segments)

kernel.sem = 32 4096 32 128 (semaphores)

fs.file-max = 524288 (max open files)

**Why:** MQ uses shared memory, semaphores for locking, needs many file handles.

### Card 17: mqm User

**Q:** Why is mqm user critical? **A:** Owns all MQ processes and files. Required for running queue managers. Should NOT have sudo access. Must have proper ulimits (nofile 10240, nproc 4096).

### Card 18: User Limits

**Q:** What are nofile and nproc limits? **A:**

* **nofile:** Max open files per process (MQ needs 10240+)
* **nproc:** Max processes (4096+) **Set in:** /etc/security/limits.conf

### Card 19: Installation Steps

**Q:** Key steps to install MQ on RHEL EC2? **A:**

1. Set kernel parameters
2. Create mqm user/group
3. Install dependencies (bc, ksh, compat-libstdc++)
4. Configure filesystems
5. Set security groups
6. Extract and install RPMs
7. Run setmqenv
8. Create queue manager

### Card 20: Queue Manager Creation

**Q:** Commands to create and start QM? **A:**

crtmqm -q QM1 (create)

strmqm QM1 (start)

runmqsc QM1 (enter commands)

START LISTENER(SYSTEM.DEFAULT.LISTENER.TCP)

### Card 21: SVRCONN Channel Setup

**Q:** Create server connection channel? **A:**

DEFINE CHANNEL(APP.SVRCONN) CHLTYPE(SVRCONN)

ALTER QMGR CONNAUTH(USE.OS)

REFRESH SECURITY

### Card 22: Local Queue Creation

**Q:** Create local queue command? **A:**

DEFINE QLOCAL(MYAPP.QUEUE) +

DEFPSIST(YES) +

MAXDEPTH(50000)

### Card 23: Remote Queue Setup

**Q:** Create remote queue definition? **A:**

DEFINE QREMOTE(REMOTE.QUEUE) +

RNAME(TARGET.QUEUE) +

RQMNAME(QM2) +

XMITQ(QM2.XMITQ)

### Card 24: Transmission Queue

**Q:** Create transmission queue? **A:**

DEFINE QLOCAL(QM2.XMITQ) USAGE(XMITQ)

### Card 25: Channel Setup for QM-to-QM

**Q:** Configure SENDER and RECEIVER channels? **A:**

On QM1:

DEFINE CHANNEL(TO.QM2) CHLTYPE(SDR) +

CONNAME('qm2.host.com(1414)') +

XMITQ(QM2.XMITQ)

On QM2:

DEFINE CHANNEL(TO.QM2) CHLTYPE(RCVR)

### Card 26: File System Structure

**Q:** Key MQ directory locations? **A:**

* **/opt/mqm:** Installation files
* **/var/mqm:** Queue manager data
* **/var/mqm/log:** Transaction logs
* **/var/mqm/qmgrs/QM1:** Queue manager config
* **/var/mqm/errors:** Error logs

### Card 27: setmqenv

**Q:** What is setmqenv command? **A:** Sets MQ environment variables. Usage: . /opt/mqm/bin/setmqenv -s (adds to PATH, sets MQ\_INSTALLATION\_PATH). Add to .bashrc for persistence.

### Card 28: Verify Installation

**Q:** How to verify MQ installation? **A:**

dspmqver (display version)

dspmq (list queue managers)

echo "DISPLAY QMGR" | runmqsc QM1 (test QM)

### Card 29: Dependencies

**Q:** Required packages for MQ on RHEL? **A:**

* bc (calculator)
* ksh (Korn shell)
* compat-libstdc++-33 (compatibility libraries)
* rpm-build

### Card 30: MQ Components to Install

**Q:** Essential MQ RPMs to install? **A:**

* MQSeriesRuntime (core runtime)
* MQSeriesServer (queue manager)
* MQSeriesMsg (message catalogs)
* MQSeriesGSKit (security)
* MQSeriesJava (Java support)

## SECURITY (10 cards)

### Card 31: CONNAUTH

**Q:** What is connection authentication (CONNAUTH)? **A:** Validates user credentials when connecting to queue manager. Types: OS users, LDAP, custom. Answers "Who are you?"

### Card 32: CHLAUTH

**Q:** What is channel authentication (CHLAUTH)? **A:** Controls which users/IPs can use specific channels. Answers "Can you use this channel?" Works with CONNAUTH for two-layer security.

### Card 33: CONNAUTH Setup

**Q:** Configure OS-based authentication? **A:**

DEFINE AUTHINFO(USE.OS) +

AUTHTYPE(IDPWOS) ADOPTCTX(YES)

ALTER QMGR CONNAUTH(USE.OS)

REFRESH SECURITY TYPE(CONNAUTH)

### Card 34: CHLAUTH Rules

**Q:** Block all, allow specific IP? **A:**

SET CHLAUTH(\*) TYPE(ADDRESSMAP) +

ADDRESS(\*) USERSRC(NOACCESS)

SET CHLAUTH(APP.SVRCONN) TYPE(ADDRESSMAP) +

ADDRESS('10.0.1.100') USERSRC(CHANNEL)

### Card 35: User Permissions

**Q:** Grant user queue access? **A:**

setmqaut -m QM1 -t qmgr -p appuser +connect +inq

setmqaut -m QM1 -t queue -n MYAPP.QUEUE -p appuser +put +get +browse

### Card 36: SSL/TLS Setup

**Q:** Key steps for SSL channel? **A:**

1. Create key database (runmqckm)
2. Request/import certificates
3. Configure channel with SSLCIPH
4. Set CERTLABL on queue manager
5. Test connection

### Card 37: Security Layers

**Q:** Three layers of MQ security? **A:**

1. **Authentication:** Verify identity (CONNAUTH)
2. **Authorization:** Control access (setmqaut, OAM)
3. **Encryption:** Protect data (SSL/TLS)

### Card 38: Principle of Least Privilege

**Q:** Apply to MQ security? **A:** Grant only minimum permissions needed. Separate admin vs app users. Use groups for permission management. Block by default, allow explicitly.

### Card 39: Channel Security Best Practices

**Q:** Secure SVRCONN channels? **A:**

* Enable CONNAUTH
* Use CHLAUTH to restrict IPs
* Require SSL/TLS (SSLCAUTH(REQUIRED))
* Use mutual authentication
* Block default channels
* Monitor failed attempts

### Card 40: Security Exits

**Q:** What are security exits? **A:** Custom programs that run at channel security checkpoints. Can implement custom authentication, logging, or filtering. Advanced security customization.

## AWS EC2 SPECIFIC (10 cards)

### Card 41: EC2 Instance Sizing

**Q:** Recommended EC2 instance types for MQ? **A:**

* **Dev:** t3.medium (2 vCPU, 4GB) - minimum
* **Prod:** m5.xlarge (4 vCPU, 16GB) - balanced
* **High-throughput:** c5.xlarge - compute optimized **Avoid:** t2/t3 for prod (burstable CPU)

### Card 42: EBS Configuration

**Q:** How to configure EBS volumes for MQ? **A:**

* **Root (/):** 30GB gp3 - OS + MQ install
* **/var/mqm:** 100GB gp3 - queue data
* **/var/mqm/log:** 50GB gp3 - transaction logs **Separate volumes for backup/performance**

### Card 43: Security Group Ports

**Q:** Required ports in security group? **A:** **Inbound:**

* 1414 (MQ listener)
* 1415 (SSL channels)
* 32768-65535 (ephemeral for server channels) **From:** Application subnets only

### Card 44: Ephemeral Port Issue

**Q:** Why open 32768-65535 range? **A:** Server-connection channels use OS-assigned dynamic ports. Can't predict which port. Must open entire range OR restrict range in /etc/sysctl.conf and open smaller range.

### Card 45: BYOL Licensing

**Q:** IBM MQ licensing on AWS? **A:** Bring Your Own License (BYOL) - AWS doesn't offer managed MQ. Purchase license from IBM, track usage, IBM provides support. Consider PVU-based licensing for cores.

### Card 46: EBS AZ Limitation

**Q:** EBS impact on HA design? **A:** EBS volumes locked to single AZ. Can't share across AZs. For multi-AZ HA, use RDQM (replication) or EFS (shared NFS storage, slower performance).

### Card 47: Backup Strategy

**Q:** Backup approach for MQ on EC2? **A:**

1. **Queue manager:** dmpmqcfg + EBS snapshots
2. **Messages:** saveqmgr (if linear logging)
3. **Frequency:** Daily config, continuous log archiving
4. **Test:** Regular restore drills

### Card 48: Monitoring on AWS

**Q:** Monitor MQ on EC2? **A:**

* **CloudWatch:** Custom metrics (queue depth, channel status)
* **MQ logs:** Ship to CloudWatch Logs
* **Alerts:** SNS notifications for thresholds
* **Dashboard:** Key metrics visualization

### Card 49: Cost Optimization

**Q:** Reduce MQ costs on AWS? **A:**

* Use Savings Plans/Reserved Instances
* Right-size instances (monitor utilization)
* Use gp3 instead of io2 (unless high IOPS)
* Stop non-prod instances off-hours
* Archive old logs to S3

### Card 50: Multi-AZ Deployment

**Q:** Recommended HA pattern for AWS? **A:** **RDQM (Replicated Data Queue Manager):**

* 3 nodes across 3 AZs
* DRBD replication
* No shared storage (solves EBS limitation)
* Automatic failover
* Best fit for AWS architecture