Connecting IBM IoT MessageSight v2.0 to IBM MQ

History of IBM IoT MessageSight

- IBM MessageSight v1.0 introduced in 2013 as an appliance to provide very high speed processing of MQTT messages. Developed for IOTf solutions, in their infancy.
- IBM MessageSight v1.2 introduced in 2014 as a virtual appliance and an upgrade to physical appliances.
- IBM IoT MessageSight v2.0 released in 2016 as an installable software component – as an RPM and a docker file.

Introduction to IBM IoT MessageSight v2.0

- IBM MessageSight v2.0 GA'd on June 10, 2016
- MessageSight v2.0 has a new release form – available as an RPM, with easy docker container integration. RPM installs on RHEL, CentOs and VMWare
- New REST API for configuration and monitoring.
- Multiple architecture choices – HA and clustering.

MessageSight Architectures

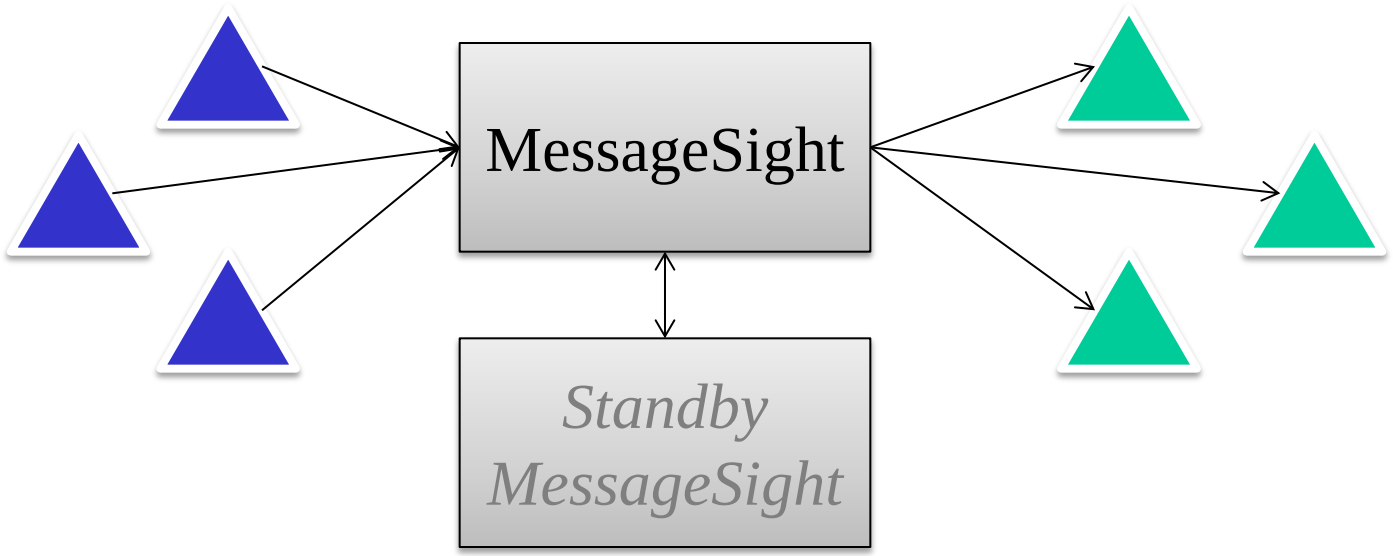
- What follows is an illustration of several different MessageSight Architectures
- This includes discussion of how MQTT messages flow through these architectures
- Combining these architectures with MQ will be discussed in the following section.

MessageSight Simple Configuration

- A set of MQTT applications publish and subscribe to a single MessageSight server

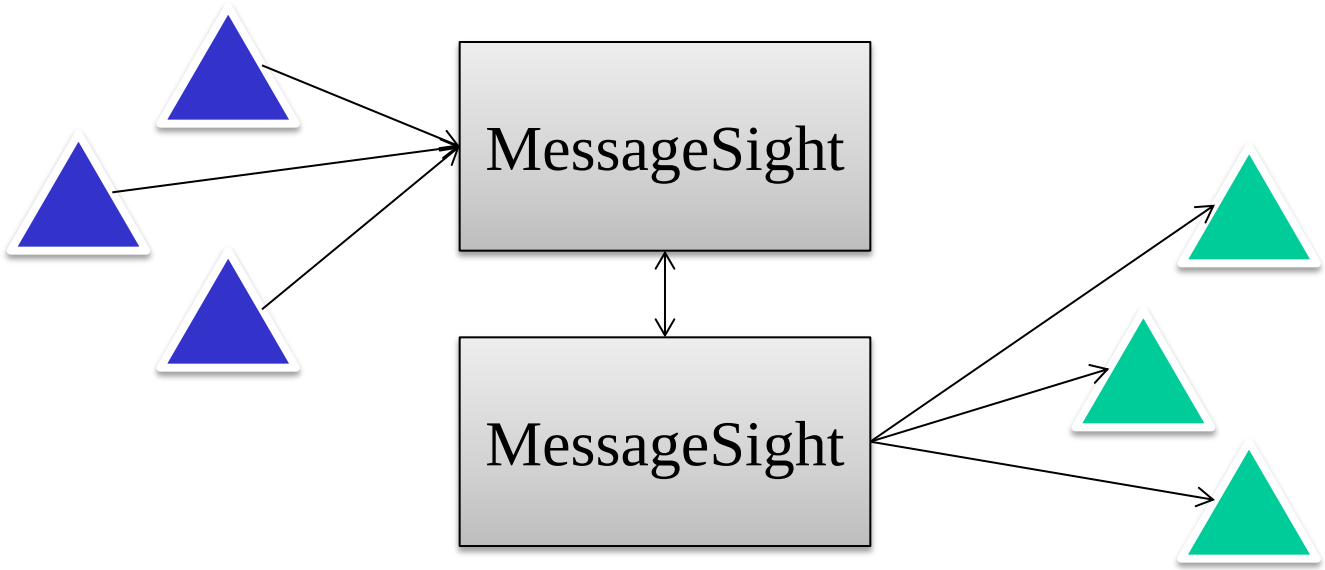
MessageSight HA Configuration

- A set of MQTT applications publish and subscribe to an HA MessageSight server. Failover is automatic.
- Applications use a *list of addresses*. Messages are not lost during failover – server store is continuously updated.



MessageSight Cluster Configuration

- A new feature in MessageSight 2.0 is clustering
- One or more MessageSight 2.0 servers can be connected in a cluster, and forward messages between them. HA servers can participate in clusters.



This looks familiar!

- All of these architectures look like MQ architectures!
- Correct!
- There are specific limitations with MQTT clusters.
- ONLY Mqtt messages are forwarded across the cluster.
- Messages received from the MessageSight JMS provider are not forwarded.
- Messages received from MQ are not forwarded.
- Implications will be discussed later in this talk.

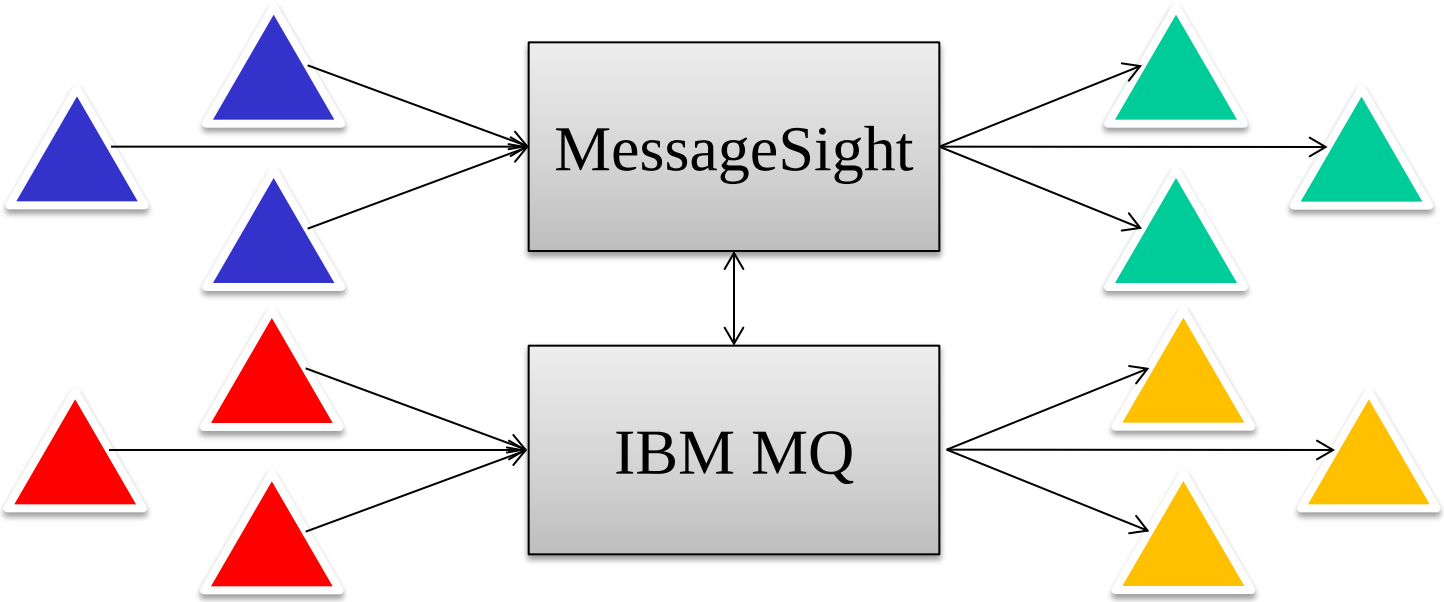
Questions & Answers

MessageSight and MQ Architectures

- What follows is an illustration of several different MessageSight Architectures connected to MQ
- This includes discussion of how messages flow between MessageSight and MQ.

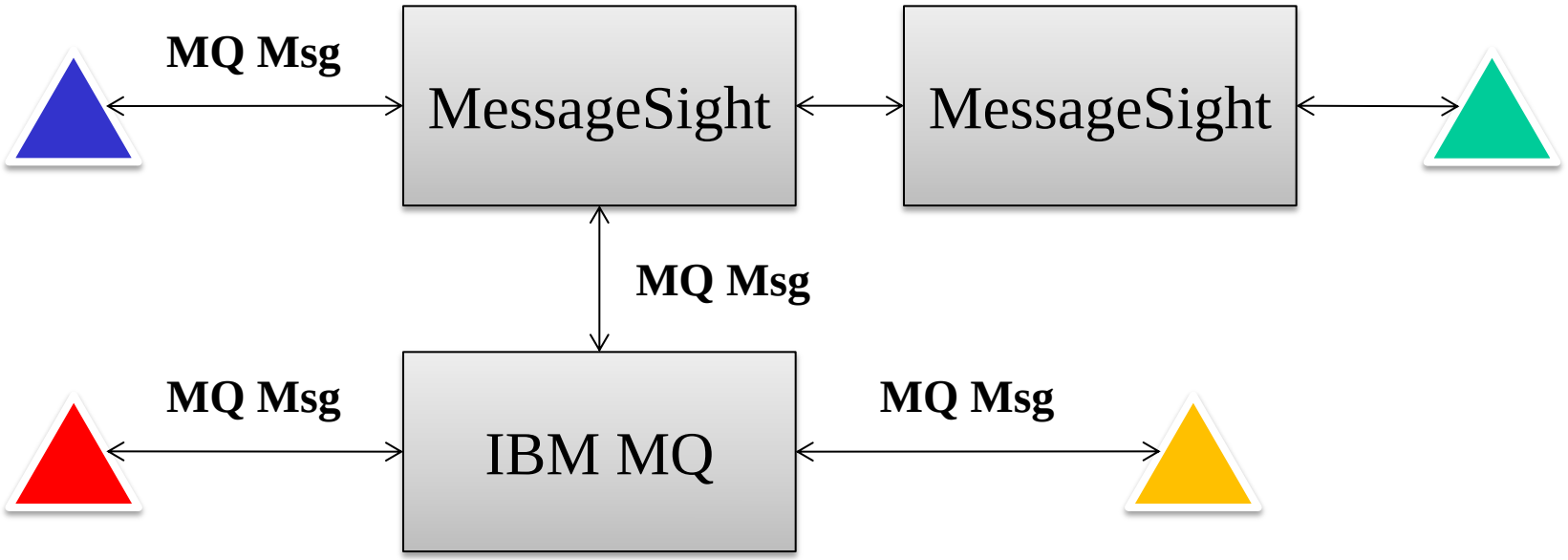
Connecting IBM MQ to MessageSight

- First is a simple MessageSight and MQ Configuration.
- Messages flow between MessageSight and MQ based on using defined connections and on defined rules.



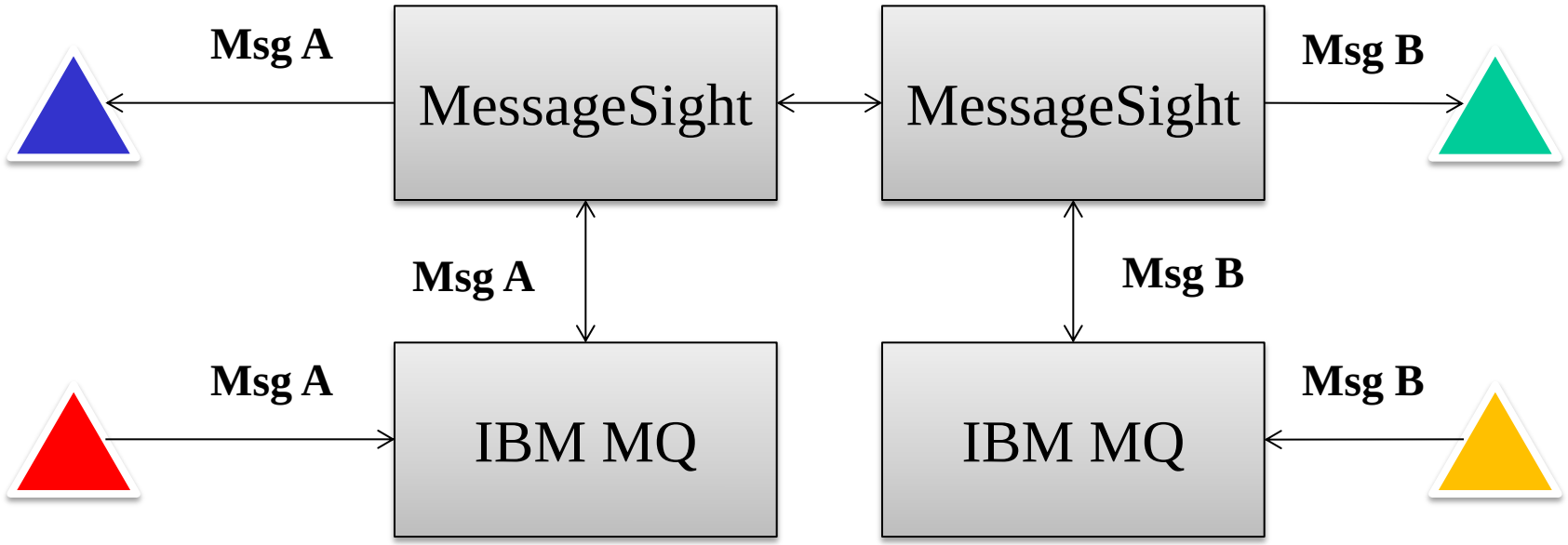
Connecting MQ to MessageSight Clusters

- Next is a MessageSight Cluster and one MQ Queue Manager.
- MQ Messages do not get forwarded through MS Cluster



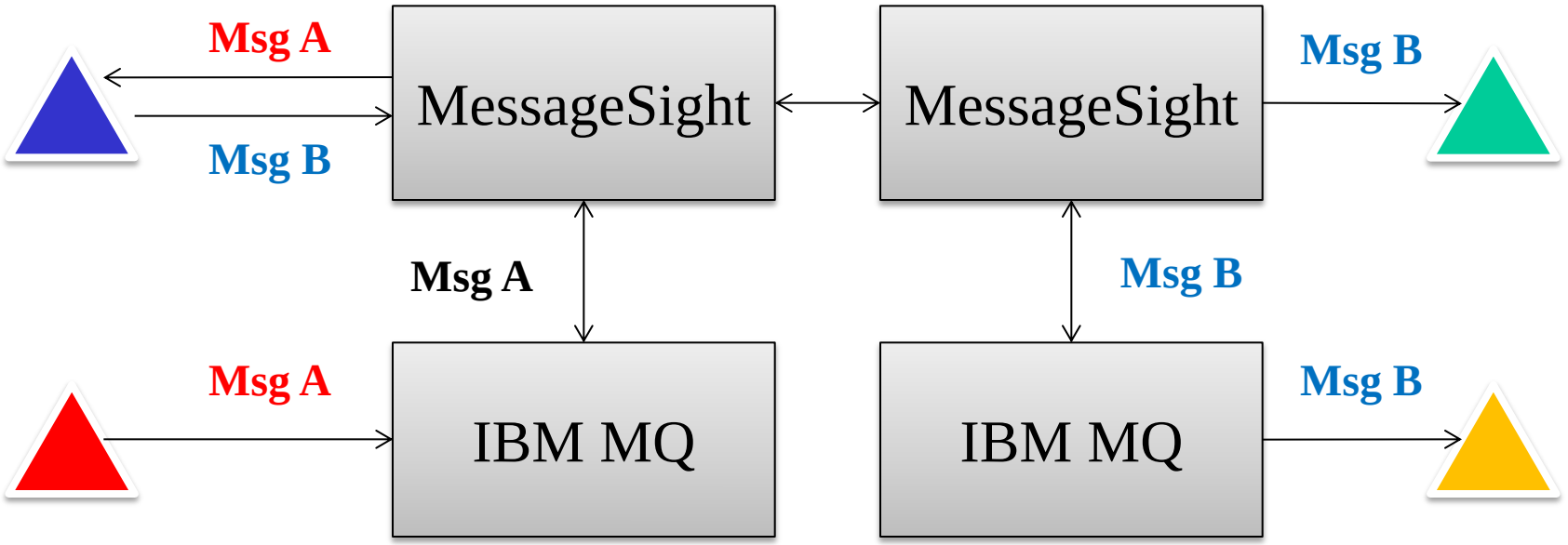
Connecting MQ to MessageSight Clusters

- Next is a MessageSight Cluster and two MQ Queue managers.
- MQ Messages do not get forwarded through the MessageSight Cluster



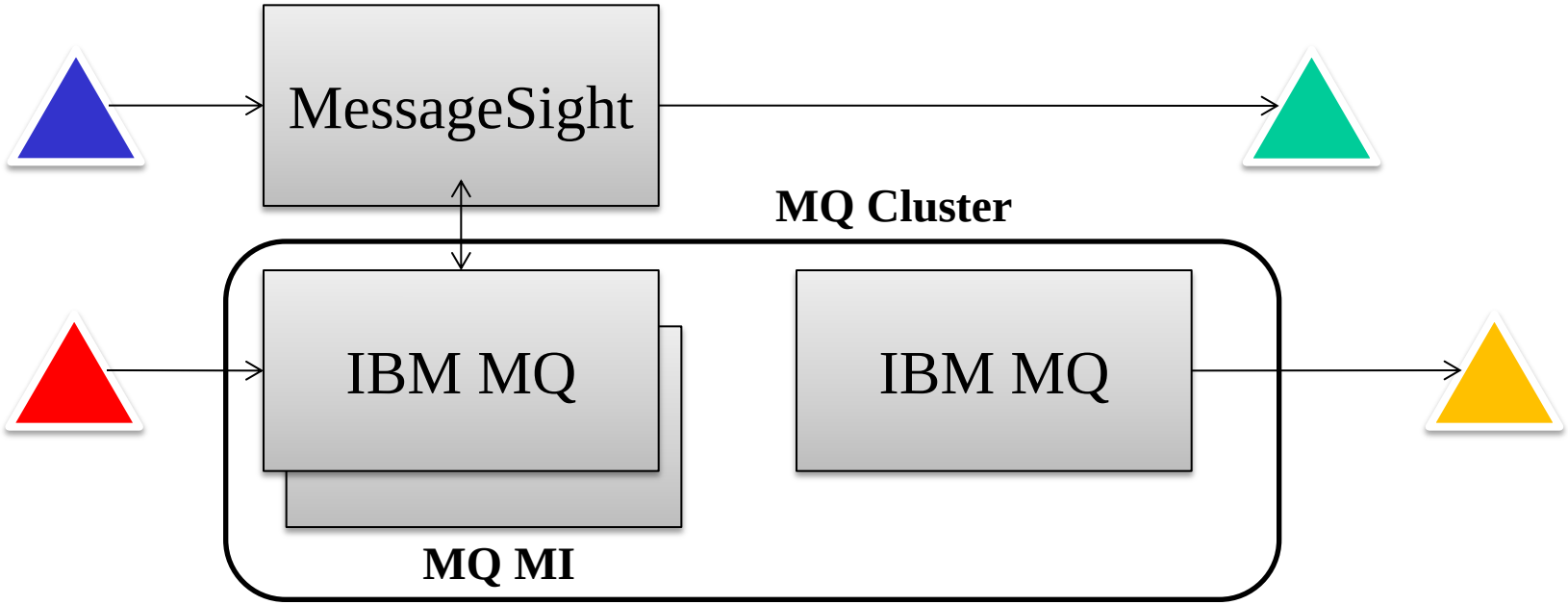
Connecting MQ to MessageSight Clusters

- Next is a MessageSight Cluster and two MQ Qms.
- MQTT Messages do get forwarded through the MessageSight Cluster. MQ Messages do not.



MessageSight and MQ HA and Clusters

- MessageSight does not know about MQ Clusters, so once messages pass over into MQ, all message movement is handled by MQ.
- MessageSight can accept connection lists in the QMC field – the only limit is the length of a CONNAME.



Questions & Answers

Connecting MessageSight to MQ

- What follows is a discussion of how to connect MessageSight and MQ
- MessageSight is connected to MQ using two configuration objects : a Queue Manager Connection and a Destination Mapping Rule.
- There is also discussion of where and how message duplication can occur.

Creating QueueManagerConnections

- MessageSight uses Queue Manager Connections (QMCs) to identify how to connect to a specific queue manager.
- MessageSight acts as an MQClient, so QMCs only talk to SVRCONN channels. Each QMC is a single MQ Client connection.
- Configurable using Web GUI or REST API.
- Supports TLS
- Supports Channel Username and Password, stored securely. (documentation not updated yet)

Create Destination Mapping Rules

- **MessageSight uses Destination Mapping Rules (DMRs) to determine how messages flow between MessageSight and IBM MQ.**
- **Again, created by WebUI or REST.**
- **DMRs support mapping between:**
  - Topics, queues, and topic subtrees, either between MQ and MessageSight or MessageSight and MQ.
  - MessageSight queues are *MessageSight JMS only*, and do not support Topic Subtrees. You cannot use MQTT to get messages from MessageSight queues.
- **DMRs use one or more QMCs.**

DMRs in Action, part 1

- A single DMR is created using a single QMC. It maps FROM a MessageSight Topic TO an MQ queue.
- When a single MQTT publisher sends to the topic, the MQ queue receives a single copy of each message published.
- When more than one MQTT publisher sends to the topic, the MQ queue receives a single copy of each message published.

DMRs in Action, part 2

- A single DMR is created using more than one QMC. It maps from a MessageSight Topic to a single MQ queue.
- When a single MQTT publisher sends to the topic, each QMC sends one copy of each message to the queue.
- When more than one MQTT publisher sends to the topic, each QMC sends one copy of each message through it's connection.
- Messages can be duplicated, if each QMC points to the same queue manager or if the queue is shared in a cluster.

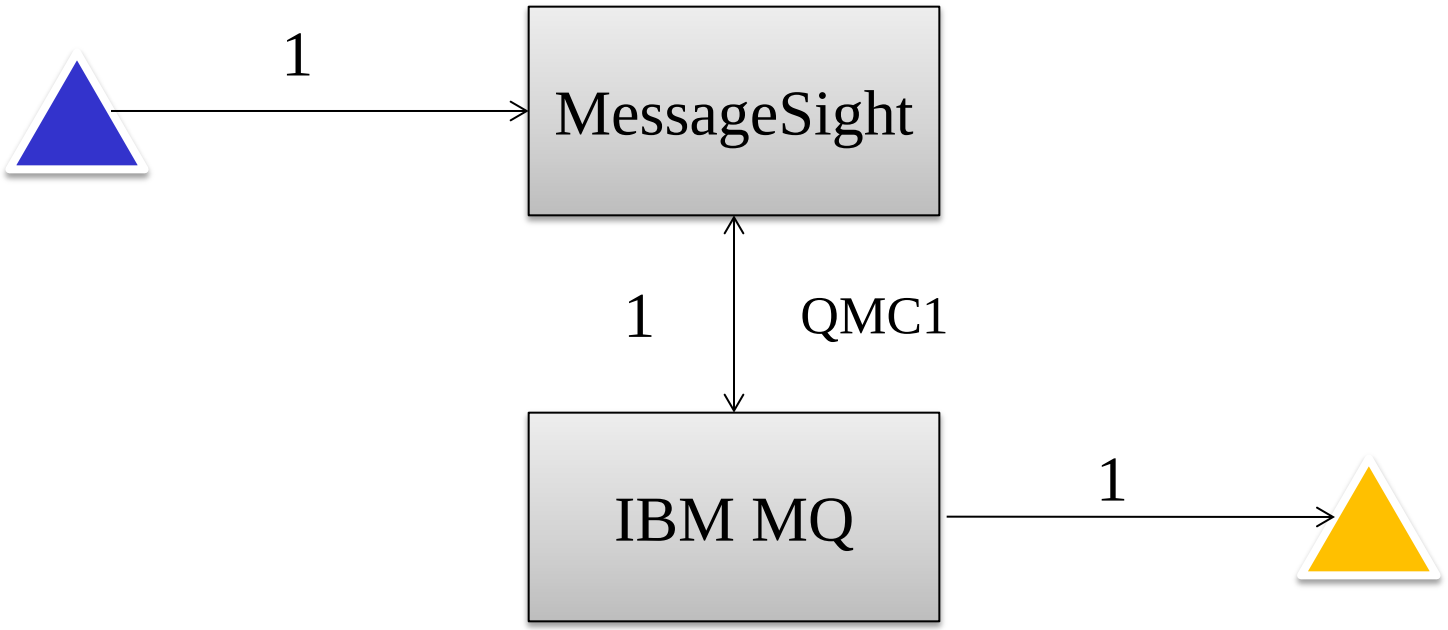
Message Duplication Scenarios

- Messages will be duplicated when mapping to or from topics – each message published goes to every subscriber. This is normal.
- Messages can be duplicated when using more than one QMC on the same DMR, particularly if each QMC points to the same qmgr, or the DMR points to a clustered object.
- Mapping from MessageSight Topics to MQ Queues will cause duplicate messages to be received by the MQ Queue when more than one QMC is used. Each QMC acts as a sender.
- Mapping from MessageSight Topics to MQ Topics will cause each message to be received by every MessageSight subscriber when more than one QMC is used. Each QMC acts as an MQ subscriber.

MessageSight to MQ example 1

An MQTT Publisher sends one message to MQ

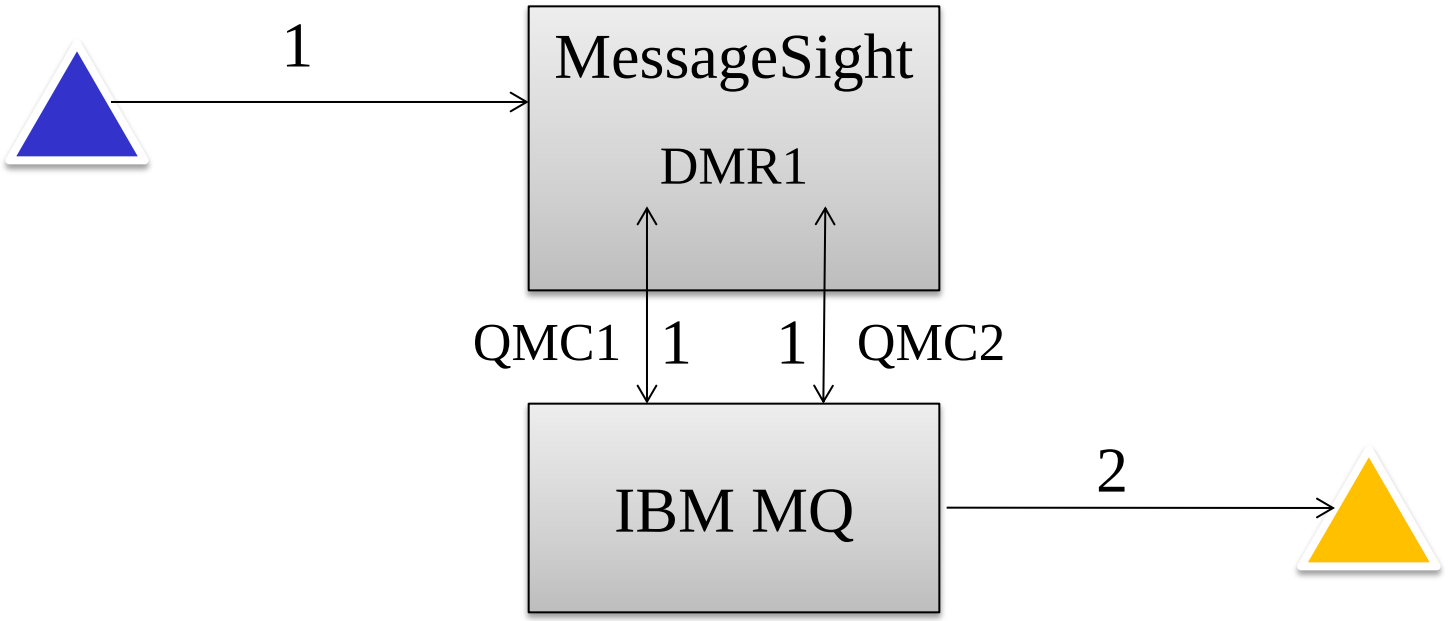
The MQ Queue receives one message from the one QMC



MessageSight to MQ example 2

MQTT Publisher sends one message to MessageSight.

The MQ Queue receives one message from each QMC for each matching DMR using one of those QMCs.

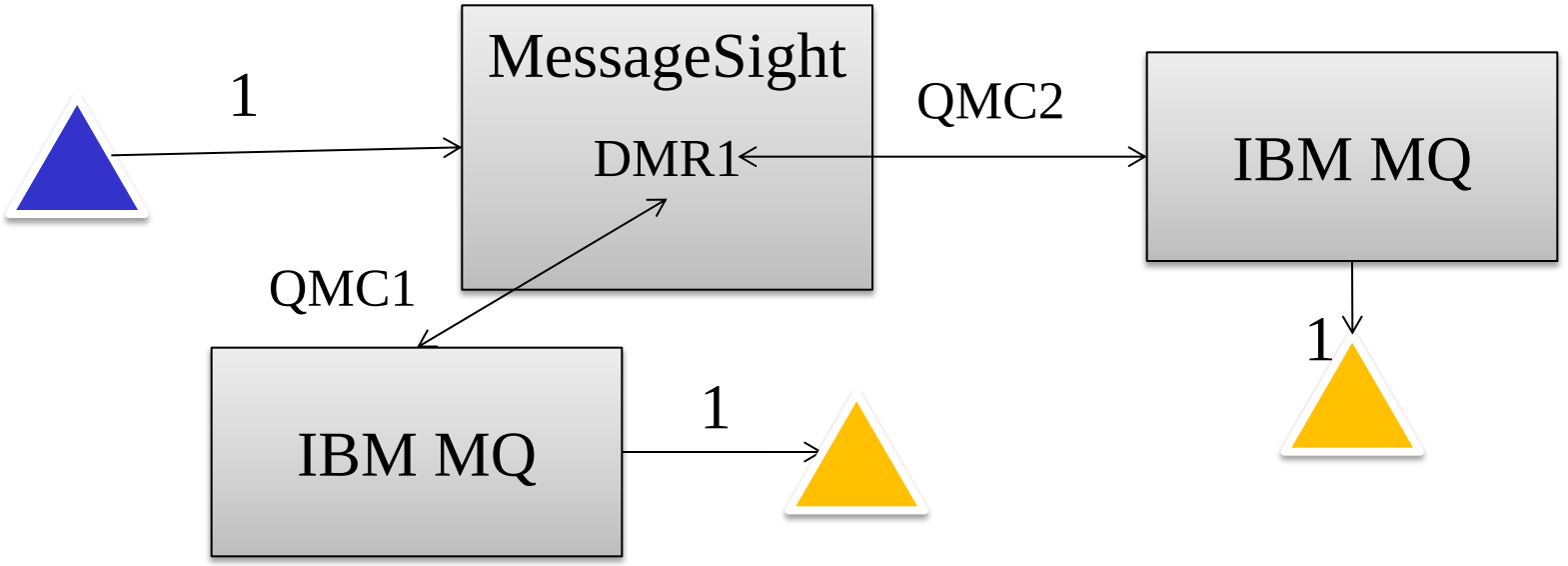


MessageSight to MQ example 3

MQTT Publisher sends one message to MessageSight

Two QMCs – one for each Qmgr. One DMR.

The DMR matches, and both queue managers get a message.

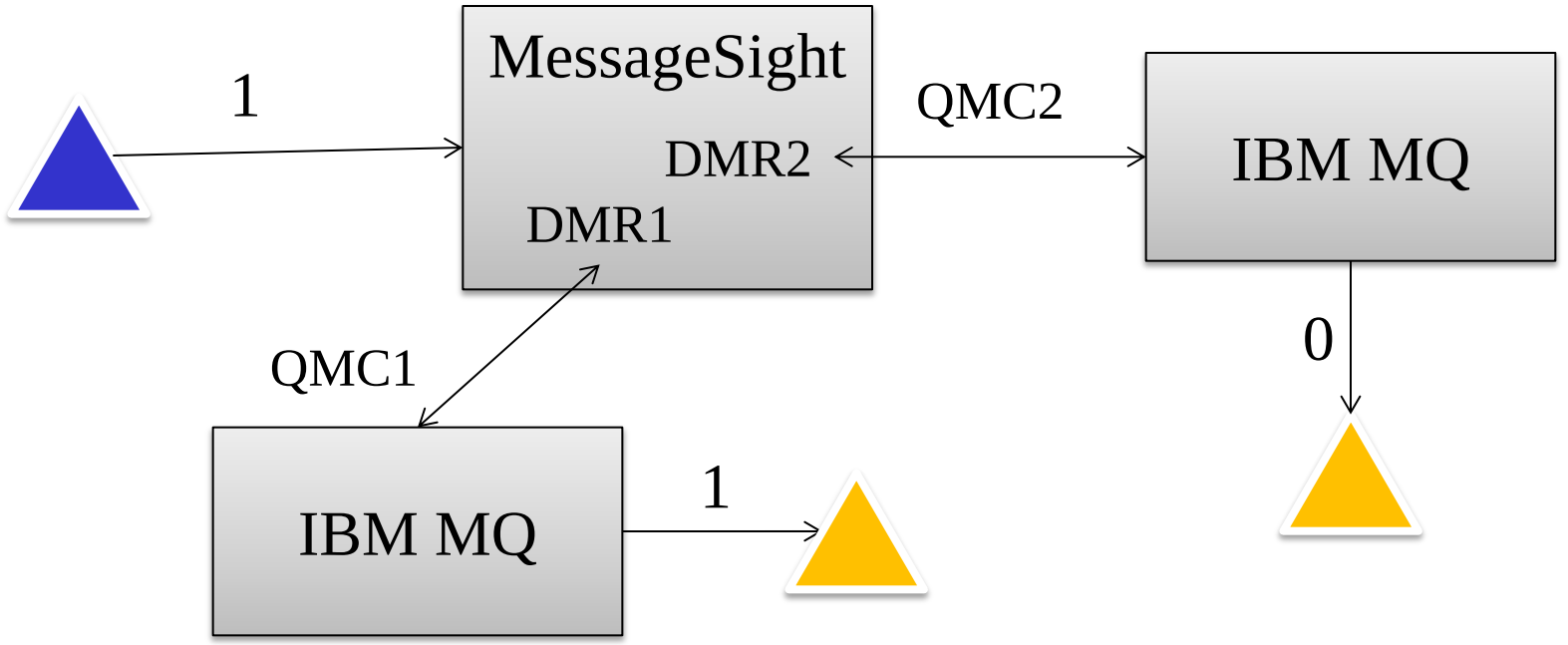


MessageSight to MQ example 4

MQTT Publisher sends one message to MessageSight

Two QMCs – one for each Qmgr with one DMR each.

DMR1 matches, DMR 2 doesn't.



Summary

- **In this talk, we've discussed :**
  - What IBM IoT MessageSight is and it's history
  - How IBM IoT MessageSight 2.0 allows for several new, but familiar, architectures
  - How MessageSight 2.0 connects to IBM MQ.
  - How messages flow between MessageSight 2.0 clusters
  - How messages flow between MessageSight 2.0 and IBM MQ
  - Where connections between MessageSight 2.0 and IBM MQ can cause unexpected duplicate messages.

Questions & Answers