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WebSphere MQ Application Design, the Good, the Bad and the Ugly

Session 12624

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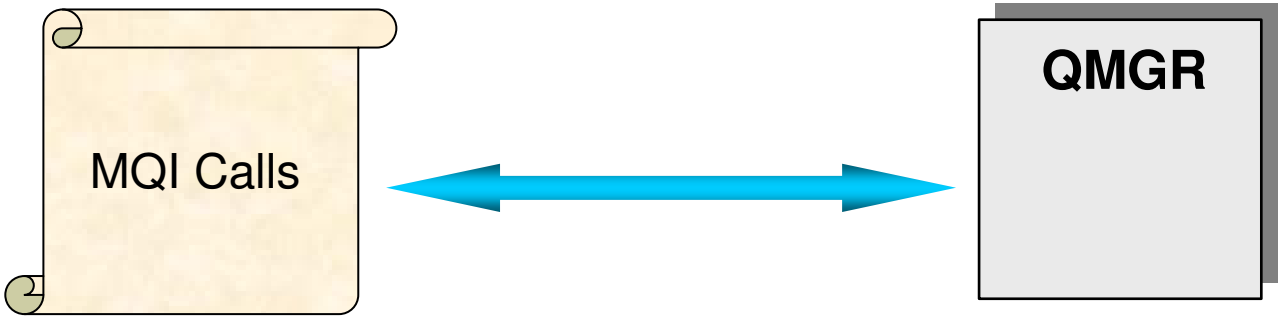
Agenda

- **MQI Concepts**
- **MQI Structures & Datatypes**
- **Basic MQI walkthrough**
  - With Demonstrations
  - A number of verbs we do not cover
    - MQCMIT, MQBACK, MQINQ, MQSET etc



Languages

- **Procedural (MQI)**
  - C
  - COBOL
  - Visual Basic
  - RPG
  - PL/1
  - Assembler
  - TAL
- **Object-Oriented (Classes)**
  - Java
  - JMS
  - C++
  - ActiveX (MQAX)
  - Perl

Interface

- **Simple ‘handle’ based interface**
  - Returned handle passed to subsequent call
- **Each verb returns**
  - Completion Code
    - `MQCC_OK` 0
    - `MQCC_WARNING` 1
    - `MQCC_FAILED` 2
  - Reason Code
    - `MQRC_xxxxxxx` 2xxx
    - `MQRC_NONE` 0
- **GOOD: Checking reason codes!!**

Data Structures

- **Programmers should be familiar with:**

Name	Description	Purpose
MQMD	**Message Descriptor**	**Attributes associated with a message**
MQOD	**Object Descriptor**	**Describes what object to open**
MQSD	**Subscription Descriptor**	**Describes what to subscribe to**
MQPMO	**Put Message Options**	**Describes how a message should be put**
MQGMO	**Get Message Options**	**Describes how a message should be got**

Data Structure Tips

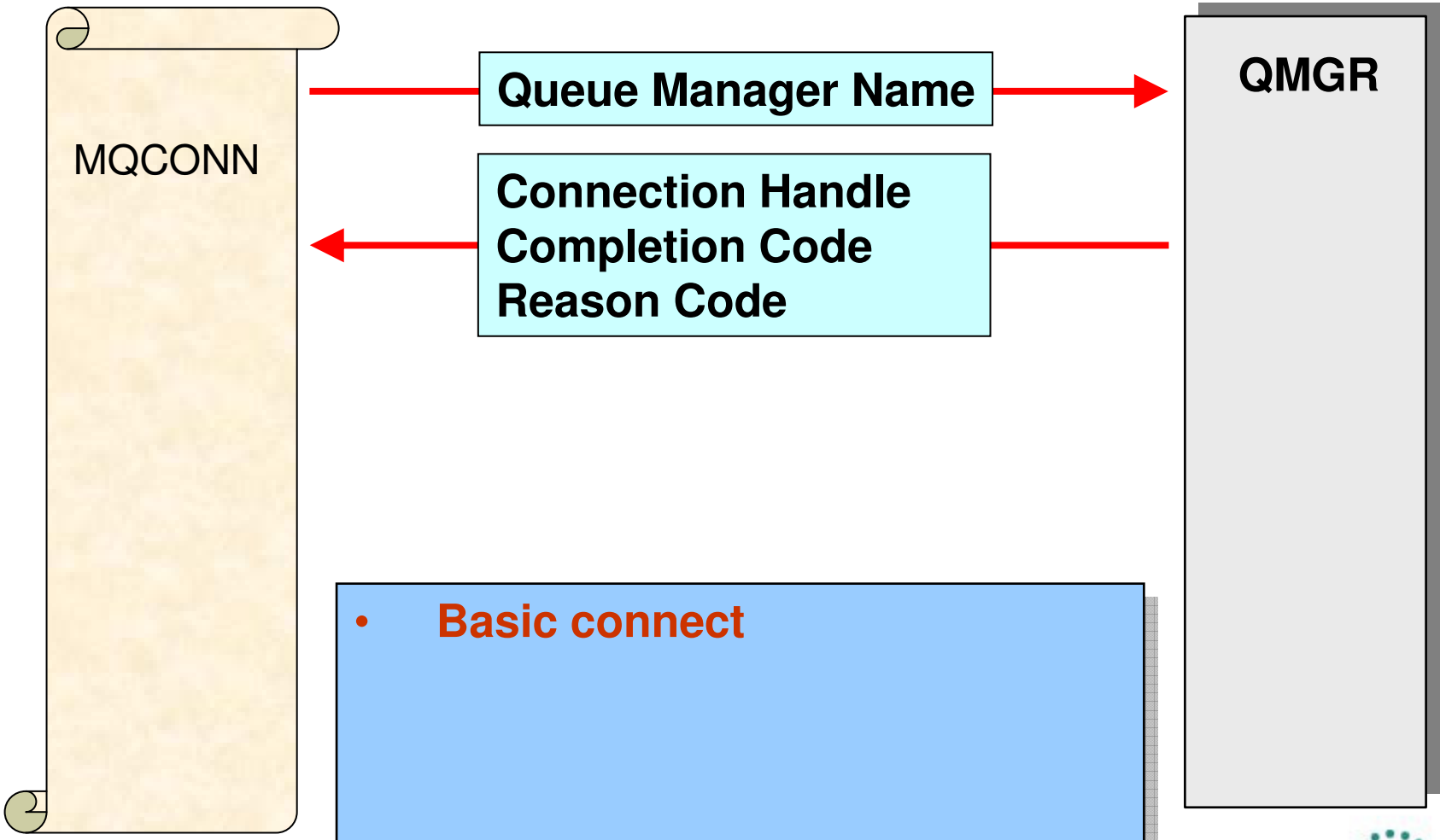
- **GOOD: Use structure initialisers**
  - `MQMD md = { MQMD_DEFAULT };`
  - Initialise to version 1
- **Structures are versioned**
  - Set the minimum version you need
    - `md.Version = 2;`
  - BAD: Using current version
    - `md.Version = MQMD_CURRENT_VERSION;`
- **Bear in mind that some structures are input/output**
  - May need to reset values for subsequent call
    - GOOD: Eg. MsgId & CorrelId fields of MQMD on MQGET call

MQ Elementary Data Types

- **The main MQI data types**

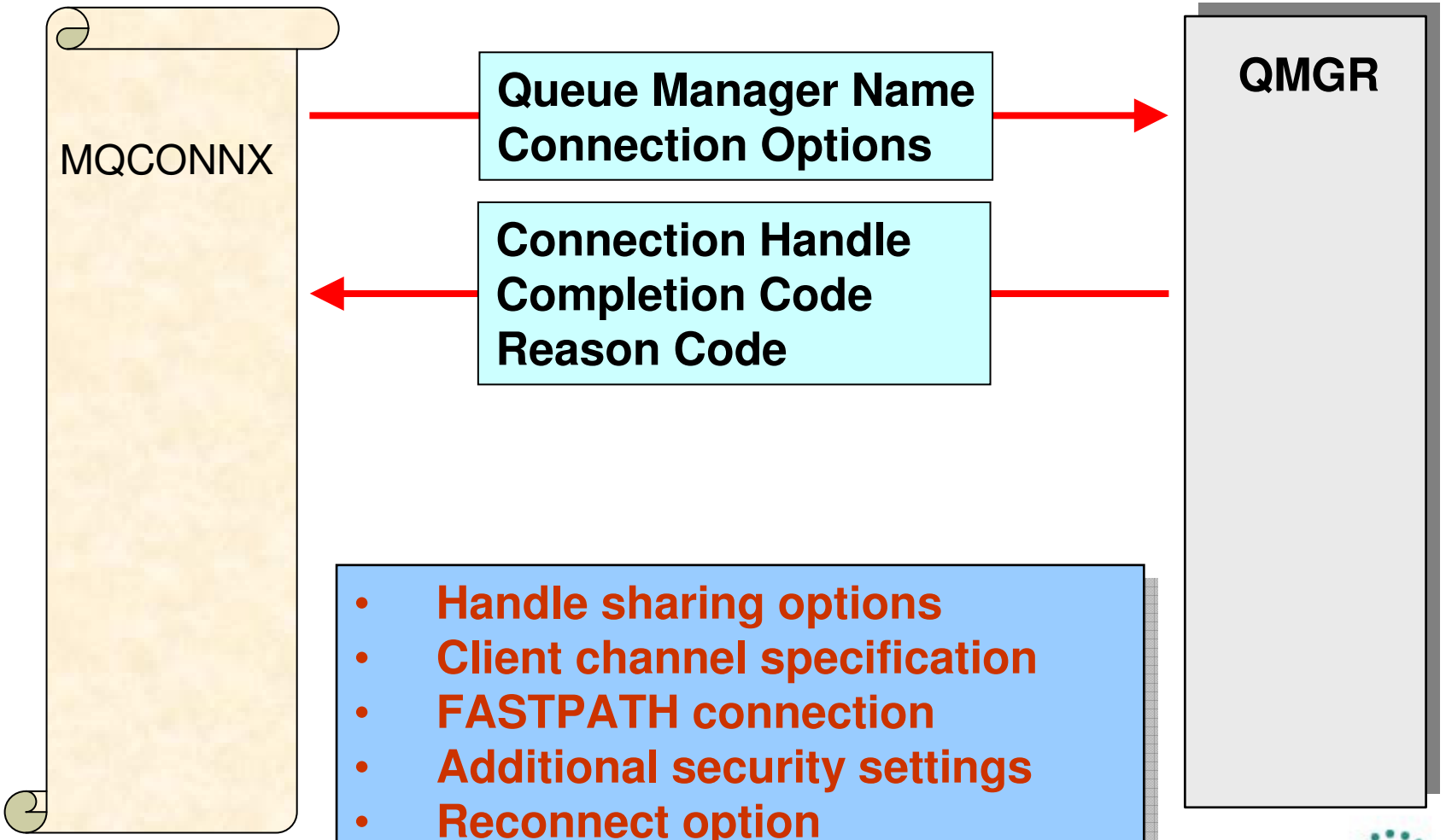
DataType	Purpose
MQHCONN	4-byte Connection Handle
MQHOBJ	4-byte Object Handle
MQLONG	4-byte binary integer
MQPTR	Pointer
MQCHARn	A series of “n” bytes containing character data
MQBYTEn	A series of “n” bytes containing binary data
MQCHARV	Variable length string

Connect



- Basic connect

Connect with extended options



- Handle sharing options
- Client channel specification
- FASTPATH connection
- Additional security settings
- Reconnect option

Connecting

- **MQCONNX**
  - UGLY: hardcoded QM name
  - GOOD: Always check reason codes
- **Connections options**
  - Connection not thread specific
  - Client reconnect

```
MQCONNX( Qm,
         &cno,
         &hQm,
         &CompCode,
         &Reason);

if (CompCode == MQCC_FAILED)
{
  /* Do some error processing */
  /* Possibly retry           */
}
```

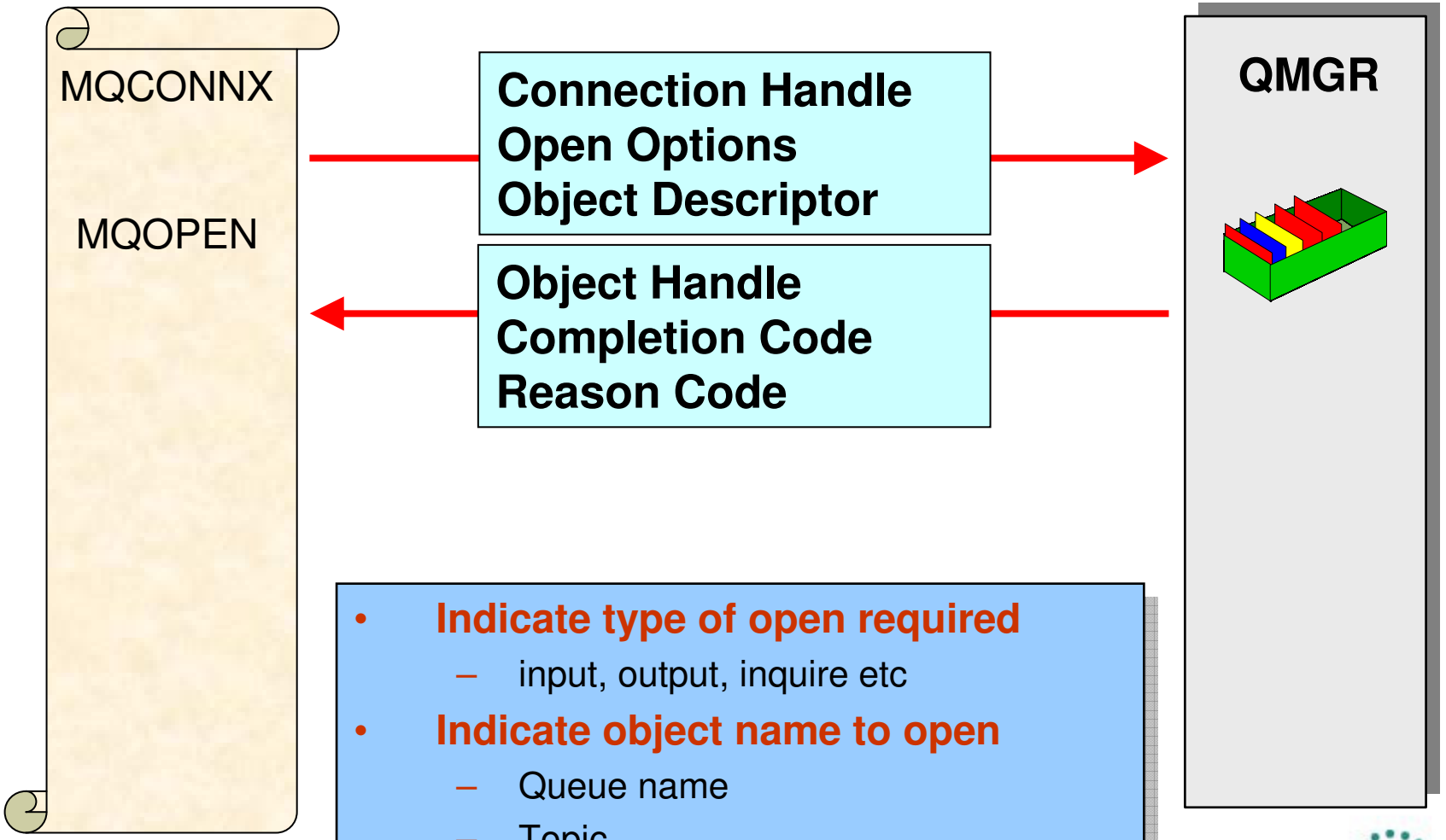
```
MQHCONN  hQm = MQHC_UNUSABLE_HCONN;
MQCHAR48 Qm  = "QM1";
MQCNO    cno = {MQCNO_DEFAULT};

cno.Options |= MQCNO_HANDLE_SHARE_BLOCK |
               MQCNO_RECONNECT;
```

MQCONN(X) Tips

- **UGLY: hardcoded Queue Manager names**
  - Pass as parameter or configure in INI file
- **GOOD: Best to use MQCONNX**
  - Has options structure should it be needed
- **BAD: Most expensive verb**
  - Don't issue it repeatedly for each request
    - Often problem for OO languages
- **If MQI handle need to be used on different threads**
  - Use connection options to indicate the MQI handle can be shared
  - Choose to block or reject any calls from another thread when handle is in use
- **GOOD: If reconnecting use exponential back-off with random wait**
  - Try to avoid client storms
- **Can dynamically load MQ libraries if client or local binding**
  - Preferable to shipping two versions of the program

Open a Queue



- **Indicate type of open required**
  - input, output, inquire etc
- **Indicate object name to open**
  - Queue name
  - Topic

Open a queue

- **MQOPEN a queue**
- **OpenOptions**
  - MQOO_ flags which are required
- **MQOD describes a object to open**
  - ObjectType
    - MQOT_Q for point-to-point
    - MQOT_TOPIC for publish
  - ObjectString/ObjectName

```
OpenOpts = MQOO_OUTPUT
         | MQOO_FAIL_IF_QUIESCING;
MQOPEN( hQm,
        &ObjDesc,
        OpenOpts,
        &hObj,
        &CompCode,
        &Reason);
```

```
MQHOBJ hObj     = MQHO_UNUSABLE_HOBJ;
MQOD   ObjDesc = {MQOD_DEFAULT};

ObjDesc.ObjectType                = MQOT_Q;
strcpy(ObjectDesc.ObjectName, "Q1");
```

Object Descriptor (MQOD)

Field	Description	Version
StrucId	Structure identifier	1
Version	Structure version number	
ObjectType	Object type	
ObjectName	Object name	
ObjectQMgrName	Object queue manager name	
DynamicQName	Dynamic queue name	
AlternateUserId	Alternate user identifier	
RecsPresent	Number of object records present	2
KnownDestCount	Number of local queues opened successfully	
UnknownDestCount	Number of remote queues opened successfully	
InvalidDestCount	Number of queues that failed to open	
ObjectRecOffset	Offset of first object record from start of MQOD	
ResponseRecOffset	Offset of first response record from start of MQOD	
ObjectRecPtr	Address of first object record	
ResponseRecPtr	Address of first response record	
AlternateSecurityId	Alternate security identifier	3
ResolvedQName	Resolved queue name	
ResolvedQMgrName	Resolved queue manager name	
ObjectString	Long object name	4
SelectionString	Selection string	
ResObjectString	Resolved long object name	
ResolvedType	Resolved object type	

Open Options

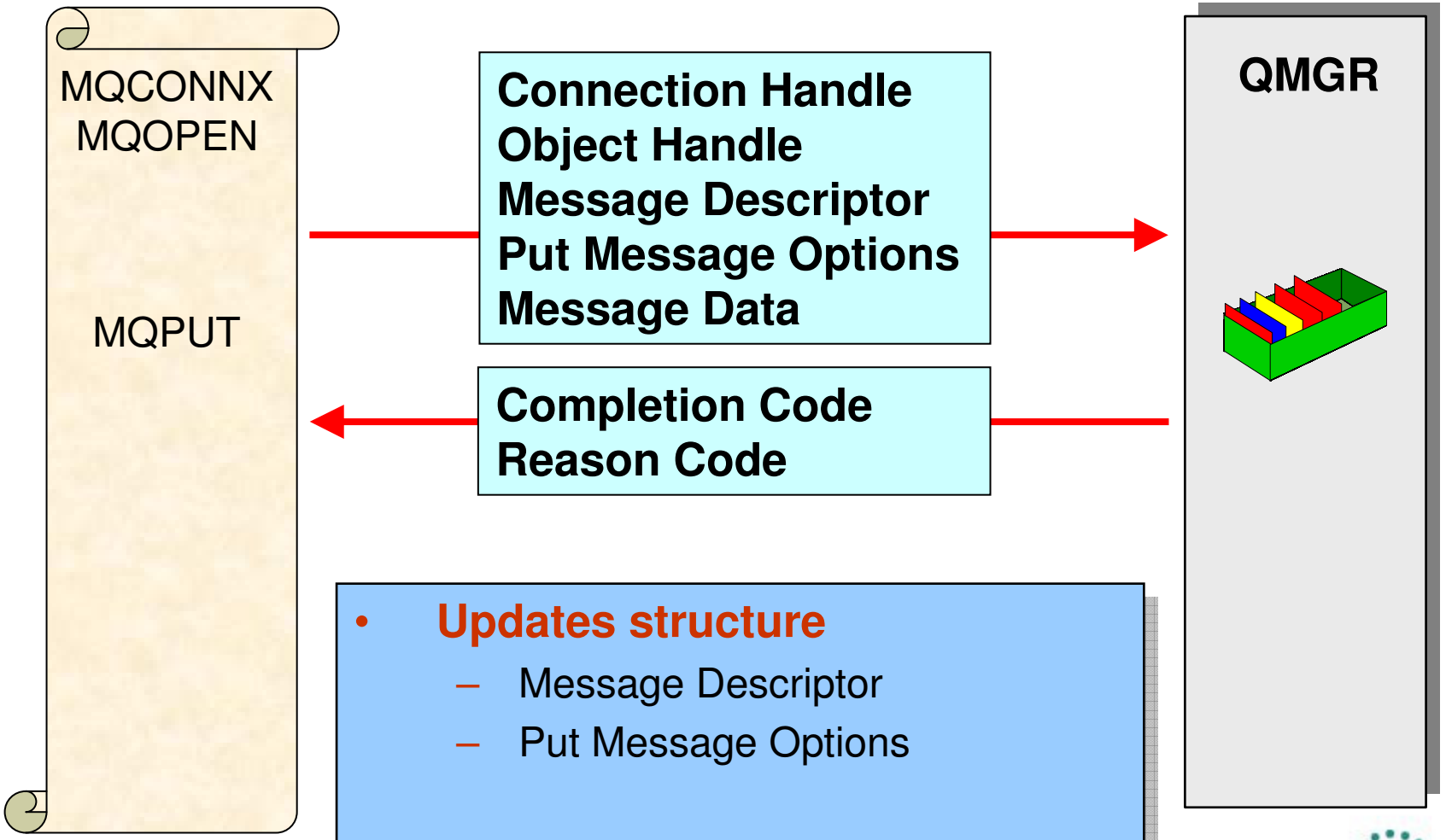
```
#define MQOO_BIND_AS_Q_DEF              0x00000000
#define MQOO_READ_AHEAD_AS_Q_DEF        0x00000000
#define MQOO_INPUT_AS_Q_DEF             0x00000001
#define MQOO_INPUT_SHARED               0x00000002
#define MQOO_INPUT_EXCLUSIVE            0x00000004
#define MQOO_BROWSE                     0x00000008
#define MQOO_OUTPUT                     0x00000010
#define MQOO_INQUIRE                    0x00000020
#define MQOO_SET                        0x00000040
#define MQOO_SAVE_ALL_CONTEXT           0x00000080
#define MQOO_PASS_IDENTITY_CONTEXT      0x00000100
#define MQOO_PASS_ALL_CONTEXT           0x00000200
#define MQOO_SET_IDENTITY_CONTEXT       0x00000400
#define MQOO_SET_ALL_CONTEXT            0x00000800
#define MQOO_ALTERNATE_USER_AUTHORITY   0x00001000
#define MQOO_FAIL_IF_QUIESCING          0x00002000
#define MQOO_BIND_ON_OPEN               0x00004000
#define MQOO_BIND_NOT_FIXED             0x00008000
#define MQOO_CO_OP                      0x00020000
#define MQOO_NO_READ_AHEAD              0x00080000
#define MQOO_READ_AHEAD                 0x00100000
```

- **Options can be ‘ORed’ together as required**

MQOPEN Tips

- **UGLY: hardcoded queue/topic names**
- **BAD: Opening queues exclusively**
  - Will reduce options for workload balancing
- **GOOD: Use MQPUT1 if only opening queue to put one message**
- **GOOD: Consider queue cache for common used queues**
  - MQOPEN is relatively expensive – load and security check
- **GOOD: Use read ahead for performance gain**
  - If client and non-persistent messaging
- **If opening model reply queues**
  - Be aware of how many instances of queues you may be creating
    - Particularly large numbers of clients.
  - May be better to share reply queue

Put a message



- **Updates structure**
  - Message Descriptor
  - Put Message Options

Putting Application

- **MQOPEN a queue**
- **MQPUT a message**
  - Simple Hello World message
  - Set message format to string
  - Put out of syncpoint

```
OpnOpts = MQOO_OUTPUT
        | MQOO_FAIL_IF_QUIESCING;
MQOPEN( hConn,
        &od,
        OpnOpts,
        &hObj,
        &CompCode,
        &Reason);

MQPUT ( hConn,
        hObj,
        &md,
        &pmo,
        strlen(msg),
        msg,
        &CompCode,
        &Reason);
```

```
MQMD    md      = {MQMD_DEFAULT};
MQPMO   pmo     = {MQPMO_DEFAULT};
char    Msg     = "Hello World!";

memcpy(md.Format, MQFMT_STRING, MQ_FORMAT_LENGTH);
pmo.Options = MQPMO_NO_SYNCPOINT;
```

Message Descriptor (MQMD)

Field (V1)	Description
StrucId	Structure identifier
Version	Structure version number
Report	Options for report messages
MsgType	Message Type
Expiry	Message lifetime
Feedback	Feedback or reason code
Encoding	Numeric encoding of message data
CodedCharSetId	Character set identifier of message data
Format	Format name of message data
Priority	Message priority
Persistence	Message persistence
MsgId	Message identifier
CorrelId	Correlation identifier
BackoutCount	Backout counter
ReplyToQ	Name of reply queue
ReplyToQMgr	Name of reply queue manager
UserIdentifier	User identifier
AccountingToken	Accounting token
ApplIdentityData	Application data relating to identity
PutApplType	Type of application that put the message
PutApplName	Name of application that put the message
PutDate	Date when message was put
PutTime	Time when message was put
ApplOriginData	Application data relating to origin

Field (V2)	Description
GroupId	Group identifier
MsgSeqNumber	Sequence number of logical message within group
Offset	Offset of data in physical message from start of logical message
MsgFlags	Message flags
OriginalLength	Length of original message

Put Message Options (MQPMO)

Field	Description	Version
StrucId	Structure identifier	
Version	Structure version number	
Options	Options that control the action of MQPUT and MQPUT1	
Context	Object handle of input queue	
KnownDestCount	Number of messages sent successfully to local queues	1
UnknownDestCount	Number of messages sent successfully to remote queue	
InvalidDestCount	Number of messages that could not be sent	
ResolvedQName	Resolved name of destination queue	
ResolvedQMgrName	Resolved name of destination queue manager	
RecsPresent	Number of put messages records or response records present	
PutMsgRecFields	Flags indicating which MQPMR fields are present	
PutMsgRecOffset	Offset of first put-message records from start of MQPMO	2
ResponseRecOffset	Offset of first response record from start of MQPMO	
PutMsgRecPtr	Address of first put message record	
ResponseRecPtr	Address of first response record	
OriginalMsgHandle	Original message handle	
NewMsgHandle	New message handle	
Action	Type of put being performed and the relationship between the original message and the new message	3
PubLevel	Level of subscription targeted by the publication	

Put Options

```
#define MQPMO_SYNCPOINT                 0x00000002
#define MQPMO_NO_SYNCPOINT              0x00000004
#define MQPMO_DEFAULT_CONTEXT           0x00000020
#define MQPMO_NEW_MSG_ID                0x00000040
#define MQPMO_NEW_CORREL_ID             0x00000080
#define MQPMO_PASS_IDENTITY_CONTEXT     0x00000100
#define MQPMO_PASS_ALL_CONTEXT          0x00000200
#define MQPMO_SET_IDENTITY_CONTEXT      0x00000400
#define MQPMO_SET_ALL_CONTEXT           0x00000800
#define MQPMO_ALTERNATE_USER_AUTHORITY  0x00001000
#define MQPMO_FAIL_IF_QUIESCING         0x00002000
#define MQPMO_NO_CONTEXT                0x00004000
#define MQPMO_LOGICAL_ORDER             0x00008000
#define MQPMO_ASYNC_RESPONSE            0x00010000
#define MQPMO_SYNC_RESPONSE             0x00020000
#define MQPMO_RESOLVE_LOCAL_Q           0x00040000
#define MQPMO_WARN_IF_NO_SUBS_MATCHED   0x00080000
#define MQPMO_RETAIN                    0x00200000
#define MQPMO_MD_FOR_OUTPUT_ONLY        0x00800000
#define MQPMO_SCOPE_QMGR                0x04000000
#define MQPMO_SUPPRESS_REPLYTO          0x08000000
#define MQPMO_NOT_OWN_SUBS              0x10000000
#define MQPMO_RESPONSE_AS_Q_DEF         0x00000000
#define MQPMO_RESPONSE_AS_TOPIC_DEF     0x00000000
```

- **Options can be ‘ORed’ together as required**

MQPUT Tips

- **GOOD: Always use explicit syncpoint setting**
  - Defaults are not the same on z/OS and Distributed
  - Generally
    - Syncpoint when persistent
    - No syncpoint when non-persistent
- **Try not to use extreme message sizes**
  - QM optimized for message 4K – 1MB
- **Consider async put response for performance gain**
  - If on client and sending many non-persistent messages

Get a message

MQCONNX
MQOPEN
MQPUT

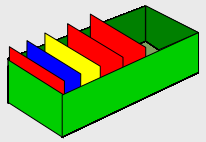
MQOPEN

MQGET

Connection Handle
Object Handle
Message Descriptor
Get Message Options
Buffer Size

Message Data
Message Length
Completion Code
Reason Code

QMGR



- **Updates structure**
  - Message Descriptor
  - Get Message Options

Getting Application

- **MQOPEN a queue**
- **MQGET a message**
  - Syncpoint if persistent
  - Always ask for convert
  - Wait for message
    - up to one minute

```
OpnOpts = MQOO_INPUT_SHARED
        | MQOO_FAIL_IF_QUIESCING;
MQOPEN( hConn,
        &od,
        OpnOpts,
        &hObj,
        &CompCode,
        &Reason);

MQGET ( hConn,
        hObj,
        &md,
        &gmo,
        sizeof(msg),
        msg,
        &msglen,
        &CompCode,
        &Reason);
```

```
MQMD   md       = {MQMD_DEFAULT};
MQGMO  gmo      = {MQGMO_DEFAULT};
gmo.Options = MQGMO_SYNCPOINT_IF_PERSISTENT |
              MQGMO_CONVERT                 |
              MQGMO_WAIT                    |
              MQGMO_FAIL_IF_QUIESCING;
gmo.WaitInterval = 60 * 1000;
```

Get Message Options (MQGMO)

Field	Description	Version
StrucId	Structure identifier	1
Version	Structure version number	
Options	Options that control the action of MQGET	
WaitInterval	Wait Interval	
Signal1	Signal	
Signal2	Signal identifier	
ResolvedQName	Resolved name of destination queue	
MatchOptions	Options controlling selection criteria used for MQGET	2
GroupStatus	Flag indicating whether message retrieved is in a group	
SegmentStatus	Flag indicating whether message retrieved is a segment of a logical message	
Sementation	Flag indicating whether further segmentation is allowed for the message retrieved	
MsgToken	Message token	3
ReturnedLength	Length of message data returned (bytes)	
MsgHandle	The handle to a message that is to be populated with the properties of the message being retrieved from the queue.	4

Get Options

```
#define MQGMO_WAIT                      0x00000001
#define MQGMO_NO_WAIT                   0x00000000
#define MQGMO_SET_SIGNAL                0x00000008
#define MQGMO_FAIL_IF_QUIESCING         0x00002000
#define MQGMO_SYNCPOINT                 0x00000002
#define MQGMO_SYNCPOINT_IF_PERSISTENT   0x00001000
#define MQGMO_NO_SYNCPOINT              0x00000004
#define MQGMO_MARK_SKIP_BACKOUT         0x00000080
#define MQGMO_BROWSE_FIRST              0x00000010
#define MQGMO_BROWSE_NEXT               0x00000020
#define MQGMO_BROWSE_MSG_UNDER_CURSOR   0x00000800
#define MQGMO_MSG_UNDER_CURSOR          0x00000100
#define MQGMO_LOCK                      0x00000200
#define MQGMO_UNLOCK                    0x00000400
#define MQGMO_ACCEPT_TRUNCATED_MSG      0x00000040
```

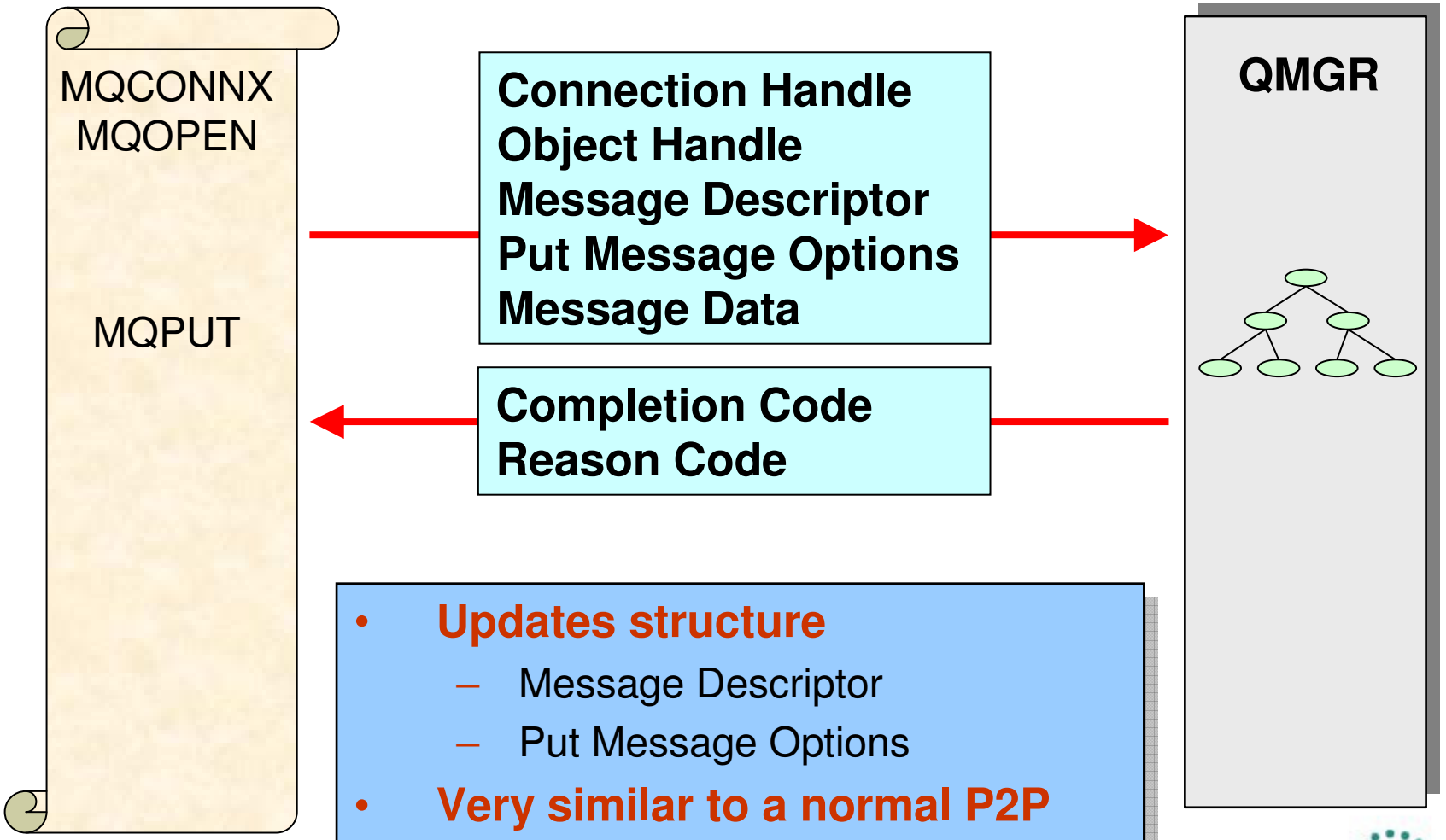
```
#define MQGMO_CONVERT                   0x00004000
#define MQGMO_LOGICAL_ORDER             0x00008000
#define MQGMO_COMPLETE_MSG              0x00010000
#define MQGMO_ALL_MSGS_AVAILABLE        0x00020000
#define MQGMO_ALL_SEGMENTS_AVAILABLE    0x00040000
#define MQGMO_MARK_BROWSE_HANDLE        0x00100000
#define MQGMO_MARK_BROWSE_CO_OP         0x00200000
#define MQGMO_UNMARK_BROWSE_CO_OP       0x00400000
#define MQGMO_UNMARK_BROWSE_HANDLE      0x00800000
#define MQGMO_UNMARKED_BROWSE_MSG       0x01000000
#define MQGMO_PROPERTIES_FORCE_MQRFH2   0x02000000
#define MQGMO_NO_PROPERTIES             0x04000000
#define MQGMO_PROPERTIES_IN_HANDLE      0x08000000
#define MQGMO_PROPERTIES_COMPATIBILITY  0x10000000
#define MQGMO_PROPERTIES_AS_Q_DEF       0x00000000
```

- **Options can be ‘ORed’ together as required**

MQGET Tips

- **GOOD: Avoid using default syncpoint setting**
  - Defaults are not the same on z/OS and Distributed
  - Generally
    - MQGMO_SYNCPOINT_IF_PERSISTENT
- **UGLY: Not using MQGMO_FAIL_IF_QUIESCING**
  - Ensure your application ends promptly
- **GOOD: Generally use MQGMO_CONVERT**
  - Even if you ‘think’ you don’t need it
- **GOOD: Remember to reset MsgId & CorrelId fields**
  - These fields are used for selection and are returned
- **BAD: Forgetting to handle ‘poison messages’**
  - Look at BackoutCount in MQMD
- **Consider using MQCB to consume messages instead**
  - Callback semantics, often easier to code

Publish a message



- **Updates structure**
  - Message Descriptor
  - Put Message Options
- **Very similar to a normal P2P Put**

Publishing Application

- MQOPEN a topic
- MQOD describes a topic to publish to
  - ObjectType
    - MQOT_Q for point-to-point
    - MQOT_TOPIC for publish
  - ObjectString/ObjectName
- MQPUT a message

```
OpnOpts = MQOO_OUTPUT
        | MQOO_FAIL_IF_QUIESCING;
MQOPEN( hConn,
        &ObjDesc,
        OpnOpts,
        &hObj,
        &CompCode,
        &Reason);

MQPUT ( hConn,
        hObj,
        &MsgDesc,
        &pmo,
        strlen(pBuffer),
        pBuffer,
        &CompCode,
        &Reason);
```

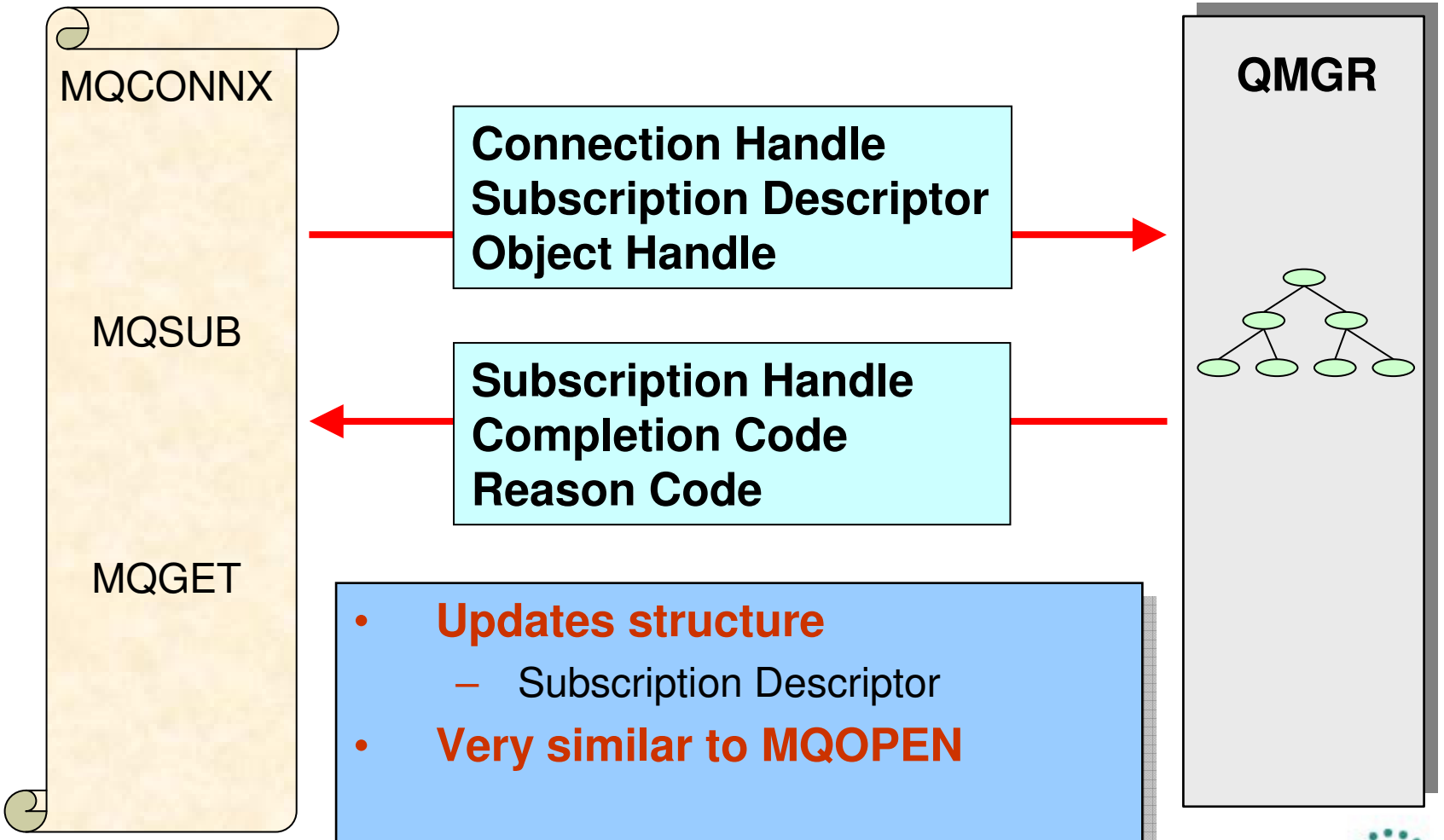
```
MQOD   ObjDesc = {MQOD_DEFAULT};

ObjDesc.ObjectType              = MQOT_TOPIC;
ObjDesc.Version                 = MQOD_VERSION_4;
ObjDesc.ObjectString.VSPtr      = "Price/Fruit/Apples";
ObjDesc.ObjectString.VSLength   = MQVS_NULL_TERMINATED;
```

Publishing Tips

- **Choose topic string carefully**
  - GOOD: Use sensible topic hierarchy
    - Based on context of published data
  - UGLY: Using different topic for each publish
    - This is probably meta data, use message property
  - BAD: Using long topic strings when not necessary
    - Topic strings can be up to 10K bytes
- **Consider using Topic object and Topic string**
  - Administer can set point in topic tree
    - Known as ‘topic tree isolation’

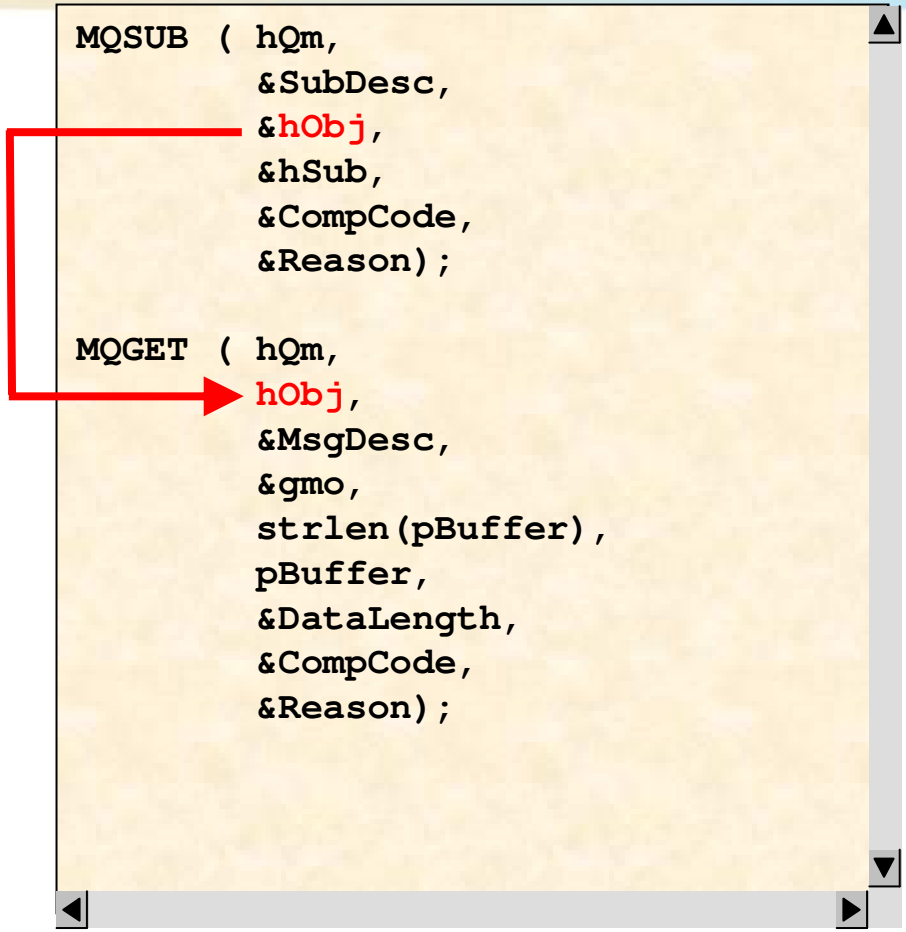
Susbcribe to a topic



- **Updates structure**
  - Subscription Descriptor
- **Very similar to MQOPEN**

Subscribing Application

- MQSUB verb
- Subscription Descriptor (MQSD) describes the topic
  - MQSD.ObjectString
  - MQSD.ObjectName
- Consume publications from the returned hObj
  - when MQSO_MANAGED used



```
MQSUB ( hQm,
        &SubDesc,
        &hObj,
        &hSub,
        &CompCode,
        &Reason);

MQGET ( hQm,
        hObj,
        &MsgDesc,
        &gmo,
        strlen(pBuffer),
        pBuffer,
        &DataLength,
        &CompCode,
        &Reason);
```

```
MQSD   SubDesc = {MQSD_DEFAULT};
SubDesc.ObjectString.VSPtr    = "Price/Fruit/Apples";
SubDesc.ObjectString.VSLength = MQVS_NULL_TERMINATED;
SubDesc.Options               = MQSO_CREATE
                              | MQSO_MANAGED
                              | MQSO_FAIL_IF_QUIESCING;
```

Subscription Descriptor (MQSD)

Field	Description
StrucId	Structure identifier
Version	Structure version number
Options	Options that control the action of MQSUB
ObjectName	Object Name
AlternateUserId	Alternate User Id
AlternateSecurityId	Alternate Security Id
SubExpiry	Subscription expiry
ObjectString	Object string
SubName	Subscription name
SubUserData	Subscription user data
PubPriority	Publication priority
PubAccountingToken	Publication accounting token
PubAppIdentityData	Publiation application identity data
SelectionString	String providing selection criteria
SubLevel	Subscription Level
ResObjectString	Resolved object string

Subscribe Options

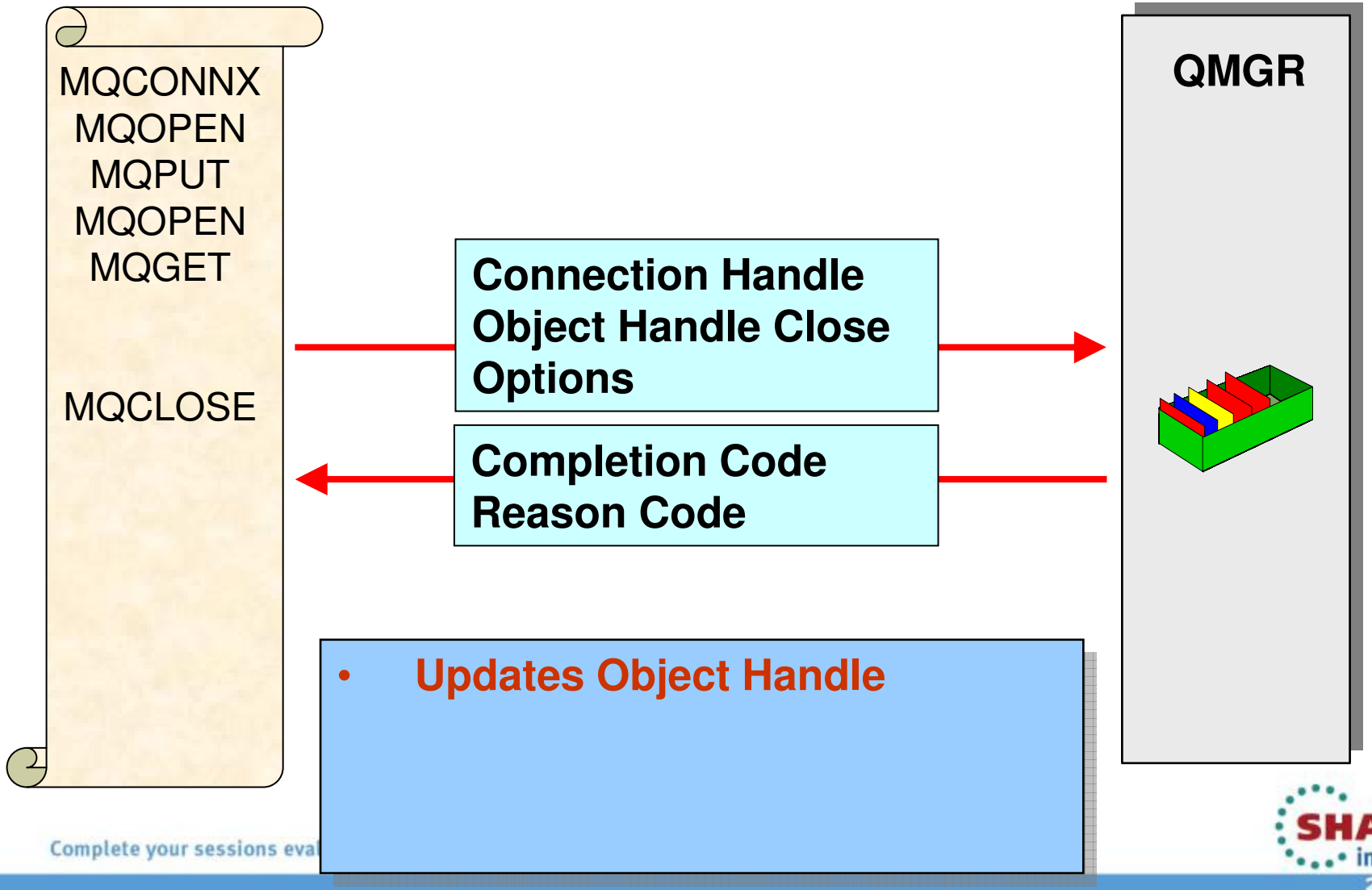
```
#define MQSO_NON_DURABLE                0x00000000
#define MQSO_READ_AHEAD_AS_Q_DEF        0x00000000
#define MQSO_ALTER                      0x00000001
#define MQSO_CREATE                     0x00000002
#define MQSO_RESUME                     0x00000004
#define MQSO_DURABLE                    0x00000008
#define MQSO_GROUP_SUB                  0x00000010
#define MQSO_MANAGED                    0x00000020
#define MQSO_SET_IDENTITY_CONTEXT       0x00000040
#define MQSO_FIXED_USERID               0x00000100
#define MQSO_ANY_USERID                 0x00000200
#define MQSO_PUBLICATIONS_ON_REQUEST    0x00000800
#define MQSO_NEW_PUBLICATIONS_ONLY      0x00001000
#define MQSO_FAIL_IF_QUIESCING          0x00002000
#define MQSO_ALTERNATE_USER_AUTHORITY   0x00040000
#define MQSO_WILDCARD_CHAR              0x00100000
#define MQSO_WILDCARD_TOPIC             0x00200000
#define MQSO_SET_CORREL_ID              0x00400000
#define MQSO_SCOPE_QMGR                 0x04000000
#define MQSO_NO_READ_AHEAD              0x08000000
#define MQSO_READ_AHEAD                 0x10000000
```

- Options can be ‘ORed’ together as required

Subscribing Tips

- **GOOD: Managed handles make things simpler**
- **BAD: Using durable subscriptions when not necessary**
  - Avoid build up of messages
- **For durable subscriptions**
  - Combine the create and resume options to make it simpler

Close a handle



- Updates Object Handle

Closing Application

- **MQOPEN a queue**
- **MQCLOSE a queue**
  - Normally we'd do something !
  - Note address of MQHOBJ

```
OpnOpts = MQOO_INPUT_SHARED
        | MQOO_FAIL_IF_QUIESCING;

MQOPEN( hConn,
        &od,
        OpnOpts,
        &hObj,
        &CompCode,
        &Reason);


< Issue some MQI calls here >


MQCLOSE( hConn,
        &hObj,
         MQCO_NONE,
        &CompCode,
        &Reason);
```

```
MQHCONN hConn;
MQHOBJ  hObj     = MQHO_UNUSABLE_HOBJ;
MQOD    ObjDesc = {MQOD_DEFAULT};

ObjDesc.ObjectType                = MQOT_Q;
strcpy(ObjectDesc.ObjectName, "Q1");
```

Close Options

- **Options available depending on object type**

MQCO_DELETE	0x00000001	Permanent Dynamic Queue
MQCO_DELETE_PURGE	0x00000002	Permanent Dynamic Queue
MQCO_KEEP_SUB	0x00000004	Durable Subscription
MQCO_REMOVE_SUB	0x00000008	Durable Subscription
MQCO_QUIESCE	0x00000020	Read Ahead input handle

MQCLOSE Tips

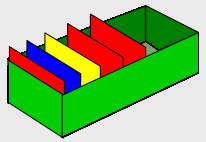
- **In triggered applications**
  - GOOD: Only close triggered queue if application ending
- **If implementing queue cache**
  - Close ‘rarely used’ queues in a timely fashion
    - Open queues can not be deleted/purged and use memory
- **For read ahead queues**
  - Use the quiesce close option to avoid message loss

Disconnect from Queue Manager

MQCONNX
MQOPEN
MQPUT
MQOPEN
MQGET
MQCLOSE

MQDISC

QMGR



Connection Handle

Completion Code
Reason Code

- **Updates connection handle**

Disconnecting Application

- MQCONN to Queue Manager
- MQDISC from Queue Manager
  - Normally we'd do something !
  - Note address of MQHCONN

```
MQCONNX(Qm,
        &cno,
        &hConn,
        &CompCode,
        &Reason);

< Issue some MQI calls here >


MQDISC( &hConn,
        &CompCode,
        &Reason);
```

```
MQHCONN   hConn = MQHC_UNUSABLE_HCONN;
MQCHAR48  Qm    = "QM1";
MQCNO     cno   = {MQCNO_DEFAULT};

cno.Options    |= MQCNO_HANDLE_SHARE_BLOCK |
                  MQCNO_RECONNECT
```

MQDISC Tips

- **GOOD: Ensure application disconnects if QM quiescing**
  - Will prevent Queue Manager from ending
- **MQDISC will close all queues/topics and subscriptions**
  - May wish to close some queues individually
- **MQDISC is an implicit commit**
  - May want to consider issuing MQBACK() first
- **Still call MQDISC**
  - If MQI call returns with a connection broken reason code
- **Application ending without MQDISC**
  - Will backout on Distributed
  - Will commit or backout depending on exit reason on z/OS
  - Try to always do explicit MQDISC if possible

Summary

- **Simple MQI – very easy to get started**
  - Let most fields have default values
  - Keep things simple if you can
    - do not try and monitor channels for example
- **Plenty of samples to help you along**
  - In a variety of languages
    - eg. *<install dir>*\Tools\c\Samples
    - *<hlq>*.SCSQC37S
- **Check reason codes and log failures**
  - MQ trace can be useful

This was session 12624 - The rest of the week ……

	Monday	Tuesday	Wednesday	Thursday	Friday	
08:00					Are you running too many queue managers or brokers?	
09:30		What's New in WebSphere Message Broker			Diagnosing Problems for MQ	CICS and WMQ - The Resurrection of Useful
11:00		Extending IBM WebSphere MQ and WebSphere Message Broker to the Cloud	WMQ - Introduction to Dump Reading and SMF Analysis - Hands-on Lab	BIG Data Sharing with the cloud - WebSphere eXtreme Scale and WebSphere Message Broker integration	Getting the best availability from MQ on z/OS by using Shared Queues	
12:15						
01:30	Introduction to MQ	MQ on z/OS – Vivisection	Migration and maintenance, the necessary evil	The Dark Side of Monitoring MQ - SMF 115 and 116 Record Reading and Interpretation		
03:00	First Steps With WebSphere Message Broker: Application Integration for the Messy	BIG Connectivity with WebSphere MQ and WebSphere Message Broker	WebSphere MQ CHINIT Internals	Using IBM WebSphere Application Server and IBM WebSphere MQ Together		
04:30	WebSphere MQ application design, the good, the bad and the ugly	What's New in the WebSphere MQ Product Family	MQ & DB2 – MQ Verbs in DB2 & Q-Replication	WebSphere MQ Channel Authentication Records		
06:00			Clustering - The Easier Way to Connect Your Queue Managers			

Please fill in evaluations at share.org/SFEval #12624

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