

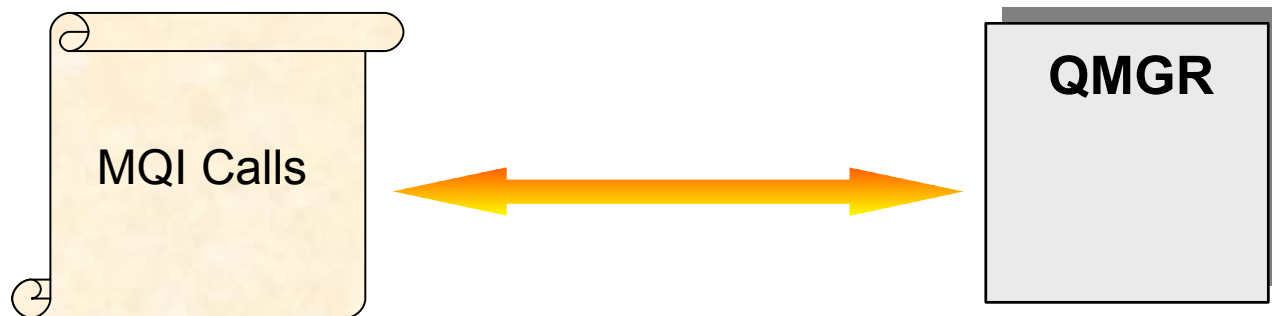
The MQ API for Dummies [z/OS & distributed]

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Session # 9512

Agenda

- MQI Concepts
- MQI Structures & Datatypes
- Basic MQI walkthrough
 - With demonstrations
 - A number of verbs not covered
 - 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
- Make sure you check the 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

- Use structure initialisers
 - MQMD md = { MQMD_DEFAULT };
 - Initialise to version 1
- Structures are versioned
 - Set the minimum version you need
 - md.Version = MQMD_VERSION_2;
 - Don't use current version
 - md.Version = MQMD_CURRENT_VERSION;
- Bear in mind that some structures are input/output
 - May need to reset values for subsequent call
 - e.g. MsgId & CorrelId field of MQMD on MQGET call

MQ Elementary Data Types

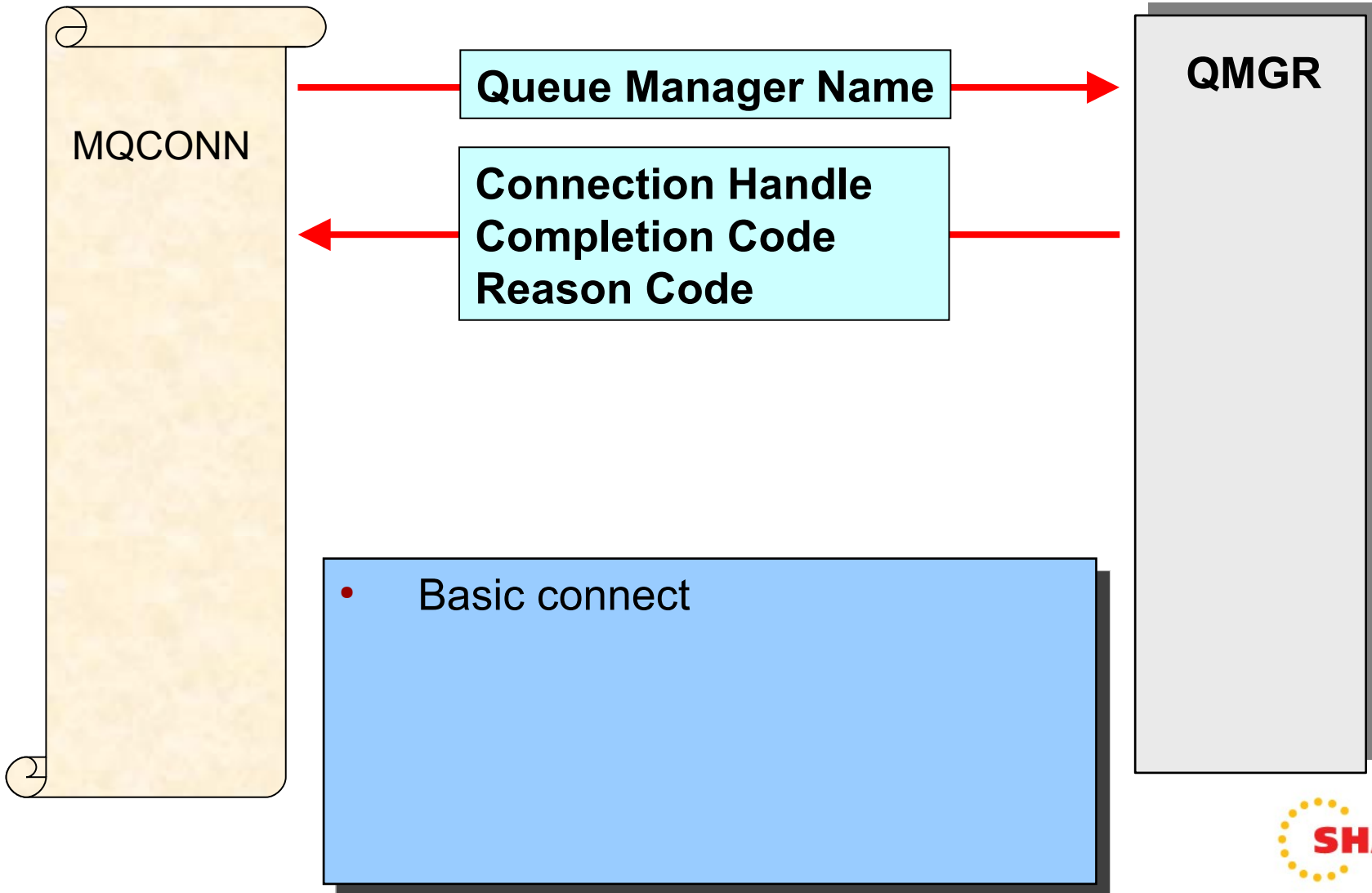
- The main MQI data types

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

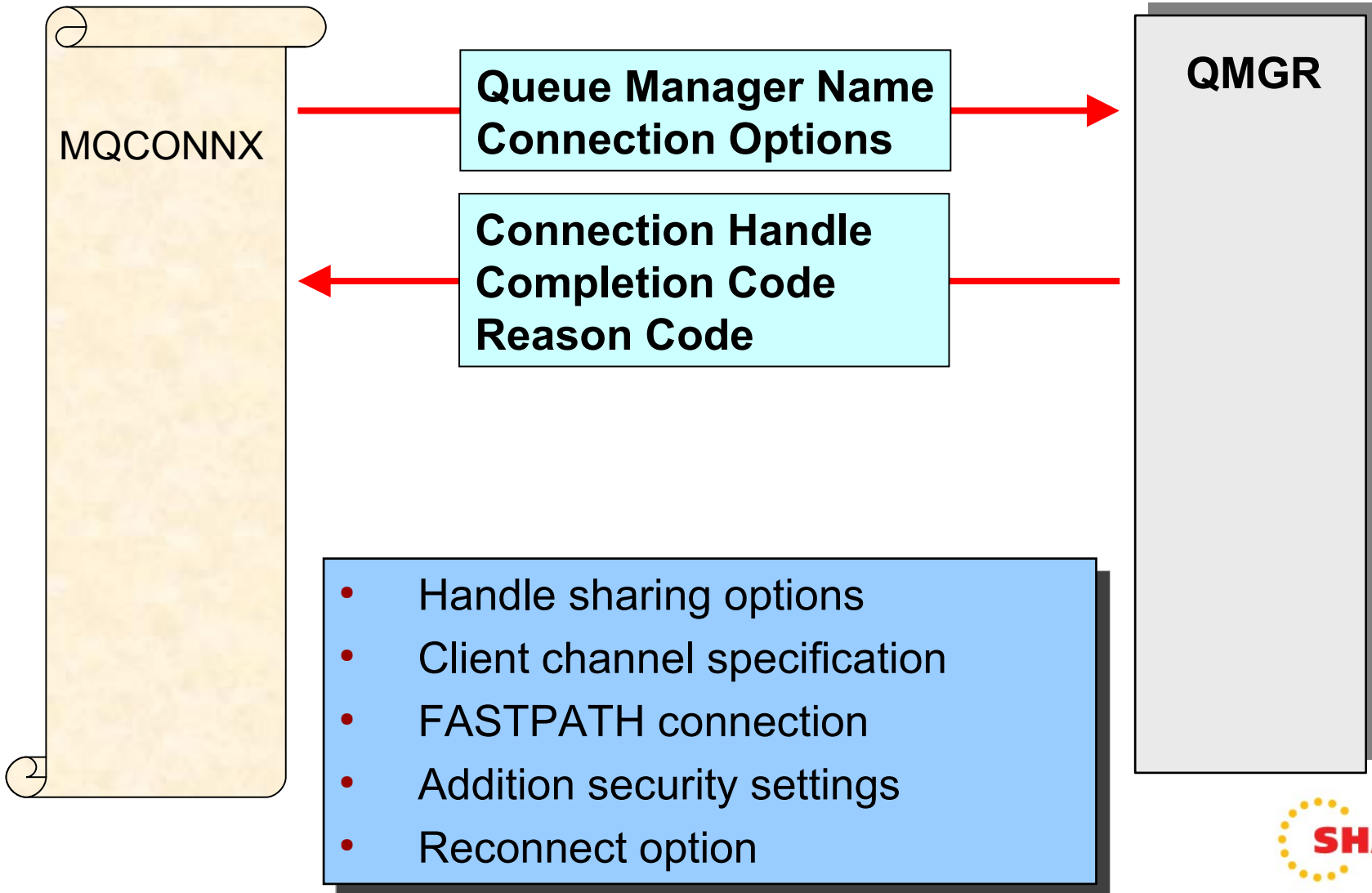
MQI Libraries

- Windows
 - mqm.dll server applications
 - mqic32.dll client applications
- UNIX (_r variants for threaded applications)
 - .../mqm/lib/libmqm.* 32-bit server applications
 - .../mqm/lib64/libmqm.* 64-bit server applications
 - .../mqm/lib/libmqic.* 32-bit client applications
 - .../mqm/lib64/libmqic.* 64-bit client applications
- IBM i (_R variant for threaded applications)
 - LIBMQM server applications
- Link with appropriate library, client or server
 - Or dynamically load

Connect



Connect with extended options



Connecting

- MQCONNX
 - Don't hardcode QM name
 - Always check reason codes
- Connections options
 - Connection not thread specific
 - Client reconnect

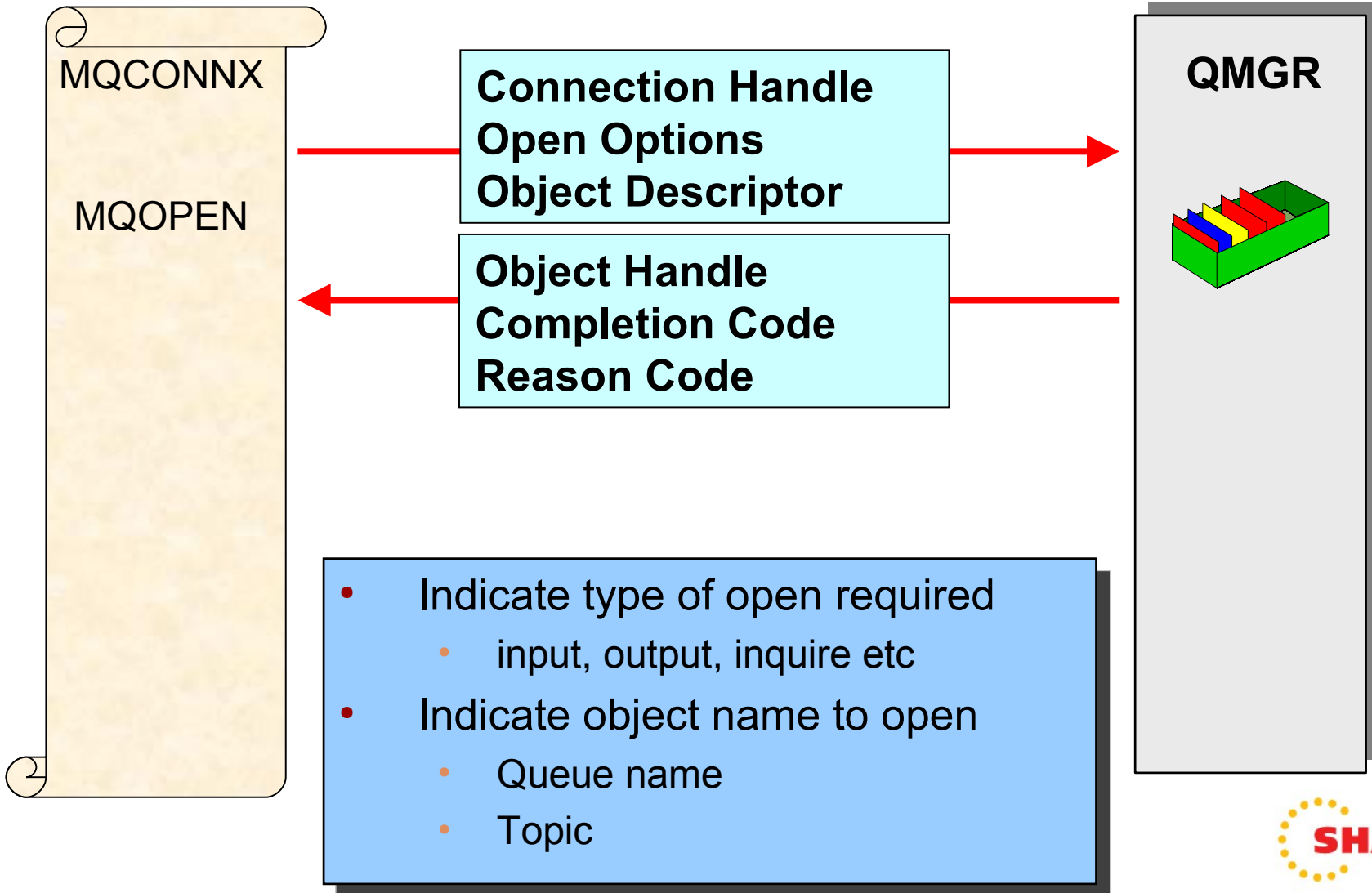
```
MQCONNX( Qm,  
         &cno,  
         &hQm,  
         &CompCode,  
         &Reason);  
  
if (CompCode == MQCC_FAILED)  
{  
    /* Do some error processing */  
    /* Possibly retry             */  
}
```

```
MQHCONN  hQm = MQHC_UNUSABLE_HCONN;  
MQCHAR48 Qm  = "QM1";  
MQCNO    cno = {MQCNO_DEFAULT};  
  
cno.Options |= MQCNO_HANDLE_SHARE_BLOCK |  
               MQCNO_RECONNECT;
```

MQCONN(X) Tips

- Don't hardcode Queue Manager names
 - Pass as parameter or configure in an INI file
- Best to use MQCONNX
 - Has options structure should it be needed
- 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 MQCNO_HANDLE_SHARE_BLOCK
- 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



Open a queue

- MQOPEN a queue
- OpenOptions
 - MQOO_ flags which are required
- MQOD describes object
 - 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(ObjDesc.ObjectName, "Q1");
```

Object Descriptor (MQOD)

```

struct tagMQOD {
    MQCHAR4   StrucId;           /* Structure identifier */
    MQLONG    Version;          /* Structure version number */
    MQLONG    ObjectType;       /* Object type */
    MQCHAR48   ObjectName;      /* Object name */
    MQCHAR48   ObjectQMgrName;  /* Object queue manager name */
    MQCHAR48   DynamicQName;    /* Dynamic queue name */
    MQCHAR12   AlternateUserId; /* Alternate user identifier */
    /* Ver:1 */
    MQLONG     RecsPresent;      /* Number of object records present */
    MQLONG     KnownDestCount;   /* Number of local queues opened successfully */
    MQLONG     UnknownDestCount; /* Number of remote queues opened */
    MQLONG     InvalidDestCount; /* Number of queues that failed to open */
    MQLONG     ObjectRecOffset;  /* Offset of first object record from start of MQOD */
    MQLONG     ResponseRecOffset; /* Offset of first response record from start of MQOD */
    MQPTR      ObjectRecPtr;     /* Address of first object record */
    MQPTR      ResponseRecPtr;   /* Address of first response record */
    /* Ver:2 */
    MQBYTE40   AlternateSecurityId; /* Alternate security identifier */
    MQCHAR48   ResolvedQName;      /* Resolved queue name */
    MQCHAR48   ResolvedQMgrName;   /* Resolved queue manager name */
    /* Ver:3 */
    MQCHARV    ObjectString;       /* Object long name */
    MQCHARV    SelectionString;    /* Message Selector */
    MQCHARV    ResObjectString;    /* Resolved long object name */
    MQLONG     ResolvedType;       /* Alias queue resolved object type */
    /* Ver:4 */
};

```

Open Options

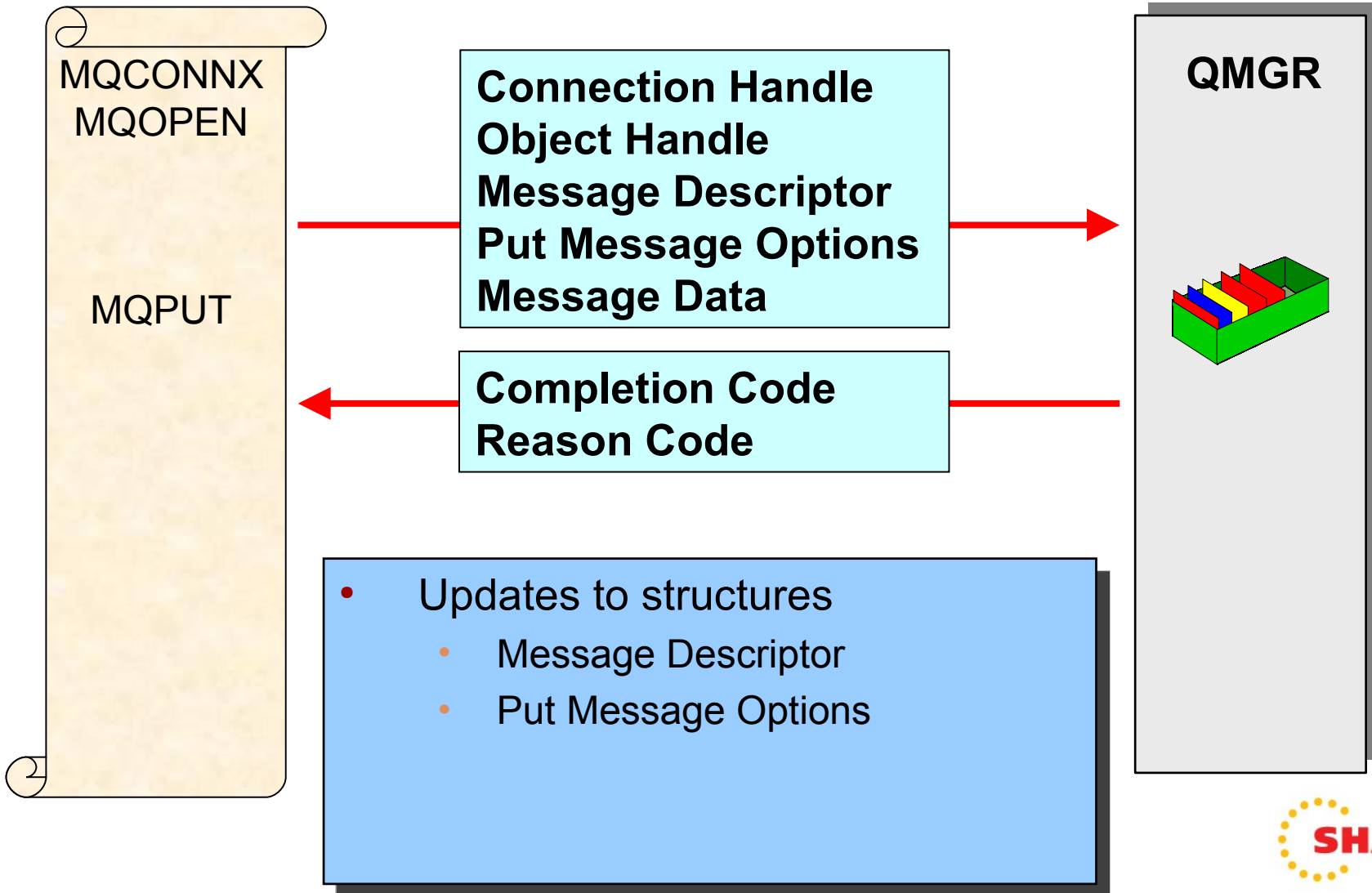
```
#define MQOO_BIND_AS_Q_DEF          0x00000000
#define MQOO_READ_AHEAD_AS_Q_DEF    0x00000000
#define MQOO_INPUT_AS_Q_DEF         0x00000001
#define MQOO_INPUT_SHARED            0x00000002
#define MQOO_INPUT_EXCLUSIVE         0x00000004
#define MQOO_BROWSE                  0x00000008
#define MQOO_OUTPUT                  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

- Try not to hardcode queue or topic names
- Try not to open queues exclusively
 - Will reduce options for workload balancing
- Use MQPUT1 if only opening queue to put one message
- Consider queue cache for common used queues
 - MQOPEN is relatively expensive – load and security check
- 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

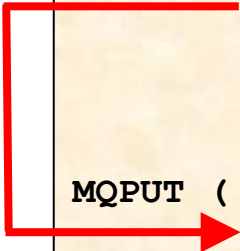


Putting Application

- MQOPEN a queue
- MQPUT a message
 - Simple Hello World message
 - Set message format to string
 - Put 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

```

struct tagMQMD {
    MQCHAR4   StrucId;           /* Structure identifier                */
    MQLONG    Version;          /* Structure version number            */
    MQLONG    Report;           /* Options for report messages        */
    MQLONG    MsgType;          /* Message type                        */
    MQLONG    Expiry;           /* Message lifetime                    */
    MQLONG    Feedback;         /* Feedback or reason code             */
    MQLONG    Encoding;         /* Numeric encoding of message data   */
    MQLONG    CodedCharSetId;    /* Character set identifier of message data */
    MQCHAR8    Format;          /* Format name of message data         */
    MQLONG    Priority;          /* Message priority                    */
    MQLONG    Persistence;      /* Message persistence                 */
    MQBYTE24   MsgId;           /* Message identifier                  */
    MQBYTE24   CorrelId;        /* Correlation identifier              */
    MQLONG    BackoutCount;     /* Backout counter                     */
    MQCHAR48   ReplyToQ;        /* Name of reply queue                 */
    MQCHAR48   ReplyToQMgr;     /* Name of reply queue manager         */
    MQCHAR12   UserIdentifier;   /* User identifier                     */
    MQBYTE32   AccountingToken; /* Accounting token                     */
    MQCHAR32   ApplIdentityData; /* Application data relating to identity */
    MQLONG    PutApplType;      /* Type of application that put the message */
    MQCHAR28   PutApplName;     /* Name of application that put the message */
    MQCHAR8    PutDate;         /* Date when message was put           */
    MQCHAR8    PutTime;         /* Time when message was put           */
    MQCHAR4    ApplOriginData;  /* Application data relating to origin   */
    /* Ver:1 */
    MQBYTE24   GroupId;         /* Group identifier                     */
    MQLONG    MsgSeqNumber;     /* Sequence number of logical message within group */
    MQLONG    Offset;          /* Offset of data in physical message from start of logical message */
    MQLONG    MsgFlags;        /* Message flags                       */
    MQLONG    OriginalLength;   /* Length of original message          */
    /* Ver:2 */
};

```

Put Message Options

```

struct tagMQPMO {
    MQCHAR4   StrucId;           /* Structure identifier                */
    MQLONG    Version;          /* Structure version number            */
    MQLONG    Options;          /* Options that control the action of MQPUT and MQPUT1 */
    MQLONG    Timeout;          /* Reserved                            */
    MQHOBJ    Context;          /* Object handle of input queue        */
    MQLONG    KnownDestCount;    /* Number of messages sent successfully to local queues */
    MQLONG    UnknownDestCount;  /* Number of messages sent successfully to remote queues */
    MQLONG    InvalidDestCount;  /* Number of messages that could not be sent */
    MQCHAR48   ResolvedQName;    /* Resolved name of destination queue */
    MQCHAR48   ResolvedQMGrName; /* Resolved name of destination queue manager */
    /* Ver:1 */
    MQLONG    RecsPresent;       /* Number of put message records or response records present */
    MQLONG    PutMsgRecFields;   /* Flags indicating which MQPMR fields are present */
    MQLONG    PutMsgRecOffset;   /* Offset of first put message record from start of MQPMO */
    MQLONG    ResponseRecOffset; /* Offset of first response record from start of MQPMO */
    MQPTR     PutMsgRecPtr;      /* Address of first put message record */
    MQPTR     ResponseRecPtr;    /* Address of first response record */
    /* Ver:2 */
    MQHMSG    OriginalMsgHandle; /* Original message handle */
    MQHMSG    NewMsgHandle;      /* New message handle */
    MQLONG    Action;            /* The action being performed */
    MQLONG    PubLevel;          /* Publication level */
    /* Ver:3 */
};

```

Put Options

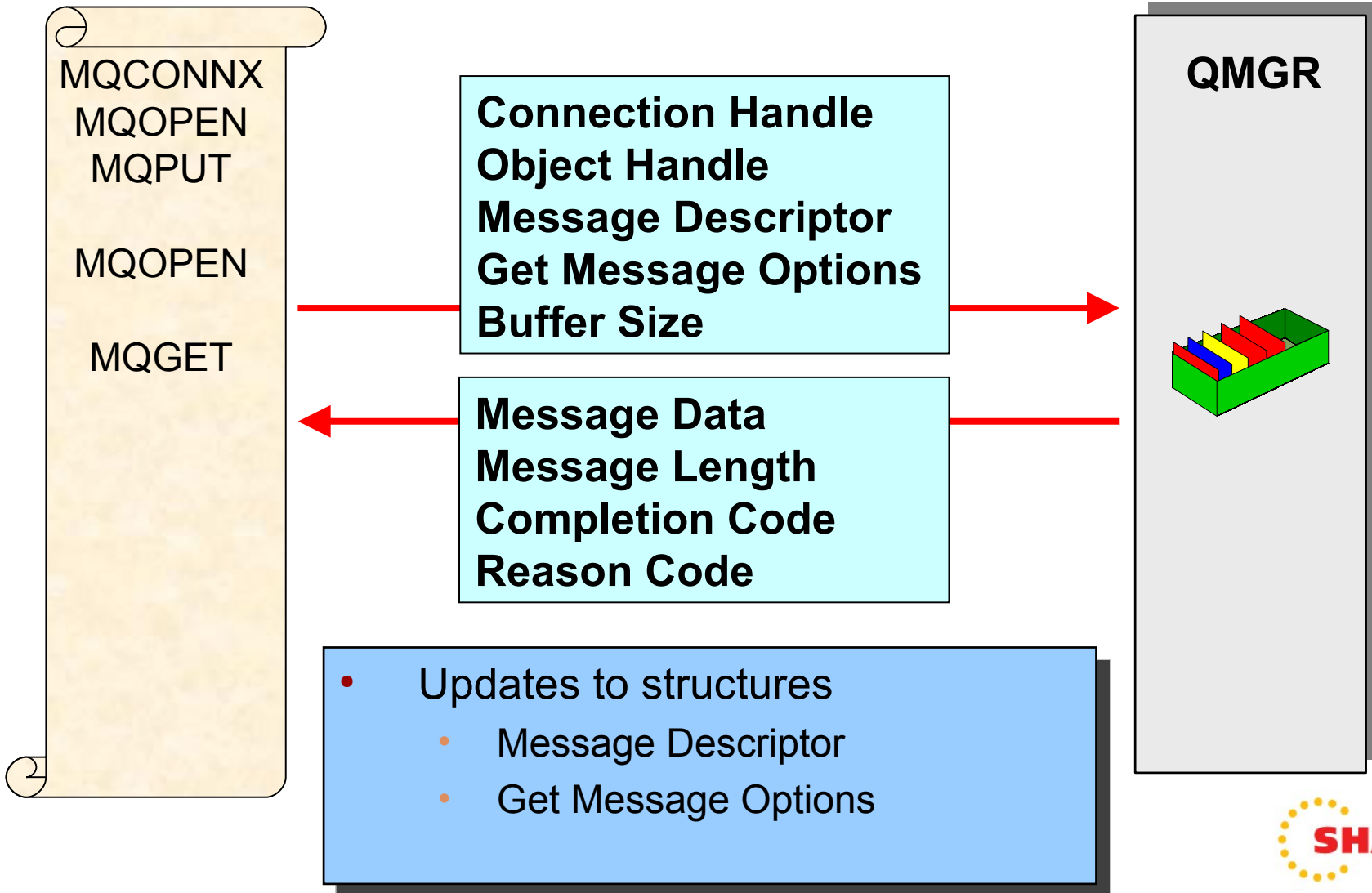
#define MQPMO_SYNCPOINT	0x00000002
#define MQPMO_NO_SYNCPOINT	0x00000004
#define MQPMO_DEFAULT_CONTEXT	0x00000020
#define MQPMO_NEW_MSG_ID	0x00000040
#define MQPMO_NEW_CORREL_ID	0x00000080
#define MQPMO_PASS_IDENTITY_CONTEXT	0x00000100
#define MQPMO_PASS_ALL_CONTEXT	0x00000200
#define MQPMO_SET_IDENTITY_CONTEXT	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

- Always use explicit syncpoint setting
 - Defaults are not the same on z/OS and Distributed
 - Generally
 - MQPMO_SYNCPOINT – when persistent
 - MQPMO_NO_SYNCPOINT – when non-persistent
- Try not to use extreme message sizes
 - Queue manager optimized for messages between 4Kb & 1Mb
- Consider async response for performance gain
 - MQPMO_ASYNC_RESPONSE
 - If on client and sending many non-persistent messages

Get a message



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};
MQPMO gmo = {MQGMO_DEFAULT};
gmo.Options = MQGMO_SYNCPOINT_IF_PERSISTENT |
              MQGMO_CONVERT |
              MQGMO_WAIT |
              MQGMO_FAIL_IF_QUIESCING;
gmo.WaitInterval = 60 * 1000;
```

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
```

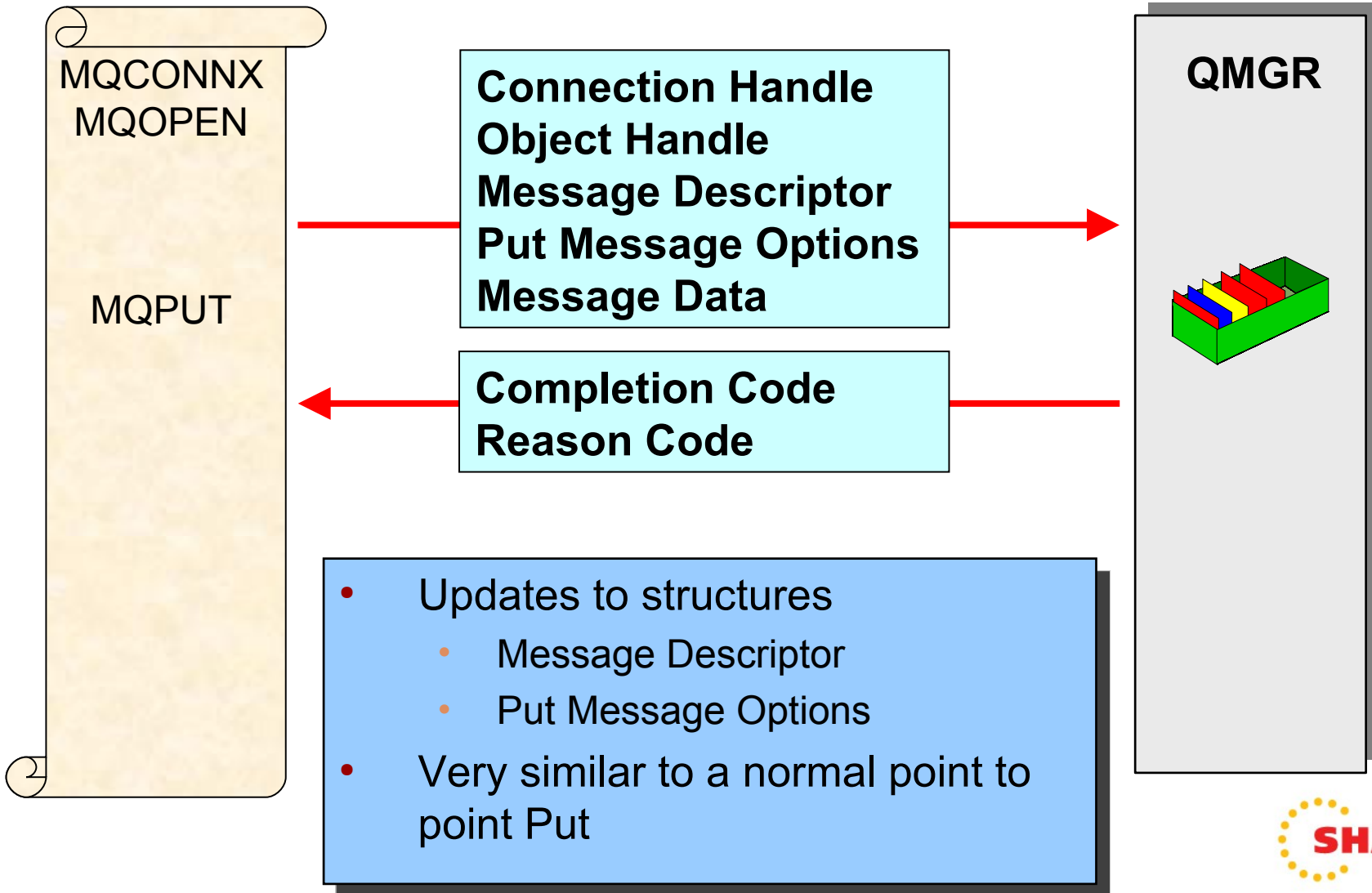
```
#define MQGMO_CONVERT 0x00004000
#define MQGMO_LOGICAL_ORDER 0x00008000
#define MQGMO_COMPLETE_MSG 0x00010000
#define MQGMO_ALL_MSGS_AVAILABLE 0x00020000
#define MQGMO_ALL_SEGMENTS_AVAILABLE 0x00040000
#define MQGMO_MARK_BROWSE_HANDLE 0x00100000
#define MQGMO_MARK_BROWSE_CO_OP 0x00200000
#define 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

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

Publish a message



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
 - Use sensible topic hierarchy
 - Based on context of published data
 - Don't use different topic for each publish
 - This is probably meta-data, use message properties
 - Topic strings can be up to 10Kb
 - But don't use long topics unless necessary
- Consider using Topic object and Topic string
 - Administrator can set point in topic tree
 - Known as 'topic tree isolation'

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

```

struct tagMQSD {
    MQCHAR4    StrucId;           /* Structure identifier          */
    MQLONG     Version;          /* Structure version number     */
    MQLONG     Options;          /* Options associated with subscribing */
    MQCHAR48   ObjectName;       /* Object name                   */
    MQCHAR12   AlternateUserId;   /* Alternate user identifier     */
    MQBYTE40   AlternateSecurityId; /* Alternate security identifier */
    MQLONG     SubExpiry;         /* Expiry of Subscription       */
    MQCHARV    ObjectString;      /* Object long name              */
    MQCHARV    SubName;           /* Subscription name             */
    MQCHARV    SubUserData;       /* Subscription user data        */
    MQBYTE24   SubCorrelId;       /* Correlation Id related to this subscription */
    MQLONG     PubPriority;        /* Priority set in publications  */
    MQBYTE32   PubAccountingToken; /* Accounting Token set in publications */
    MQCHAR32   PubApplIdentityData; /* Appl Identity Data set in publications */
    MQCHARV    SelectionString;   /* Message selector structure   */
    MQLONG     SubLevel;          /* Subscription level            */
    MQCHARV    ResObjectString;   /* Resolved long object name     */
};

```

Subscribe Options

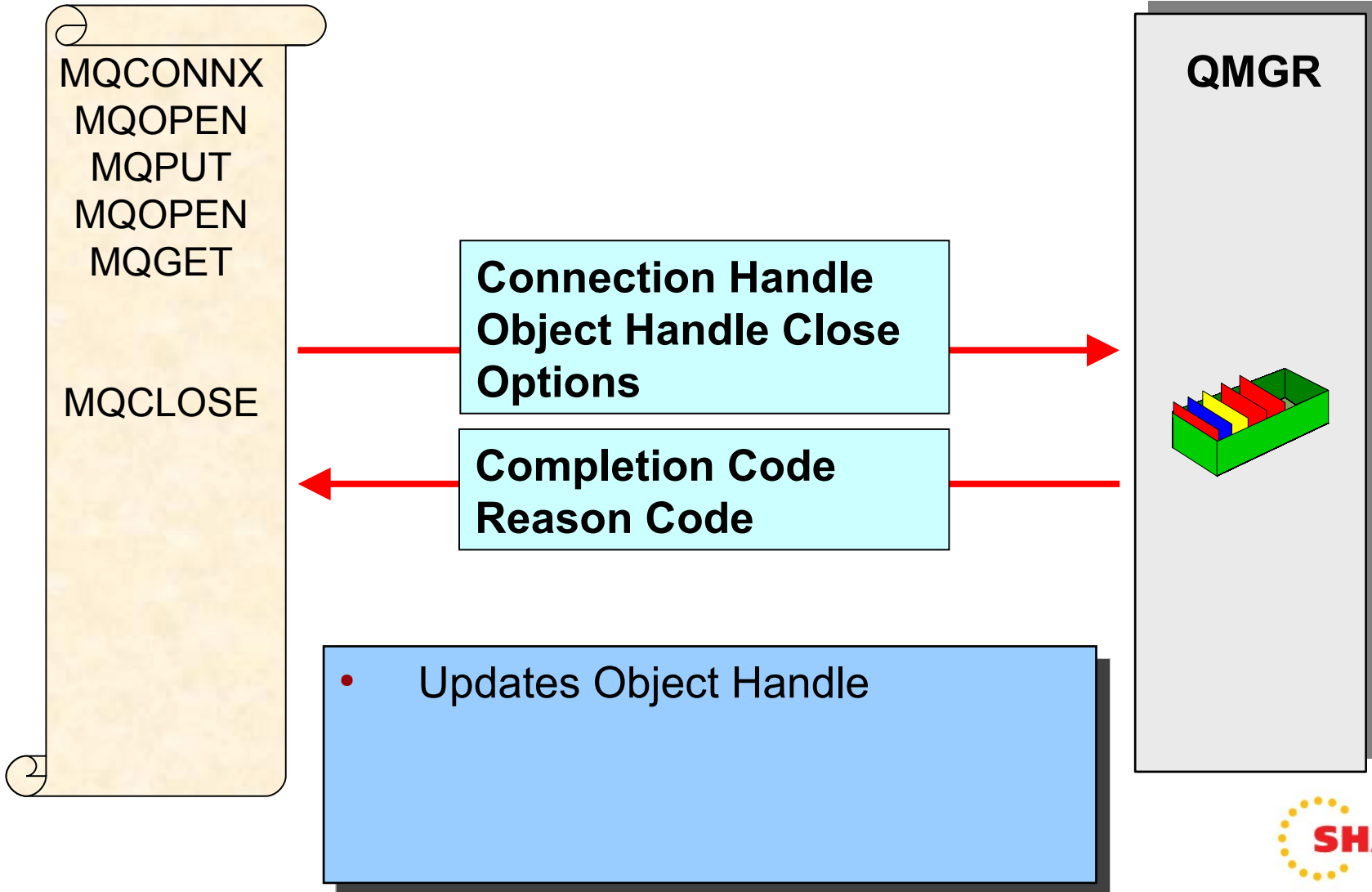
#define MQSO_NON_DURABLE	0x00000000
#define MQSO_READ_AHEAD_AS_Q_DEF	0x00000000
#define MQSO_ALTER	0x00000001
#define MQSO_CREATE	0x00000002
#define MQSO_RESUME	0x00000004
#define MQSO_DURABLE	0x00000008
#define MQSO_GROUP_SUB	0x00000010
#define MQSO_MANAGED	0x00000020
#define MQSO_SET_IDENTITY_CONTEXT	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

- Managed handles make things simpler
- Only use durable subscriptions when necessary
 - Avoid build up of messages
- For durable subscriptions
 - MQSO_CREATE | MQSO_RESUME makes it simpler

Close a 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(ObjDesc.ObjectName, "Q1");
```

Close Options

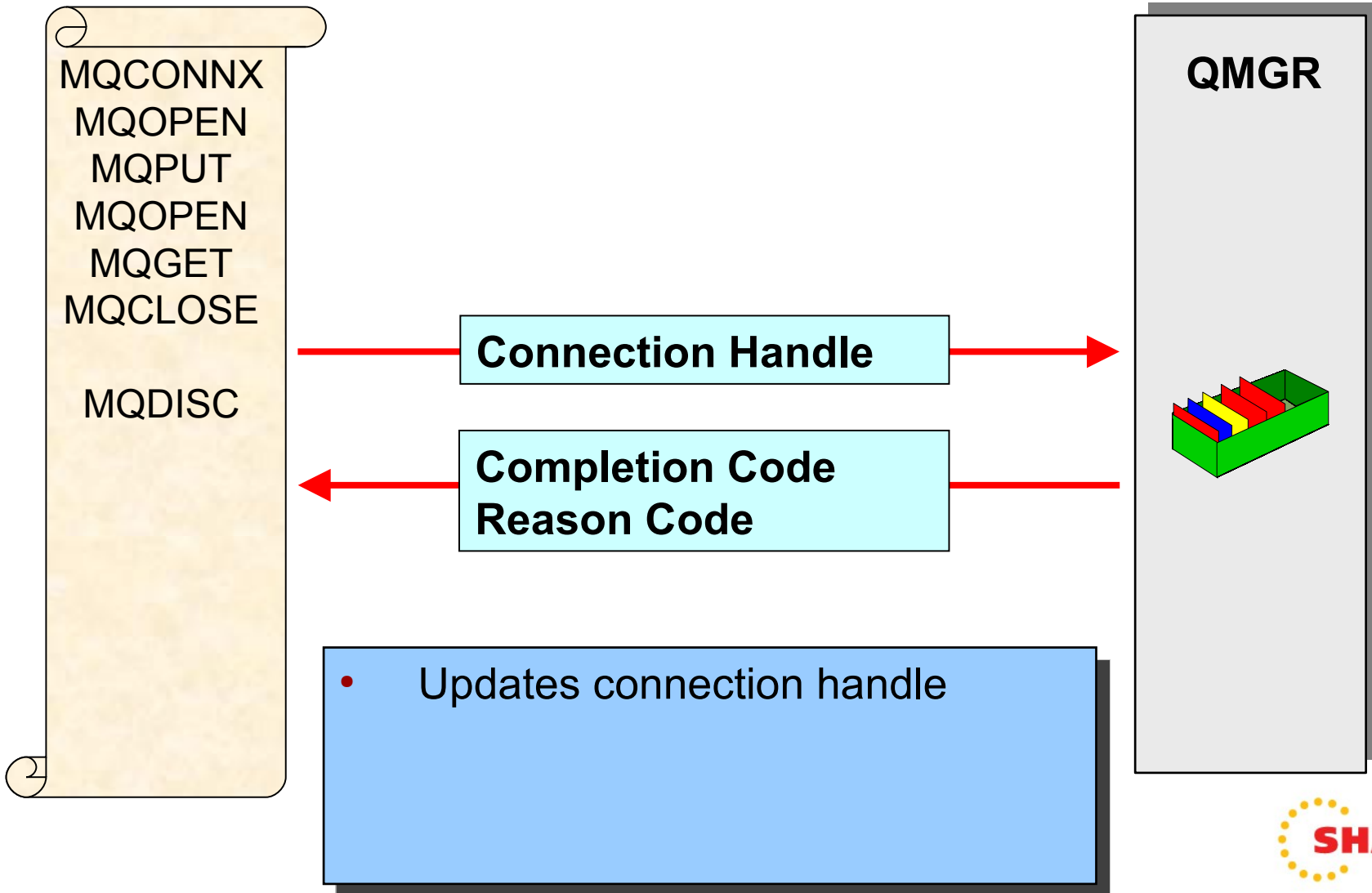
- Options available depending on object type

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
 - 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 MQCO_QUIESCE to avoid message loss

Disconnect from Queue Manager



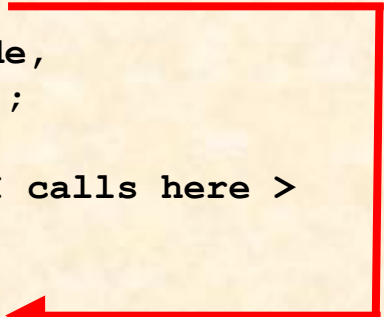
Disconnecting Application

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

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

< Issue some MQI calls here >

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



```
MQHCONN hQm = MQHC_UNUSABLE_HCONN;
```

```
MQCHAR48 Qm = "QM1";
```

```
MQCNO cno = {MQCNO_DEFAULT};
```

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

MQDISC Tips

- Ensure application disconnects if queue manager 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 MQRC_CONNECTION_BROKEN
- 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 their default values
 - Keep things simple if you can
 - e.g. do not try and monitor channels
- Plenty of samples to help you along
 - In a variety of languages
 - e.g. <install dir>\Tools\c\Samples
- Check reason codes and log failures
 - MQ trace can be useful

The rest of the week

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00			More than a buzzword: Extending the reach of your MQ messaging with Web 2.0	Batch, local, remote, and traditional MVS - file processing in Message Broker	Lyn's Story Time - Avoiding the MQ Problems Others have Hit
09:30		WebSphere MQ 101: Introduction to the world's leading messaging provider	The Do's and Don'ts of Queue Manager Performance	So, what else can I do? - MQ API beyond the basics	MQ Project Planning Session
11:00		MQ Publish/Subscribe	The Do's and Don'ts of Message Broker Performance	Diagnosing problems for Message Broker	What's new for the MQ Family and Message Broker
12:15	MQ Freebies! Top 5 SupportPacs	The doctor is in. Hands-on lab and lots of help with the MQ family		Using the WMQ V7 Verbs in CICS Programs	
01:30	Diagnosing problems for MQ	WebSphere Message Broker 101: The Swiss army knife for application integration	The Dark Side of Monitoring MQ - SMF 115 and 116 record reading and interpretation	Getting your MQ JMS applications running, with or without WAS	
03:00	Keeping your eye on it all - Queue Manager Monitoring & Auditing	The MQ API for dummies - the basics	Under the hood of Message Broker on z/OS - WLM, SMF and more	Message Broker Patterns - Generate applications in an instant	
04:30	Message Broker administration for dummies	All About WebSphere MQ File Transfer Edition	For your eyes only - WebSphere MQ Advanced Message Security	Keeping your MQ service up and running - Queue Manager clustering	
06:00			Free MQ! - MQ Clients and what you can do with them	MQ Q-Box - Open Microphone to ask the experts questions	

Questions & Answers

Please fill out your evaluation forms
Session # 9512