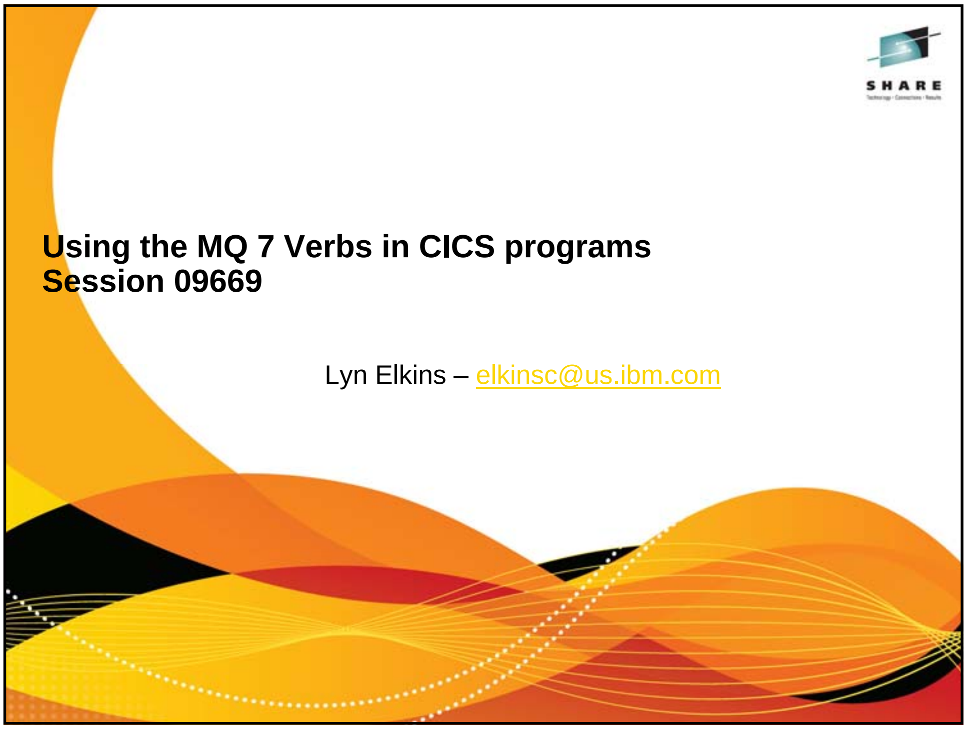
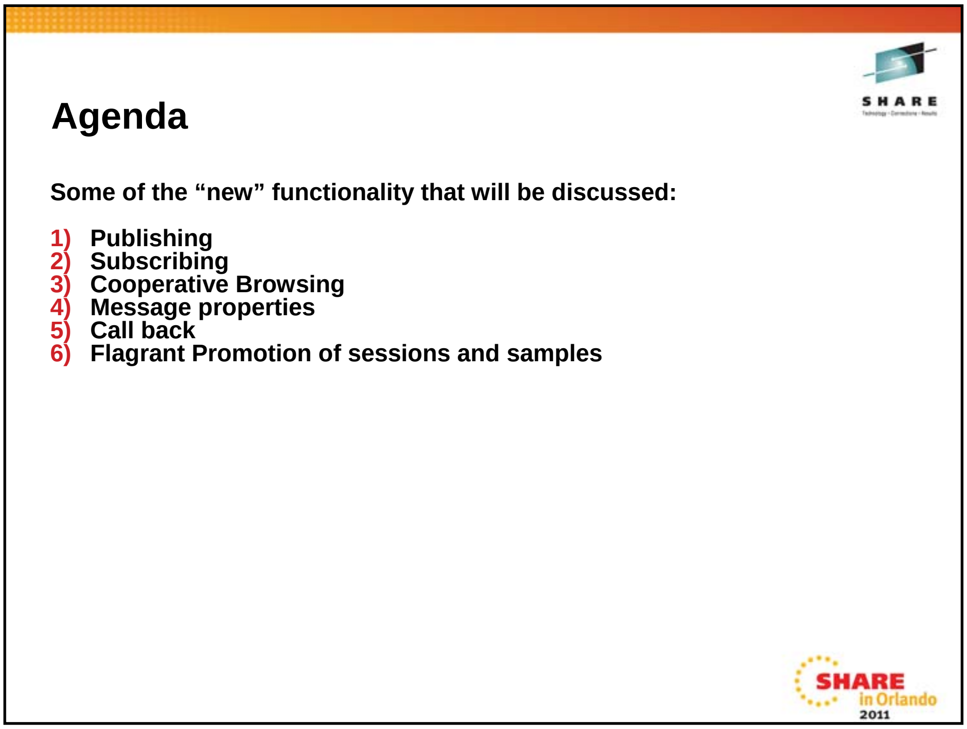


Using the MQ 7 Verbs in CICS programs
Session 09669

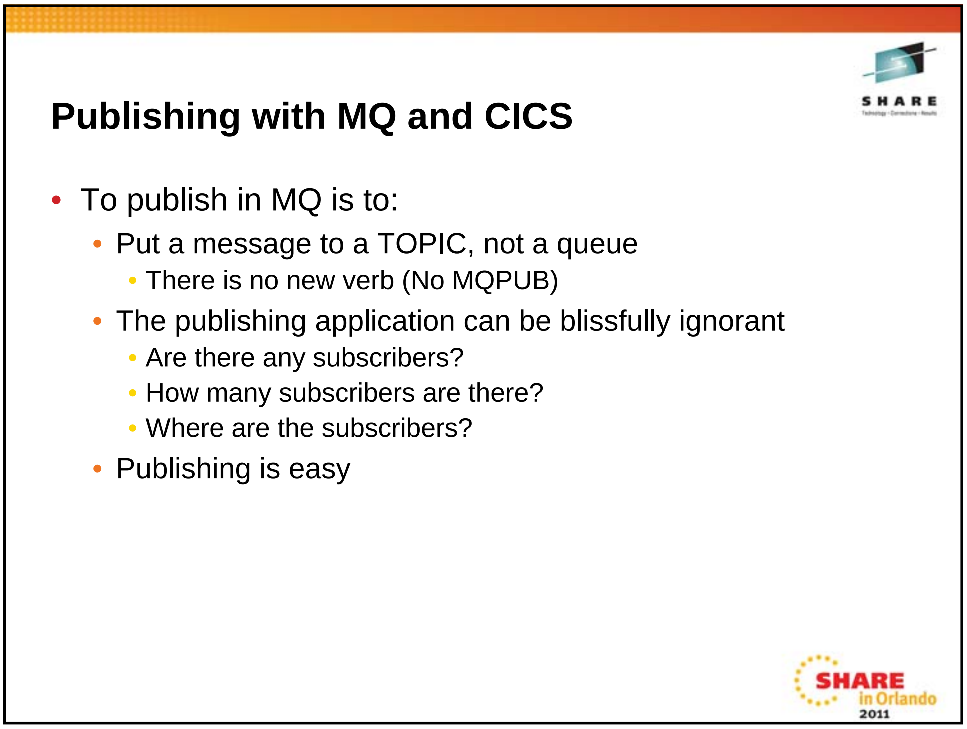
Lyn Elkins – elkinsc@us.ibm.com



Agenda

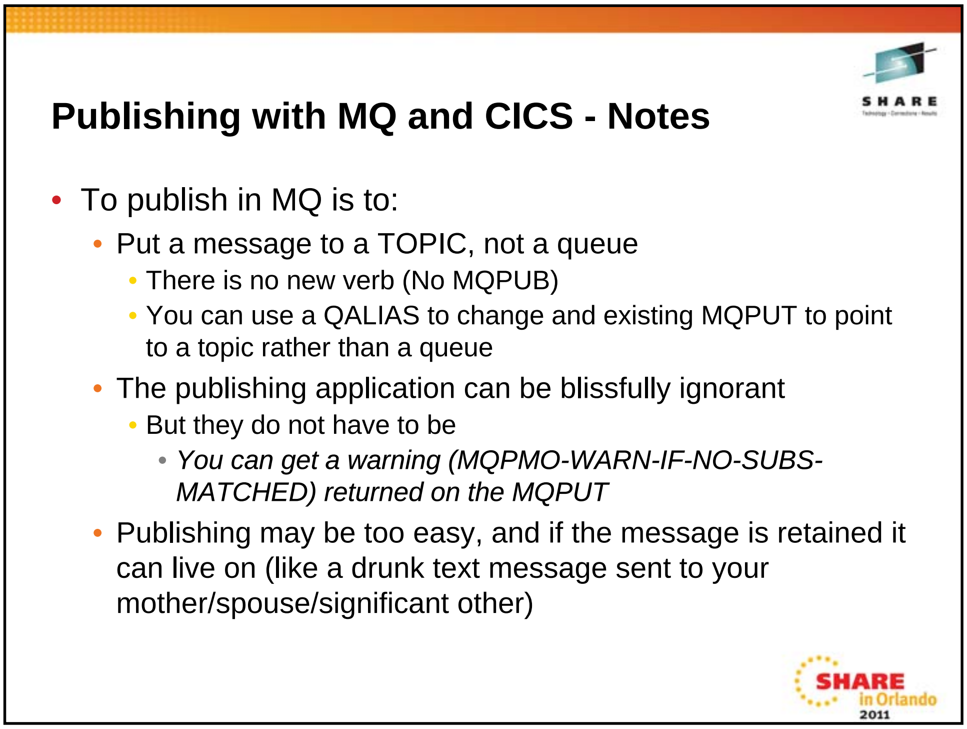
Some of the “new” functionality that will be discussed:

1) **Publishing**
2) **Subscribing**
3) **Cooperative Browsing**
4) **Message properties**
5) **Call back**
6) **Flagrant Promotion of sessions and samples**



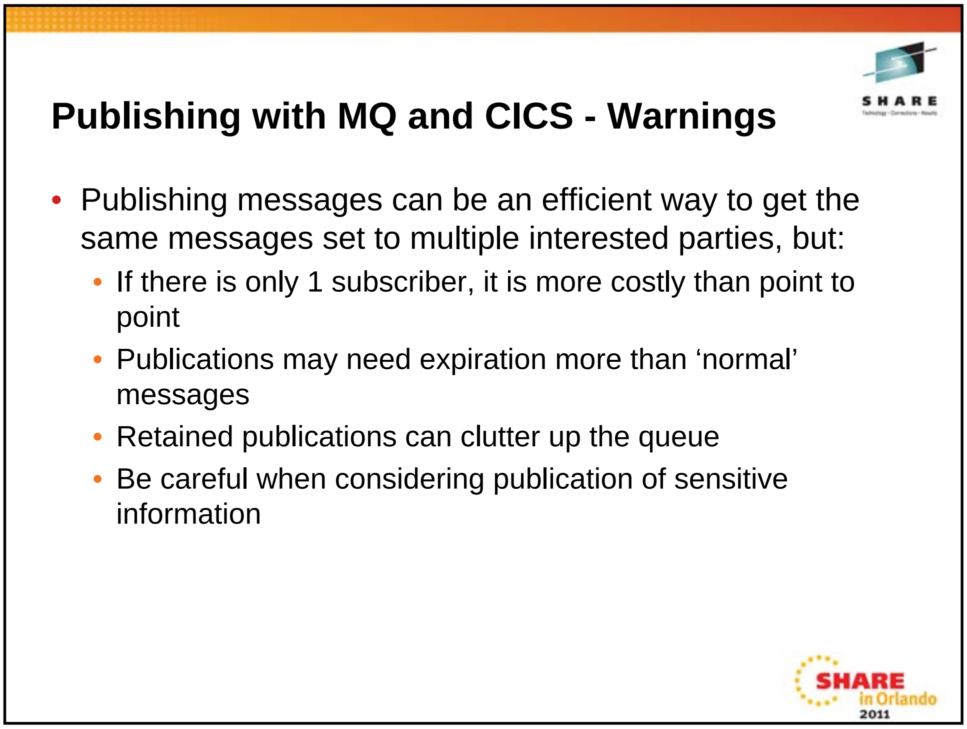
Publishing with MQ and CICS

- To publish in MQ is to:
  - Put a message to a TOPIC, not a queue
    - There is no new verb (No MQPUB)
  - The publishing application can be blissfully ignorant
    - Are there any subscribers?
    - How many subscribers are there?
    - Where are the subscribers?
  - Publishing is easy



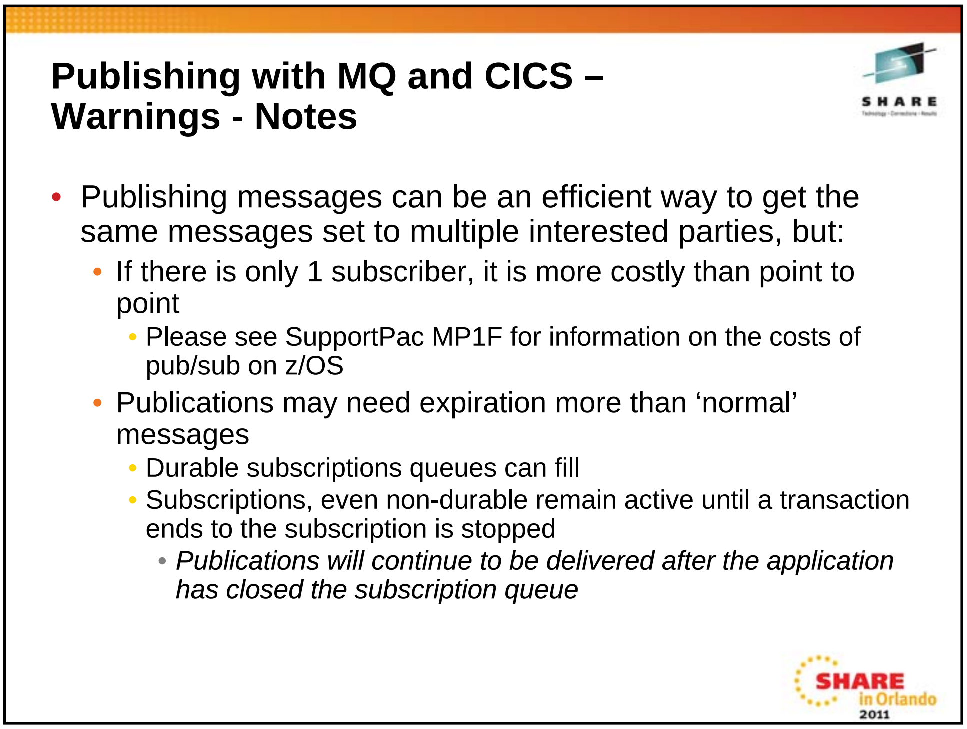
Publishing with MQ and CICS - Notes

- To publish in MQ is to:
  - Put a message to a TOPIC, not a queue
    - There is no new verb (No MQPUB)
    - You can use a QALIAS to change and existing MQPUT to point to a topic rather than a queue
  - The publishing application can be blissfully ignorant
    - But they do not have to be
      - *You can get a warning (MQPMO-WARN-IF-NO-SUBS-MATCHED) returned on the MQPUT*
  - Publishing may be too easy, and if the message is retained it can live on (like a drunk text message sent to your mother/spouse/significant other)



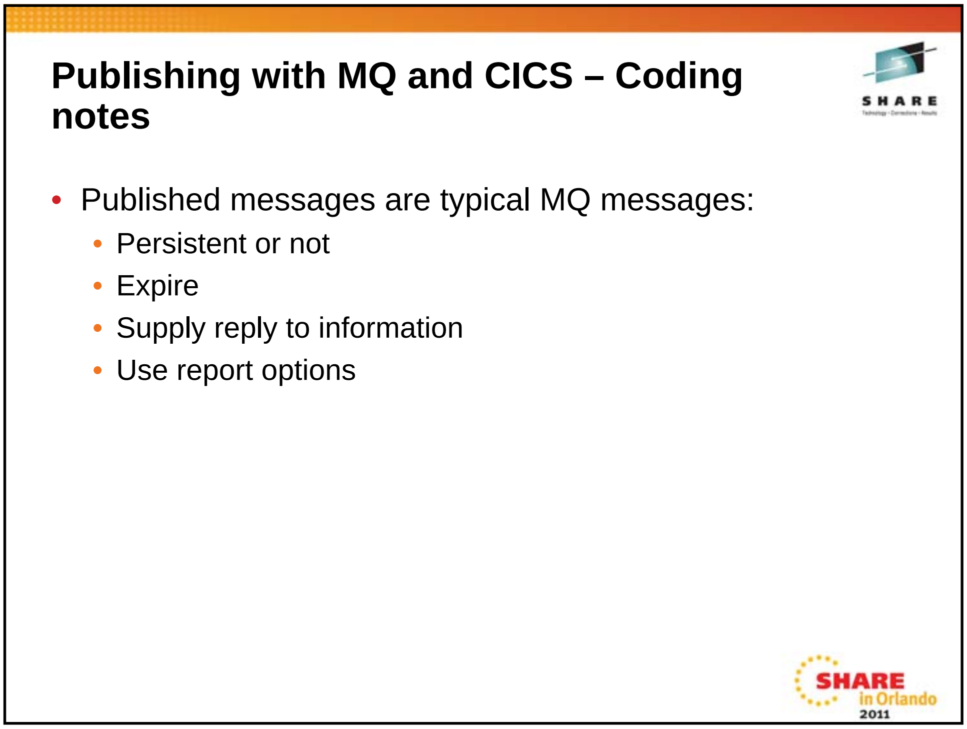
Publishing with MQ and CICS - Warnings

- Publishing messages can be an efficient way to get the same messages set to multiple interested parties, but:
  - If there is only 1 subscriber, it is more costly than point to point
  - Publications may need expiration more than ‘normal’ messages
  - Retained publications can clutter up the queue
  - Be careful when considering publication of sensitive information



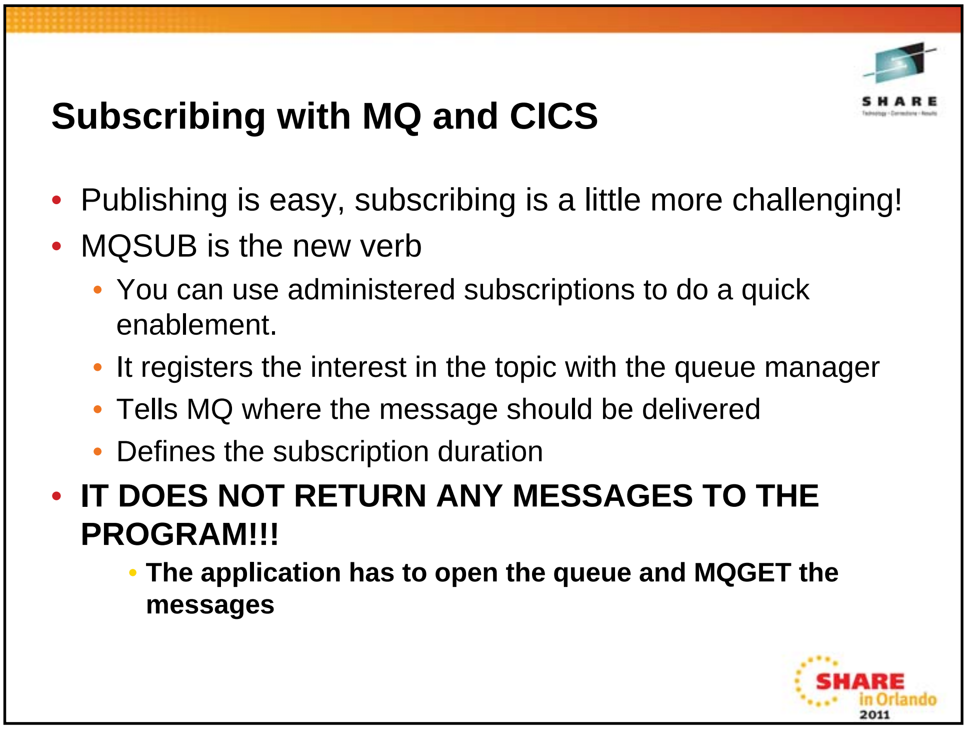
Publishing with MQ and CICS – Warnings - Notes

- Publishing messages can be an efficient way to get the same messages set to multiple interested parties, but:
  - If there is only 1 subscriber, it is more costly than point to point
    - Please see SupportPac MP1F for information on the costs of pub/sub on z/OS
  - Publications may need expiration more than ‘normal’ messages
    - Durable subscriptions queues can fill
    - Subscriptions, even non-durable remain active until a transaction ends to the subscription is stopped
      - *Publications will continue to be delivered after the application has closed the subscription queue*



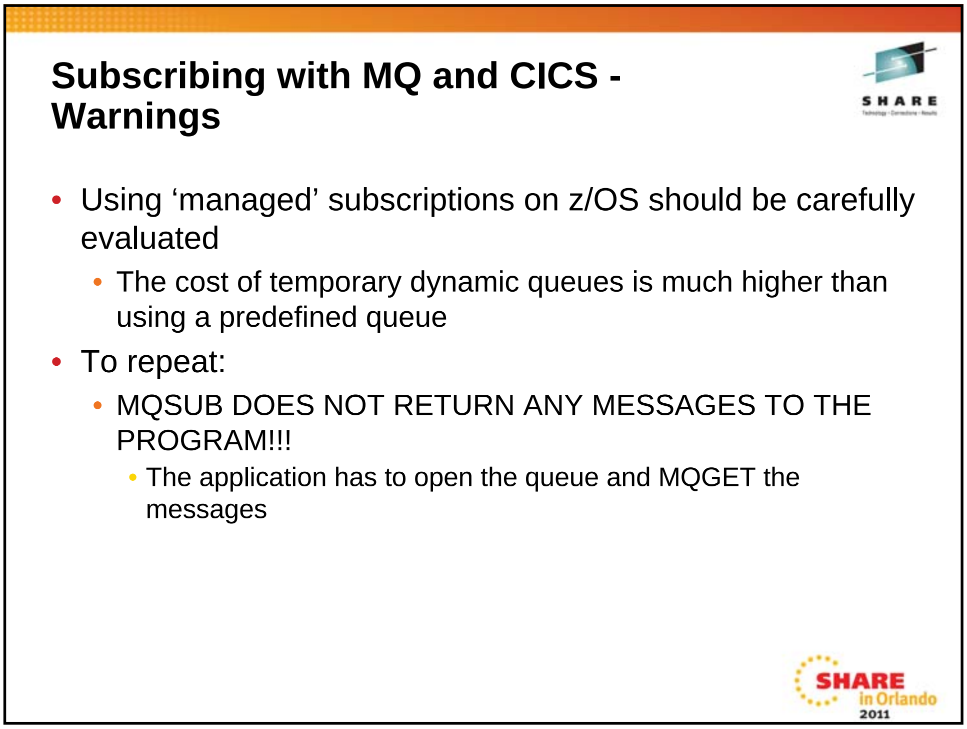
Publishing with MQ and CICS – Coding notes

- Published messages are typical MQ messages:
  - Persistent or not
  - Expire
  - Supply reply to information
  - Use report options



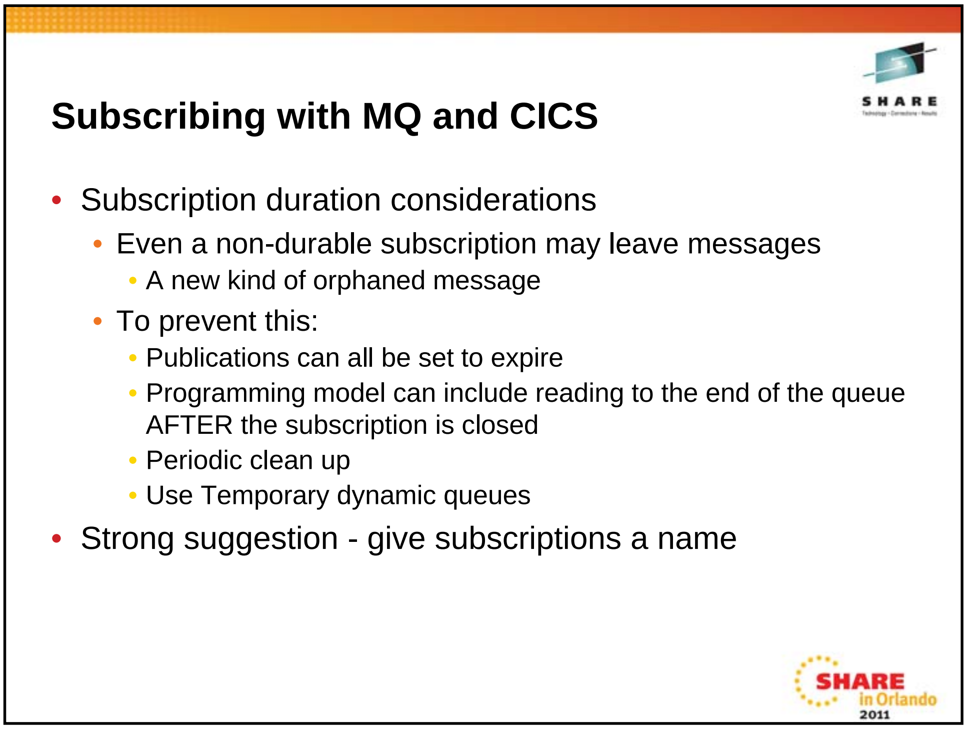
Subscribing with MQ and CICS

- Publishing is easy, subscribing is a little more challenging!
- MQSUB is the new verb
  - You can use administered subscriptions to do a quick enablement.
  - It registers the interest in the topic with the queue manager
  - Tells MQ where the message should be delivered
  - Defines the subscription duration
- **IT DOES NOT RETURN ANY MESSAGES TO THE PROGRAM!!!**
    - **The application has to open the queue and MQGET the messages**



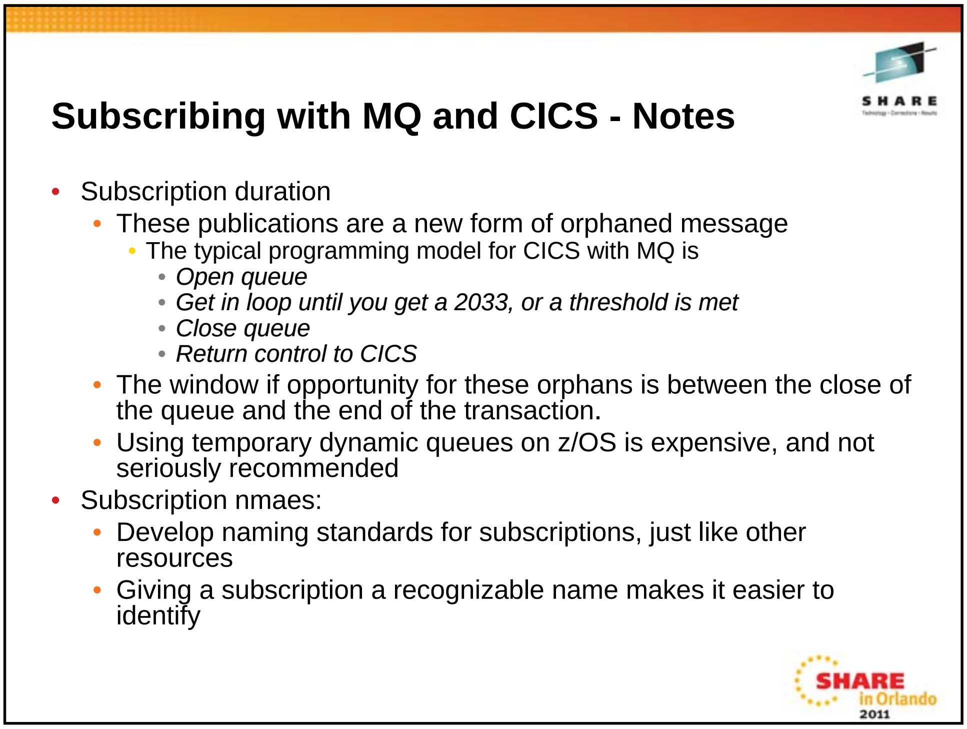
Subscribing with MQ and CICS - Warnings

- Using ‘managed’ subscriptions on z/OS should be carefully evaluated
  - The cost of temporary dynamic queues is much higher than using a predefined queue
- To repeat:
  - MQSUB DOES NOT RETURN ANY MESSAGES TO THE PROGRAM!!!
    - The application has to open the queue and MQGET the messages



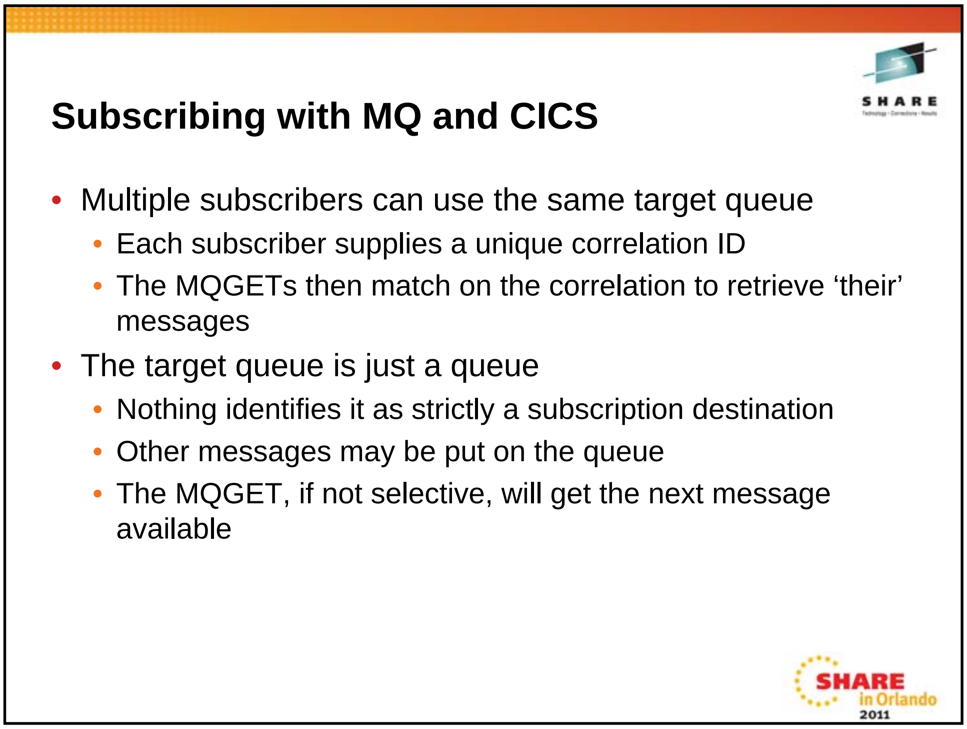
Subscribing with MQ and CICS

- Subscription duration considerations
  - Even a non-durable subscription may leave messages
    - A new kind of orphaned message
  - To prevent this:
    - Publications can all be set to expire
    - Programming model can include reading to the end of the queue AFTER the subscription is closed
    - Periodic clean up
    - Use Temporary dynamic queues
- Strong suggestion - give subscriptions a name



Subscribing with MQ and CICS - Notes

- Subscription duration
  - These publications are a new form of orphaned message
    - The typical programming model for CICS with MQ is
      - *Open queue*
      - *Get in loop until you get a 2033, or a threshold is met*
      - *Close queue*
      - *Return control to CICS*
  - The window if opportunity for these orphans is between the close of the queue and the end of the transaction.
  - Using temporary dynamic queues on z/OS is expensive, and not seriously recommended
- Subscription nmaes:
  - Develop naming standards for subscriptions, just like other resources
  - Giving a subscription a recognizable name makes it easier to identify



Subscribing with MQ and CICS

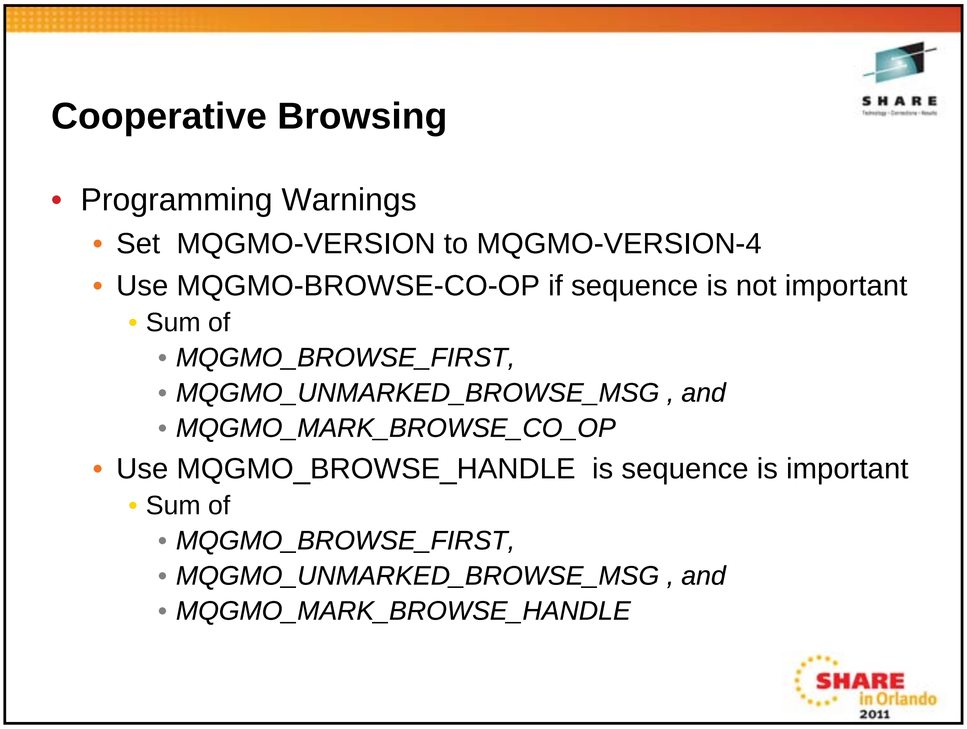
- Multiple subscribers can use the same target queue
  - Each subscriber supplies a unique correlation ID
  - The MQGETs then match on the correlation to retrieve ‘their’ messages
- The target queue is just a queue
  - Nothing identifies it as strictly a subscription destination
  - Other messages may be put on the queue
  - The MQGET, if not selective, will get the next message available

Subscribing with MQ and CICS - Notes

- Using a common target queue
  - Multiple application or clients can use the same queue – saving queue definitions, and other resources
- Remember – there is nothing special about the destination queue used by a subscription

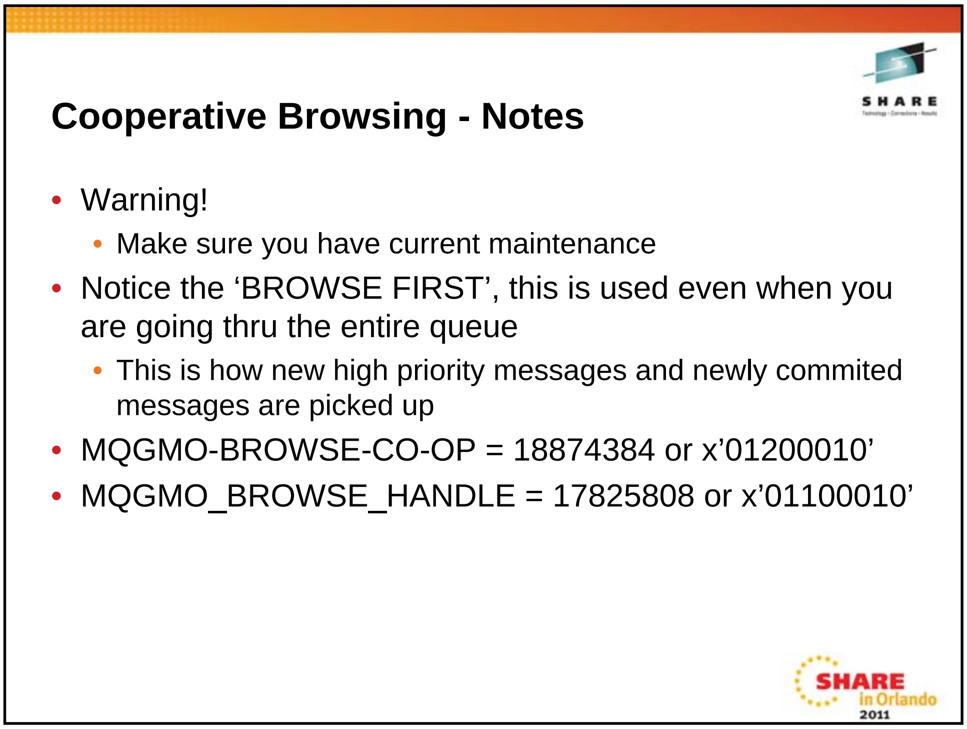
Cooperative Browsing

- Designed for work dispatching
  - Multiple applications can browse and dispatch work, without competing for messages
  - Can reduce the costly transaction starts for messages already processed by other instances
  - Allows new (or newly committed) messages to be ‘in stream’
  - Uses a 16-byte message token to uniquely identify the message
- You must alter existing dispatching programs to take advantage of this



Cooperative Browsing

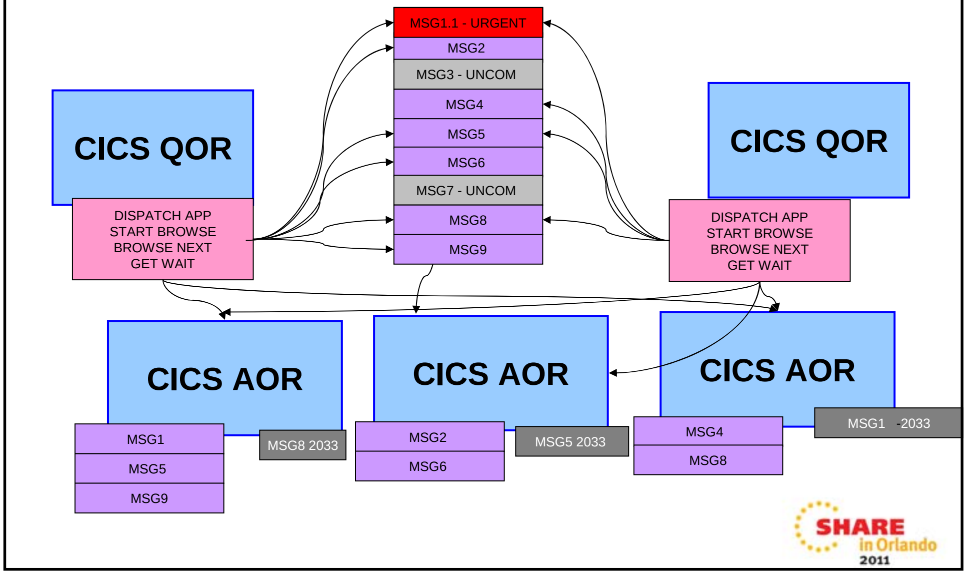
- Programming Warnings
  - Set MQGMO-VERSION to MQGMO-VERSION-4
  - Use MQGMO-BROWSE-CO-OP if sequence is not important
    - Sum of
      - *MQGMO_BROWSE_FIRST,*
      - *MQGMO_UNMARKED_BROWSE_MSG , and*
      - *MQGMO_MARK_BROWSE_CO_OP*
  - Use MQGMO_BROWSE_HANDLE is sequence is important
    - Sum of
      - *MQGMO_BROWSE_FIRST,*
      - *MQGMO_UNMARKED_BROWSE_MSG , and*
      - *MQGMO_MARK_BROWSE_HANDLE*



Cooperative Browsing - Notes

- Warning!
  - Make sure you have current maintenance
- Notice the ‘BROWSE FIRST’, this is used even when you are going thru the entire queue
  - This is how new high priority messages and newly commited messages are picked up
- MQGMO-BROWSE-CO-OP = 18874384 or x’01200010’
- MQGMO_BROWSE_HANDLE = 17825808 or x’01100010’

Uncooperative Multiple Dispatcher Example – WMQ and CICS



MSG1.1 - URGENT
MSG2
MSG3 - UNCOM
MSG4
MSG5
MSG6
MSG7 - UNCOM
MSG8
MSG9

CICS QOR

DISPATCH APP
START BROWSE
BROWSE NEXT
GET WAIT

CICS QOR

DISPATCH APP
START BROWSE
BROWSE NEXT
GET WAIT

CICS AOR

MSG1
MSG5
MSG9

MSG8 2033

CICS AOR

MSG2
MSG6

MSG5 2033

CICS AOR

MSG4
MSG8

MSG1 -2033

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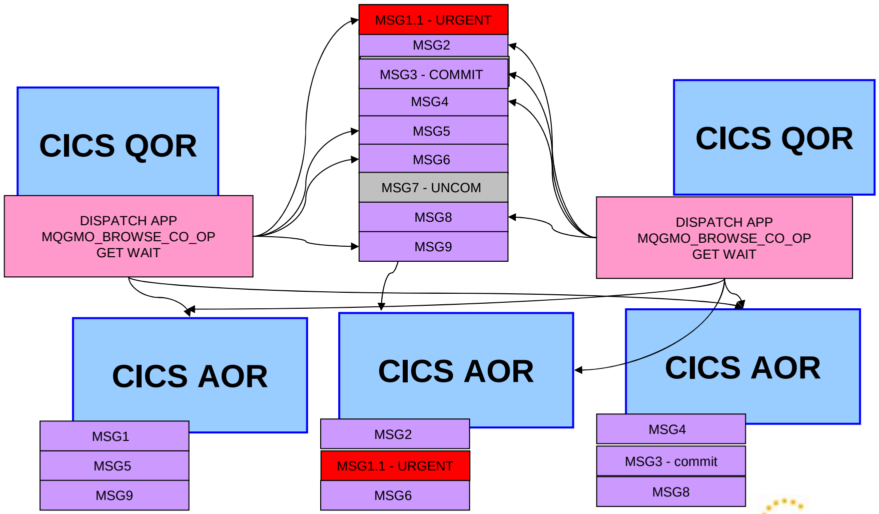
Multiple Dispatcher Example – Cooperation



MSG1.1 - URGENT
MSG2
MSG3 - COMMIT
MSG4
MSG5
MSG6
MSG7 - UNCOM
MSG8
MSG9

CICS QOR

DISPATCH APP
MQGMO_BROWSE_CO_OP
GET WAIT

CICS QOR

DISPATCH APP
MQGMO_BROWSE_CO_OP
GET WAIT

CICS AOR

MSG1
MSG5
MSG9

CICS AOR

MSG2
MSG1.1 - URGENT
MSG6

CICS AOR

MSG4
MSG3 - commit
MSG8

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Message Properties – ‘the side data’

- Message properties are information about the message not part of the message body
- MQMD and MQMDE fields are also properties
  - They do not require the new verbs
- Suggested uses:
  - Message selection:
    - Red messages processed by transaction ABCD
    - Green messages processed by QERF
  - Adding processing data or status
    - ‘I have been thru transaction ABCD’
- Formerly RFH2 data

Message Properties – ‘the side data’ - Notes

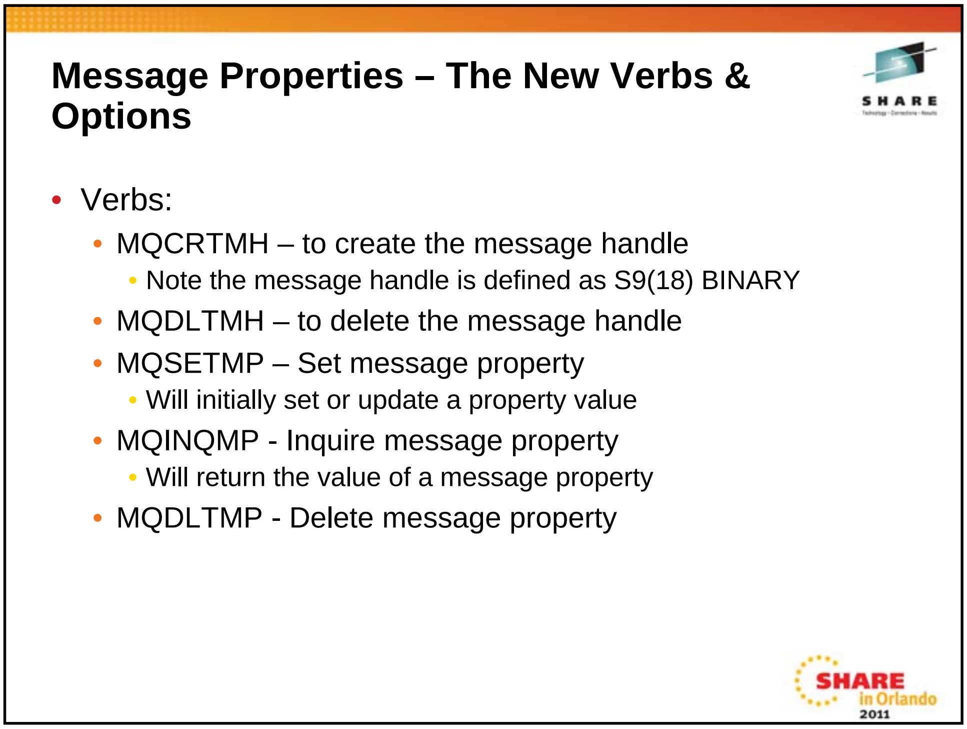
- Formerly RFH2 data
  - There are a number of places where options have been added to provide ‘old style’ delivery of the properties:
    - On queue definitions:
      - *PROPCTL Values*
        - *COMPAT – the default value. If the message contains a property with a prefix of mcd., jms., usr., or mqext., all message properties are delivered to the application in an MQRFH2 header. Otherwise all properties of the message, except those contained in the message descriptor (or extension), are discarded and are no longer accessible to the application.*
          Applications which expect JMS related properties to be in an MQRFH2 header in the message data to continue to work unmodified. If a message handle is supplied then the behavior is to return the properties in the message handle.all properties that are identified with a special type are delivered in the RFH2 headers, others are discarded
        - *ALL – message properties are delivered as RFH2 headers*
        - *FORCE - Properties are always returned in the message data in an MQRFH2*
        - *NONE – All properties are removed*
    - On the MQGET:
      - *MQGMO-PROPERTIES-FORCE-MQRFH2*
      - *MQGMO-PROPERTIES-COMPATIBILITY*

Message Properties – ‘the side data’

- Message properties are associated with a message via a Message Handle
- Multiple message properties associated with the handle
- New verbs have been added to create and delete the handles
- New verbs have been created to add, inquire and delete message properties

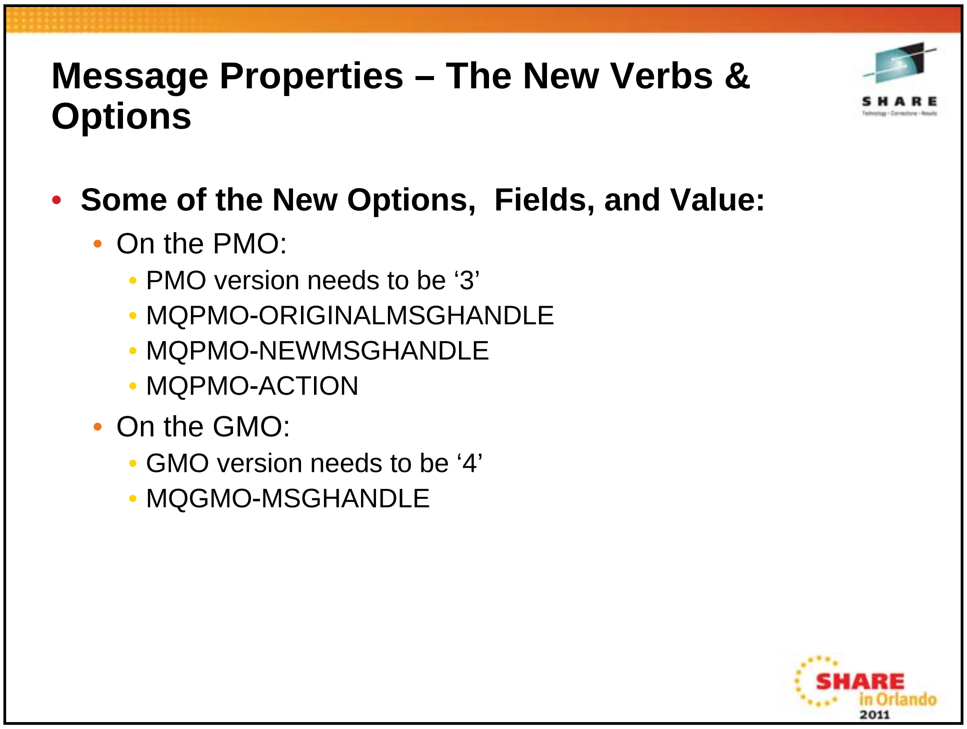
Message Properties – Warnings

- Performance
  - No Indexing
    - Deep queues may, no will, see higher CPU and response time when selecting by a property
  - The message size can increase dramatically when properties are added
    - Potential performance impact
    - Potential resource (bufferpool, pageset, logs) impact
  - ‘My properties are gone’
    - Check your queue properties



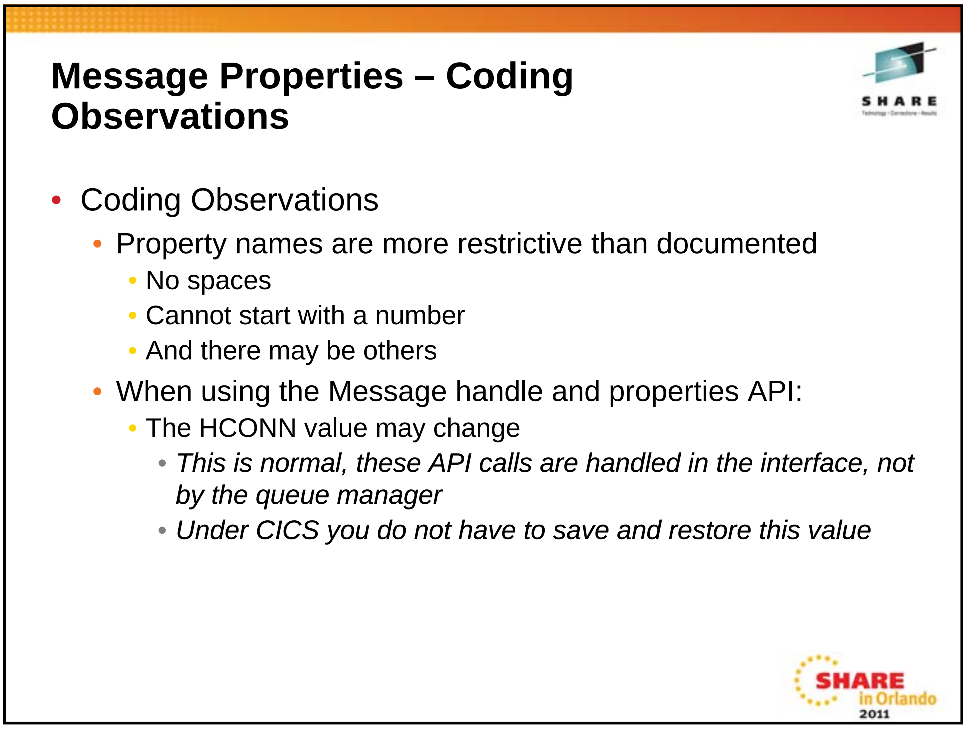
Message Properties – The New Verbs & Options

- Verbs:
  - MQCRTMH – to create the message handle
    - Note the message handle is defined as S9(18) BINARY
  - MQDLTMH – to delete the message handle
  - MQSETMP – Set message property
    - Will initially set or update a property value
  - MQINQMP - Inquire message property
    - Will return the value of a message property
  - MQDLTMP - Delete message property



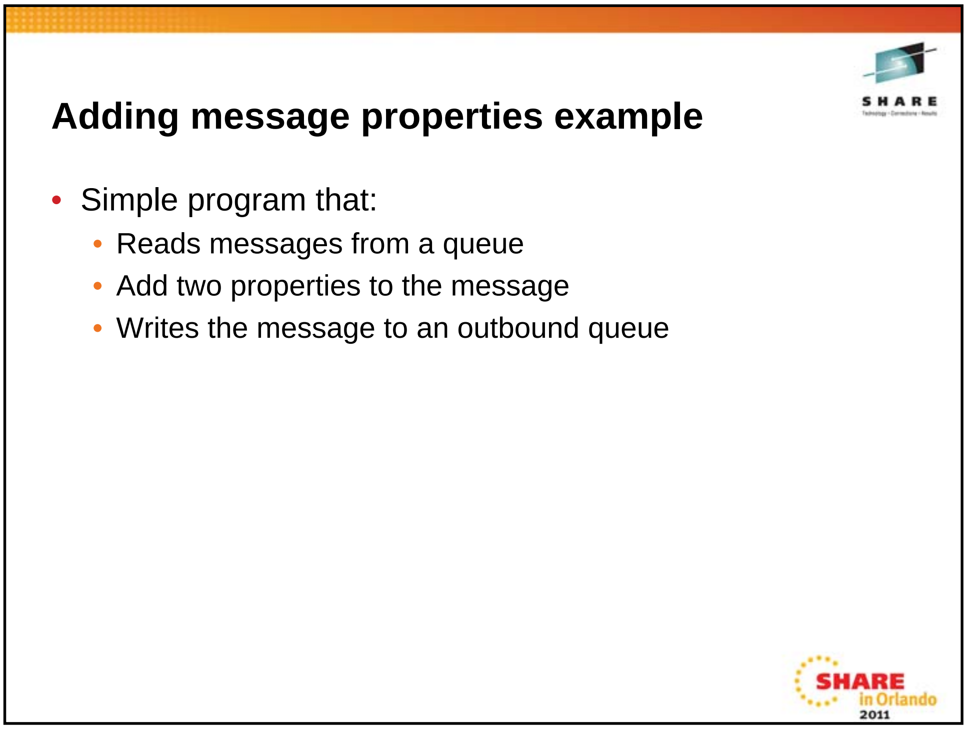
Message Properties – The New Verbs & Options

- **Some of the New Options, Fields, and Value:**
  - On the PMO:
    - PMO version needs to be ‘3’
    - MQPMO-ORIGINALMSGHANDLE
    - MQPMO-NEWMSGHANDLE
    - MQPMO-ACTION
  - On the GMO:
    - GMO version needs to be ‘4’
    - MQGMO-MSGHANDLE



Message Properties – Coding Observations

- Coding Observations
  - Property names are more restrictive than documented
    - No spaces
    - Cannot start with a number
    - And there may be others
  - When using the Message handle and properties API:
    - The HCONN value may change
      - *This is normal, these API calls are handled in the interface, not by the queue manager*
      - *Under CICS you do not have to save and restore this value*

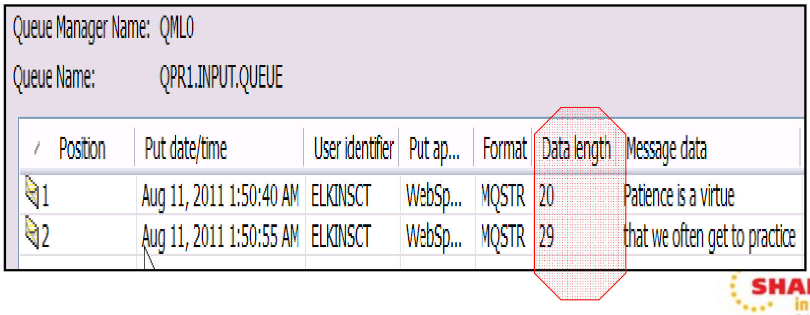


Adding message properties example

- Simple program that:
  - Reads messages from a queue
  - Add two properties to the message
  - Writes the message to an outbound queue

The inbound messages

- Using the MQ Explorer to put two messages on the inbound queue
- Note the Data length field for both



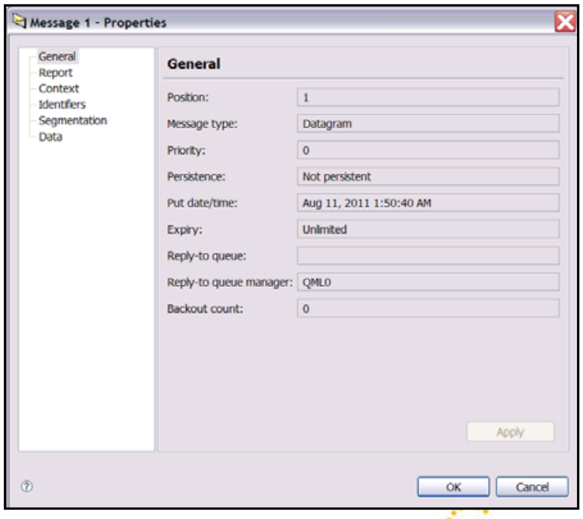
Queue Manager Name: QML0

Queue Name: QPR1.INPUT.QUEUE

Position	Put date/time	User identifier	Put ap...	Format	Data length	Message data
1	Aug 11, 2011 1:50:40 AM	ELKINSCT	WebSp...	MQSTR	20	Patience is a virtue
2	Aug 11, 2011 1:50:55 AM	ELKINSCT	WebSp...	MQSTR	29	that we often get to practice

The inbound messages - continued

- The properties of both inbound messages looked as shown



General

Position: 1

Message type: Datagram

Priority: 0

Persistence: Not persistent

Put date/time: Aug 11, 2011 1:50:40 AM

Expiry: Unlimited

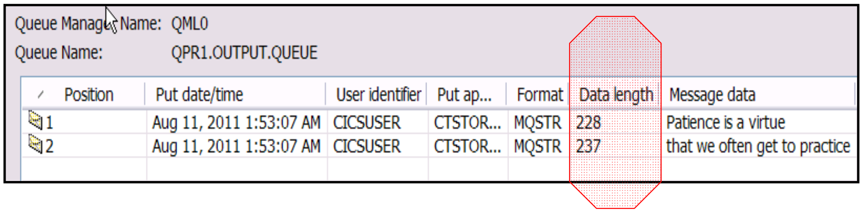
Reply-to queue:

Reply-to queue manager: QML0

Backout count: 0

The outbound messages

- The processing program added two message properties to each message
- The message body remained the same
- Note the new ‘Data length’ values

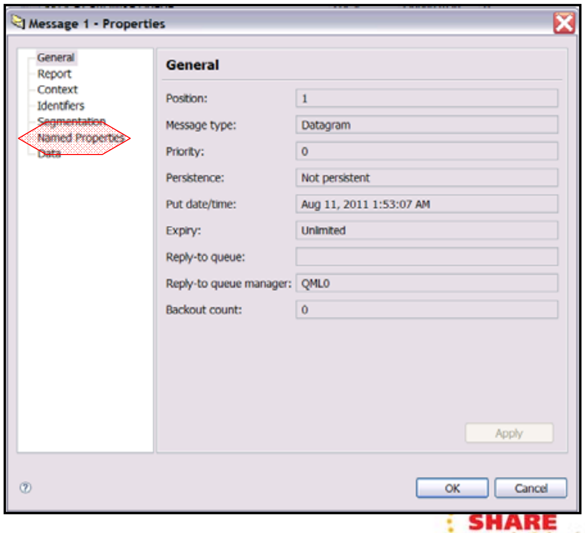


Queue Manager Name: QML0
Queue Name: QPR1.OUTPUT.QUEUE

Position	Put date/time	User identifier	Put ap...	Format	Data length	Message data
1	Aug 11, 2011 1:53:07 AM	CICSUSER	CTSTOR...	MQSTR	228	Patience is a virtue
2	Aug 11, 2011 1:53:07 AM	CICSUSER	CTSTOR...	MQSTR	237	that we often get to practice

The outbound messages - continued

- The properties of both outbound messages look as shown
- The panel shows ‘Named Properties’ are attached to the message



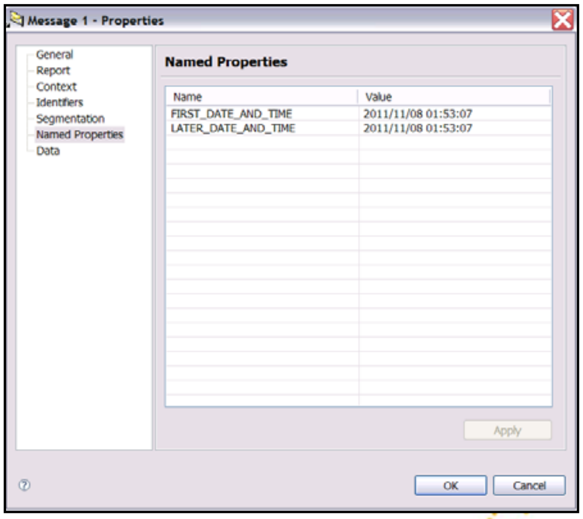
Message 1 - Properties

General

Position: 1
Message type: Datagram
Priority: 0
Persistence: Not persistent
Put date/time: Aug 11, 2011 1:53:07 AM
Expiry: Unlimited
Reply-to queue:
Reply-to queue manager: QML0
Backout count: 0

The outbound messages - continued

- Clicking on that tab will display the added properties



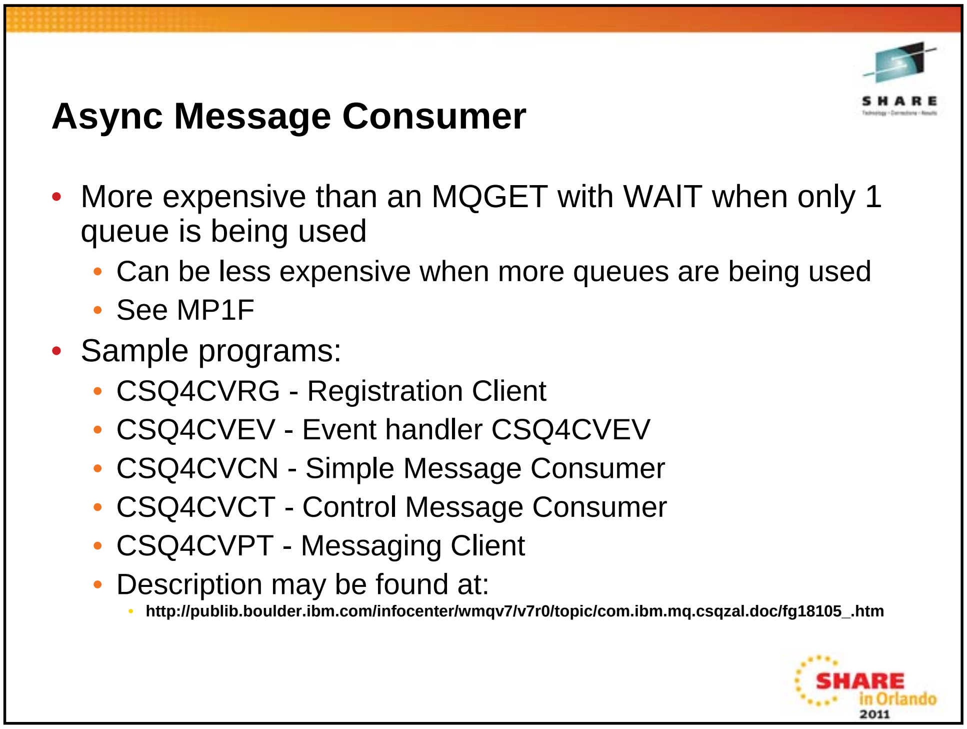
Message 1 - Properties

Named Properties

Name	Value
FIRST_DATE_AND_TIME	2011/11/08 01:53:07
LATER_DATE_AND_TIME	2011/11/08 01:53:07

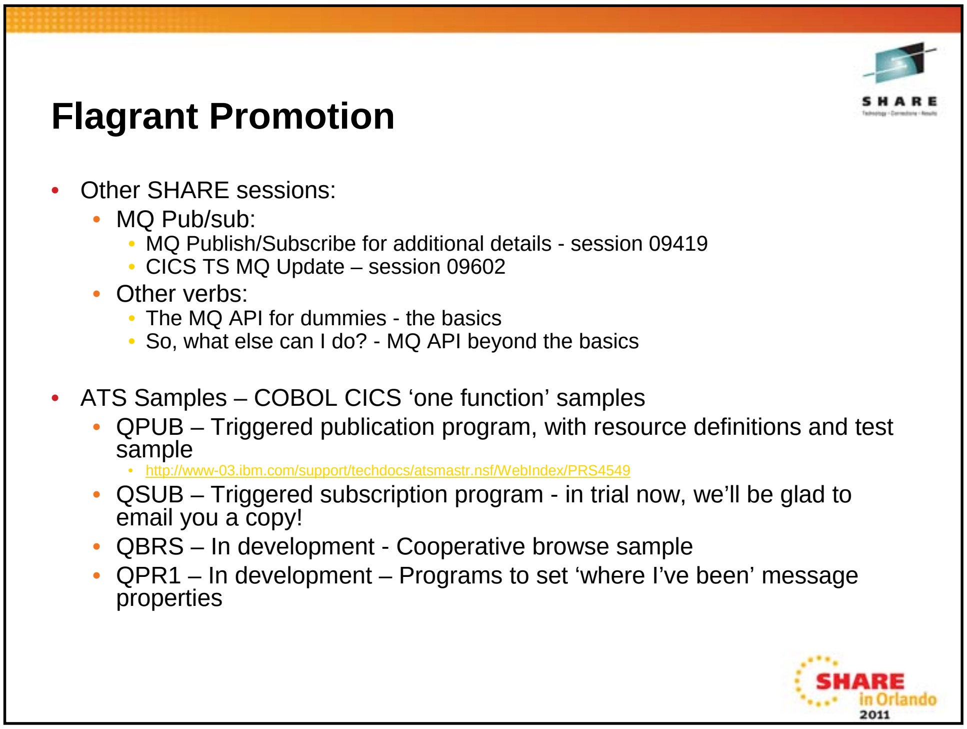
Async Message Consuming

- Aka MQCB and MQCTL verbs
  - Session 09602 covered in detail
- Registers interest in specific messages and ‘calls back’ to the defined routine
  - The application can continue with non-MQ work
  - The called routine gets the message in a buffer
  - No ‘Get Wait’
  - No ‘Triggering’



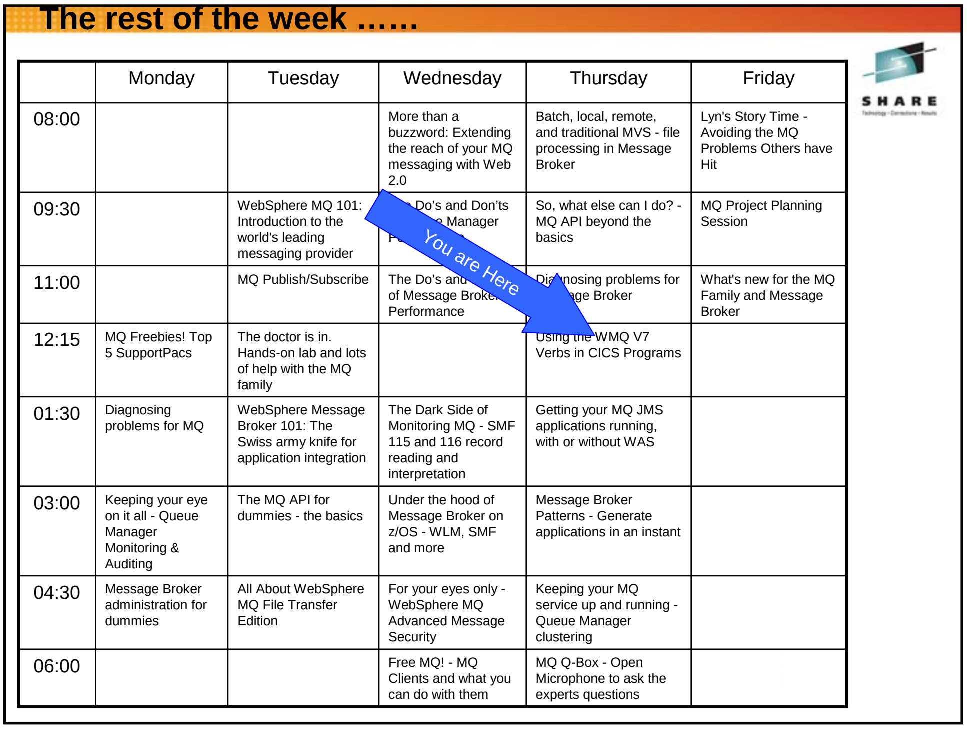
Async Message Consumer

- More expensive than an MQGET with WAIT when only 1 queue is being used
  - Can be less expensive when more queues are being used
  - See MP1F
- Sample programs:
  - CSQ4CVRG - Registration Client
  - CSQ4CVEV - Event handler CSQ4CVEV
  - CSQ4CVCN - Simple Message Consumer
  - CSQ4CVCT - Control Message Consumer
  - CSQ4CVPT - Messaging Client
  - Description may be found at:
    - **http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/topic/com.ibm.mq.csqzal.doc/fg18105_.htm**



Flagrant Promotion

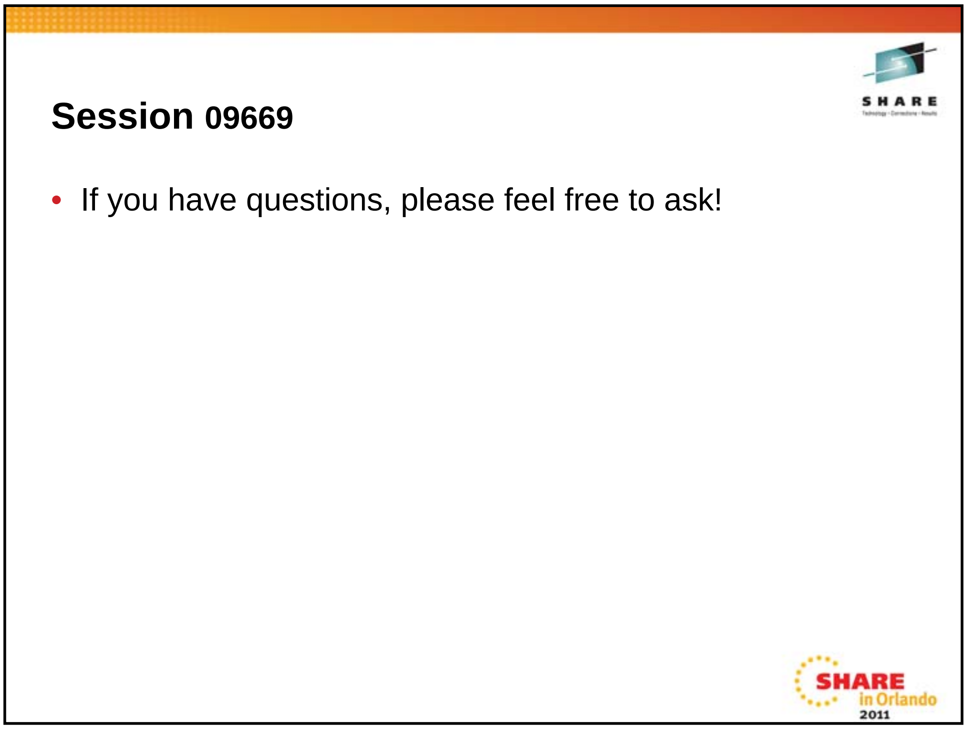
- Other SHARE sessions:
  - MQ Pub/sub:
    - MQ Publish/Subscribe for additional details - session 09419
    - CICS TS MQ Update – session 09602
  - Other verbs:
    - The MQ API for dummies - the basics
    - So, what else can I do? - MQ API beyond the basics
- ATS Samples – COBOL CICS ‘one function’ samples
  - QPUB – Triggered publication program, with resource definitions and test sample
    - http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4549
  - QSUB – Triggered subscription program - in trial now, we’ll be glad to email you a copy!
  - QBRS – In development - Cooperative browse sample
  - QPR1 – In development – Programs to set ‘where I’ve been’ message properties



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	

You are Here



Session 09669

- If you have questions, please feel free to ask!

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