The top ten issues in WebSphere MQ and WebSphere MB

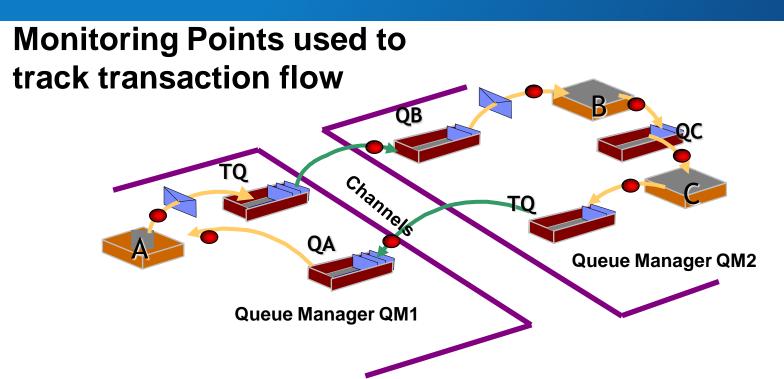
> Barry D. Lamkin Executive IT Specialist blamkin@us.ibm.com

Who Am I?

- Barry Lamkin
- Army Helicopter Pilot 1967 1971
- Air Traffic Controller 1973 1981
- MVS (aka z/OS) Systems Programmer 1981 1994
- Candle Systems Engineer 1994 2004
- IBM Executive IT Specialist 2004 whenever

WebSphere MQ (MQSeries) - Features

 \checkmark Assured, exactly once delivery ✓ Single API across 45+ platforms ✓ Network integration across various network protocols ✓ Transactional control ✓ Triggering of jobs/programs ✓ Content independence ✓ Single message > 100MB ✓ Asynchronous design (application & platform independent) \checkmark Parallel processing ✓ Robust, commercial middleware \checkmark Shields developers from network complexities

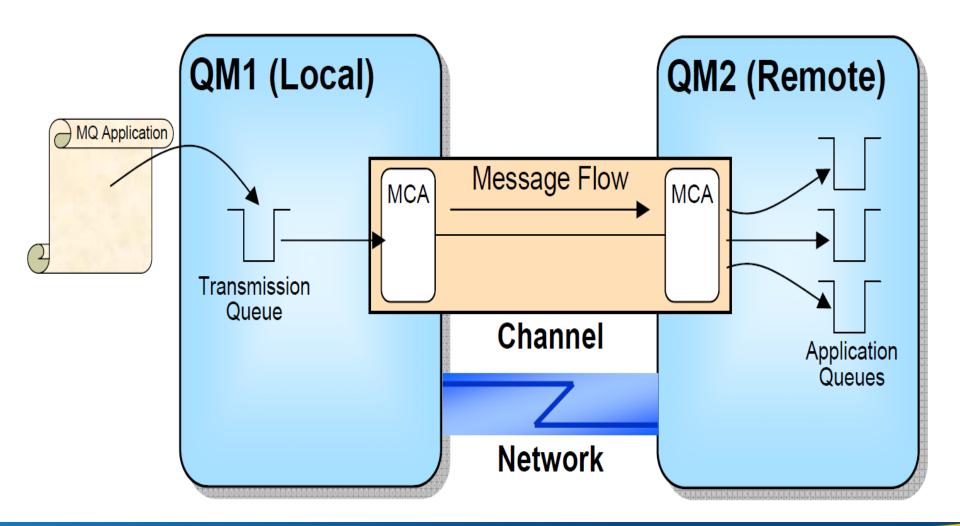


- Application A, B and C are components of a business transaction
- There are many objects that make up the underlying transactions
- There are as many as 8 monitoring points for objects associated to this transaction
- You should Monitor all the objects as it relates to the transaction (queues, channels)
- You should Monitor the flow of messages belonging to specific message queues (get/put rate)
- You need the ability to detect slowdown or stoppage in flow in specific queues (put rate exceeds get rate, channel down)
- You will need to identify problems and automatically react to them.

Top Ten Issues in WMQ & WMB (or more)

- MQ Channel Down
- Queue Full
- Messages in the Dead Letter Queue
- Messages in a queue and no open processes
- Isolating MQ problems between IBM z/OS® and distributed systems
- Changes in the MQ configuration
- Restoring last valid MQ configuration
- Determining if slow performance is due to network, MQ or Message Broker
- Problems connecting to broker's queue manager
- No messages flowing in the broker
- Execution Groups or Message Flows not started

MQ Channels



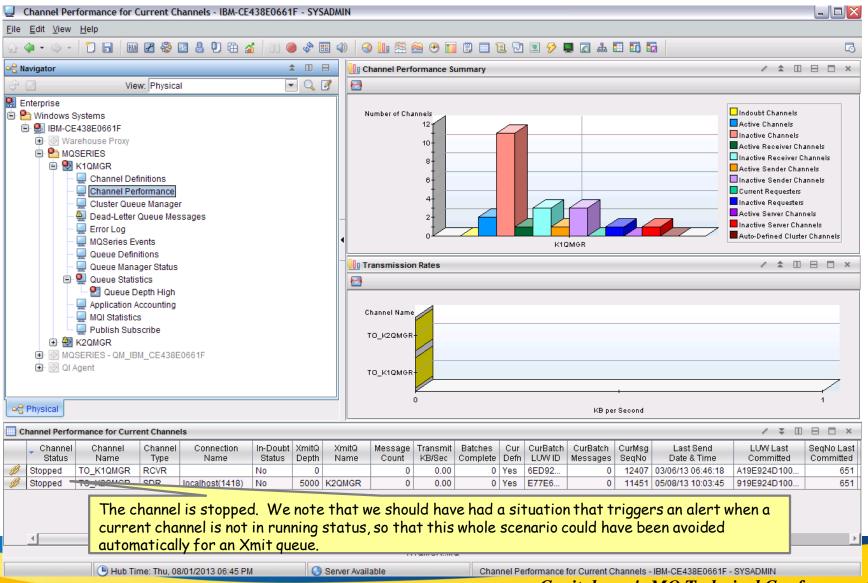
Issues with Channels

- Which channels are running or stopped?
- If my channel is up, is it transmitting messages?
- Are my channels optimally configured?
- If channel performance is poor, how does that impact my clients?

MQ Channel Down

- Is this a problem?
- MQ Event "Channel Stopped" may not be good enough
- Check Channel Status
- Is the Listener running?
- Are there messages in the XmitQ?
- Is the Remote Queue Manager down?
- Is the Remote Queue correct or full?
- Is there a Network problem?

Channel Stopped



Start the Channel

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🕒 Hub Time: Thu, 08/01/2013 06:48 PM 🕓 Server Available	Channel Performance for Current Channels - IBM-CE438E0661F - SYSADMIN

WebSphere MQ Channel is started but not running

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Monday March 10 2014

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Monday March 10 2014

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Monday March 10 2014

C Session C - [62 x 160]												d X
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<u>F</u> ile <u>E</u> dit	<u>V</u> iew	<u>T</u> ools <u>N</u> avig	ate <u>H</u> elp	03/10/2014 0	3:30:16						— Auto Update	: Off
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×				Connections Su	ummary for Q	7G4CHIN						
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ч ™				TCP Listeners S	Gummary for (Q7G4CHIN						
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06/003

Session C - [62	x 160]													f X
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~			e(top) port(us						_ <u> 0 ×</u>
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_ Q7G5 _ Q7G1 _ Q7G4	I SYS I SYS I SYS	Critical Warning OK	Unknown Warning OK	Unkn Crit OK		0 0 0	Stopped Running Running	Stopped Running Running	Stopped Waiting Waiting	0 32 39	0 0 0	0 0 0	0 197 8	
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06/054

Connected to remote server/host wlaa.tivlab.raleigh.ibm.com using lu/pool TCPA0035 and port 23

避 Session C - [62 x 160]												
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M					Queue	Manager Sta	tus					
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ΔQMgr <mark>← →</mark> Hos ⊽Name Nam	t ← → ΔQI e ∇H	Mgr ealth	∆Queue ⊽Health		∆Current 7MQEvents	QMgr Status	Channel Initiator	Command Server	Conn #	DLQ Depth	Message # On XMITQ	Total Messages
_ Q7G5	0		Unknown OK OK	Unknown OK OK	0 0 0	<mark>Stopped</mark> Running Running	<mark>Stopped</mark> Running Running	<mark>Stopped</mark> Waiting Waiting	0 32 39	0 0 0	0 0 0	0 197 8
Σ					Queue-Sha	aring Group	Nodes					No Data 🔤 🗌 🛛
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01/002

Queues

A queue is a container for messages

- Local Queues
- Transmission Queues
- Remote Queues
- Alias Queues
- Model Queues

Managed by the Queue Manager

Queue Defined

- Predefined
- Dynamically defined

Messages are placed in queues to allow programs to interact with each other asynchromously

Queue Statistics / Definitions

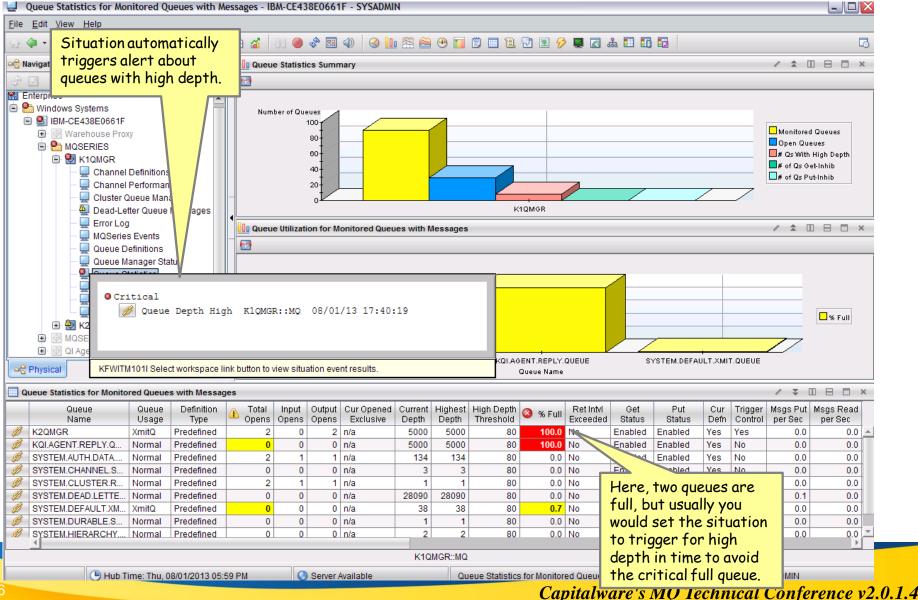
- Active, Input and Output Processes
- Local Aliased Queue Name and Type
- Queue Configuration
 - Trigger Active
 - Trigger Depth
 - Max Message Length

Queue Full

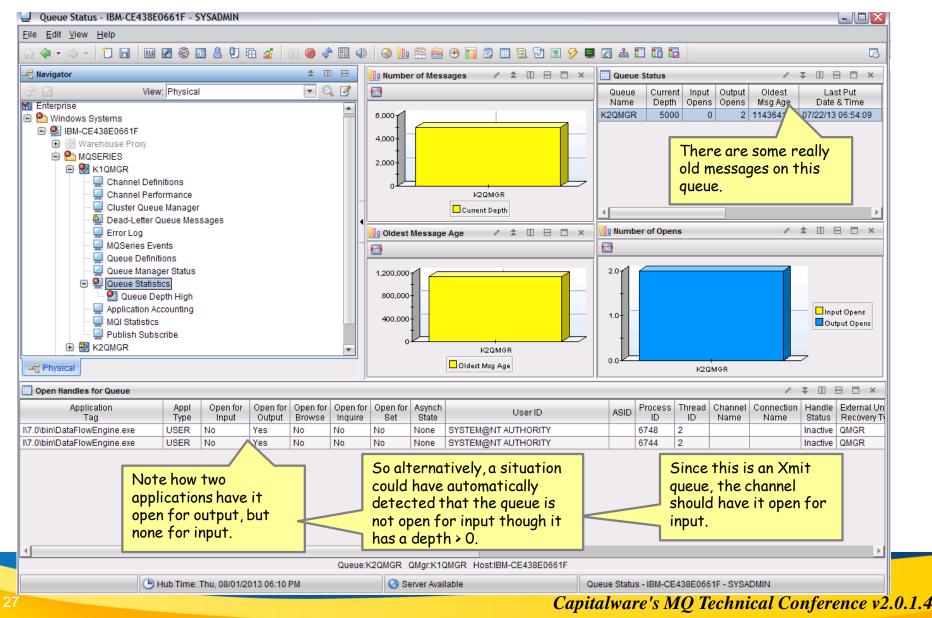
- Local Application or MCA can no longer put messages to Queue
- Local Application should check for Queue Full condition
 MQRC_Q_FULL (2053, X'805')
- MCA will put messages to Queue for a Remote Application
 - If Queue Full messages go to Dead Letter Queue
 - If no Dead Letter Queue channel will be stopped
- MQ Event "Queue Full" or "Queue High" may not be adequate
 - These events do not get reset until the Queue Depth hits "Queue Low"
- Check Queue Depth
- Check if messages are on a Queue and no processes have it opened

Queue Depth High

Queue Statistics for Monitored Queues with Messages - IBM-CE438E0661F - SYSADMIN



Check Queue Status



Combine z/OS and MQ information to solve Queue Full

	File Edit View Tools Navigate Help 07/24/2014 23:57:41	
Command		Auto Update : <u>Off</u> HostName : SP22
кмффмsт		QmgrName : 0721
Stat	tus Parameters	
\sim	Queue Manager Health	
0Mgr 0Mgr	NameQ721 Host Name HealthBuarning Connection Count StatusBuarning Channel Initiator Status and Server Status	55 Running
\sim	Queue Health	
High Total	e Health DLQ Depth Depth Queue Count	
\sim	Channel Health	
Curre Curre	nel Health OK Indoubt Connections ent Not Running 0 Server Connections ent Connections	
\sim	Log Datasets	
l Activ	st Active UOW Log Dataset Name Set Recovery Log Dataset Name ve Log Copy i Dataset Name ve Log Copy 2 Dataset Name.	MQM.V701

hursday July 24 2014

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_	<u> </u>	it <u>V</u> iew <u>T</u>	ools <u>N</u> avig	ate <u>H</u> elp O	3/10/2014	02:59:14					Aut	o Update : Off		
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Y					Queue	Manager Sta	atus							
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	Q722:SP22:MQESA 07.10.00 ip.pipe:#9.42.46.22 <nm>SP22<!-- z/OS~01.12.00 SP22:MQIRA<br-->Q723:SP22:MQESA 07.10.00 ip.pipe:#9.42.46.22<nm>SP22<!-- z/OS~01.12.00 SP22:MQIRA<br-->SP22:MQIRA 07.10.00 ip.pipe:#9.42.46.22.15857.<nm m5510r22:cms<="" os~01.12.00="" td="" z=""></nm></nm></nm>													

01/003

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\checkmark				Queues	with High	Depth						
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ABCQ P6.IN.Q1 TUNGW.QUEUE ITML3TEST003 ITML3TEST009 SYSTEM.CHANNEL.SYNCQ ITML3TEST001 javascript Q4QM7501 SYSTEM.CLUSTER.REPOS ITML3TEST007 ITML3TEST004 SYSTEM.HIERARCHY.STA SYSTEM.DURABLE.SUBSC SYSTEM.RETAINED.PUB.	157572 912 40 26 14 11 10 7 7 5 5 5 3 2 2 2 1	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	01000001000000000000000000000000000000	Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled	Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled Enabled	0ff 0ff 0ff 0ff 0ff 0ff 0ff 0ff 0ff 0ff	0.0 91.2 55.5 45.5 0.0 33.3 70.0 0.0 20.0 10.0 0.0 0.0 0.0 0.0	80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0				

File Edit View Tools Navigate Help 07/25/2014 00:07:16

		1100 1			20, 2011 0						Auto Upda	ate : Off
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KMQQUESD					Queue Sta	atus Detai	ls				QmgrName	: 0721
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\sim				Applica	ations with	Open Hand	le for Queue					
Columns <u>2</u>	to <u>12</u> of <u>20</u>				+	→ ↑ ↓			R	ows <u>1</u> t	o <u>2</u> (of <u>2</u>
∆Appl ← → ⊽Tag	∆Appl ⊽Type	∆ASID ⊽	∆User <mark>←</mark> → ⊽ID	Open for Input	Open for Output	Open for Browse	Open for Inquire	Open for Set	Channel Name	Connectio Name	n ←	+CICS Regio
_ A6INP _ A60UP	ВАТСН ВАТСН	0047 003F	DONGCC DONGCC	No Exclusive	Yes No	No Yes	No No	No No				

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×					Queue P6.	IN.Q1 Appl (AGOUP						
Columns <u>2</u>	to <u>13</u> of <u>15</u>				+	→ ↑ ↓				Rows	1 to	1 of	1
♦Appl Tag	User ID	Handle Status	Asynch State	Open for Input	Open for Output	Open for Browse	Open for Inquire	Open for Set	QSG Disp	External Unit of Recovery Type	External Recovery		+QMg Rec
_ A60UP	DONGCC	Active	None	Exclusive	No	Yes	No	No	Qmgr	QMGR			
\sim				z∕0S Addri	ess Space CM	PU Details (for A6OUP 0	×003F					
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ZIIP on CP A IFA Percent ZIIP Percent Job CPU Perc Job SRB Perc Job TCB Perc Job CPU Time Job SRB Time Job SRB Time Job Preempta Job Preempta	With Encla With Encla cent cent ent ent ent able Home S able Home S hal SRB Serv	ve Home SRB ave Home SRI RB Service ⁻ RB Service I vice Time	Time. B Time. Time. Percent.										0.0 0.0 87.7 87.76 88.76 88.76 0.06 0.00 0.00

Command ==> KMQAPQZD KM5MQASZ Navigation Options for Address Spa	ace A6OUP 0x003F ils	for Queue				Hosti	Update Name : SP Name : Q7	
✓ Select an action and then press ENTER	ppl	AGOUP						_ 0 ×
Columns 1. ! Take Action on Address Space					Rows	1 to	1 of	1
 ◇Appl A Address Space A Address Space Bottlenecks Summary Tag B Bottleneck Analysis for Address Space D Storage Usage by Address Space 	pace for	Open for Inquire	Open for Set	QSG Disp	External Unit of Recovery Type	External Recovery		+QMg Rec
A60UP6. M Storage Usage by Aldress Space A60UP6. M Storage Usage by all Address Space 7. S Address Space CPU Usage Details	25	No	No	Qmgr	QMGR			
 8. T TCB Storage and LSQA for Address S 9. W WLM Service Class Resources 	Space ils	for A60UP 0>	(003F					_ 0 ×
Job Name.								160UP 003F
Type JESJOBID Step Name							B JOB1	Batch
Proc Step IO per Second.								0.0
CPU Percent. IFA Percent.								96.1
SRB Percent. TCB Percent.								0.0
ZIIP Percent CPU Percent Excluding Home SRB Time								96.1 96.1
IFA Percent With Enclave Home SRB Time ZIIP Percent With Enclave Home SRB Time								90.1 0.0 0.0
IFA on CP Percent								0.0
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zIIP Percent With Enclave Home SRB Time Job CPU Percent								0.0 87.7
Job SRB Percent Job TCB Percent								0.0 87.7
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								0.0

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		Bottleneck	k Ana	Auto Updat Plex ID : lysis SMF ID :	LPAR400J
~		Address Space	A60U	P Summary	
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_ Using CPU _ CPU Loop Index _ ECB Wait _ CPU Wait	16.8 17.7 6.5 4.9				
\sim		Contention(%)) by	Resource	
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JES2 Job Cancel JES2 Job Status JES2 Job Requeue HSM JES3 C/I Locate HSM Recall HSM Recall SWAP Aux Stor SWAP Detected. SWAP Detected. SWAP Detected. SWAP Dut Too Long. SWAP Out Too Long. SWAP Request SWAP Sys Paging. SWAP Terminal In SWAP Transition				JES2 Job Delete. JES2 SYSOUT. HSM Backup. HSM Delete. HSM digrate. HSM CDS Read. SWAP Central Stor. SWAP Central Stor. SWAP Enq Exchange. SWAP Long. SWAP Long. SWAP MPL Delay. SWAP Real Stor. SWAP Real Stor. SWAP Terminal Out. SWAP Unilateral.	
SWAP OMVS Input SWAP In-Real Crypto Async Msg Proc Wait Crypto Assist Proc Wait			0.0 0.0 0.0 0.0	SWAP OMVS Output Using Crypto Async Msg Proc Using Crypto Assist Proc WTOR Wait	0.0 0.0 0.0 0.0

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Command ==> (M5INSS	==>											Auto Update : <u>Off</u> Plex ID : <u>LPAR400J</u> SMF ID : <u>SP22</u>													
Sampling Statistics																									
Columns 3 to 4 of 4 ← + + + + + + + + + + + + + + + + + +										Rows	1 to	1 (of 1												
♦Samples	◇Interval	Samples Taken	Sample Used																						
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✓ CPU Usage for A60UP 0x003F																									
Columns <u>1</u> to <u>11</u> of <u>19</u>										Rows	<u>1</u> to	<u> </u>	of <u>5</u>												
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_ CSQ4BCJC _ _ _ _	007F803	30 240000	90	100.0		CSQ4BCJ1	24C00080	00000E10 00000E00 00000E20 00000E30 00000E30	69.7 18.7 10.1 1.2 0.1			 	CSQ4BCJ												
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Issues with DLQ

- Are there any messages in the DLQ?
- How long has a message been in the DLQ?
- What messages are in the DLQ?
- Why is a message in the DLQ?
- Can I view the message?
- Can I delete one or more messages?
- Can I requeue a message?

Messages in the Dead Letter Queue

- Dead Letter Queue prevents the Queue Manager from stopping the channel
- Need to monitor if messages arrive in the Dead Letter Queue
- Need to quickly isolate the cause of the message(s) arriving in the DLQ
- Need to be able to resolve the issue with the DLQ messages
 - Fix the issue
 - Delete the message(s)
 - Retry the messages

MQ problems between IBM z/OS® and distributed systems

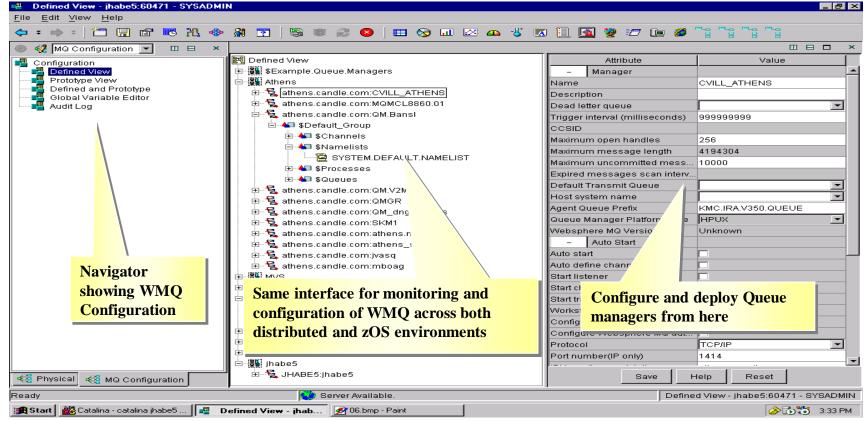
- MQ provides common API across all platforms
- Different monitoring/management solutions for each platform?
- Best practices dictate looking at MQ environment holistically
- Differing backup & recover strategies for MQ objects

MQ Configuration - Administration

- Enterprise-wide configuration/administration strategy?
- Different strategies depending on platform?
- What about backup/recovery?
- If an object is modified you need to be able to detect that.



WebSphere MQ Configuration Management



- Discovery of existing MQ resources
- Prototyping/Modeling (templates) of configuration
- Validation prior to deployment
- Deployment of template based configuration to multiple nodes, immediate or scheduled
- Synchronization from actual to defined or defined to actual
- Audit trail
- Identify WMQ configuration discrepancies
- Recovery of WebSphere MQ Environments

WebSphere Message Broker (IIB)

More of a Black Box than MQ

- Execution Groups
- Message Flows
- Processing Nodes
- Threads
- Need to understand if MB is being affected by MQ
- Is the Queue Manager running?
- Is the Broker connected to the Queue Manager?
- Are the issues with the Network?
- Are there issues with the OS?
- Demands a holistic approach to monitoring to improve MTTR

Message Broker Performance & Availability Monitoring

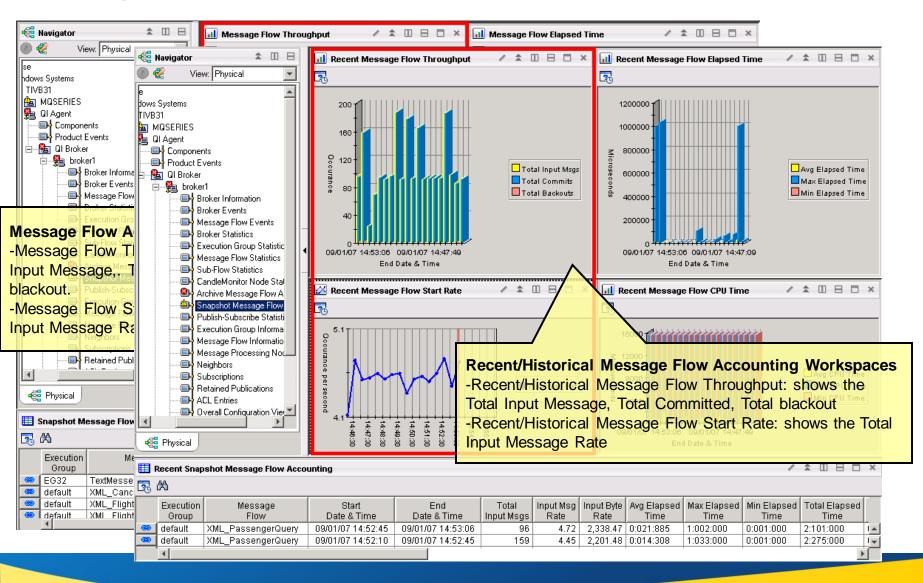
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L Hub Time: Wed, 03/26/2008 11:30 AM	Server Available QI_Broker_QMgr_Not_Connected - TIVQ60 - SYSADMIN

- Monitor message broker / message flow events
- Provide performance statistics at broker, execution group, message flow, sub-flow and processing node levels
- Report pub/sub neighbors, subscriptions, retained publications and ACL entries in broker
- Detect broker configuration changes

- Message broker operational command access
- Detect Broker Status stopped broker, problems connecting to broker's queue mgr, stopped message flow, an active trace, expired publications or subscriptions
- Track Broker performance message flow time, queue time, input/output rates

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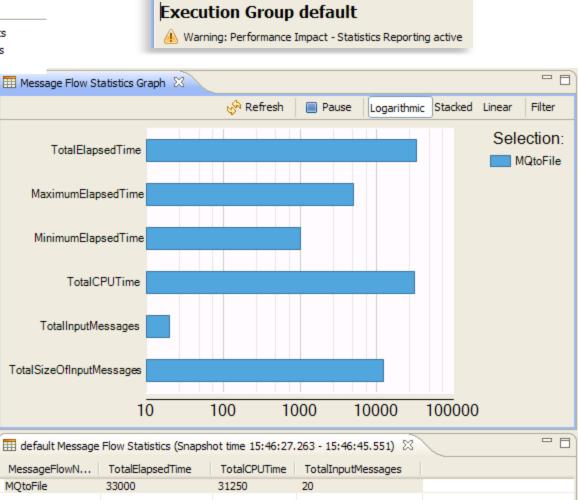
Message Flow Workspaces



Broker Explorer & Message Flow Statistics

Start Message Flow Statistics	
Stop Message Flow Statistics	
Open Statistics Views	
Start Resource Statistics	
Stop Resource Statistics	
Open Resource Views	

- The Message Broker Explorer enables you to start/stop message flow statistics on the broker, and view the output.
- New in V7 (although supportpac IS02 available for V6.1)
- Warnings are displayed advising there may be a performance impact (typically ~3%)



🗐 MQ Explorer - Content 🛛 🕅

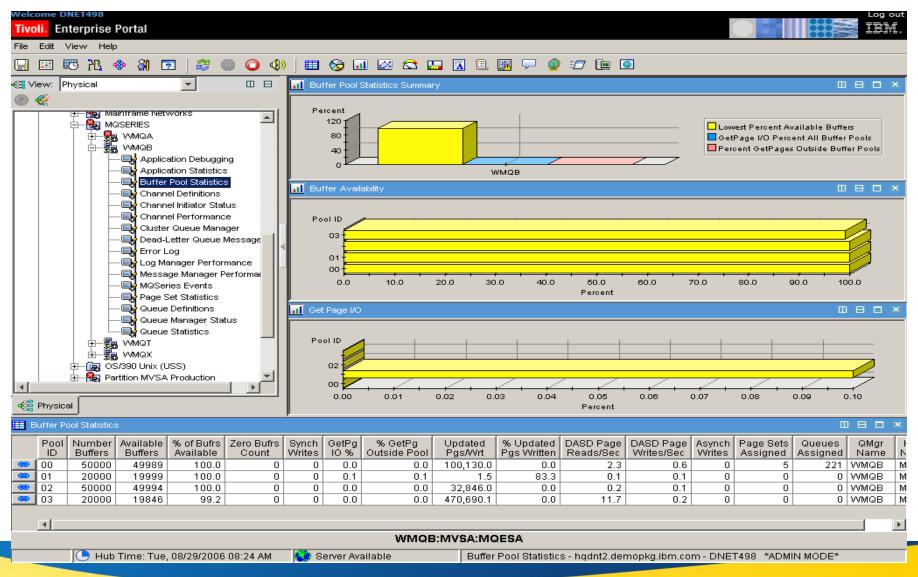
Capitalware's MQ Technical Conference v2.0.1.4

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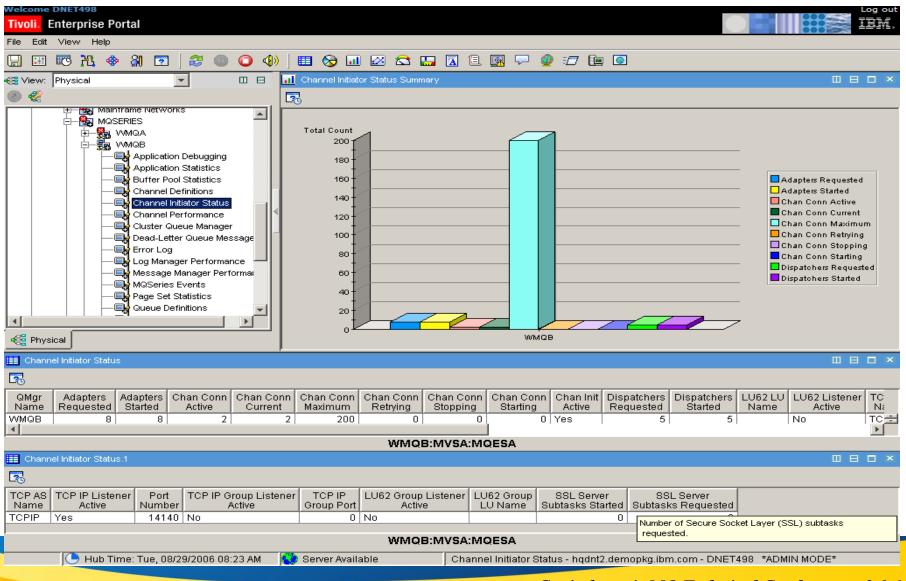
What else?

- Logs (different for z/OS and Distributed)
- Buffer Pools (z/OS)
- Page Sets (z/OS)
- Shared Queues/Coupling Facility (z/OS)
- Clusters
- Age of Messages
- Queue/Dequeue Rate
- Channel Usage
- Poison Messages
- What's normal activity?
- Predictive Analysis

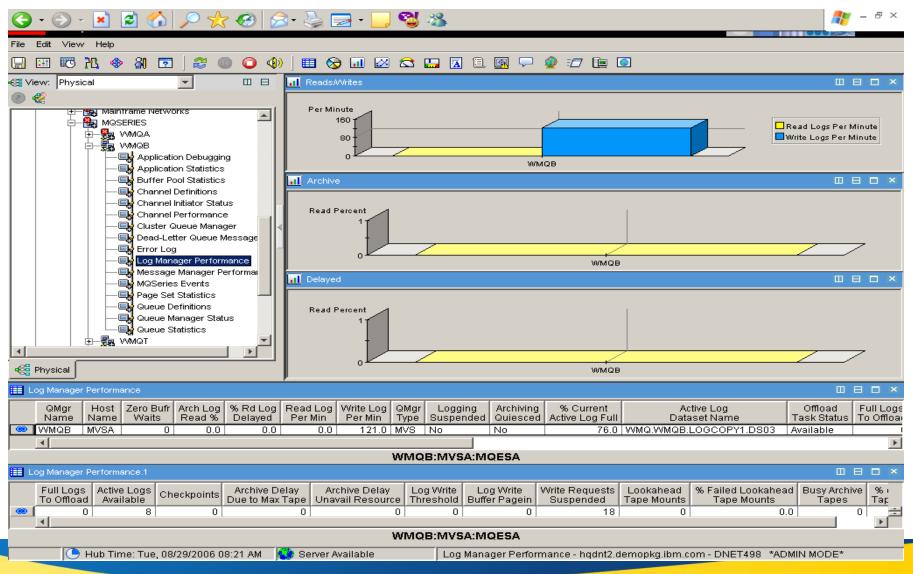
Buffer Pool Statistics - zOS



Channel Initiator Status - zOS

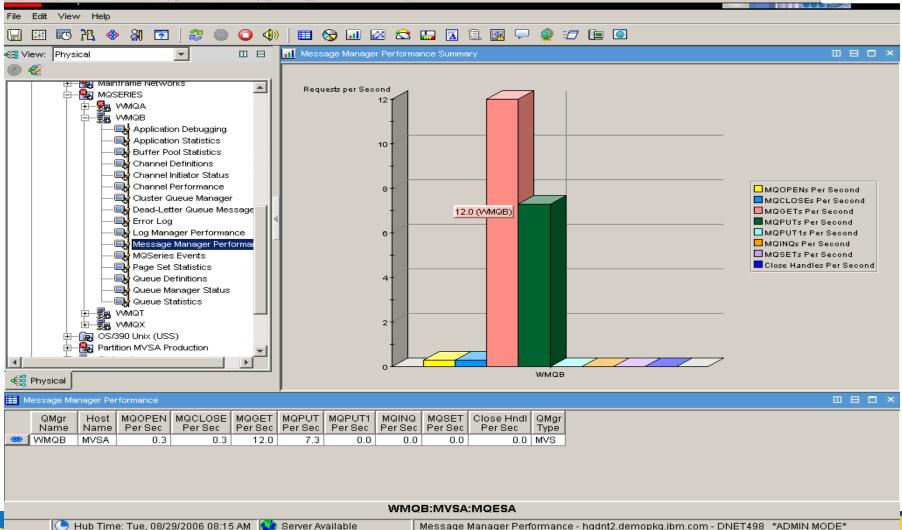


Log Manager Performance - zOS



Message Manager Performance - zOS

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WMQB:MVSA:MQESA

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Summary

- Once introduced into an environment WMQ and WMB become ubiquitous.
- Monitoring/managing your messaging backbone in a silo is not adequate
- Start looking at your Enterprise Monitoring & Management strategy holistically.
- It may look like the problem is WMQ or WMB, maybe it Is not.
- Use automation for corrective action when appropriate

Questions & Answers



Questions & Answers

