

# The top ten issues in WebSphere MQ and WebSphere MB

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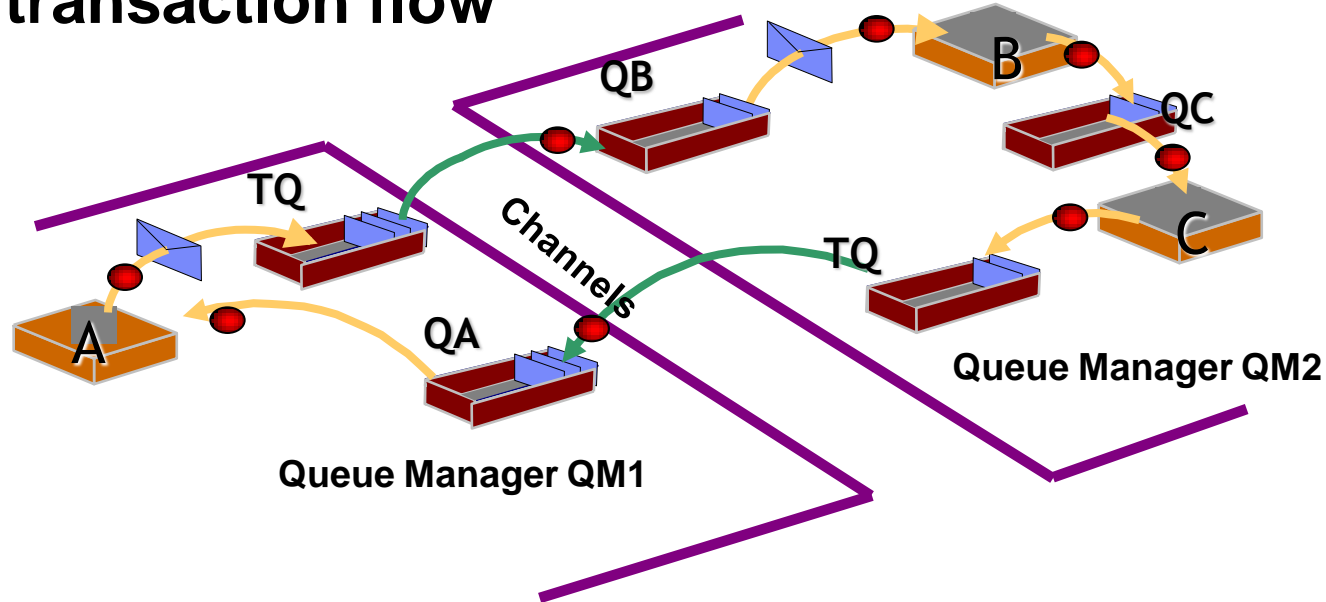
# Who Am I?

- **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

- ✓ 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)
- ✓ Parallel processing
- ✓ Robust, commercial middleware
- ✓ Shields developers from network complexities

# Monitoring Points used to track transaction flow

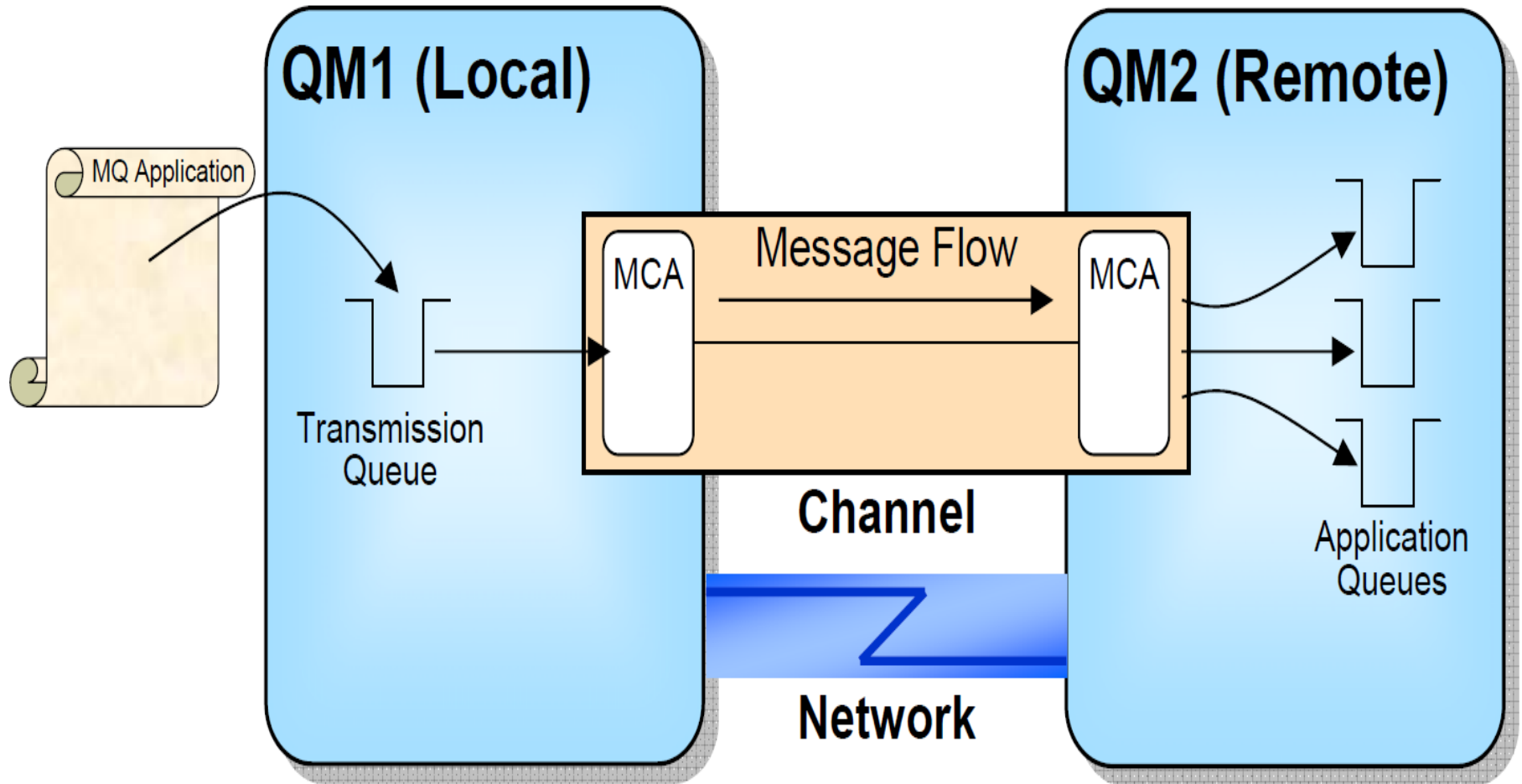


- Application A, B and C are components of a business transaction
- There are many objects that make up the underlying transactions
- There are as many as 8 monitoring points for objects associated to this transaction
- You should Monitor all the objects as it relates to the transaction (queues, channels)
- 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 (maybe 11)

- ▶ 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

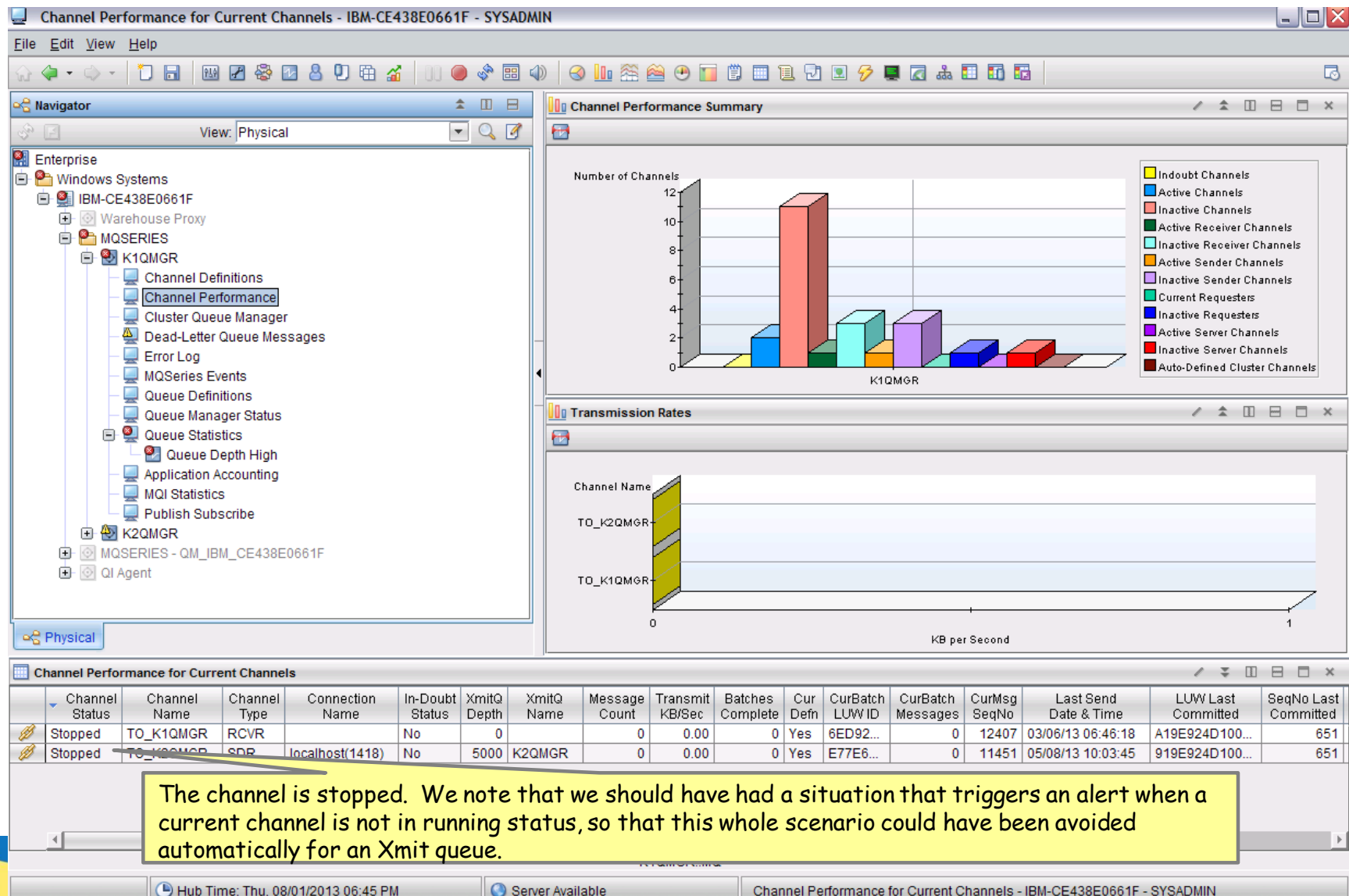
- Which channels are running or stopped?
- If my channel is up, is it transmitting messages?
- Are my channels optimally configured?
- If channel performance is poor, how does that impact my clients?

# MQ Channel Down

- Is this a problem?
- MQ Event “Channel Stopped” may not be good enough
- Check Channel Status
- 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

The screenshot shows the IBM MQ Channel Performance console. A 'Take Action' dialog box is open, displaying the 'MQ Start Channel' action. The command field contains 'MQ:START CHANNEL(TO\_K2QMGR)'. A yellow callout box with a lightning bolt points to the 'TO\_K2QMGR' channel in the table below, containing the following text:

- Right click on the channel row and select the Take Action option, then select the action to start the channel. The channel name for the selected row is automatically filled in.
- If we had the situation to detect the stopped channel, the action to start it could be automated to occur at the time the issue is detected.
- Note that any MQSC command can be configured as a take action, even if it is not product-provided.

The 'Channel Performance Summary' section shows a bar chart titled 'Number of Channels' with a value of 12. The 'Destination Systems' section lists 'K1QMGR::MQ' and 'K2QMGR::MQ'. The 'Channel Performance for Current Channels' table is shown below:

Channel Status	Channel Name	Type	Name	Status	Depth	Name	Count	KB/Sec	Complete	Dem	LOW ID	Messages	SeqNo	Date & Time	Send	LUW Last Committed	SeqNo Last Committed
Stopped	TO_K1QMGR	RCVR		No	0		0	0.00	0	Yes	6ED92...	0	12407	03/06/13 06:46:18		A19E924D100...	651
Stopped	TO_K2QMGR	SDR	localhost(1418)	No	5000	K2QMGR	0	0.00	0	Yes	E77E6...	0	11451	05/08/13 10:03:45		919E924D100...	651

# 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 asynchronously**

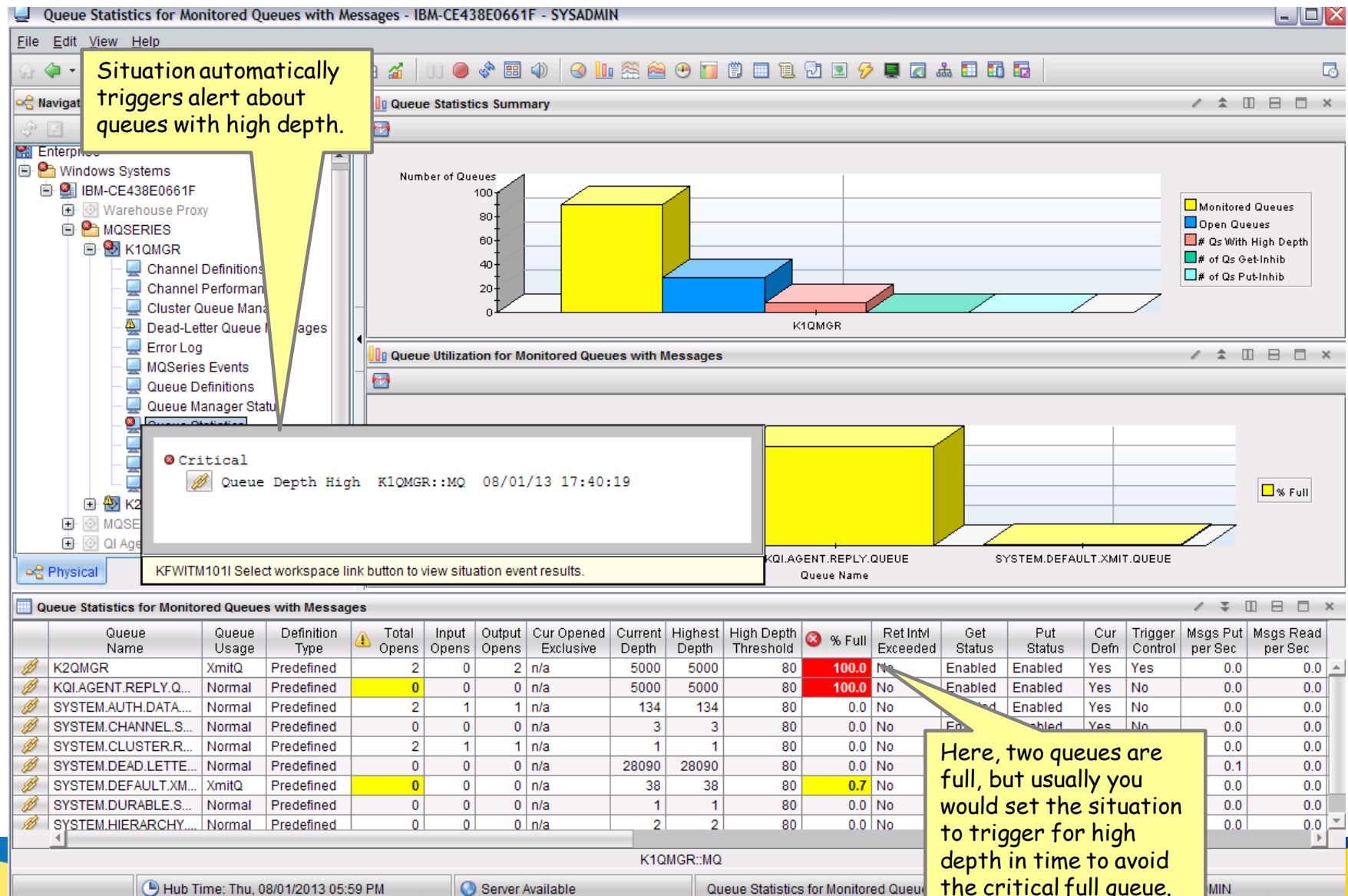
# Queue Statistics / Definitions

- **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



# Check Queue Status

Queue Status - IBM-CE438E0661F - SYSADMIN

File Edit View Help

Navigator View: Physical

- Enterprise
  - Windows Systems
    - IBM-CE438E0661F
      - Warehouse Proxy
      - MQSERIES
        - K1QMGR
          - Channel Definitions
          - Channel Performance
          - Cluster Queue Manager
          - Dead-Letter Queue Messages
          - Error Log
          - MQSeries Events
          - Queue Definitions
          - Queue Manager Status
          - Queue Statistics**
          - Queue Depth High
          - Application Accounting
          - MQI Statistics
          - Publish Subscribe
        - K2QMGR

Physical

Number of Messages

K2QMGR

Current Depth

Queue Status

Queue Name	Current Depth	Input Opens	Output Opens	Oldest Msg Age	Last Put Date & Time
K2QMGR	5000	0	2	114364	07/22/13 06:54:09

There are some really old messages on this queue.

Oldest Message Age

K2QMGR

Oldest Msg Age

Number of Opens

K2QMGR

Input Opens  
Output Opens

Open Handles for Queue

Application Tag	Appl Type	Open for Input	Open for Output	Open for Browse	Open for Inquire	Open for Set	Asynch State	User ID	ASID	Process ID	Thread ID	Channel Name	Connection Name	Handle Status	External Un Recovery T
I7.0\bin\DataFlowEngine.exe	USER	No	Yes	No	No	No	None	SYSTEM@NT AUTHORITY		6748	2			Inactive	QMGR
I7.0\bin\DataFlowEngine.exe	USER	No	Yes	No	No	No	None	SYSTEM@NT AUTHORITY		6744	2			Inactive	QMGR

Note how two applications have it open for output, but none for input.

So alternatively, a situation could have automatically detected that the queue is not open for input though it has a depth > 0.

Since this is an Xmit queue, the channel should have it open for input.

Queue: K2QMGR QMgr: K1QMGR Host: IBM-CE438E0661F

Hub Time: Thu, 08/01/2013 06:10 PM

Server Available

Queue Status - IBM-CE438E0661F - SYSADMIN

# 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

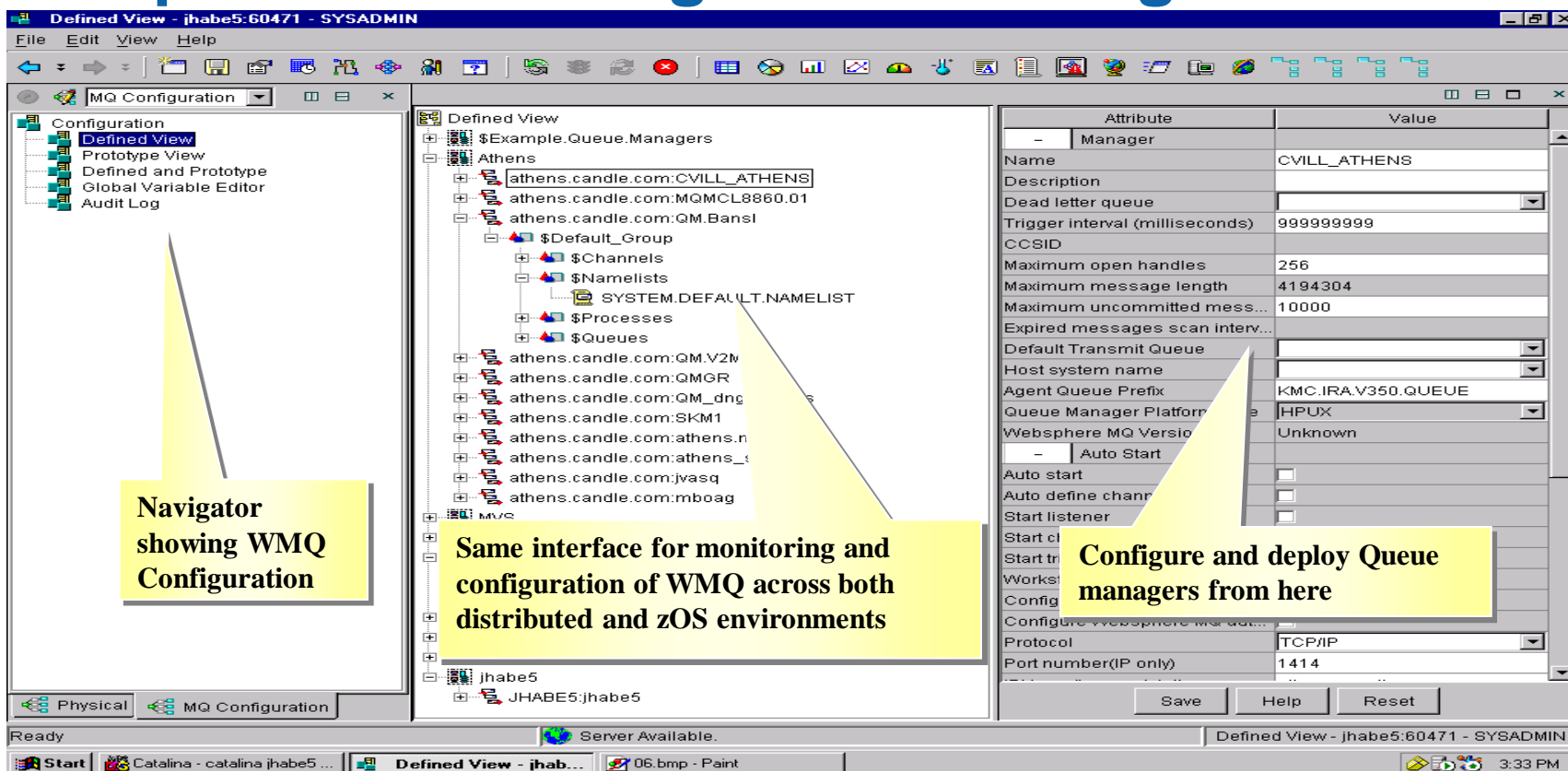
# **MQ problems between IBM z/OS® and distributed systems**

- **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

The screenshot displays the IBM Tivoli Monitoring interface for Message Broker (MQ) performance and availability. The main window is titled "QI\_Broker\_QMgr\_Not\_Connected - TIVQ60 - SYSADMIN". It features a "Navigator with WMB monitor" on the left, a "Physical" view of the broker hierarchy, and a "Take Action" panel at the bottom. The "Initial Situation Values" and "Current Situation Values" tables show the status of the broker and its components. The "Expert Advice" panel on the right provides a "Situation Description" and "Suggested Actions".

**WMB Reports**

**Navigator with WMB monitor**

**Same interface, monitoring paradigms for managing both WMQ and WMB across both distributed and zOS environments**

QMGr Connect Status	Origin Node	Broker (Deprecated)	Broker Status	Execution Groups	Queue Manager	Trusted QMgr	
NotConnected	BK60::KQIB	BK60	Stopped	0	BKQM60	No	0f8eaa9d-1601-000C

QMGr Connect Status	Origin Node	Broker (Deprecated)	Broker Status	Execution Groups	Queue Manager	Trusted QMgr	
NotConnected	BK60::KQIB	BK60	Stopped	0	BKQM60	No	0f8eaa9d-1601-000C

**Take Action**

Action Name: <Select Action>  
Command:   
Arguments:

Destination Systems:

Hub Time: Wed, 03/26/2008 11:30 AM  
Server Available

QI\_Broker\_QMgr\_Not\_Connected - TIVQ60 - SYSADMIN

**Expert Advice**

**QI\_Broker\_QMgr\_Not\_Connected**

[Situation Description](#)  
[Suggested Actions](#)

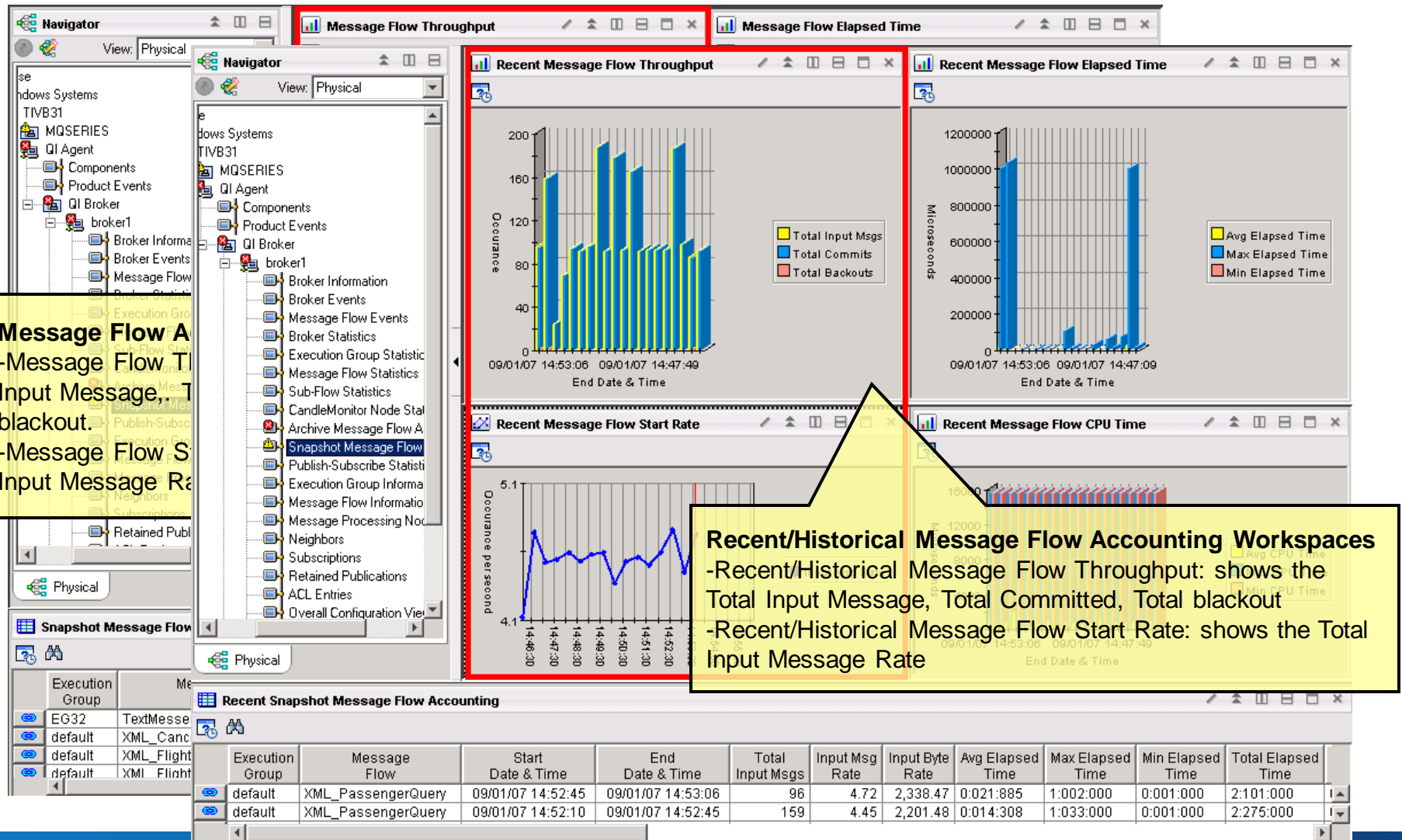
**Situation Description**  
The monitoring agent cannot connect to a...

[Expert Advice](#)

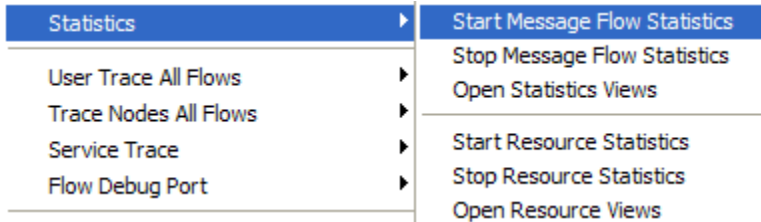
- Monitor message broker / message flow events
- Provide performance statistics at broker, execution group, message flow, sub-flow and processing node levels
- Report pub/sub neighbors, subscriptions, retained publications and ACL entries in broker
- Detect broker configuration changes

- 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

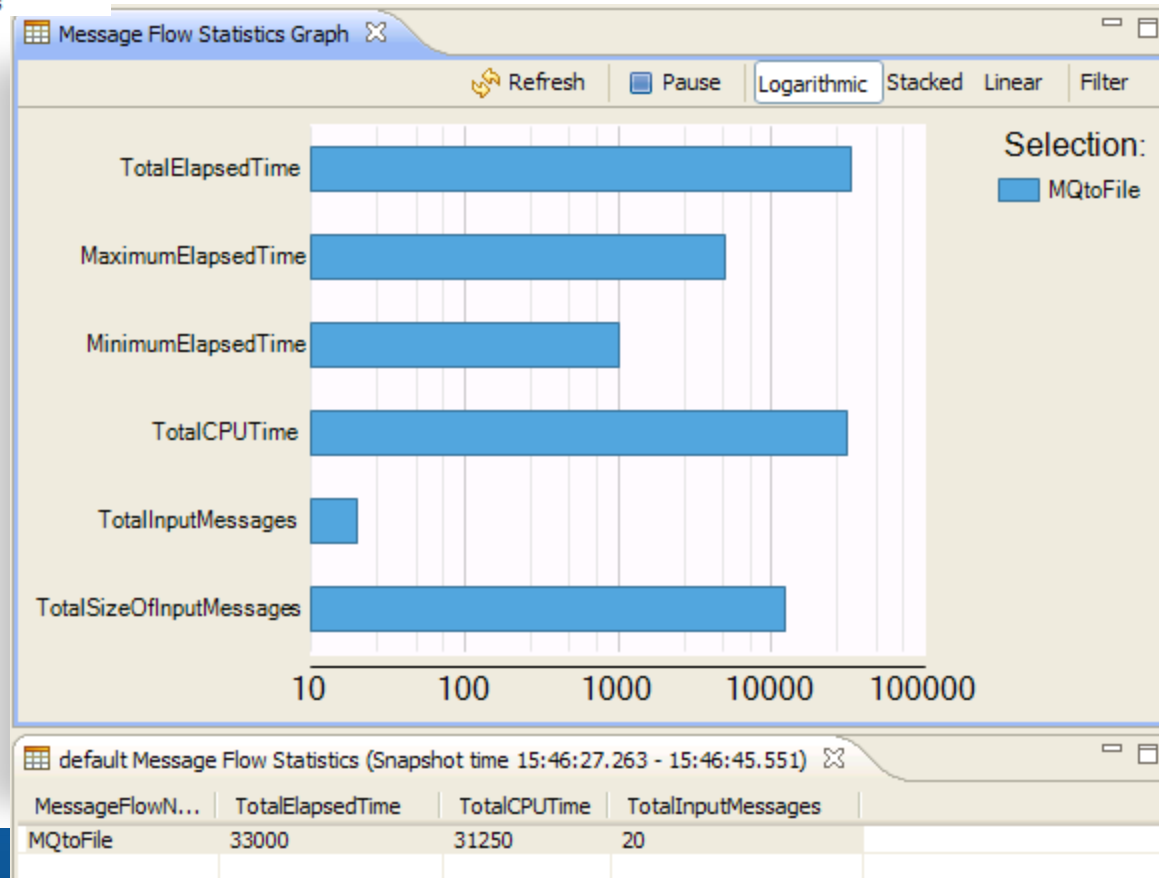
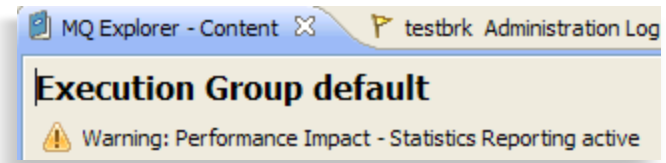
# Message Flow Workspaces



# Broker Explorer & Message Flow Statistics



- 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%)

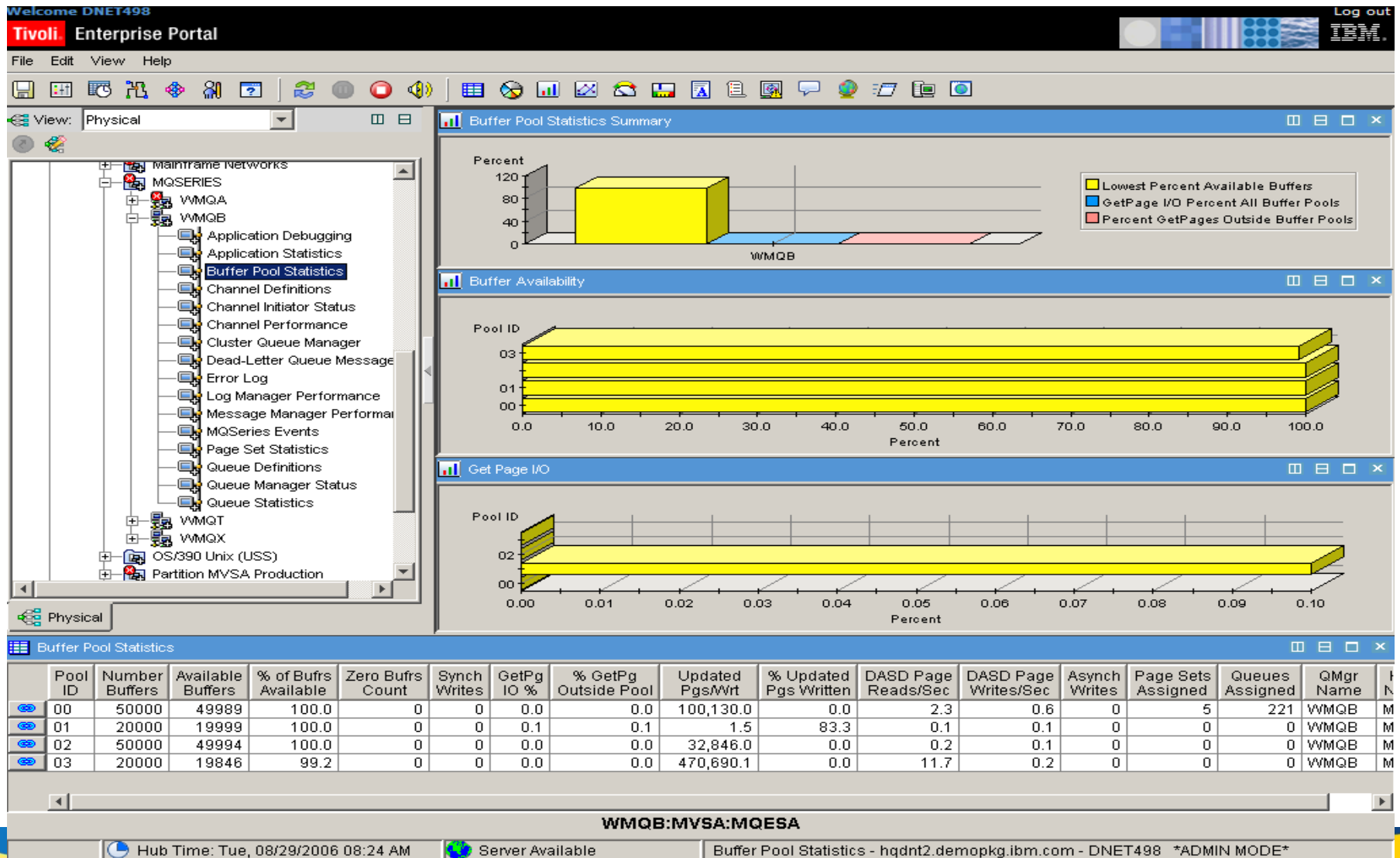




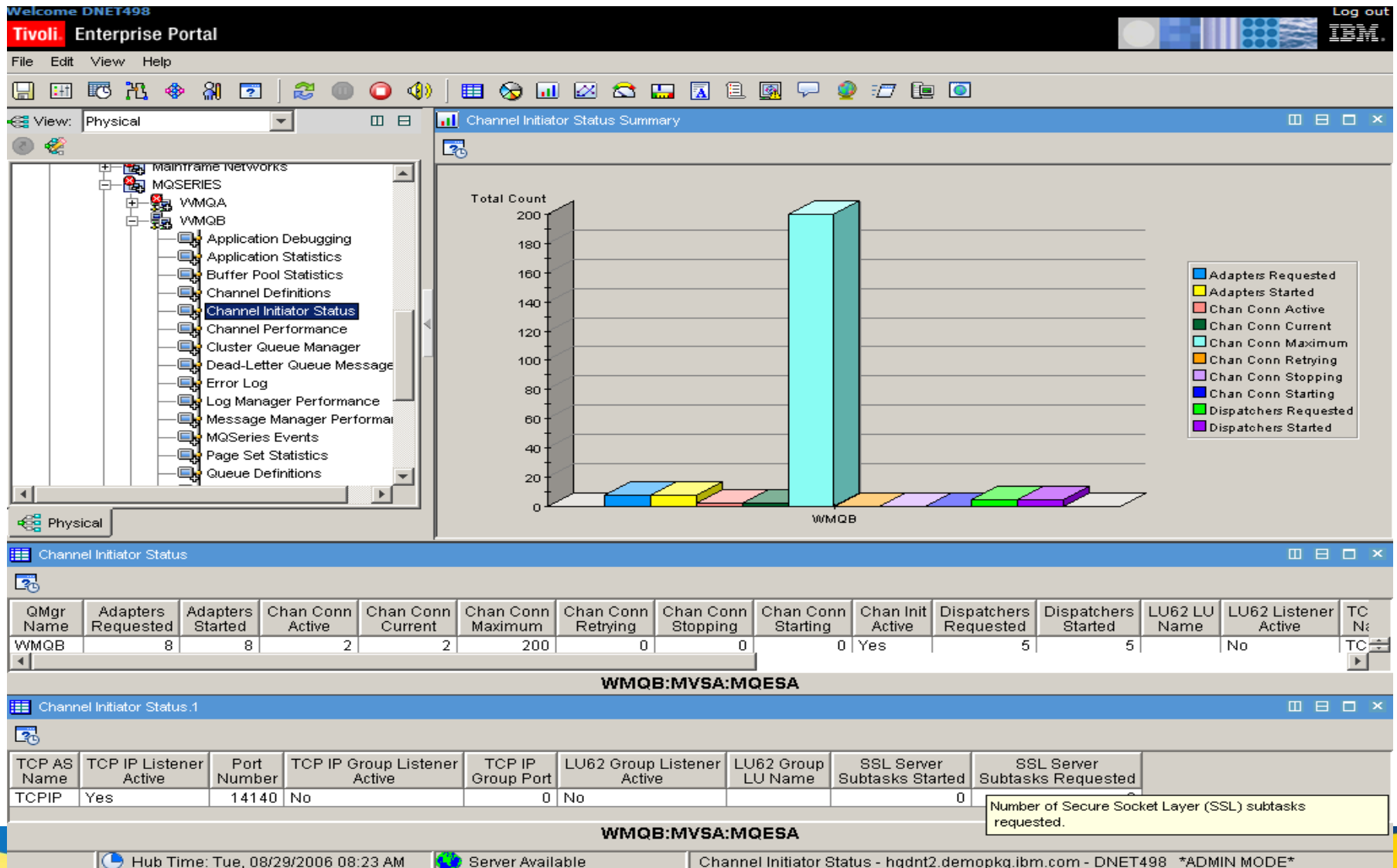
# What else?

- 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

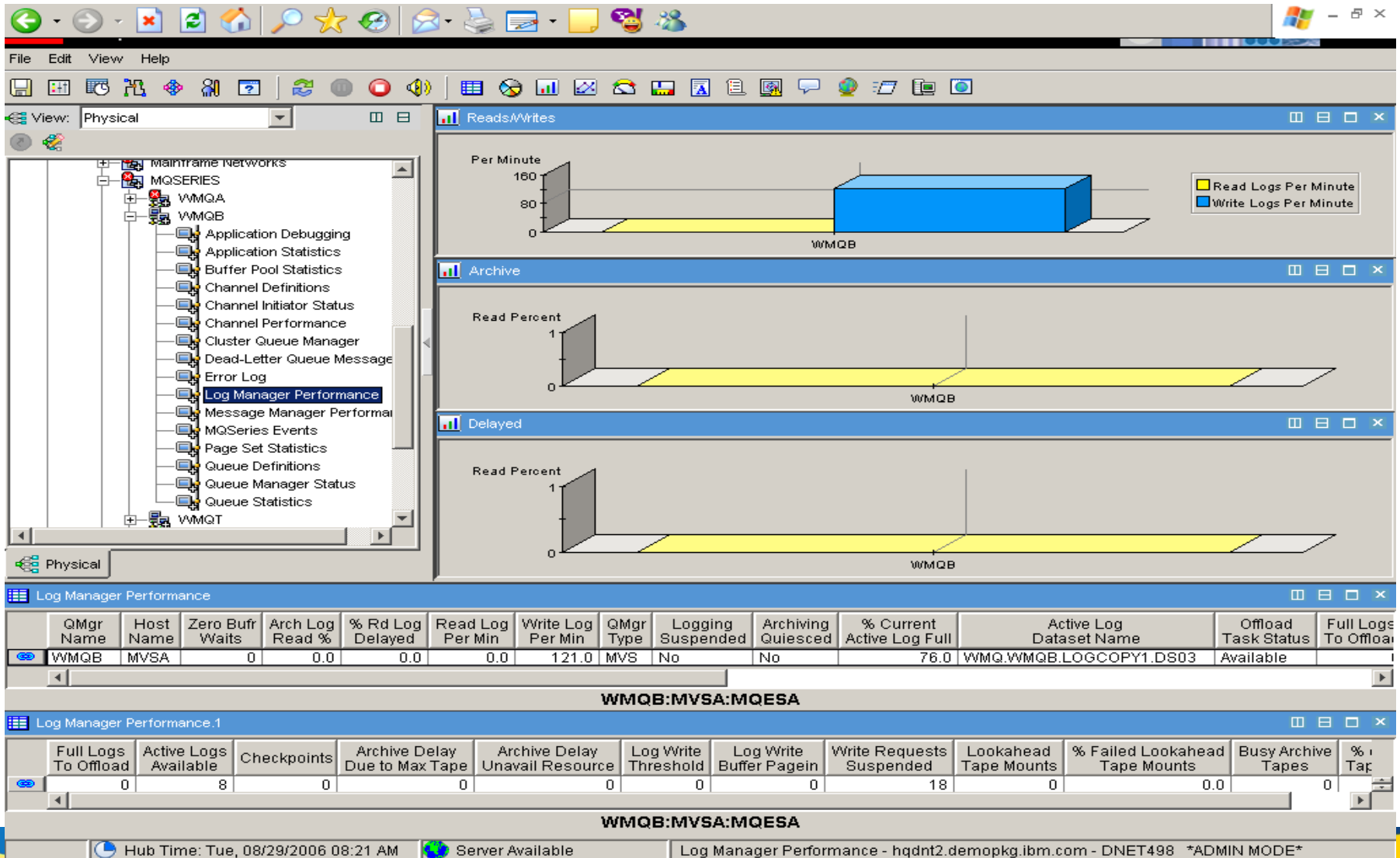
# Buffer Pool Statistics - zOS



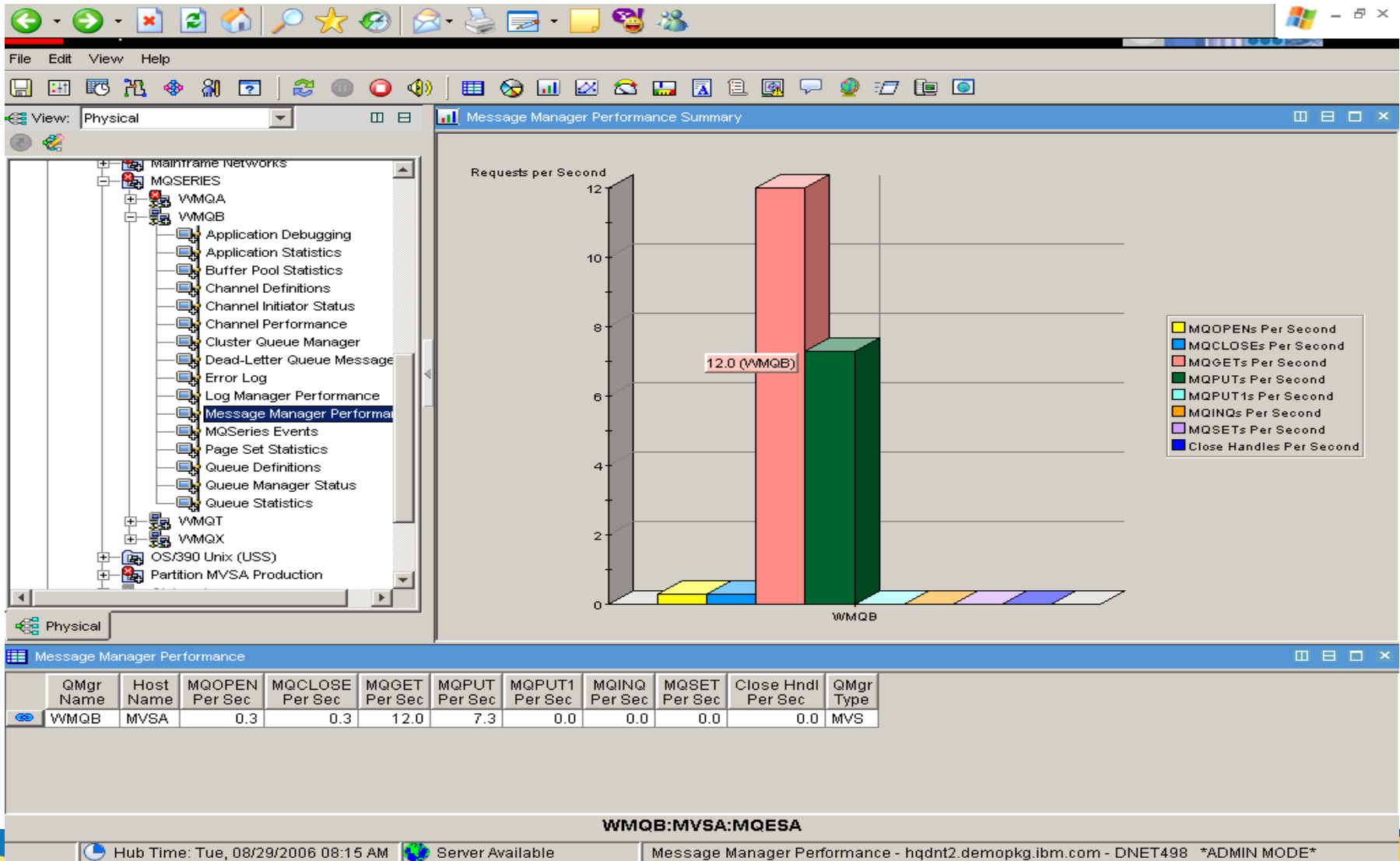
# Channel Initiator Status - zOS



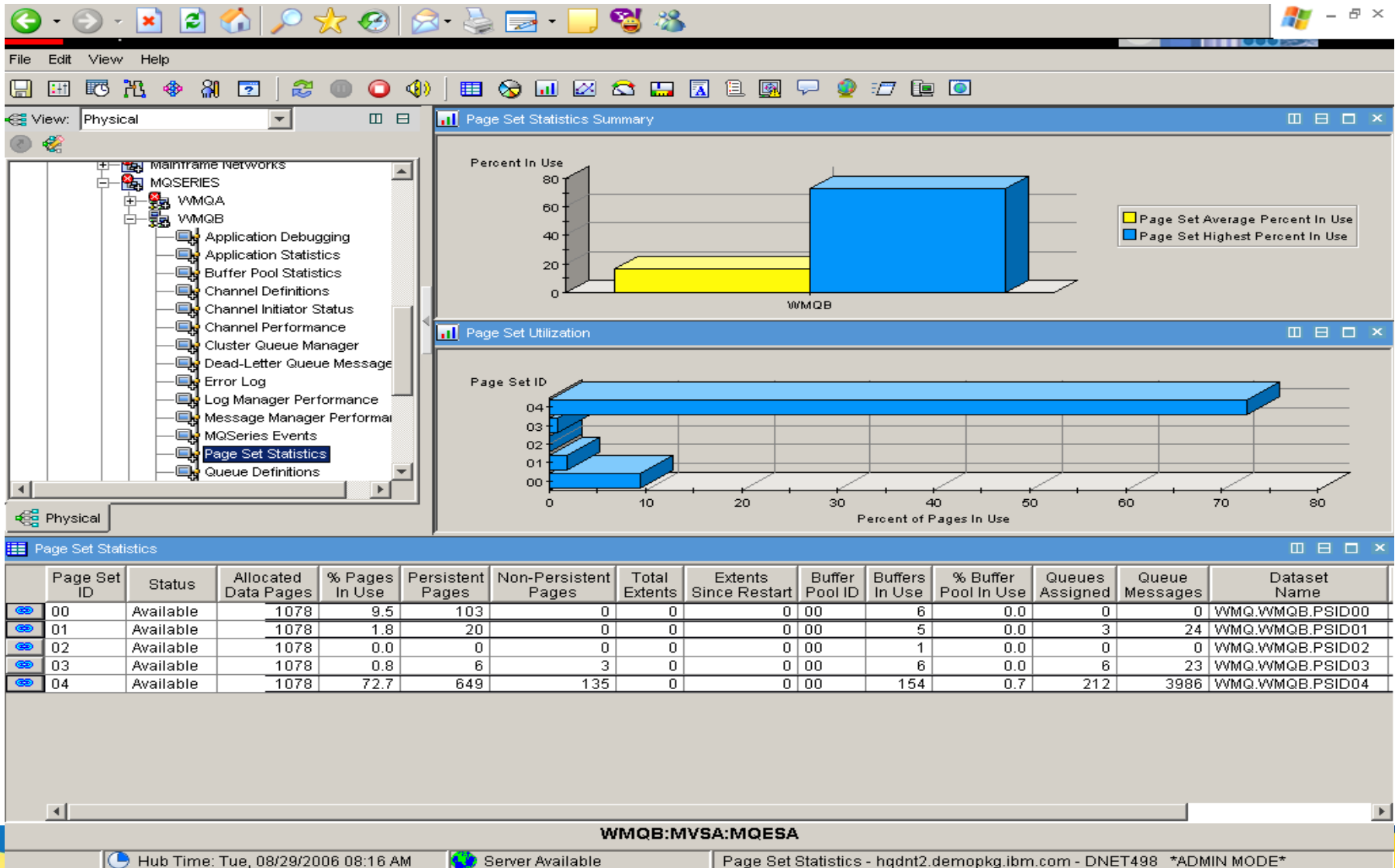
# Log Manager Performance - zOS



# Message Manager Performance - zOS



# Page Set Statistics - zOS



# 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

