Software Services for WebSphere

WebSphere MQ Best Practices





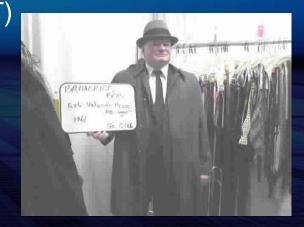
Capitalware's MQ Technical Conference v2.0.1.3

Bobbee Broderick (1970)

Experience

✤ Wall St Consultant 25+ years (z, CICS, DB2) (MQ, MQSI)

- MQ/MQSI/WMB since 1998
- ✤ IBM ISSW 8 years
 - Healthchecks
 - Crit Sits
 - Architecture, programming, etc
- Tech Lead for ISSW for MQ and MQFTE (MFT) Also for MQAMS/ WMB
- Star of "The Good Shepherd"
- BB Photography www.bb-photography.org
- Email rkbroder@us.ibm.com



WebSphere MQ Industry Practices Credits

- Talk to your IBM representative
- Talk to your collegues
- Visit The Capitalware site



http://www.capitalware.biz/

Capitalware's MQ Technical Conference v2.0.1.3

MQSeries Ten Commandments

- 1. Thou **shalt** not use a queue as a database.
- 2. Thou **shalt** backup your pagesets, filesystems, and logs.
- 3. Thou **shalt** routinely apply maintenance to your WebSphere MQ systems.
- 4. Thou **shalt** use MQCLOSE and MQDISC when terminating an application.
- 5. Thou **shalt** not use MQGET with WAIT UNLIMITED without specifying MQGMO_FAIL_IF_QUIESCING.
- 6. Thou **shalt** secure all client-channel connections to a queue manager.
- 7. Thou shalt create standard naming conventions.
- 8. Thou **shalt** provide systems management tools for administrators and users.
- 9. Thou **shalt** not create a WebSphere MQ network without mapping out all connections and object relations on paper first.
- 10.Thou **shalt** not attempt to apply asynchronous methods to all problems simply because WebSphere MQ is a wonderful product.

WebSphere MQ Best Practices MQSeries Ten Commandments - Amendments

- Thou shalt apply security to queue objects.
- Thou shalt have JMS applications capture and log the LinkedException for all JMSExceptions.
- Thou shalt have Unit Of Work (UOW) use the minimum amount of resources (short in duration).
- Thou shalt not use MQOPEN, MQGET or MQPUT without specifying MQ*O_FAIL_IF_QUIESCING (where MQ*O is MQOO or MQGMO or MQPMO).
- Thou shalt have triggered applications completely drain a queue before exiting.
- Thou shalt have applications transfer unknown or invalid messages to an application back-out queue.
- Thou shalt have client applications automatically reconnect to a queue manager after any type of failure.



WebSphere MQ Best Practices Best Practices?

What are they

Building Blocks for a effective system Proven ✤ Reliable ✤ Value Proprietary Cost Effective IBM Accepted



Areas of Concern

- Business Requirements
- Sizing
- Naming Standards
- Logging
- Application Design
 Standards
- High Availability
- Disaster Recovery
- Monitoring

- Roles
- Skill Development
- Process Approach
- Security
- Clustering
- Release Management



Business & Project Requirements

> Define the requirements Document interfaces & Stakeholders Collect Interface Objects Document the interchange specifications > Define the mappings Define the SLA requirements ➤Testing Environments Requirements Implementation requirements

Sizing - Server

WebSphere MQ requires:

Memory

> CPU

- Fast Disk
- Network
- IBM Techline
 - Server Estimates
 Memory, CPU, DISK
 Workload Based



Sizing - Queue Manager

Queue Manager Sizing (Distributed) Log File directory space Log File Type Log File Size - <u>http://tiny.cc/MQsizing</u> Log File Placement Data Directory Size Queue Buffers Queue Max Size >Z/OS > Bufferpools > Logs > PageSets



WebSphere MQ Best Practices Naming Standards

> Define a naming standard that works > More important, define a naming standard Select simple names, KISS it >Avoid object identifiers Avoid location identifiers Define cluster naming standards Use Alias names for local Cluster Queue access Keep QMGR Names short SDLC identifier (i.e. MQDAPP01) Adhere to standards Support Pack



Logging

- Reality
- Log Types Circular vs Linear
- Log Sizing is important, for distributed, download and use the log file size estimator @ <u>http://tiny.cc/MQsizing</u>
- running out of log space is bad.
- Keep logs on spindles separate from other file systems
- z/OS, alternate DASD
- z/OS keep dual logs separate
- DEV and SIT use Circular
- UAT, PROD and DR use linear
- Move archived logs off file system
- Delete after successful restart
- Usually 14 days on weekly restarts



Application Design Standards

- Create Application programming standards
- Should work with Naming Standards
- Create patterns and detail QMGR interactions
 - Request/Reply
 - Triggering
 - Error Processing
 - Reconnection
 - Poison messages
 - Audit / Logging
- Language Specific Interactions
- Create program specification templates
- Create Test Script Templates
- Perform Code Reviews prior to implementation
- Security
- •Wrappers



WebSphere MQ Best Practices Application Coding

- Avoid the excessive use of MQCONN and MQDISC
- Trigger on first, read till 2033
- Smaller messages are preferred
- Batching of messages provides performance
- Provide reconnection logic, CCDT or JNDI
- Values
 - Avoid Hard Coding values, parameterize
- Use Persistent messages were needed, not ALWAYS
- Avoid large LUW
- Separate Request Response processing where possible
- Capture Errors
- When finished, Close and disconnect. Even during unexpected termination
- Use MQ for Checkpoint Restart
- Use Properties or Enterprise Headers

- What tools do you need
- Do you standardize or give free hand
- Do you buy or borrow?
- What Tools do your application programmers use
- What tools do your administrators use
- What tools do your Business users use
- What tools do your support team use
- Support Packs
- MQ out-of-the-box

WebSphere MQ Best Practices Tools - RFHUTIL

RfhUtil V7.0.2 (Client)			00000	- • ×
e Edit Search Read Write View Ids MQ Help				
ain Data MQMD PS Usr Prop RFH PubSub pscr jr	ns usr	other CICS	IMS DLQ	
Queue Manager Name (to connect to) SYSTEM ADMIN.SVRCONN/TCP/172.24.65.23(2414) Queue Name	•	Queue Type	Queue depth	
ISSUER.ERR.Q	•		Move Q	
Remote Queue Manager Name (remote queues only)		Save Q	Purg <u>e</u> Q	
		Load Q	Display Q	
Selector			,	
File Code Page 437 File Name	e Prev End Br	User Props As Queue C None C Yes C RFH2 C Compet	Cluster Open C As Queue C Bind Open C Not Fixed	
COBOL Copy Book File Name	☐ Getb ☐ Getb ☐ SetId	Msgld Ne y Msgld Lo y Correlid Co y Group Id All den Context Co	ew Correl Id Igical Order omplete Msg I Avrail onvert ternete User Id	
4 F			Exit	



Tools - MQExplorer

IBM WebSphere MQ Explorer (Installation1)	~	-		-		
File Edit Window Help						
🔁 MQ Explorer - Navigator 🛛 🛛 🤣 🕞 🌣 🖯		MQ Expl	orer - Content 🛛	3		
🔺 🌐 IBM WebSphere MQ		Queues	\$			
🔺 🗁 Queue Managers						
Der Bobbee		Filter: Sta	andard for Queu	Jes		
Image: Register State		/ Queue name			Queue type	
ENTDQM04		BOBBEE			Local	
MB8QMGR					Local	
MB8QMGR1 on '172.24.65.23(2414)'			M.ADMIN.ACTIV		Local	
MB8QMGR2 on '172.24.65.24(2414)'			M.ADMIN.CHAN		Local	
MB8QMGR2 on '172.24.65.24(2414)' using 'SYSTEM.ADMIN.SVR		_	M.ADMIN.COMM		Local	
WMBUAT02 on '10.106.69.22(2414)'		-	M.ADMIN.COM		Local	
WMQA on 'demomvs.demopkg.ibm.com(1414)'			Local			
WMQDEV01 on '10.106.65.21(2414)'		SYSTEM.ADMIN.CONFIG.EVENT			Local	
WMQDEV01 on '10.106.65.21(2414)' using 'SYSTEM.ADMIN.SVR					Local	
WMQDEV01 on '172.24.65.29(2414)'					Local	
□ WMQDEV01 on '172.24.65.39(2414)'		SYSTEM.ADMIN.PUBSUB.EVENT			Local	
□ WMQDEV01 on '172.24.65.41(2414)'					Local	
 WMQDEV02 on '10.106.65.22(2414)' WMQDEV02 on '10.106.65.22(2414)' using 'SYSTEM.DEF.SVRCO' 	Ξ					
WMQDEV02 on 10.106.05.22(2414) using SYSTEM.DEF.SVRCO WMQUAT01 on '10.106.69.21(2414)'					Local	
Queue Manager Clusters					Local	
Gueue Manager Clusters MS Administered Objects		•		III		
Administered Objects Administered Objects Administered Objects		Scheme:	Standard for Q	ueues - Distributed		
COORDQM		Last updated: 13:45:36 (79 items)				
 Service Definition Repositories 		Last upd	ated: 13:45:36 (7	(9 items)		
Administered Servers		• Administ	tration Log			
A Brokers			Source	Timestamn	Massa	
BRKDEV01 on 'WMQDEV01 (10.106.65.21)(2414)'		wess	Source	Timestamp	Messa	
BRKDEV02 on 'WMQDEV02 (10.106.65.22)(2414)'						
BRKUAT01 on 'WMQUAT01 (10.106.69.21)(2414)'						
BRKUAT02 on 'WMBUAT02 (10.106.69.22)(2414)'						
MB8BROKER						
B88BROKER1 on 'MB8QMGR1 (172.24.65.23)(2414)'						
B88BROKER2 on 'MB8QMGR2 (172.24.65.24)(2414)'						
🔺 🐸 Broker Archive Files 🚽						
🕨 🗁 Localhost	-					
4						



Capitalware's MQ Technical Conference v2.0.1.3

Testing

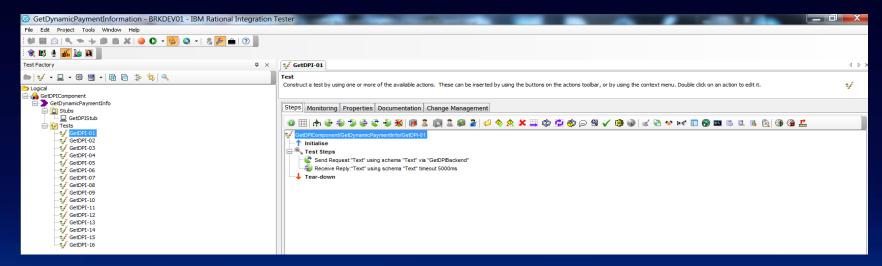
- SDLC Cycles
 - Development Developer testing, initial test script creation
 - System Integration Testing Integration testing with endpoint. Shakeout of integration specifications. Increased testing script
 - Quality Assurance/User Acceptance Test Formal Process, Independent group, Secure, isolated, Production 'like'

Types

- Load testing
- Performance
- Break
- Sustained
- Manual
- Automated
- Tools



Testing – Rational Integration Tester

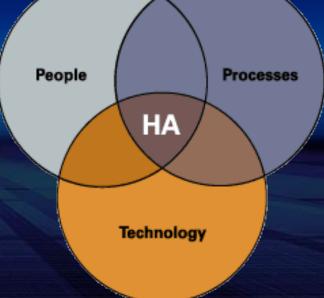


GetDynamicPaymentInformation - BRKDEV01 - IBM Ration	al Integration Tester							
File Edit Project Tools Window Help								
: 💱 🖩 🖂 🔍 🖘 👆 🕮 🏛 🗶 i 🥥 🖸 - 💁 🔍 - I 🎗 🌽								
i 🛠 🛤 🖉 🔐 🔟								
Test Execution P ×	Task Monitor							
💕 🖩 🖷 🎲 🔍	= O 😂 🎭 📚 = 🛥 🗏 🤱							
Contraction of the second seco	Туре	Task	Progress	Status				
E GetDPIComponent		GetDPIComponent/GetDynamicPaymentInfo/GetDPI-01	100%	Completed				
GetDynamicPaymentInfo	•							
GetDPIStub								
E Tests								
GetDPI-01								
GetDPI-02								
GetDPI-03								
GetDPI-04								
GetDPI-05								
GetDPI-06	Console							
GetDPI-07								
GetDPI-09								
GetDPI-10	Certon 10							
GetDPI-11	[14:30:08.301 2013/09/06] Initialising							
GetDPI-12	[14:30:08.302 2013/09/06] Using environment: BRKDEV01							
GetDPI-13	GetDP1-13							
GetDPI-14								
GetDPI-15 [14:30:12.536 2013/09/06] [Error] Receive Reply: "Text" using schema "Text" timeout 5000ms com.ghc.utils.GHException: Error executing method. Connection refused: connect								
GetDPI-16 [14:30:12.539 2013/09/06] [Failed] 1 iteration completed, 1 iteration failed (1)								
	Logging summary: Info (0), Warnings (0), Errors (0) Overall status: Failed							
	Overall St	atus: falled						

Capitalware's MQ Technical Conference v2.0.1.3

High Availability

- What does High Availability mean to you and your business?
- Different people, different requirements.
- What is the driving force for the availability of a system
- Levels Silver, Gold, Platinum
- What is my approach?
- How do I implement it.
- What am I really getting.
- Active/Passive
- Active/Active



Disaster Recovery

- End of the world approach
- COB or Real Time
- SLA's again as determining factor
- Placement of datacenter is key.
- A lot of activity after 9/11 and power grid loss
- File systems are replicated to a secondary datacenter
- Primary activity can be sync or async
- Secondary can be passive or active
- Moving data ?
- Dark sites? Resource reduction



WebSphere MQ Best Practices Monitoring

- DO NOT WAIT TILL THE LAST MINUTE.
- Pick you Monitoring Approach.
 - -simple or complex
 - -Feature rich or basic
- Decide the key factors that provide enterprise wide capabilities
- Centralize your Monitoring Console
- Know what to monitor
- MQ Monitoring http://tiny.cc/MQMonitoring

Role Definition

Who are the actors
What groups control what
Who do you turn to
Clear definition
Multiple Hats
Training



Capitalware's MQ Technical Conference v2.0.1.3

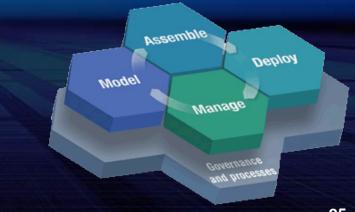
WebSphere MQ Best Practices Skill Development

- Skilled employees are an asset not a liabillity
- Training is important for the health of the system
- Changing technologies require training
- In-house, remote, Self Paced
- IBM offers training in all features and components of their software
- External sites are available for training
- Hire vs Train
- Certification Testing



WebSphere MQ Best Practices The SOA Process Approach

- > Simplify
- Accelerate
- Secure
- Govern



Security

- What should be done
 - When you start thinking about security, you need to decide exactly what it is you want to achieve, determine what your objectives are.
 - Ensure each user is uniquely identified
 - Prove that a user is who they say they are
 - Limit Access to authorized users only
 - Track who does what to what and when
 - Protect your sensitive data from unauthorized viewing
 - Check unauthorized changes have not been made to data
 - Ensure a message really is associated with whom it claims

> How

- > SSL
- MQAMS
- CHLAUTH, SETMQAUT, AUTHREC

WebSphere MQ Best Practices Clustering – Why do we use it

✓ Simplified administration Large WMQ networks require many object definitions ✓ Channels ✓Transmit queues ✓ Remote queues ✓ Workload balancing ✓ Spread the load ✓ Route around failures ✓ Flexible connectivity ✓ Overlapping clusters ✓ Gateway Queue managers ✓ Pub/sub Clusters

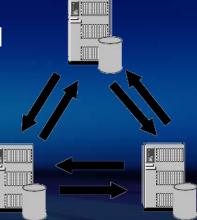
WebSphere MQ Best Practices Clustering

- Don't have too many cooks
 - Treat a single cluster as a single point of administration
 - Have well defined policies for the gateway queue managers
- Treat all overlapping clusters as a single Namespace
 - Channel names, and therefore queue manager names, should be unique throughout.

WebSphere MQ Best Practices Clustering – Full Repositories

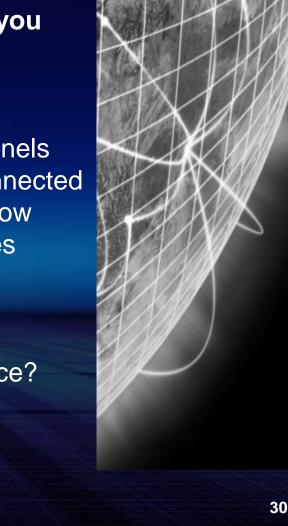
- FRs should be highly available
 - Avoid single point of failure have at least 2
 - Recommended to have exactly 2 unless you find a very good reason to have more
 - Put them on highly available machines
- FRs must be fully inter-connected
 - Using manually defined cluster sender channels
- If at least one FR is not available or not fully connected
 - Cluster definition changes via FRs will not flow
 - User messages between Partial Repositories over existing channels will flow
- Should applications run on full repositories?
 - Best Practice hat on: No
- What if I need to take them down for maintenance?
 - Use the fact that you have two!





WebSphere MQ Best Practices Clustering – Full Repositories

- FRs should be highly available
 - Avoid single point of failure have at least 2
 - Recommended to have exactly 2 unless you find a very good reason to have more
 - Put them on highly available machines
- FRs must be fully inter-connected
 - Using manually defined cluster sender channels
- If at least one FR is not available or not fully connected
 - Cluster definition changes via FRs will not flow
 - User messages between Partial Repositories over existing channels will flow
- Should applications run on full repositories?
 - Best Practice hat on: No
- What if I need to take them down for maintenance?
 - Use the fact that you have two!



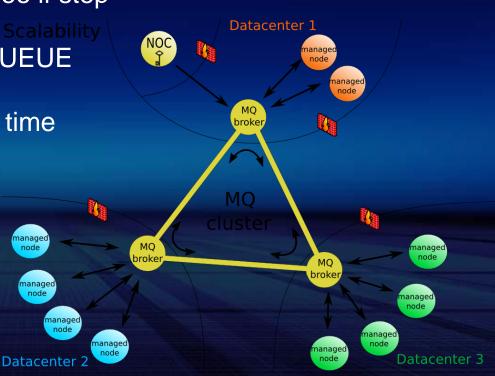
WebSphere MQ Best Practices Clustering – Cluster History

Refresh Cluster and the History Queue

- REFRESH CLUSTER considered harmful?
 - Sledgehammer approach
 - Review processes first and see if step
 missed
 Scalability

•SYSTEM.CLUSTER.HISTORY.QUEUE

- Version 7.0.1
- Snapshot captured at refresh time
- Serviceability enhancement



Release Management

- MQ releases Fix Packs frequently
- MQ releases interim fixes between Fix Packs
- Fix Pack are cumulative
- Organizations typically lack planning
- Upgrades are not planned and troublesome
- System Outages
- Plan for upgrades
- Proactive vs Reactive



Thank you for your attention Any questions?

Capitalware's MQ Technical Conference v2.0.1.3