MQ "Golden Image" Queue Managers

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Why a Golden Image?

Concept of the Golden Image

- "Golden Image" defined
  - Term used with slightly different meanings for different software.
  - Term refers to a standardized, repeatable, cloneable image of software.
    - Implication is that the image embeds "Best Practices"
  - Concept is the basis for emerging technologies such as the IBM Pure systems.

- Benefits of a Golden Image
  - Standardization
    - All Queue Managers look and behave as expected
    - All Queue Managers embed "Best Practices"
  - Automation
    - Standardized image enables automation
    - Standardization requires automation
    - Automation increases productivity
    - Standardization and automation increase build quality
  - **Continuous Improvement**
    - Scripts can be improved as errors are found or opportunities identified
    - Issues discovered can be institutionalized ("Find once, Fix many times")
    - An essential part of the ISO 9001 process

Golden Image Constraints

- Infrastructure Constraints
  - Lack of a standardized metadata solution to store and deploy configuration information
  - Vendors are driving towards this
- Server Constraints
  - Distributed Operating Systems have repositories.
    - It isn't possible to simply install directories and files
      - UNIX has Package Management
      - Windows has its Registry
  - It isn't possible to install the software on every server
    - Disk Space
    - License issues
  - The software can be pre-installed in images when new servers are built
    - IBM Pure systems do this
    - There is a limit to have many base images can be maintained
- Skill Constraints
  - Scripting capability; Both to create and to maintain the installation scripts
  - Conceptualization; See the larger picture and long-term benefits

Caveats

- The remainder of this presentation presents a possible Golden Image
- The Image presented has been used successfully in multiple organizations
- However, there are multiple ways to do things in WMQ
  - Each approach has benefits and drawbacks
  - You must make your own choices and create your own organizations Golden Image
  - What is being presented is a base version for your consideration
- Content versus decisions
  - The most important part of your Golden Image is the decisions you make, and embed, in the Image
  - Consider all of the things covered in this Image, but make your own decisions for your own Image
  - The decisions illustrated in this presentation are my choices
- Style versus Substance
  - The style of administration is the least important part of the Golden Image
  - The substance of the choices and the consistency of the infrastructure are the important parts

What are you doing?

- Do you have a Standard Image?
  - Why not?
    - WMQ has been around over 20 years.
    - We know how to do this.
  - Reasons
    - Time constraints.
    - Too much up front work.
    - Too much personalization.
      - Personal preferences in admin style.
      - Changing personnel over time.
      - Changing preferences over time.
    - Mindset
      - Hands on Keyboard
    - Management
      - Quality difficult to measure, so often neglected
  - But
    - Our best customers are doing this.
    - Our best customers have doing this for a long time.

Installing WMQ Software

WMQ Software Installation

- The process of installing WMQ software may be scripted and standardized
  - In some cases, this part of the Golden Image has the lowest ROI (Return on Investment)
    - Software installations are often one of the least frequent administration steps performed
    - However, this is not true for all organizations
    - It the installations are more frequent, the ROI increases
- In all cases, at least some parts of the installation should be standardized
  - The creation of the “mqm” User and Group IDs in UNIX
    - Ensuring that these are installed and have consistent UID and GID numbers
  - Modifying underlying system (e.g. UNIX) settings
  - Running the mqconfig program
  - Creating standard directories for administrative use
    - Scripts
    - Tools
  - Post Installation steps
    - Setting up the WMQ environment (setmqinst, setmqenv)
    - Automating WMQ startup with the server (e.g. /etc/init…)
  - Institutionalizing Fixes
    - IBM Technotes (e.g. TechNote 1442991)

Software Installation – What are you doing?

- Group Feedback
  - Learn from your peers
  - Think about the total number of years of MQ knowledge in this room!.

Creating Queue Managers

Queue Manager Creation

- crtmqm *qmgr*
  - This simple command will get the job done, but is it what you want?
  - At a minimum, this command determines (forever)
    - The name of your Queue Manager
    - The type of logging your Queue Manager will use
    - The size of the log files (Log File Page Size)
- Things to consider standardizing
  - Logging Type (Circular vs Linear)
    - Possibly based upon environment
  - Number and size of Logs
  - TCP Port
  - Dead Letter Queue assignment & name
  - Default Queue Manager
- Standardization
  - Script that executes the “crtmqm” command
    - Put as little as possible in this script, only doing the essentials (e.g. Logging)
  - MQSC Commands are simpler and more flexible than scripts

Qmgr Creation – What are you doing?

- Group Feedback
  - Learn from your peers
  - Think about the total number of years of MQ knowledge in this room!.

Automating Startup

Queue Manager Startup

- Queue Manager Startup
  - Queue Managers should be started when the Operating System boots
    - This was covered in the Software Installation portion of the Image
- What else should happen when a Queue Manager starts?
  - Channel Initiator: alter qmgr schinit (qmgr)
  - Command Server: alter qmgr scmdserv (qmgr)
  - Channel Listener: define service (…) … control (qmgr)
  - Trigger Monitor: define service (…) … control (qmgr)
- Dead Letter Queue Handler: define service (…) … control (qmgr)
- Standardize the way all Queue Managers are started
  - There should be little need for specialized startup and shutdown commands
    - Exploit MQ services for all routine tasks
  - The UNIX startup command can be a simple “strmqm” command or loop
- Simplify and Standardize
  - Don’t forget to document!

Qmgr Startup – What are you doing?

- Group Feedback
  - Learn from your peers
  - Think about the total number of years of MQ knowledge in this room!.

Customizing Queue Managers

Queue Manager Customization Scripts

- Use MQSC Scripts
  - Scripts may have parameters substituted through a simple mechanism like *sed*
- Two basic scripts
  - Script that is common to all Queue Managers and requires no customization
  - Script that contains Queue Manager specific parameters (e.g. CONNAME)
- Queue Manager settings that change across builds and require parameterization
  - Queue Manager Name
  - Queue Manager Port
  - Queue Manager Installation Path
  - Queue Manager Connection Name
- Communication settings that change across builds and require parameterization
  - Cluster name
  - Full Repository Queue Manager Name
  - Full Repository Queue Manager Connection Name
  - Full Repository Queue Manager Port

Queue Manager Customization Settings #1

- Queue Manager Settings
  - Dead Letter Queue
  - Channel Authorizations (Enabled) (Channel Authorization Security)
  - ChAD (Disabled) (Channel Auto Definition)
  - DefClXQ (Default Transmission Queue)
- Maxmimum Message Sizes
  - Queue Manager
  - Channels
  - Queues
- Monitoring
  - MonQ
  - MonChl
  - MonACls (Monitor Auto-defined Cluster Sender Channels)
- Accounting & Statistics
- Events

Queue Manager Customization Settings #2

- Message Monitoring
  - ActivRec
  - RouteRec
- System Default Queues
  - Maximum Message Size
  - Maximum Depth
  - Monitoring
  - Default Persistence
  - Default Bind
- System Default Channels
  - Maximum Message Size
  - Monitoring
- Security
  - Channel Authorizations
  - MCAUSER settings on all “SYSTEM” receiving channels

Queue Manager Customization Settings #3

- MQ Administration
  - Server Connection Channels (WMQ.ADMIN.***)
    - Administrative use
      - MQExplorer, etc. (all client based Administrative tools)
  - Queues
    - Administrative use (WMQ.ADMIN. ***)
      - “Ping” queues
      - “Trace Route” queues
  - Services
    - Move messages
    - Clear queues
    - Any routine functions
    - Service (or any MQSC command) can be executed from your desktop to any Queue Manager
      - Use the MO72 SupportPac (Thank you Paul Clarke)
- Channel Definitions
  - The MQSC template doesn’t change
  - Remote Queue Manager name and connection Information change
  - Scripts can also be used to define Cluster and Point-to-Point channels

Qmgr Customizaton – What are you doing?

- Group Feedback
  - Learn from your peers
  - Think about the total number of years of MQ knowledge in this room!.

MQ “Golden Image” Queue Managers

Tools

Administrative Tools

- Standard Tools can be deployed to each Queue Manager
  - SupportPacs
  - Scripts

- SupportPacs
  - MA01 (“q”)
    - Move messages from/to queues and/or files
    - May be invoked as a Service for routine activities
    - Moving messages from a queue to the file “/dev/null” will clear a queue with open handles!
  - MO06 (Log Summary)
    - Analyze error logs for more easily identify issues
  - MH03 (Queue Statistics - xmqqstat)
    - Monitor queues and record activity statistics

Adminstrative Tools – What are you doing?

- Group Feedback
  - Learn from your peers
  - Think about the total number of years of MQ knowledge in this room!.

Application Configuration

Application Configuration

- Applications require the same objects on each Queue Manager
  - Queues
  - Server Connection channels
  - Processes and Trigger Monitors
  - Hopefully the object names do not change across Queue Managers
    - If they do, this can be handled in the same way that Queue Manager changes are handled
- Application configuration can be scripted
  - MQSC scripts for each type of server
    - Front-end Web Server
    - Message Broker
    - Back-end Application Server

App Configuration – What are you doing?

- Group Feedback
  - Learn from your peers
  - Think about the total number of years of MQ knowledge in this room!.

Summary

“Golden Image” Queue Manager Summary

- Fully realized Queue Managers require many configuration actions
  - The number of different configuraton commands run from the Scores to the Hundreds!
  - This does not count Application configuration!
  - Queue Managers frequently support multiple Applications,
- If manual configuration is performed
  - Standardization is virtually impossible
  - Build quality is unacceptably low
  - Improvement is difficult
- Defining a standard configuration is the first step
  - This should be done even/especially if the builds are done manually!
- Automation (Scripting) can provide significant results
  - Productivity
  - Build quality
- Each of these steps supports Continuous Improvement
  - If you don’t automate the easy stuff, you’ll never have time for the real engineering!

Questions & Answers

Presenter

- Glen Brumbaugh
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- Computer Science Background
  - Lecturer in Computer Science, University of California, Berkeley
  - Adjunct Professor in Information Systems, Golden Gate University, San Francisco
- WebSphere MQ Background (20 years plus)
  - IBM Business Enterprise Solutions Team (BEST)
    - Initial support for MQSeries v1.0
    - Trained and mentored by Hursley MQSeries staff
  - IBM U.S. Messaging Solutions Lead, GTS
  - Platforms Supported
    - MVS aka z/OS
    - UNIX (AIX, Linux, Sun OS, Sun Solaris, HP-UX)
    - Windows
    - iSeries (i5OS)
  - Programming Languages
    - C, COBOL, Java (JNI, WMQ for Java, WMQ for JMS)

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