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Extending IBM WebSphere MQ and WebSphere Message Broker to the Cloud

Mark Taylor

marke_taylor@uk.ibm.com

WMQ Technical Strategy, IBM Hursley

Session 11860

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Session Overview

- **Cloud Concepts**
- Messaging and Integration in Clouds
  - Messaging, Integration in IaaS, PaaS and SaaS
- Messaging and Integration in Private Clouds
  - Private cloud environments
  - Virtual Systems Patterns
  - Virtual Applications Patterns
  - Additional considerations
- Messaging and Integration in Public Clouds
- Summary

Why Cloud?

IT

Cloud can help us to:
- Deploy systems **faster, easier** and **on demand**.
- **Reduce** and **rationalize** our IT environment.
- **Scale elastically** to cope with demand.
- Enable **chargeback** for users

Line of Business

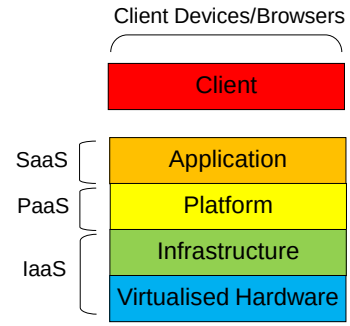
Cloud can help us to:
- **Pay like a utility** for IT, **reduce our fixed costs** and benefit from **economy of scale**.
- **Provide on-demand self-service, commoditized** IT and give us **more choices**.

Cloud Deployment Models

- Private
  - Used solely by the owning organisation
  - Benefits include in-house storage of critical data
- Community
  - Owned by several organisations but supporting a specific community
  - Some of the benefits of public cloud whilst in a closed community
- Public
  - The consumer and provider of cloud services are separate enterprises
  - Benefits include low-cost and scalability
- Hybrid
  - Seamlessly combines services from public and private cloud
  - Provides combination of benefits, but requires careful placement of secure/regulated data and applications

Cloud Service Models

- Reflect the traditional computing layers
- Software as a Service (SaaS)
  - Provides access to hosted applications or services, which may themselves use PaaS and IaaS services
  - Charging is generally usage based, per hour or per 'transaction'
- Platform as a Service (PaaS)
  - Deployment of a consumer's application into an environment hosted in the cloud
  - Charging by licensed capacity or by usage
  - Examples: IBM PureApplication System
- Infrastructure as a Service (IaaS)
  - Access to compute and storage resources as a service
  - Charging generally by (virtual) machine capacity
  - Examples: IBM Workload Deployer, VMWare, IBM SmartCloud, Amazon EC2

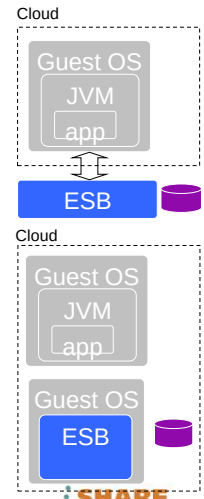


IaaS and messaging, integration

- IaaS provides virtualization of hardware resources
  - Key benefits are ease of deployment and maintenance when managing large numbers of systems
  - Applies to many types of system, including messaging and integration middleware
  - User retains full flexibility and gains improved control of software versions
    - easier to schedule planned updates
    - fewer unplanned disruptions
- In production environments with strict SLAs:
  - Standardized system images improve control of software versions, speeding deployment and maintenance of middleware, reducing setup cost and time to value
- In development & test environments (with SLAs):
  - On-board developers rapidly by provisioning a standard development environment
  - Test systems can be provisioned quickly and torn down when finished, with improved isolation

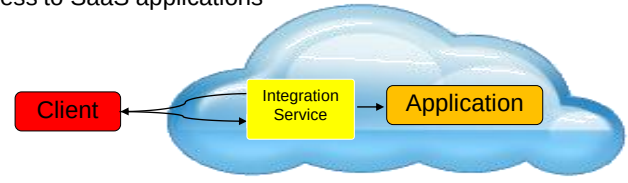
PaaS and messaging, integration

- PaaS provides a virtualized runtime environment
  - Application centric deployment model
  - The 'Platform' takes care of the applications' dependencies
  - For example, an Enterprise Application that has dependencies on databases and messaging and integration
  - PaaS provides simplicity, but may be less flexible than IaaS
- Two messaging options:
  - Connection to an existing enterprise messaging backbone or ESB, whether outside the cloud or deployed on virtualized (IaaS) resources in the cloud
  - Automatic provisioning of messaging services in the cloud to support the application
    - Simplified deployment of messaging and integration resources
    - Fast time to value (reduced skills) for green field deployments or testing without existing infrastructure



SaaS and messaging and integration

- SaaS provides self-service access to services running in the cloud
- Further trades off flexibility in favour of ease of use
- Of most benefit to users with less middleware experience, who require ease-of-use and need minimal control
- Examples:
  - The Cast Iron integration service running inside the cloud can orchestrate access to SaaS applications



  - A messaging service that hosts queues and topics, accessible from inside and outside the cloud, without needing to provision IaaS messaging resources or a PaaS messaging application

Private Cloud environments

- IBM Workload Deployer (IWD)
  - A hardware appliance that supports provisioning of software images and patterns, and virtual application patterns
  - Supports customization and secure deployment and management in a private cloud
  - Provides a consistent UI across hypervisors
    - zVM, PowerVM, VMWare ESX

- IBM PureSystems
  - IBM PureFlex System – infrastructure platform
  - IBM PureApplication System – an integrated application platform, providing a complete runtime environment with compute, networking, storage, virtualization and integrated patterns of expertise
  - Single view for hardware management and monitoring and including IWD

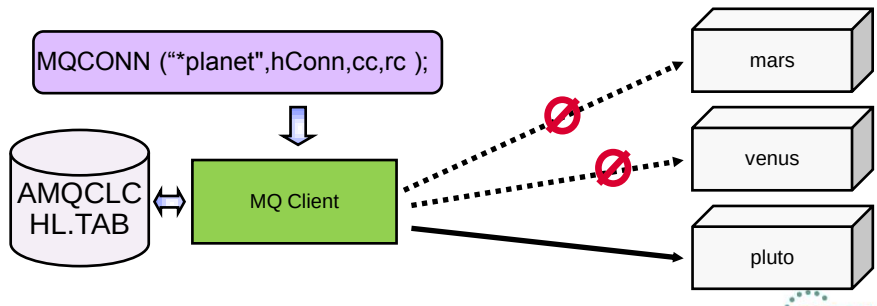
- Non-IBM
  - Customer-specific and third-party environments
  - Example: VMware vCloud

MQ Pre-Connect Exit

- Supports movement by some to “Utility Compute”, Private Cloud configs, etc.
  - Rapid provision of applications allied with need to further decouple Client/Server connectivity
  - Server applications might move location – new addresses or queue managers
- MQ Client connects to a “service” rather than specific Queue Manager
- Can transparently change location of MQ server-side applications
  - No client code changes needed
  - No configuration files need to be updated at the client machine
  - JMS/XMS applications already do this via JNDI lookup
- Exit run during MQCONN queries a repository to discover real location
  - MQ V7.1 incorporates the LDAP implementation from SupportPac MA98

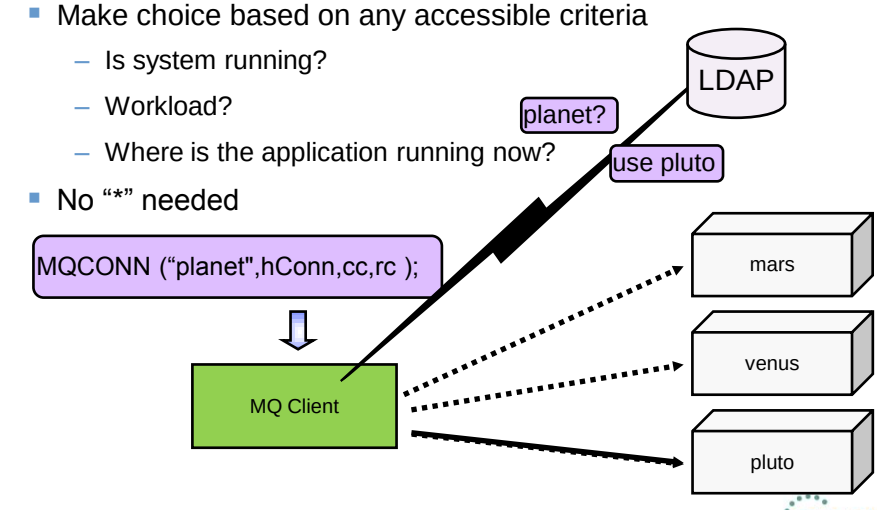
Client Connections: Channel Definition Tables

- How it used to be done …
- The CCDT is used to select a queue manager from a list
  - Based on a pseudo-queue manager name prefixed with “*”
  - CCDT is a locally-accessible file
- CCDT must be distributed to all client systems



Client Connections: Pre-Connect Exit

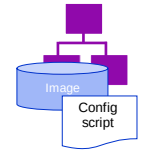
- Look up in a directory such as LDAP
- Make choice based on any accessible criteria
  - Is system running?
  - Workload?
  - Where is the application running now?
- No “*” needed



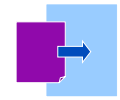
IaaS/PaaS in IWD and PureApplication System

- IBM Workload Deployer and IBM PureApplication System provide pattern types for deployment that correspond to the IaaS and PaaS service models

- Virtual Systems Patterns (correspond to IaaS)
  - User specifies an image consisting of OS, messaging and integration middleware, plus patterns/scripts for configuration
  - Image is hosted by virtual machines provisioned by the cloud
  - Charging is by software license



- Virtual Application Patterns (correspond to PaaS)
  - User specifies an application which is hosted in the runtime platform by the cloud
  - Charging by license or usage



Virtual Systems Patterns

- A Virtual Systems Pattern supports provisioning of standardized images onto a topology of virtual machines with additional customisation if necessary
  - A pattern can be user-defined or supplied
  - A pattern captures and reuses best practices and common solutions

- A pattern consists of Images, Topologies and Scripts
  - A pattern can contain multiple virtual machines
  - Scripts are used to perform deploy-time configuration and customization
    - Configuration can be at deployment, at undeploy or ad hoc
    - Create a zip file of executables and metadata

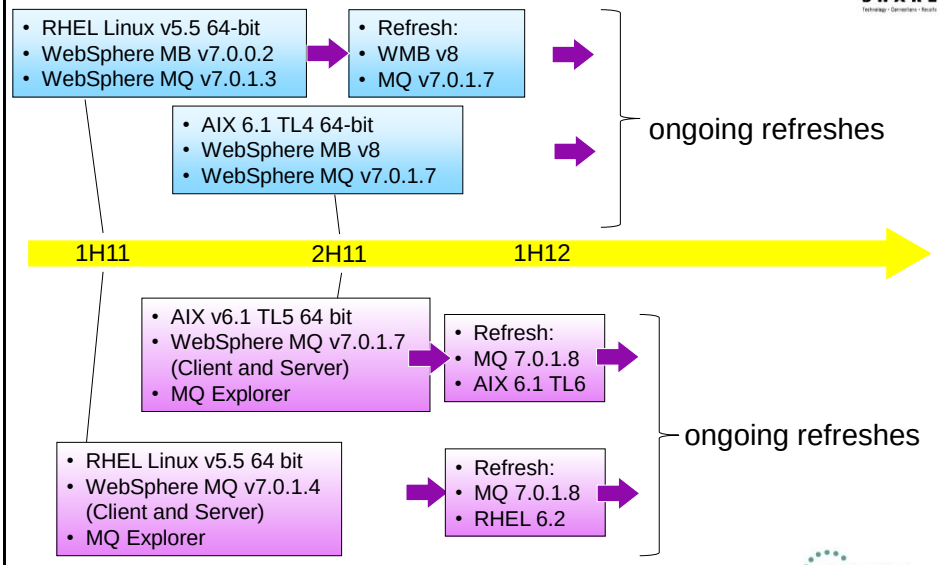
Virtual Systems Patterns

- For a customer running a large number of mission critical queue managers, there are many benefits:
- Standardization of software images reduces risk and simplifies scheduling of maintenance tasks on critical systems
- Automated provisioning reduces errors and time to value
- Applying software maintenance is simpler and quicker
- Repeatable configuration across sets of machines is quicker and less error-prone
- Comprehensive history/audit is maintained
- License tracking is integrated

WebSphere MQ & MB Hypervisor Editions

- IBM provide WMQ and WMB Hypervisor Editions containing ready-made images, patterns and scripts
- Supported operating systems include
  - AIX (PowerVM)
  - RHEL (for VMWare ESX)
- Both support IBM Workload Deployer and can be used in Virtual Systems Patterns
  - Additional metadata supports patterns and allows HVE refreshes to be downloaded from FixCentral and applied to deployed VMs at the touch of a button
- The RHEL versions (for VMWare ESX) can alternatively be run on ESX directly

WebSphere MQ & MB Hypervisor Editions

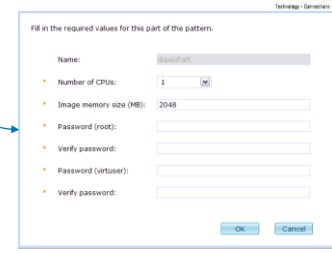


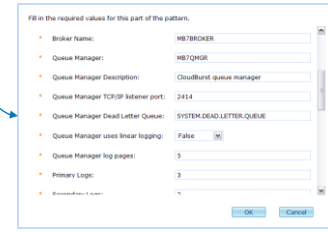
Custom Images and Virtual Appliances

- IWD allows you to load your own images, or clone and extend an existing image
- You may wish to customize images:
  - For an alternative OS
  - Or to include additional facilities/tools in the image:
    - custom administration tools
    - monitoring software
    - backup and recovery tools
  - A self-contained image can be thought of as a virtual appliance
- IBM Image Construction and Composition Tool (ICCT) supports the creation of an image by OS and middleware experts
  - ICCT is part of IWD 3.1
  - Formerly known as “ICON” (*image construction*)

WebSphere Message Broker patterns

- 2 pre-defined patterns:
  - Basic
    - Just VM specific configuration
  - Advanced
    - VM + extensive configuration parameters for WMB and WMQ

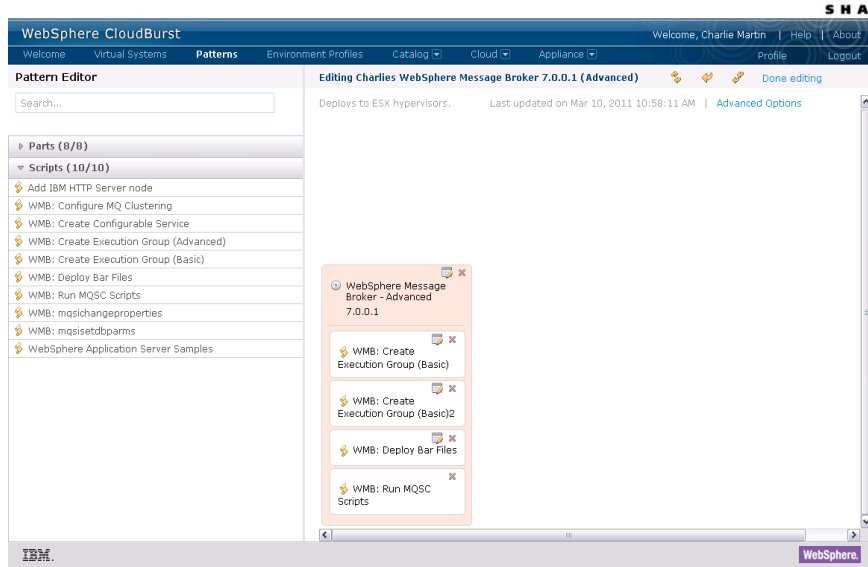




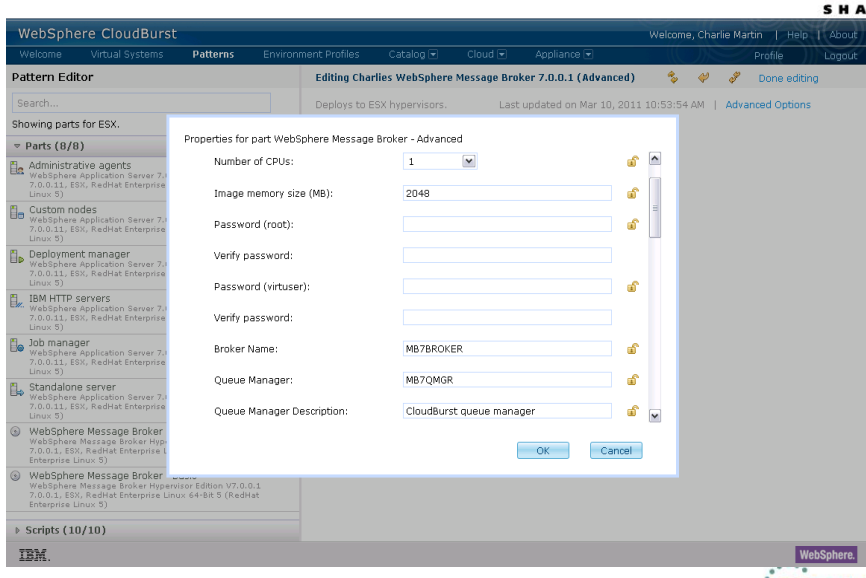
- 8 pre-defined script packages
  - WMB: Configure MQ Clustering
  - WMB: Create Configurable Service
  - WMB: Create Execution Group (Advanced)
  - WMB: Create Execution Group (Basic)
  - WMB: Deploy Bar Files
  - WMB: Run MQSC scripts
  - WMB: mqsichangeproperties
  - WMB: mqsisetdbparms

WMQ patterns are similar; WMQ scripts support clustered Queue Manager and MQSC scripts

Creating a Virtual Systems Pattern

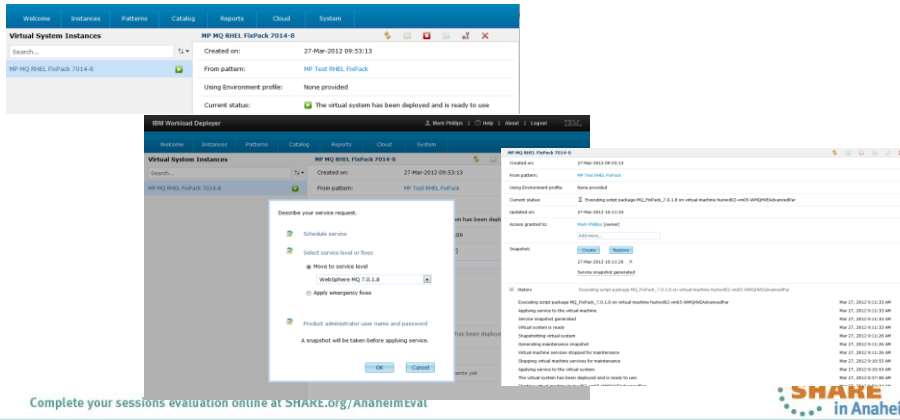


Deploying a Virtual Systems Pattern

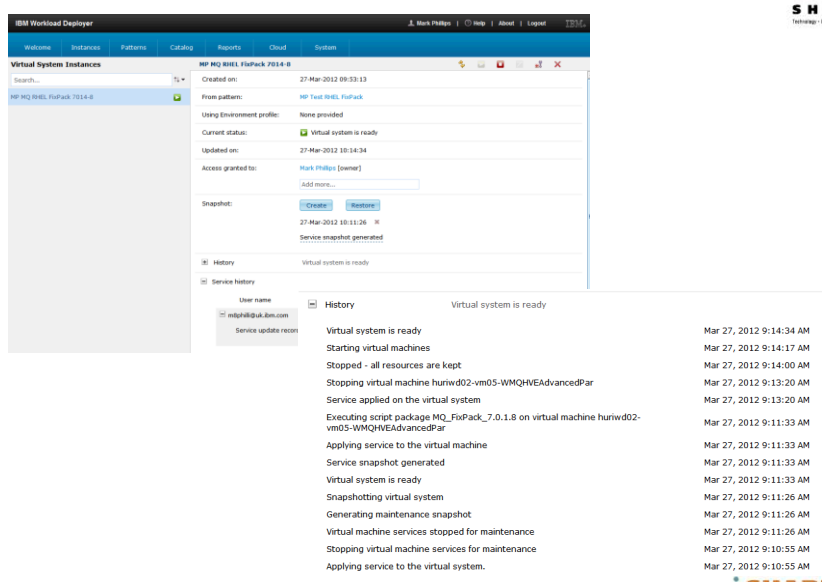


Applying maintenance

- When new fix pack levels are released, images are updated on IBM web and can be downloaded into your image repository
- Fixes are delivered as fix packages, on FixCentral and can be loaded into catalog
- Maintenance can be applied to selected images and deployed machines

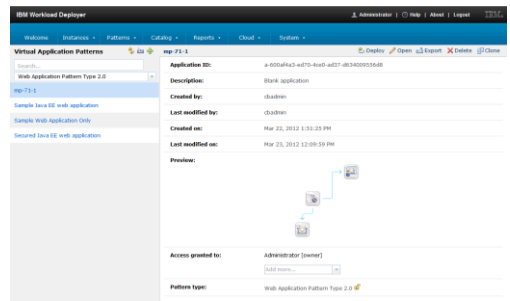


Applying maintenance (continued)



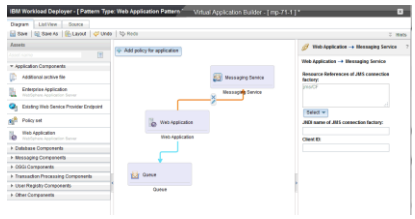
Virtual Application Patterns

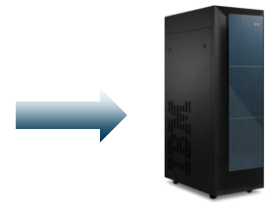
- A Virtual Application Pattern provides an application centric deployment model corresponding to the PaaS service model



- A Virtual Application Pattern can build on (use) services from the IaaS service model – e.g. from a Virtual System Pattern

Virtual Application Patterns

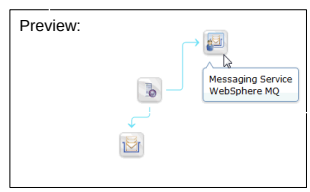


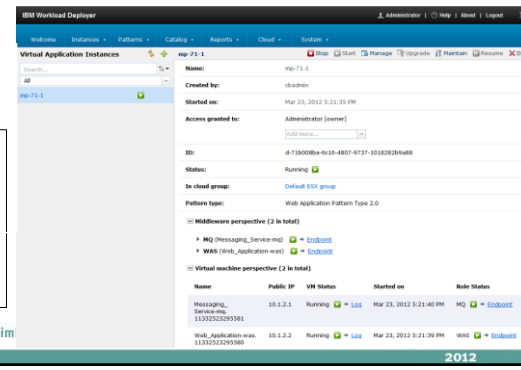


- Virtual Application Patterns provide an application–centric model for deployment of applications into PaaS
- They reduce the time and skill needed to deploy applications
- A Web App Pattern is a VAP for JEE applications (EAR/WAR file)
- The pattern defines the application's dependencies, such as JDBC database connectivity and JMS messaging endpoints
- At deploy time, IWD/PureApplication System creates and configures the necessary services

Virtual Application Patterns and Messaging

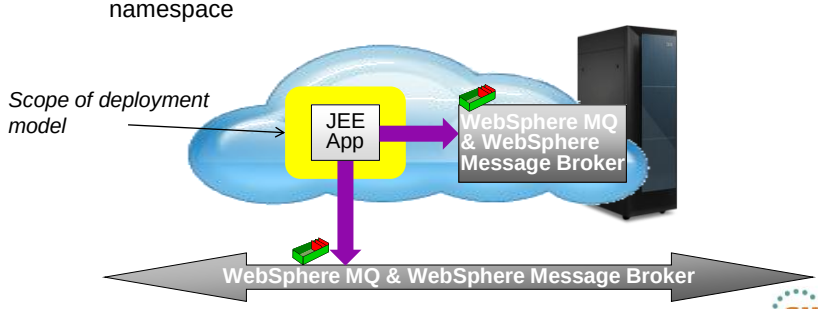
- Applications can send and receive messages to JMS queues and topics, to drive WMB message flows or other applications or services
- These messaging dependencies can be quickly identified and defined
- Introspection highlights resource references to messaging dependencies which can then be defined and "wired" in to the pattern
- The necessary messaging resources can be provided by the cloud





Virtual Application Patterns and Messaging

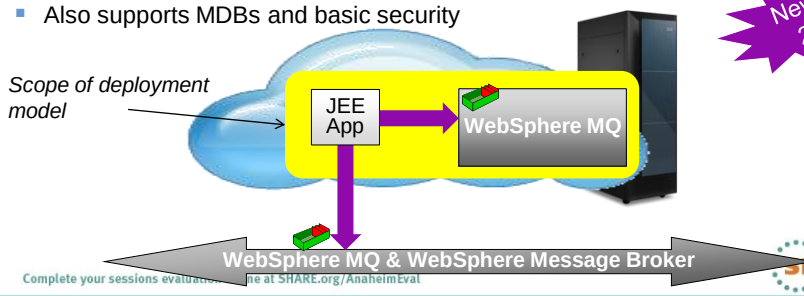
- In 4Q11 IBM shipped a messaging plugin for connectivity to a WebSphere MQ queue manager, which supports JMS connection factories, queues and topics
  - The queue manager already exists – inside or outside the cloud - in a physical or virtual machine
  - The queue manager may be part of the existing MQ backbone
  - The plugin configures the JNDI JMS resources bound into the WAS namespace



Virtual Application Patterns and Messaging

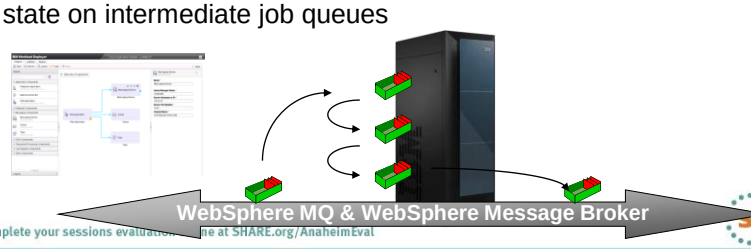
- During 2H12 the messaging plugin will be enhanced to provide a comprehensive extension to Virtual Application Patterns for JMS connectivity
- Queues or topics can then be hosted by a queue manager that is automatically provisioned by the cloud
- Each deployed instance of a deployment model can be provisioned with a queue manager to host queues or topics not hosted elsewhere
- Can still connect to existing queue managers, where queues or topics are hosted – physical or virtual, inside or outside the cloud
- Also supports MDBs and basic security

New in 2012



Web Application Pattern

- The PaaS service model is simpler to use than IaaS, but is consequently less flexible
- A messaging system provisioned in the cloud as part of an application deployment is not visible to other users' deployment instances
- You can migrate the model to use an externally provisioned queue manager – e.g. to hook the app up to the backbone
- You can mix and match – so for example you could drive the application from an externally provisioned queue or topic, on the backbone, but use an automatically provisioned queue manager for staging application state on intermediate job queues



Governance and Lifecycle

- License Tracking
  - License Tracking is automatic
  - Both IWD and VMware vCenter know the physical capacity of the machine and licensing is capped at the physical capacity of the machine
  - You can choose to integrate with ILMT or use IWD tracking of HVEs
  - Integrated ILMT can alert, ignore or enforce adherence to licensed capacity
- Decommissioning
  - Remember when decommissioning a VM (IaaS) or deployment model (PaaS) to ensure that any stateful resource managers have been quiesced and do not contain important data

Messaging and Integration in Public Clouds

- IBM SmartCloud Enterprise and Enterprise+ provide enterprise class IaaS
  - Benefits of cloud economics whilst preserving security, portability and governance and supporting business centric SLAs
  - For WebSphere MQ look at the Industry Application Platform, also available on Amazon EC2
  - There is also a WebSphere Message Broker v8.0 image on Smart Cloud Enterprise
- SmartCloud supports a number of licensing models
  - BYOL – bring your own license
  - DUO – development use only
  - PAYG – pay as you go
- IBM SmartCloud Application Services provides enterprise PaaS running on SmartCloud Enterprise
  - For development and deployment of applications to the cloud
  - Beta program includes free non-production use of WebSphere MQ and Message Broker Images

Product Information

- Hypervisor Editions (HVEs) are available from Passport Advantage
  - WebSphere Message Broker Hypervisor Edition (supports RHEL and AIX)
  - WebSphere MQ Hypervisor Edition for AIX
  - WebSphere MQ Hypervisor Edition for Red Hat Enterprise Linux for x86-64
  - Each HVE has a PVU license, which also covers use of the non-HVE product, to allow migration from core to HVE as required
- ICCT/ICON is available in IBM PureSystems and IBM Workload Deployer 3.1
- Further information is available in the Workload Deployer, WMQ and WMB InfoCenters
  - http://publib.boulder.ibm.com/infocenter/worlodep/v3r1m0/index.jsp
  - http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/index.jsp
  - http://publib.boulder.ibm.com/infocenter/wmbhelp/v8r0m0/index.jsp

Summary

- Cloud delivers many benefits, including self-service, automation, rapid deployment, ease of management, usage-based charging, elastic scalability
- Messaging and Integration are supported in a variety of patterns
- Virtual Systems Patterns provide IaaS level support for virtualization, standardization and automation
  - Allow you to virtualize your existing enterprise backbone
  - Provide full flexibility using familiar administrative interfaces
  - Images are available in HVEs, or construct a custom image using ICCT
- Virtual Application patterns provide PaaS level deployment model
  - Application centric – simpler, but less flexible
  - Plugins can simplify connectivity and provisioning of messaging resources Images are available in SmartCloud Enterprise and third party clouds
- IBM intends to continue to develop its messaging and integration capabilities in the cloud, including hosted messaging services for seamless connectivity within and beyond the enterprise - we are interested in your requirements

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