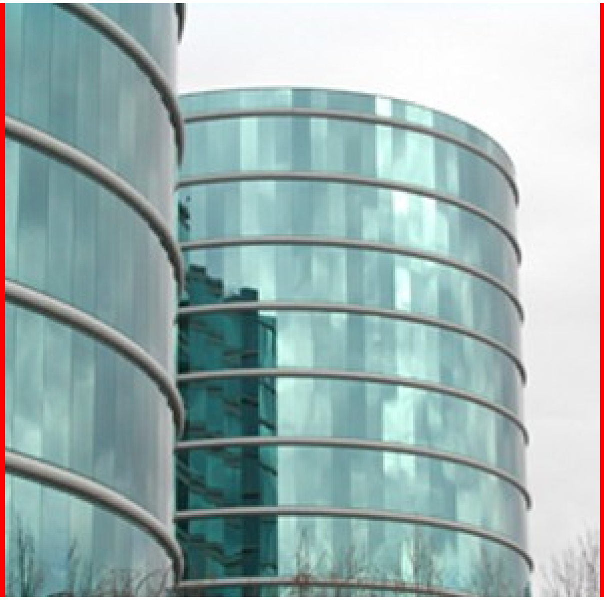

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GlassFish Boot Camp – MDBs and JMS

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The JMS Provider: Open MQ

- GlassFish Server, includes a JMS Provider: GlassFish Open Message Queue (Open MQ)
- Open MQ provides the complete range of message service
  - From fire and forget message notifications to once and only once, guaranteed delivery patterns
  - Persistent, non-persistent support
  - Singleton or clusters
  - Disk based storage, SQL storage
  - Conventional and enhanced availability clustering

What you will learn

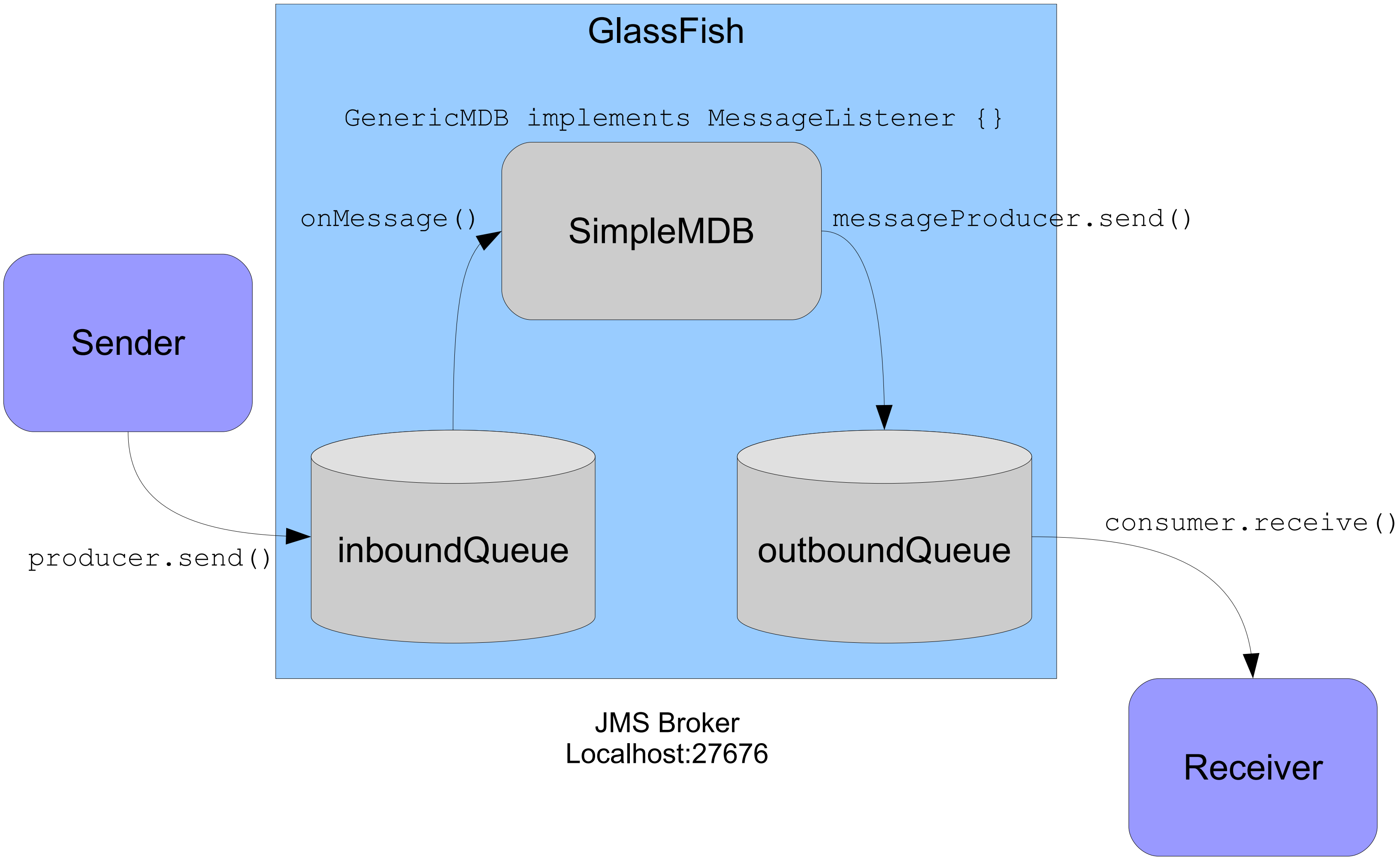
- Compile simple java applications to send and receive messages via the JMS API
- Compile and package a simple MDB application which receives a message from a JMS destination and sends a message to another JMS destination
- How to configure a single GlassFish instance
  - How the MDB pool can effect processing
- How to configure a GlassFish cluster
  - Change the configuration and deploy the same MDB
  - How MQ clustering provides messages across the cluster

What you will need

- A PC with an Operating system (I’m using Windows 7 Professional)
- GlassFish 3.1 (I’m running build 34)
  - http://glassfish.java.net/public/downloadsindex.html
- Command shell (I’ll be using Cygwin bash shell)
  - http://cygwin.com/setup.exe
- Java (I’ll be using 1.6.0_25)
  - You can get this in a GlassFish bundle, or separately
- An editor (I’ll be using Notepad++)
  - You could use Netbeans (http://netbeans.org)
- The JMS Files archive from Arun

Lab 1
Single Local Instance, Default Embedded Broker

Single Instance Flow Diagram



Compile the resources

- Follow the instructions on the top Demo page to build the resources
- Compile & package the MDB
  - javac GenericMDB.java
  - jar cvf ejb-jar-ic.jar GenericMDB.class
  - jar cvf simplemdb.ear ejb-jar-ic.jar
- Compile JMS Sender/Receiver
  - javac Sender.java Receiver.java

Configuring the GlassFish Instance

- Instructions at Glassfish Single Instance Embedded Mode
  - Work through, line-by-line
  - Can use GUI instructions further down
- You will need to perform these steps:

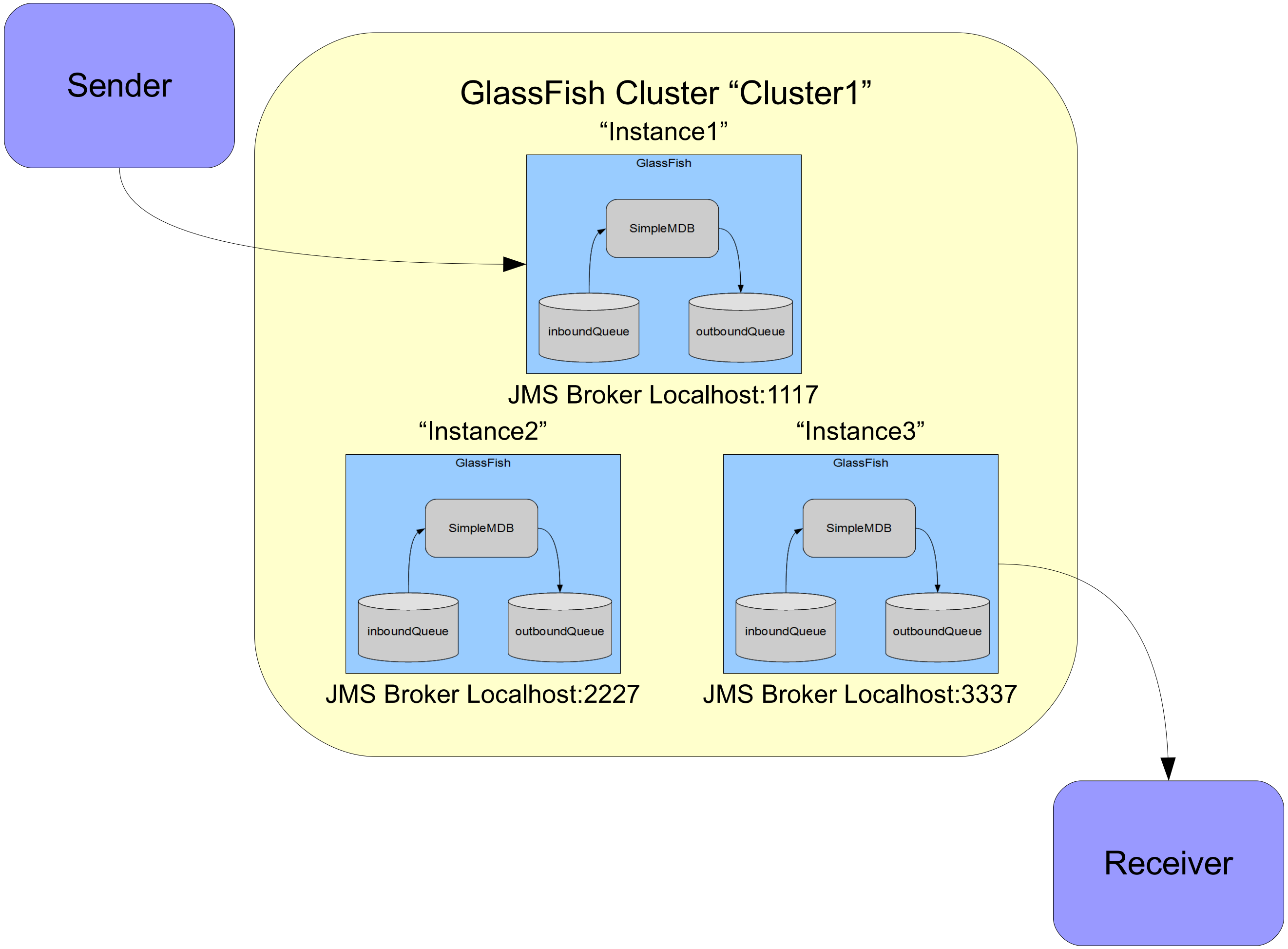
1) Start the domain
2) Create a local instance
3) Create the JMS Resources
4) Deploy the MDB
5) Start the receiver
6) Start the sender
7) Look at the output
8) Tear it all down

Did you notice?

- The producer created the messages in order
- The receiver (in most cases) logged the reception in a random order
- Why is this?
  - The MDB Pool size > 1
- Extra credit
  - Change the MDB pool size to fix this and retry

Lab 2
Cluster of three GlassFish Instances
Embedded Brokers
Conventional Cluster

System diagram, GlassFish Cluster



Configuration

- Follows the same general pattern as a single instance cluster
  - For best results, you should modify and recompile Sender and Receiver programs to increase the number of messages
- A script is provided if you'd rather not copy-paste all the commands
  - Pauses are inserted to allow you to review the results, and to use the GUI to examine the settings

Things to notice

- No changes necessary for your applications
- All messages produced to JMS Broker at instance1
- MDBs at all instances will process messages
- All messages are consumed
  - Regardless of instance the Sender or Receiver connect to
- How can you tell?
  - Browse the UI Monitors or script output at script pauses
  - Use GUI, or Broker commands to check which outboundQueue holds messages

Optional experiments

- Increase the number of messages and observe the message distribution
- Try connecting Sender and Receivers to different ports to see if there are behavior differences
- Try a Qbrowser tool, to look at the message content
  - e.g. Hermes, QBrowser, or Open MQ's Visual VM Sample
- Should always receive the correct number of messages

In Case of Difficulty

- Javac doesn't work
  - Check PATH and CLASSPATH
  - For most resources, these should be absolute (beginning with drive-letter: (e.g. c:\glassfish3\glassfish\lib\...)
  - Don't forget to include current directory in CLASSPATH ('.')
- Can't start the domain
  - You may be inadvertently using the wrong Java
  - Check windows system PATH, or shell PATH
  - Windows-Cygwin: try comparing the results between your shell and windows cmd.exe
- Can't use the UI to create JMS resources (Firefox 4)
  - Use FireFox 3, Chrome, Safari, Explorer

More troubleshooting ...

- Use the logs
  - GlassFish log in default setting is relatively terse
  - Increase the log level if necessary
- Use JMS Broker logs for debugging JMS problems
- Look in

  ${glassfish}/glassfish/nodes/ … /imq/instances/... /log/log.txt

More resources

- For Java programming start with the Java tutorial
  - http://download.oracle.com/javase/tutorial/
- For Java EE, the Java EE 6 tutorial
  - http://download.oracle.com/javaee/6/tutorial/doc/
- JMS Tutorial
  - http://download.oracle.com/javaee/1.3/jms/tutorial/
- Open MQ Project
  - http://mq.java.net

You Learned ...

- … how to configure and run a simple MDB application which integrates external JMS applications and processes them with an MDB
- … how to extend an application to run in a GlassFish Cluster
- ,,, details that must be managed in your application when using a pool of MDBs
- … some valuable troubleshooting and diagnostic features of GlassFish and the JMS provider, Open MQ

Other Integration Options

- GlassFish supports GenericJMSRA for JMS integration of other JMS providers
  - http://download.oracle.com/docs/cd/E18930_01/html/821-2416/gbtvg.h
- GlassFish MQ also supports integration via ...
  - JMS Integration to Spring Framework
    - http://wikis.sun.com/display/GlassFish/OpenMQSamples
  - JMS Bridge to remote JMS providers (e.g. IBM MQ Series)
    - http://download.oracle.com/docs/cd/E18930_01/html/821-2438/gjdl
  - STOMP – Text based Stream Oriented Messaging Protocol
    - http://wikis.sun.com/display/GlassFish/OpenMQStompConnect
  - UMS – JMS commands via plan old URLs
    - http://download.oracle.com/docs/cd/E18930_01/html/821-2442/ggr

Join us

- Join the GlassFish Project
  - http://java.net/projects/glassfish/watch
  - mailto:sympa@glassfish.java.net?subject=sub%20users
- Join the GlassFish Open MQ project
  - http://java.net/projects/mq/watch
  - mailto:sympa@mq.java.net?subject=sub%20users

Thank You!

An Appendix for Windows Users

- Windows can be somewhat daunting at initial setup
- You can avoid this by using an IDE like NetBeans
- Most GlassFish documentation uses Windows cmd.exe
- Cygwin adds extra complications

Windows Environment Variables

- Windows System PATH
  - Make sure that your shell finds the correct version of Java
  - Include your Java Install/bin directory (Mine is C:\Program Files (x86)\CVSNT\;C:\Program Files\Java\jdk1.6.0_25\bin\)
    - Right click on start->Computer, choose Advanced system settings, click on Environment Variables
- CLASSPATH
  - Generally set in your shell
  - Do not use a Unix style path (Mine is

    c:\glassfish3\glassfish\lib\javaee.jar;c:\glassfish3\mq\lib\imq.jar;c:\glassfish3\mq\lib\jms.jar;.

Using Cygwin

- Don’t forget to EXPORT PATH and CLASSPATH variables
- Java is NOT a Cygwin application – it expects Windows style path settings
  - Use ‘\’ (Backslash) not ‘/’ (Forward slash)
  - Separate items with semi-colon
- In Bash shell, I set my CLASSPATH:

```
export
CLASSPATH='c:\glassfish3\glassfish\lib\javaee.jar;c:\glassf
ish3\mq\lib\imq.jar;c:\glassfish3\mq\lib\jms.jar;.'
```

  - Don’t forget the dot at the end either!
- Learn about Cygpath

Using Cygwin continued

- Shell PATH
  - Add your JDK bin folder. This is in shell format. Mine is:
    “/cygdrive/c/program files/java/jdk1.6.0_25/bin:/usr/local/bin: ...”
  - For Bash shell, I set mine like this

    ```
    export PATH="/cygdrive/c/program files/java/jdk1.6.0_25/bin:
    $PATH"
    ```
  - Verify with `which`

    ```
    ebratt@EBRATT-LAP $ which java
    /cygdrive/c/program files/java/jdk1.6.0_25/bin/java
    ```
- From a ZIP archive, the bin directory will contain both script and executable files
  - Will need to specify .exe (or remove the shell scripts)

Q-Browser Tool References

- Using Hermes JMS with GlassFish MQ
  - http://wikis.sun.com/display/GlassFish/OpenMQHermesJMSQuestions
- Using QBrowser with GlassFish MQ
  - http://sourceforge.net/projects/qbrowserv2/
- Using VisualVM with GlassFish MQ
  - http://mq.java.net/4.4-content/visualvm/quickstartguide/index.html