Ask the Experts
Troubleshooting Web Services in IBM WebSphere Application Server

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Agenda

- Introduce the panel of experts
- Introduce **Troubleshooting Web Services in IBM WebSphere Application Server** Topics
- Answer 6 questions submitted
- Open telephone lines for questions
- Summarize highlights

Panel of Experts

Panelist	Role at IBM
Michael McGuinness mwmcguin@us.ibm.com	Support Engineer Michael, an IBM WebSphere Application Server level 2 support engineer, has over six years experience in troubleshooting web services problems.
Krishna Jaladhi krishnaj@us.ibm.com	Support Engineer Krishna, an IBM WebSphere Application Server level 2 support engineer, has over ten years experience.
Allen Alarcon alarcon@us.ibm.com	Support Engineer Allen, an IBM WebSphere Application Server level 2 support engineer, has ten years experience. Other areas of specialization are J2C, Web Services, Transaction, XML and SDK.
Hobert Bush III bushh@us.ibm.com	Support Engineer Hobert has been a Level 2 Support analyst for WebSphere Application Server since 2009. He is an IBM Certified Solution Developer and System Administrator for WebSphere Application Server. He has resolved numerous high impact issues for clients related to the HA Manager, DB Connections, Transactions, and the Web Services components.

Introduction

- We will be covering a number of questions that cover various WebSphere Application Server Topics :

    - Web Services Performance Problems
    - Web Services Connectivity Problems
    - IP Caching in Web Services
    - JAXB Performance problems in JAX-WS applications
    - WSDL_Generation_Extra_ClassPath custom property

- Platforms covered will include Windows, Unix.

Question 1

- How to troubleshoot web services performance problems?

Answer to Question 1

Web Services performance Tracing.
- Isolate problem within Web Services engine OR outside.
- Have a smallest number of trace point as possible

  ▸ **com.ibm.ws.webservices.trace.WSPerf=all**

- <u>Within Web Services</u>
- Client-side, total time spent in Web Services processing the request/response

  ▸ org.apache.axis2.jaxws.client.proxy.JAXWSProxyHandler invoke JAXWSProxyHandler.invoke() calling method

  ▸ org.apache.axis2.jaxws.client.proxy.JAXWSProxyHandler invoke JAXWSProxyHandler.invokeSEIMethod() returned

- Service-side, total time spent processing the request

  ▸ WASAxis2Servlet.doPost() entry

  ▸ WASAxis2Servlet.doPost() exit

Answer to Question 1

- <u>Outside of Web Services</u>
- Client side time spent waiting for response from service.
    - ▸ HttpOutSyncWriter.finishBufferRequest.finishRequestMessage() calling

    - ▸ org.apache.axis2.jaxws.client.proxy.JAXWSProxyHandler invoke JAXWSProxyHandler.invokqeSEIMethod() returned method

- Service side time spent waiting for the application to complete the business method (the invoke).
    - ▸ org.apache.axis2.jaxws.server.dispatcher.JavaDispatcher invokeTargetOperation JavaDispatcher.invokeTargetOperation() calling

    - ▸ org.apache.axis2.jaxws.server.dispatcher.JavaDispatcher invokeTargetOperation JavaDispatcher.invokeTargetOperation() returned

Question 2

- How to troubleshoot web services connectivity problems?

Overview of Web Services outbound connection pool

●Connection pooling improves performance by avoiding the overhead of creating and destroying connections

●Applicable to Web Service Client/Consumer

● JAX-RPC and JAX-WS Web Service Clients/Consumers will use outbound connection pool

●Outbound connection pool can be configured using JVM custom properties only

●Outbound connection pool cannot be disabled

●Outbound connection pool Connection reuse can be disabled

●There is one pool for JAX-RPC and one for JAX-WS

Answer to Question 2

[5/16/14 12:53:17:905 EDT] 00000089 **OutboundConne > OutboundConnectionCache.findGroupAndGetConnection() WAITING_THREADS_THRESHOLD is 5, HTTP_CONNECTION_TIMEOUT is 300000, HTTP_MAX_CONNECTIONS is 50 Entry**

[5/16/14 12:53:17:905 EDT] 00000089 OutboundConne 1   WSWS3595I: Current pool size: 0. Connections-in-use size: 0. Configured pool size: 50

[5/16/14 12:53:17:907 EDT] 00000089 OutboundConne 1   **WSWS3547I: Outbound connection group is created for key: HttpOutboundChain:ashishworkmc.raleigh.ibm.com:9082**

[5/16/14 12:53:17:929 EDT] 00000089 **OutboundConne 1   WSWS3595I: Current pool size: 1. Connections-in-use size: 1. Configured pool size: 50**
[5/16/14 12:53:17:929 EDT] 00000089 **OutboundConne < OutboundConnectionCache.findGroupAndGetConnection() Exit**
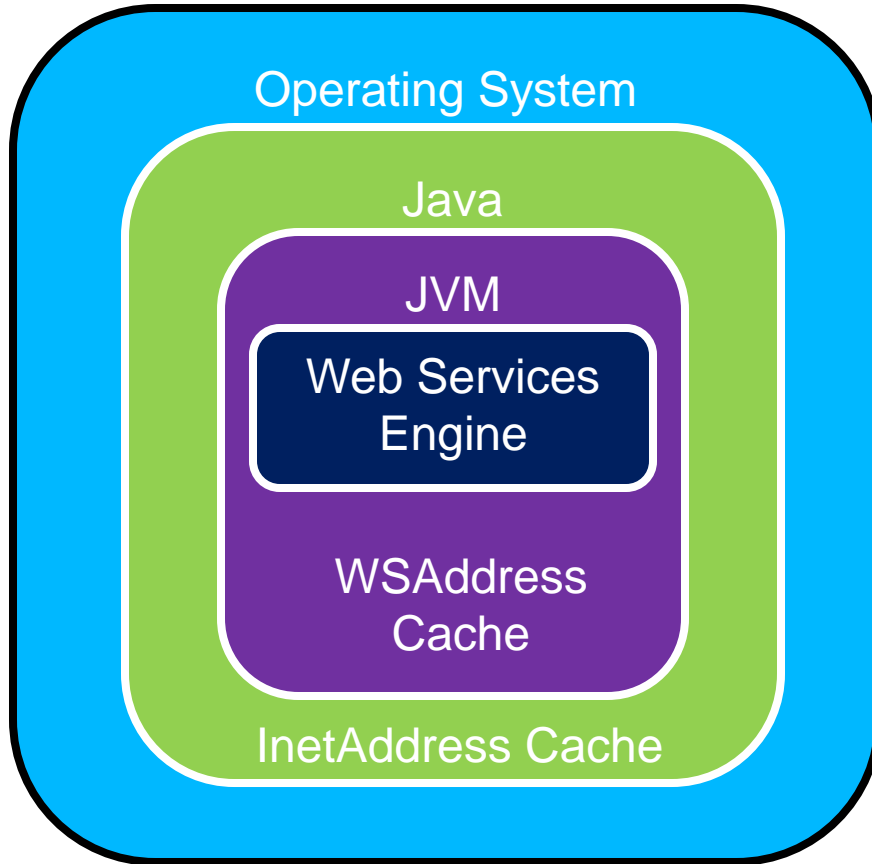
Question 3

- What is IP caching in web services?

Answer to Question 3

- java.net.InetAddress class is used to resolve hostnames to their IP addresses.
- InetAddress class provides methods which rely on the operating system to perform resolution
- The operating system will attempt to resolve the hostname by performing a lookup of a file, a DNS Server, or other name service
- Completed results are passed back to the JVM
- Results, successful or unsuccessful, may then be stored in the InetAddress Cache

Answer to Question 3

Operating System

Java

JVM

Web Services Engine

WSAddress Cache

InetAddress Cache

Java™ JVM™

- OS resolves hostname to IP address
- OS results stored in InetAddress Cache
- Web Services Engine checks WSAddrCache cache for existing host and port

Question 4

- How to troubleshoot JAXB Performance problems in your JAX-WS applications?

Understanding Why JAXBContext Creation Can Degrade Performance

● JAX-WS runtime trying to create JAXBContext objects, or find existing ones for re-use

● Application packages are used to create the JAXBContextValue

● findBestSet() attempt is made to create a JAXBContext, this approach gets MORE tedious when flow goes into the findBestSet() method.

Answer to Question 4

- Wsimport / xjc tools to create the ObjectFactory and/or package-info classes for the package, and bundle them into the application

- For bottom-up approach, wsgen does not generate ObjectFactory.class, JAXBContext is created using class construction. Application developer should put JAXB and non-JAXB classes in different packages so that the findBestSet code path will not be executed

Reducing the time required to create the JAXBContext
http://www.ibm.com/support/knowledgecenter/SSAW57_8.0.0/com.ibm.websphere.nd.doc/info/ae/ae/cwbs_tuning_jaxbcontext.html

- A new alternative to solve the performance problem is to use jaxb.index
https://jaxb.java.net/nonav/2.2.1/docs/api/javax/xml/bind/JAXBContext.html

Question 5

- What is the purpose of com.ibm.websphere.webservices.WSDL_Generation_Extra_ClassPath custom property?

Used To Help Generate WSDL

- Its purpose is to add/append include classes, jars to the -classpath argument of the wsgen (wsdl generate) command.
- If you see these symptoms
  - ▸ WSWS7054E: The WSDL file could not be generated… because of the following error: {1}.
  - ▸ Caused By: java.lang.NoClassDefFoundError … com.mycompany.app.TestMe
- Find the jar in which the TestMe class resides.
- Add/append the jar's path to the value of the custom property

Alternative to the Custom Property

- Package the missing class directly in the same module as the SEI, or in a JAR in the EJB™'s or WAR's lib directory, or in the EAR's lib directory
- Best Practice - Include the wsdl file with the application.

  - ▶ Provide a reference to the WSDL file in the wsdlLocation attribute of the @WebService annotation. By specifying a pre-defined WSDL file, performance is improved.

  - ▶ Example

  @**WebService** (serviceName="FooService", portName="FooPort", **wsdlLocation**="WEB-INF/wsdl/FooService.wsdl")

Question 6

- What are some of the tips to reduce/minimize connection latency in troubleshooting Web Services problems? (I know it's a 'loaded' question; however, any rule-of-thumbs ideas are welcomed)

Answer to Question 6

On the client side

- Identify which endpoint address URL the client is using. Make sure that this is truly the URL at which the target service is accessible.

- Set JVM custom property to throw an exception sooner, default is 180 seconds
  com.ibm.websphere.webservices.http.SocketTimeout

  ▸ This property specifies the amount of time, in seconds, to wait for the outbound socket to be established with the remote server.

- Service provider side – Look for latency in the web server, Security layer, and in the WAS JVM.

Open Lines for Questions

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