Release 12
Java Infrastructure

Brian Bent

April 17, 2008

ORACLE CERTIFIED ADVANTAGE PARTNER

SOLUTION BEACON, LLC
Real Solutions for the Real World®

Agenda

- **Presentation (45 minutes)**
  - Java on the client
  - Application Server 10*g*: OC4J
    - Features
    - Architecture
    - Administration
  - Managing the JVM
- **Q&A (10 minutes)**
- **More Information**

End User Changes

- No JInitiator for Release 12
- Replaced with Sun's JRE browser plugin
- JRE version must be certified by Oracle
  - J2SE Plugin 1.5.0_10-erdist (as of the initial Release 12 shipping date)

    This is NOT the same as J2SE Plugin 1.5.0_10!
  - As of 6/25/07 support for the Sun provided 1.5.0_12 has been announced for both the 11*i* and 12 releases!
- Advantages of eliminating JInitiator:
  - One less custom component to deploy
  - Eliminates possible conflicts between JInitiator and Sun's JRE browser plugin
  - Quicker access to technology improvements

JInitiator Metalink Notes

- For details reference MetaLink Doc. ID: 393931.1 "Upgrading J2SE Plugin with Oracle Applications for r12.0"

- For related browser details reference MetaLink Doc ID: 389422.1 "Recommended Browsers for Oracle E-Business Suite Release 12"

- For replacing JInitiator in the 11*i* environment refer to MetaLink Doc ID: 290807.1 "Upgrading Sun JRE (Native Plug-in) with Oracle Applications 11*i* for Windows Clients"

Server Changes

- **Application Server 10*g***
  - Version 10.1.2 for Reports
  - Version 10.1.3 for Applications
- **JServ replaced with Oracle Containers for Java (OC4J)**
  - Connected to Apache via mod_oc4j
  - Supports many Java EE standards
  - Paves the way to the Fusion Applications
- **Note that Apache stays at 1.3**

Application Server 10*g* Versions

- ## Two Oracle homes…
  - – AS 10*g* 10.1.2 for Reports
    - Java 4
    - Supports Java EE 1.3 standards
    - Runs Reports server, Concurrent Processing tier
  - – AS 10*g* 10.1.3 for Apps
    - Java 5
    - Supports Java EE 1.4 standards
    - Runs Web tier

http://blogs.oracle.com/schan/newsItems/departments/release12/2006/06/05#a287

Application Server 10*g* Features

- Oracle BPEL Process manager
  - Moves business process to a modeled language
  - The glue for web services

- Oracle Web Services Manager
  - The infrastructure for implementing web services

- Oracle Enterprise Service Bus
  - A transport mechanism between a web service client and server

- Oracle Identity Management
  - Integrates EBusiness Suite into corporate LDAP for user authentication

Application Server 10g Features (cont'd)

- Sun Java EE 1.4 standards compliance
- Sun Enterprise Java Beans 3
- Sun JavaServer Faces 1.1
- Sun J2EE Connector Architecture 1.5

❖ OTN White Paper "Application Server 10g R3 New Features"
  http://www.oracle.com/technology/tech/java/oc4j/1013/OracleAS-NF-10131.pdf

ORACLE CERTIFIED ADVANTAGE PARTNER

SOLUTION BEACON, LLC
Real Solutions for the Real World®

Structure of OC4J

- Apache 1.3 + mod_oc4j (not upgraded)
- OC4J server
  - 3 distinct servers launched by default:
    - oacore: for OAF applications
    - forms: for forms
    - oafm: for web services
    - *AS Control application
- OPMN for starting/stopping the server
- opmn.xml for controlling configuration files
- In the E-Business Suite environment AD utilities are used for stopping/starting OC4J, and AutoConfig is used for managing the opmn.xml file.

AS 10g Deployment Diagram

- Application architecture is the traditional n-tier

- Firewalls can be placed between tiers

- Clustering is available for the web tier, the application tier, and the database tier

- Content switches can be placed between Client and Web Tier for SSL acceleration, URL firewalling, and HTTP acceleration

❖ For DMZ details reference MetaLink Doc ID: 380490.1 "Oracle E-Business Suite R12 Configuration in a DMZ"

Client Tier

Web Tier

Apache

mod_oc4j

Application Tier

OC4J

Database Tier

Database
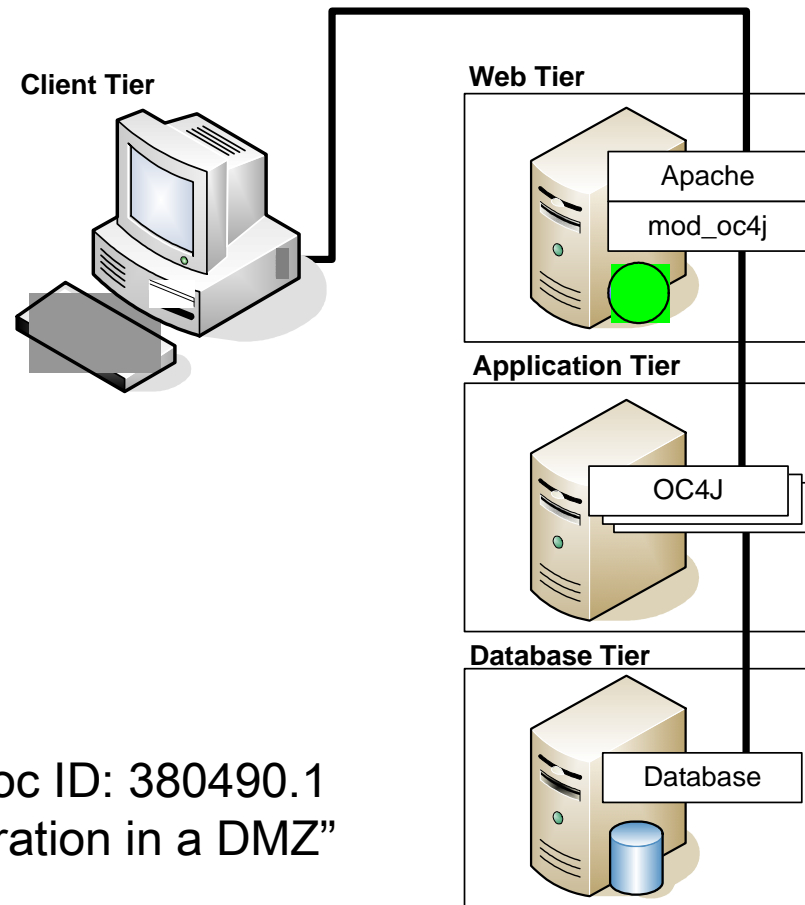
Benefits of Java 5

- Language improvements for custom development
- Elimination of the need for a virtual framebuffer
- Performance improvements
  - garbage collection
  - 64bit CPU support
  - better memory management

Management Utilities

- **Improved monitoring in the Java realm**
  - jps
  - jstat
  - JConsole
- **All three utilities are part of Sun's Java developers kit, these are not provided by Oracle's Java install**
- **Download and install Sun's package outside of the Oracle homes**
  - Sun's software packages typically install to somewhere like /usr/java

Java 1.5 Utilities: "jps"

- The jps command is like "ps" but shows details of java processes only.

```
a120vis1@sbllc12 > /usr/java/jdk1.5.0_11/bin/jps -v
8056 jar -DCLIENT_PROCESSID=8056 -verbose:gc -Xmx512M -Xms128M
    -XX:MaxPermSize=160M -XX:NewRatio=2
    -XX:+PrintGCTimeStamps ...
    -XX:+UseParallelGC -XX:ParallelGCThreads=2
    -Dcom.sun.management.jmxremote ...
    -Djava.awt.headless=true ...
    -Doracle.ons.oraclehome=/a120vis1/apps/tech_st/10.1.3 ...
    -Doracle.home=/a120vis1/apps/tech_st/10.1.3 ...
    -Doracle.oc4j.instancename=oacore ...
```

Java 1.5 Utilities: "jstat"

- The jstat command can be used to monitor JVM internals like the various memory pools and garbage collector performance

- Using "jstat –gccapacity *PID interval*" is great for tuning memory, in this case I've cut out the Permanent Generation memory pool

```
a120vis1@sbllc12 > /usr/java/jdk1.5.0_11/bin/jstat -gccapacity 8056 5000
… PGCMN      PGCMX      PGC        PC         YGC        FGC
… 16384.0   262144.0   232320.0   232320.0   2471       80
… 16384.0   262144.0   232320.0   232320.0   2471       80
… 16384.0   262144.0   232320.0   232320.0   2471       80
```

Java 1.5 Utilities: JConsole

- **Allows monitoring of memory usage**
  - Total JVM memory in use
  - Amount in use by each of the internal JVM pools (stack, heap, etc.)
  - Allows the JVM garbage collector to be requested…

- **Requires parameter change to the OC4J JVM in order to connect**
  - -Dcom.sun.management.jmxremote

JConsole Screenshots

- Login as the applications owner, launch JConsole via the command /usr/java/jdk1.5.0_11/bin/jconsole

- Select the appropriate instance of OC4J
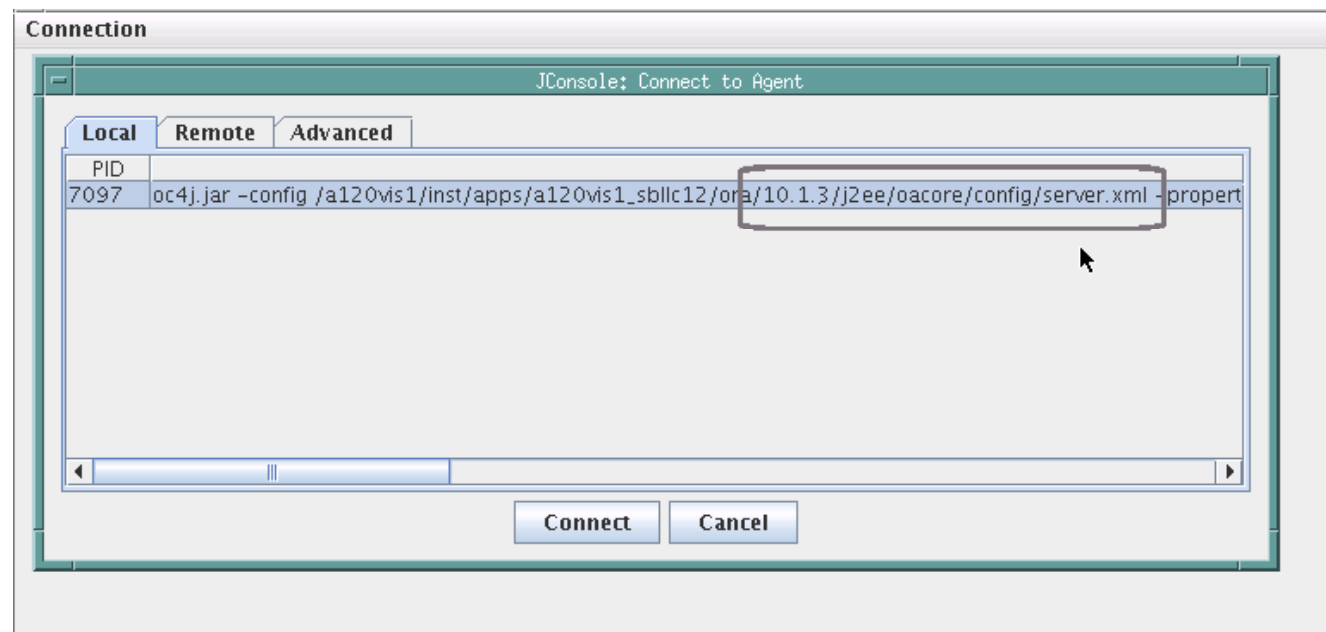
JConsole Screenshots

- **The initial display shows various summaries about the JVM**

JConsole Screenshots

- **Displays details for the various Heap and Stack memory pools**

- **This screen is the basis for tuning memory in the JVM**
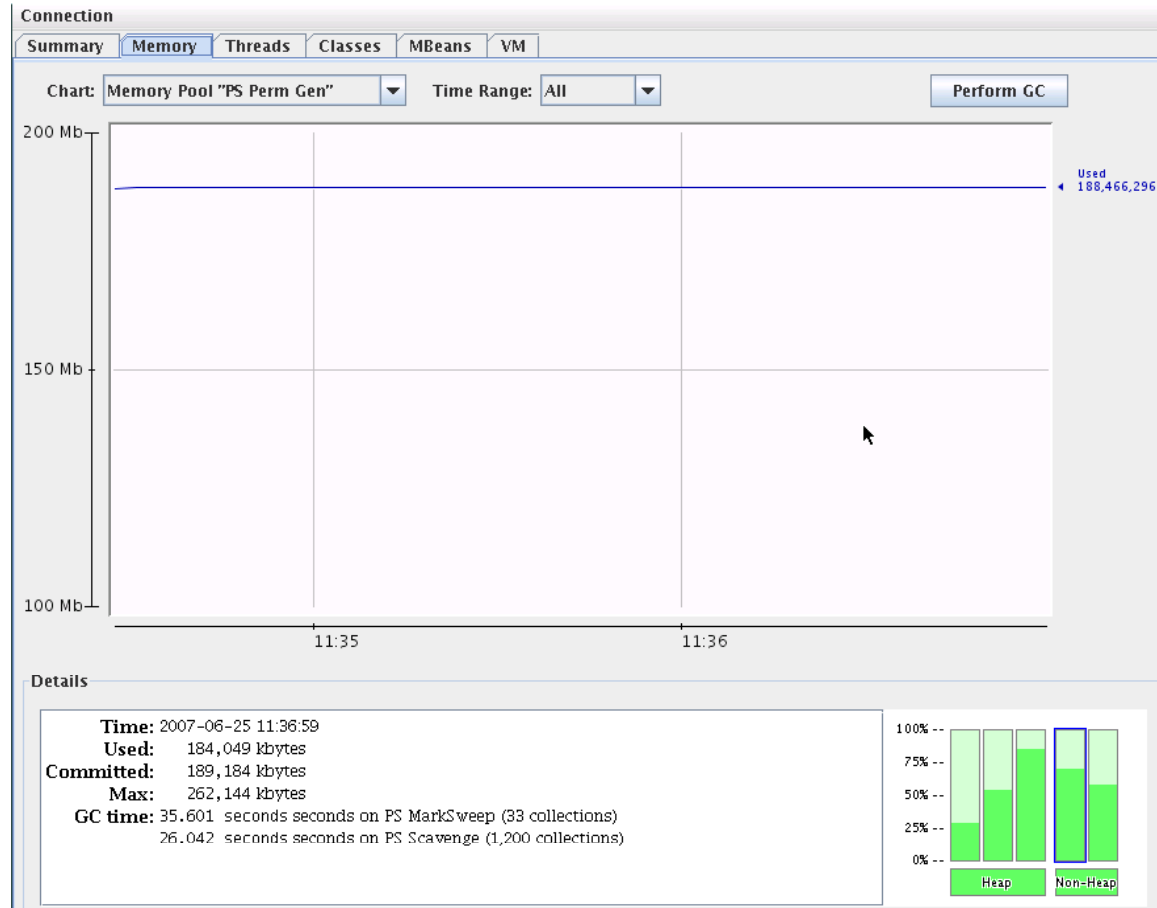
Running Application Server 10*g*

- Server process(es) are controlled via Oracle Process Monitor (OPMN) or AD utilities

- In addition to basic start/stop tasks OPMN can be configured to invoke shell scripts upon unplanned shutdown of the OC4J process

- Tuning of parameters to the OC4J instance are also done via the OPMN configuration file, this is shown later in detail.

Basic OPMN Operations

- The opmnctl command is in the $INST_TOP/ora/10.1.3/opmn/bin directory
- Shows status of, stops, and starts components

```
a120vis1@sbllc12 > opmnctl status

Processes in Instance: a120vis1_sbllc12.sbllc12.solutionbeacon.net
------------------+--------------------+--------+---------
ias-component     | process-type       |    pid | status
------------------+--------------------+--------+---------
OC4J              | oafm               |   7485 | Alive
OC4J              | forms              |   7326 | Alive
OC4J              | oacore             |   7097 | Alive
HTTP_Server       | HTTP_Server        |   7043 | Alive
ASG               | ASG                |    N/A | Down
```

Tuning the JVM

- Many tuning operations are done in OPMN's config file via AutoConfig ($INST_TOP/ora/10.1.3/opmn/conf/opmn.xml)

- Can be used to tune memory and garbage collection, and to enable JConsole connections

- The next slide details the tunable entries in this example opmn.conf

```
<ias-component id="default_group">
        <process-type id="oacore" module-id="OC4J" status="enabled">
            <environment>…</environment>
            <module-data>
                <category id="start-parameters">
                    <data id="java-options" value="-
Dcom.sun.management.jmxremote …   -Xmx1024M -Xms512M -XX:PermSize=64M …
-XX:MaxPermSize=128M …"/>
                </category>
```

Tunable Entries

- Enable connections via JConsole
  - -Dcom.sun.management.jmxremote
- Initial JVM memory allocation
  - -Xms512M
- Maximum JVM memory allocation
  - -Xmx1024M
- Initial size for the permanent generation
  - -XX:PermSize=160M
- Size limit for the permanent generation
  - -XX:MaxPermSize=200M
- Write garbage collection activities to a file
  - -Xloggc:/some/file/name

Activating Tuning Changes

- Make changes to Context file

- Run autoconfig

- Restart OC4J instances

- Verify changes are in place using jps

Logfiles

- ## Logs written by OC4J are stored under the $INST_TOP directory

```
a120vis1@sbllc12 > pwd
$INST_TOP/logs/ora/10.1.3
a120vis1@sbllc12 > ls
Apache  install  j2ee  javacache  opmn
a120vis1@sbllc12 > ls Apache/
access_log.1171411200        dms_metrics_8922.shm.mem   mm.17058.sem
mod_oc4j.6186.shm.sem        dms_metrics_17842.lock     error_log.1180396800
mm.17842.mem                 mod_rewrite.log            sec_audit.log
sec_debug.log                ssl_engine_log              ssl_mutex.16843
a120vis1@sbllc12 > ls j2ee
forms  oacore  oafm
a120vis1@sbllc12 > ls j2ee/oacore/oacore_default_group_1/
application.log              default-web-access-2007-06-04.log  jms.log
system-application.log       log.xml                            rmi.log
global-application.log       server.log
```

Logfile details

- …/Apache/access_log.* - URLs requested from the Apache server

- …/Apache/error_log.* - URLs that don't exist, hackers

- …/Apache/mod_rewrite.log – URL rewriting results (if enabled)

- …/j2ee/oacore/*/application.log – JVM messages, exceptions

  - 07/05/30 03:24:57.874 html: java.lang.OutOfMemoryError: PermGen space

Summary

- **New infrastructure components**
  - New client Java Runtime Environment (JRE) plugin
  - Oracle Containers for Java (OC4J)
- **Old infrastructure components**
  - Apache 1.3
- **Java EE compliance**
- **Ease of management**
  - jps
  - jstat
  - JConsole
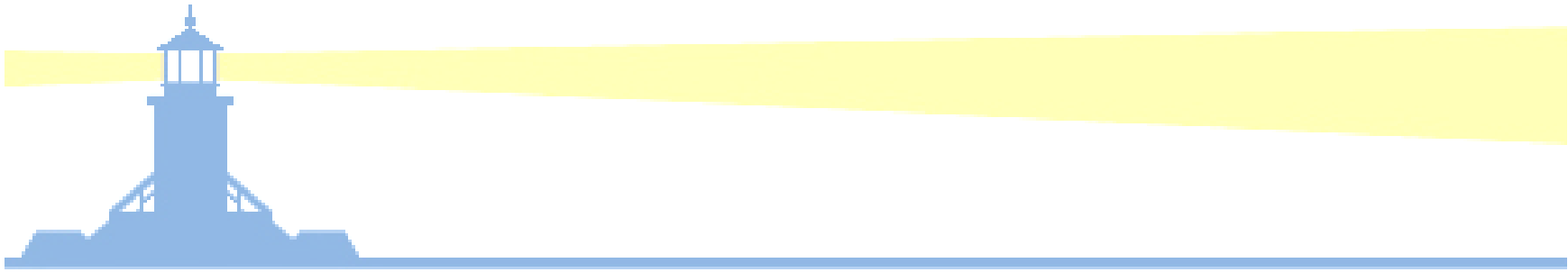
More Information

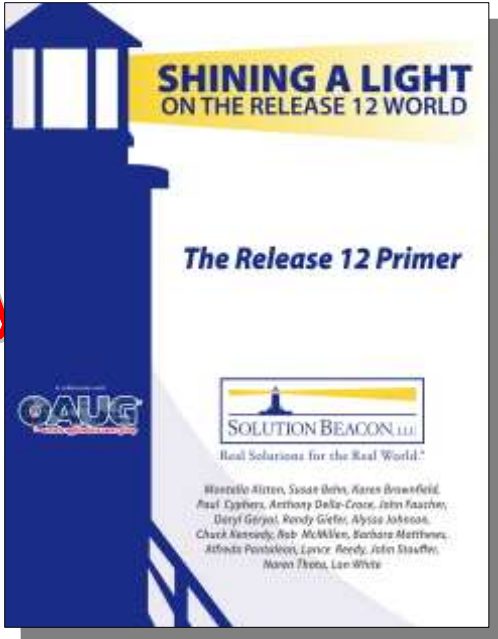Over $24,800 donated to the Solution Beacon Foundation from the sale of our books!

Got Oracle?
Get the Books!

Order Your Copy Today

Installing, Upgrading and Maintaining Oracle E-Business Suite Applications 11.5.10.2+

The Release 12 Primer – Shining a Light on the Release 12 World

Available at
www.solutionbeacon.com

SOLUTION BEACON, LLC

Real Solutions for the Real World®

Oracle Applications Users Group (OAUG)

- THE world's largest knowledgebase for Oracle Applications users

- Networking opportunities with over 118,000 members worldwide

- Access to over 50,000 white papers in the online OAUG Conference Paper Database

- FREE online training every Tuesday, Wednesday and Thursday for OAUG members

ORACLE CERTIFIED ADVANTAGE PARTNER

SOLUTION BEACON, LLC
Real Solutions for the Real World®

Questions and Answers

Thank You!

Brian Bent

bbent@solutionbeacon.com

www.solutionbeacon.com

Real Solutions for the Real World ®

ORACLE CERTIFIED ADVANTAGE PARTNER

SOLUTION BEACON, LLC
Real Solutions for the Real World®