Monitoring, Administering, and Troubleshooting Oracle SOA Suite & ADF

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Agenda

- SOA Suite Management
  - Platform Architecture
  - Configuration Management
  - Monitoring and Fault Recovery
  - Performance Tuning & Troubleshooting
- ADF Management
- Q&A
Platform Architecture
Service Oriented Architecture
Composite Applications

SOA Composite Editor

Policy Management
Optimized Service & Eventing Infrastructure
Common Connectivity Infrastructure

SCA Composite

Pluggable Service Engines

BPMN
BPEL
Human Task

Policy Manager
Service Infrastructure

B2B
ETL
JCA
SDO
ADF BC
## Internal Stack of SOA Suite 11g

<table>
<thead>
<tr>
<th>Service Engines (BPEL PM, Mediator, Human Workflow, Business Rules)</th>
<th>Binding Components (WS, JCA Adapters, B2B, BAM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Infrastructure (SCA)</td>
<td></td>
</tr>
<tr>
<td>Oracle Portability Layer (JRF) / OWSM / EDN / UMS</td>
<td></td>
</tr>
<tr>
<td>WebLogic Server</td>
<td></td>
</tr>
</tbody>
</table>
### J2EE Deployment View of SOA Suite 11g

#### Admin Server

<table>
<thead>
<tr>
<th>J2EE Applications (ear)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>em</td>
<td>Enterprise Manager Console</td>
</tr>
</tbody>
</table>

#### Manager Server / Cluster

<table>
<thead>
<tr>
<th>J2EE Applications (ear)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>soa-infra</td>
<td>Core SOA runtime hosting Service Infrastructure</td>
</tr>
<tr>
<td>b2bui</td>
<td>B2B Console</td>
</tr>
<tr>
<td>worklistapp, DefaultToDoTaskFlow</td>
<td>Human Workflow Consoles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JCA Adapter Archives (rar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FileAdapter</td>
</tr>
<tr>
<td>AqAdapter</td>
</tr>
<tr>
<td>MQSeriesAdapter</td>
</tr>
<tr>
<td>DbAdapter</td>
</tr>
<tr>
<td>FtpAdapter</td>
</tr>
<tr>
<td>OracleAppsAdapter</td>
</tr>
<tr>
<td>JmsAdapter</td>
</tr>
<tr>
<td>SocketAdapter</td>
</tr>
<tr>
<td>OracleBamAdapter</td>
</tr>
</tbody>
</table>
Enterprise Manager (EM) is hosted on the Admin Server

SOA Runtime (soa-infra)
- soa-infra is a J2EE application that is targeted to either a managed server or a cluster
- There can be a single SOA cluster in a domain.

BAM is a separate application that is deployed to the same domain as soa-infra.
Domain – Physical and Logical Aspects

- Oracle Home - Multiple domains can be created from binaries installed within a Oracle Home.
- Domain Home - At a physical level, a domain is a directory that contains configurations for all servers, services and deployed applications.
- A managed server instance can be started from any physical box as long as it has access to a domain directory.
- Multiple servers can refer to the same physical domain home or have their local copies of the domain.
SOA 11g HA Architecture

- **WLS Cluster**
  - Defined in config.xml
  - Can be viewed from WLS Console and EM

- **SOA Cluster**
  - Coherence based cluster
  - Defined as system parameters in startup scripts
  - Can be validated through deployment / configuration changes.
Configuration Management
SOA Domain - Directory Structure

- **Configuration:**
  - Stored under “config” directory
  - The config directory contains a file called *config.xml* which is the primary source of all configuration information within a domain.
  - SOA configuration is stored in MDS since PS1.

- **Scripts:**
  - Stored under “bin” directory.
  - Start / stop Admin & Managed server
  - Set environment and JVM properties

- **Logs:**
  - Server logs are placed under `servers/<server_name>/logs`
WLS and SOA Configuration

- **WLS Properties**
  - Persisted in domain configuration files, changes are propagated across the cluster by the Adminserver.

- **Service Infrastructure (soa-infra) Properties**
  - 11gR1 PS1: Properties are persisted in MDS (database), changes are automatically propagated across a cluster.

- **Composite Properties**
  - Meta-data associated with a composite is stored in MDS (database)
  - These properties can be customized using a “Configuration Plan” at the time of deployment.
  - Composite properties are automatically propagated across a cluster as part of the composite deployment process.
SOA 11g Meta-Data Store

- **Runtime Store**
  - Composite meta-data
  - Security policies
  - Error policies
  - B2B Agreements
  - Shared WSDLs and XSDs
  - ADF / Human Workflow

- Can be accessed from JDeveloper and Ant.

- Configuration customization is stored in MDS.
Configuration Propagation in a Cluster

**WLS Configuration**
- File based
- AdminServer has “gold” copy
- Configuration propagated by WLS JMX framework.
- During startup, a Managed Server copies configuration from AdminServer and overwrites local copy.

**SOA Configuration**
- DB (MDS) based.
- Database has “gold” copy.
- Configuration propagated by soa-infra using the Coherence cluster.
- During startup, a SOA server loads its configuration from MDS.
Layered Management Consoles

Enterprise Manager
Fusion Middleware Control
- soa-infra
- Service Engines
- Composites

WebLogic Server
Administration Console
- Adapter config
- Data sources
- JMS
- JTA
- Security Realms
Tools for Configuring SOA Apps

- SOA container configuration done through EM console / WLST

- Endpoint properties modified during deployment through a Configuration Plan
  - Created
  - Adapter properties

- WLS Console / WLST for managing WLS configuration
  - Domain creation, adding / changing resources within a domain.
Enterprise Manager
Features / Concepts

- Composite Instance State
  - Derived from state of component instances, must be enabled

- Audit-Level Inheritance
  - Service engines can inherit audit level from soa-infra
  - Composites can override global settings

- Role-Based Access
  - Administrator, operator and read-only roles

- Advanced Configuration via MBean Browser
  - Common features on property pages

- Log Viewer
  - Filtered, searchable built-in log viewer
Monitoring and Fault Recovery
SOA Composite

- Bindings – binding.ws, binding.jca, binding.ejb, binding.direct
Process Execution Visibility

- **BPEL**
- **External Service**
- **Human Workflow**
- **Routing**
- **Business Rules**

Business User Visibility
- **BAM Dashboard Sensors**

Administrative Visibility
- EM: Audit Trail
Faults and Recovery

- Categories of Faults
  - Business Faults
  - Runtime Faults

- Recovery Options
  - Fault policies or BPEL fault handlers for programmatic handling of faults
    - Can delegate to administrator
  - BPEL message recovery for unhandled faults
    - Auto-recovery (recommended) / EM based
  - Rejected messages from inbound adapters
Policy Based Fault Handling

- **Fault Policies**
  - Fault handling rules centralized in policy files (XML files)
  - Associated with specific a Reference, Component or Composite
  - Can define a conditions chain of recovery actions

- **Recovery Actions**
  - Retry - Retries failed operation # times with specified wait time, exponential back off, retry failure action, multiple endpoints
  - **Human Intervention** - Console based recovery, possibility of changing values of component variables
  - Abort process
  - Replay scope
  - Re-throw fault
  - Java action – custom Java code called
Fault Handling within EM

- Unified exception handling framework:
  - Search
  - Delete
  - Recover failed instances (individual or batch)

- Directly access corresponding log entries
Performance Tuning & Troubleshooting
Performance Tuning Highlights

- **Scalability** - All asynchronous points are associated with configurable thread pools:
  - BPEL – Invoker thread pool, Engine thread pool
  - Mediator Parallel Routing – Worker threads, Locker batch and frequency
  - Inbound adapter thread pools (defaults to 1)

- **Reducing CPU / memory usage**
  - Turn off XML validation where not required
  - Throttle above thread pools
Performance Tuning Highlights

- Persistence has a major impact on performance
  - Audit Trail
    - Turn Off where not required
    - Use Minimal at engine level to not store BPEL messages
  - Turn off message buffering for one-way processes where message is recoverable e.g. inbound Adapters
    - oneWayDeliveryPolicy=sync (default is async.persist)
  - Turn of state persistence for synchronous short lived processes
    - inMemoryOptimization + completionPersistPolicy

- Purging – Important to have a strategy
  - Database partitioning, purge scripts, hybrid
JVM / System Diagnostics
JRockit Mission Control
Common Issues

- **Deployment**
  - HTTP 503 during JDeveloper deployment
    - Proxy server setting in JDev missing (requires restart)
  - Cannot find Server <IP>
    - IP / host is retrieved from admin server mbeans
    - WLS mgd’ server binds to all NICs, change listen address and/or set Front-End host on WLS console

- Composite does not deploy on all running nodes in a cluster
  - Check Coherence configuration

- Adapter connection factory
  - Addition / change of connection factory does not take effect
  - Either restart the mgd’ server or redeploy the adapter with plan
  - PS3 - Can add a connection factory without requiring a restart
Common Issues

- Transaction Timeout
  - Change domain-wide transaction timeout settings
  - Change BPEL engine EJB transaction timeout settings

- High memory footprint with large set of composites
  - Fixed part of PS3 release.
  - Patches available for PS2

- SOA EM pages loading slowly
  - Disable aggregated metrics
  - Scope queries by time
ADF
Management
ADF Architecture

Data Binding → Business Services

BAM

Human Workflow Service

Mediator /BPEL Process

Rules Engine

assign → complete

events → facts

results
ADF Configuration

- Configure Database Connection and pooling
  - WLS datasources
  - bc4j.xcfg

- Configure Web Application
  - web.xml file
    - Context root
    - Timeouts
    - ADF Faces parameters
  - Possibly webcache configuration

- Security

- MDS
ADF Monitoring

- Use EM to monitor your application
- Specific functionality built in for ADF
Overall Application View
### Monitor Application Module Pools

#### ADF Performance

This page displays active application module pools. An application module pool is a collection of application module instances of the same type.

<table>
<thead>
<tr>
<th>Module</th>
<th>Requests</th>
<th>Avg Creation Time (ms)</th>
<th>Free Instances</th>
</tr>
</thead>
<tbody>
<tr>
<td>AppModuleLocal</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>AppModuleLocal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Lifetime

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool Checkouts</td>
<td>0</td>
</tr>
<tr>
<td>Module Removals</td>
<td>3</td>
</tr>
</tbody>
</table>

#### State Management

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activations</td>
<td>0</td>
</tr>
<tr>
<td>Passivations</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Pool Use

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool Check Ins</td>
<td>0</td>
</tr>
<tr>
<td>Pool Check Outs</td>
<td>0</td>
</tr>
<tr>
<td>Pool Check Out Fails</td>
<td>0</td>
</tr>
<tr>
<td>Referenced Modules Reused</td>
<td>3</td>
</tr>
<tr>
<td>Unreferenced Modules Recycled</td>
<td>0</td>
</tr>
</tbody>
</table>
Monitor Task Flows

ADF Performance

- Task Flows

Taskflow Performance Charts

Past 15 minutes

Request Processing Time

Active Taskflows

Average Request Processing Time (ms)

Active Taskflows (per minute)
ADF Tuning

- JDeveloper Profilers
- Oracle Application Testing Suite
  - Automates both functional testing and load testing
  - Simulates application loads of hundreds to tens of thousands of concurrent users while minimizing hardware requirements
  - Gathers critical infrastructure performance metrics to identify bottlenecks under load
- Check database access
ADF Troubleshooting

- Turn on logging
  - Advanced functionality available through EM
- ADF Debugger
  - Special functionality to monitor ADF artifacts and lifecycle
Summary
Key Guides

- Administrator’s Guide
  - Test to production procedure

- Enterprise Deployment Guide and HA Guide
  - Configuring production domain
  - HA Considerations

- Performance Tuning Guide
Oracle SOA and BPM Suites – Related Books

**SOA tutorial**

Getting Started With Oracle SOA Suite 11g R1 – A Hands-On Tutorial

Fast track your SOA adoption – Build a Service-Oriented composite Application in just hours

**BPM tutorial**

Getting Started with Oracle BPM Suite 11gR1

A Hands-On Tutorial

Learn from the experts – teach yourself Oracle BPM Suite 11g with an accelerated and hands-on learning path brought to you by Oracle BPM Suite Product Management team members

Forwarded by Michael Wiikane, Vice President, Product Development, Oracle Corporation

**reference**

Oracle SOA Suite 11g R1 Developer’s Guide

Develop Service-Oriented Architecture Solutions with the Oracle SOA Suite

**reference**

Official Documentation:

SOA Suite 11g Administration Guide

http://snipurl.com/soa11gbook  
http://snipurl.com/bpm11gbook