



SOA SUITE 12C UPGRADE

David Shaffer
Managing Partner, Middleworks
dave@middleworks.com



Why Upgrade? (Besides support policies...)

- Many new capabilities:
 - Integration Debugger in JDev
 - SCA/BPEL & Service Bus converged design-time / arch
 - API Management
 - Stream Explorer
 - Cloud Adapters
 - Mobile
 - MFT for file integration
 - SOA for Healthcare
 - Much richer purge support and OOB performance tuning
 - SOA Cloud Service (SOACS)
 - Enterprise Scheduler
 - Real-Time Integration Business Insight (option)
 - New SAP, Peoplesoft, JDE, Siebel adapters (non-OEM)
 - 12.2.1: Continuous Availability, Circuit Breaker, in-memory SOA options, XSLT debugger
 - Maven support, REST/JSON
 - Based on Java 8
 - Significant EM performance enhancements



Agenda

- 1 Useful docs / content
- 2 12c Upgrade Basics
- 3 Upgrade Best Practices



12c Base Upgrade Docs and Presos

- Previous SOA Expert Series upgrade webinar:
www.middleworks.com/soa-expert/#12cUpgradeWebinar
- SOA Suite 12.2.1 Upgrade doc:
<http://docs.oracle.com/middleware/1221/core/FUPSS>
(tip: can get to a single PDF of doc at
<http://docs.oracle.com/middleware/1221/core/FUPSS.pdf>)
- Upgrade videos:
http://docs.oracle.com/middleware/1221/cross/upgrade_videos.htm



Other Useful Upgrade Content

- Support Knowledgebase Documents 1958724.1 & 2084555.1
- Best practices upgrade blogs from Oracle:
blogs.oracle.com/SOA/entry/comparison_of_inplace_and_side
blogs.oracle.com/SOA/entry/soa_suite_12c_topology_suggestions
blogs.oracle.com/SOA/entry/best_practices_for_soa_11g
blogs.oracle.com/SOA/entry/soa_suite_12c_upgrade_updatesoa
- Many other blogs available, e.g.:
blogs.oracle.com/soacommunity/entry/upgrading_oracle_soa_suite_from
mp3muncher.wordpress.com/2015/07/10/from-aia-to-soa-suite-12c/
etc...



Surveys: 12c Upgrade and Feedback

- When you upgrade or prepare to upgrade, please fill out:
 - www.surveymonkey.com/r/soa-12c-upgrade
- Some interesting trends from responses so far:
 - Most people do side-by-side upgrade, go straight to 12.2.1
 - Some challenges around configurations for upgrade (probably a side effect of above...) and SRs for earliest adopters
 - Easiest things are code migration and new install for side-by-side
 - Most common components to upgrade SCA/BPEL, Service Bus and OWSM, followed by Rules and BAM, smattering of B2B/other

Agenda

- 1 Useful docs / content
- 2 **12c Upgrade Basics**
- 3 Upgrade Best Practices

SOA Suite 11g -> 12c Upgrade Basics



- Great doc at <http://www.middleworks.com/soaexpert/upgrade/4.Danilo-12cUpgradeTips.pdf> (excerpted here)
- Choose in-place domain upgrade and re-configuration or side-by-side upgrade with new install / config / deploy
- Can upgrade to 12.1.3 or straight to 12.2.1.x (recommend latter)
- Prerequisites:
 - Starting point: SOA Suite 11.1.1.6, 11.1.1.7 or 11.1.1.9 or 12.1.3
 - 64-bit OS and JVM – must be supported version
 - Dehydration store DB must be supported version – 11g or 12c
 - OPSS 12c must use DB or LDAP based policy store

Options for Upgrade

- In-Place Upgrade

- Install SOA Suite 12c software in a **new Oracle Home**
- Upgrade domain and DB **in-place**
- **Rewire** domain to new Oracle Home
- No need to redeploy composites
- See support note 2084555.1 if you have AIA

- Side by Side Upgrade

- Install SOA Suite 12c software in a **new Oracle Home.**
- Create **new** DB schemas
- Create **new** domain
- **Configure domain and DB** from scratch
- **Deploy** all composites
- **Switch** clients/load balancer to new domain

Upgrade Options Comparison

In Place

Less Work

Keeps History

Keeps Running
Processes

Used most often when you have
long-lived processes

Side by Side

Less
Downtime

Lower Risk

All
Components
(BAM)

Allows
Topology
Change

Typically preferred otherwise

Upgrade Process | Step-by-Step Overview

1. Understand the upgrade process PREPARATION
2. Define a To-Be Topology
3. Decide on an upgrade strategy that fits to your requirements
4. Pre-Upgrade Tasks INFRASTRUCTURE
5. Install 12c Software SETUP
6. Create or upgrade schemas
7. Domain (Re-) Configuration
8. Upgrade the projects (and deploy if needed) CODE UPGRADE
9. Post Upgrade Steps
10. Verify Upgrade Results (Test)



Upgrade Process | Step-by-Step – Preparation

1. Understand the upgrade process

- ✓ [Understand upgrade concepts](#)
- ✓ [Understand the Basic 12c Upgrade Tasks](#)
- ✓ [Understand the SOA Cluster Upgrade Topology](#)
- ✓ [Understand the Oracle Service Bus Upgrade to 12c](#)
- ✓ [Understand an Upgrade to Business Activity Monitoring in 12c](#)
- ✓ [Understand SOA Domain Upgrade Restrictions](#)

2. Define a To-Be Topology

- ✓ [Understand new and changed features of 12c \(12.2.1\)](#)
- ✓ [Understand an Enterprise Deployment](#)
- ✓ Decide on components (e.g. SOA, OSB, BAM, etc.)
- ✓ Shared Weblogic Domain (for OSB / SOA / BAM) vs. separate Weblogic Domains
- ✓ Non Cluster vs. Cluster

Upgrade Process | Step-by-Step – Preparation (2)

3. Select an upgrade strategy that fits your requirements

▪ In-Place Upgrade

- ✓ Schemas and domain directory upgrades are performed "in place" (updates existing 11g files)
- ✓ Oracle Home binaries are upgraded "out of place" (binaries are installed in a new directory)
- ✓ No need to redeploy composites after upgrade
- ✓ Suitable for long running instances which should resume after upgrade

▪ Side-by-Side Upgrade

- ✓ New installation of schemas and domains
- ✓ New deployment & configuration of the existing 11g projects
- ✓ Suitable in stateless & short-running scenarios
- ✓ Appropriate if the targeted system architecture should be different than with 11g or if the current topology is not supported

Upgrade Process | Step-by-Step - Infrastructure

4. Pre-Upgrade Tasks

- ✓ Complete all applicable tasks from the [Pre-Upgrade Checklist](#)
- ✓ Check if your To-Be Topology is supported

- ✓ Perform [General Pre-Upgrade Tasks](#)
- ✓ Perform the [SOA-Specific Pre-Upgrade Tasks](#)
- ✓ Perform [the Pre-Upgrade Tasks for Oracle BAM](#)
- ✓ Perform the [Pre-Upgrade Tasks for Oracle Service Bus \(OSB\)](#)

- ✓ [Validate your starting point](#) which has to be 11.1.1.6 (PS5) or 11.1.1.7 (PS6)
- ✓ Calculate [system requirements](#) (Memory, Disk Space, Network, OS)
- ✓ Make a complete backup of your existing environment
- ✓ Make sure that DB, OS and JVM are supported and apply recommended database parameters on the new installation
- ✓ Save copies of customized start scripts, configuration files, policies

- ✓ More details: [Upgrade Planning Guide](#) and [Interoperability and Compatibility Guide](#)



Upgrade Process | Step-by-Step - Infrastructure (2)

5. Install 12c Software

- ✓ Download the Oracle Fusion Middleware Infrastructure distribution from the [Oracle ADF download page on OTN](#) or from the Oracle Software Delivery Cloud
- ✓ Download the production distribution for Oracle SOA Suite and Business Process Management from the Oracle Software Delivery Cloud
- ✓ Download the production distribution for Oracle Service Bus from the Oracle Software Delivery Cloud
- ✓ [Roadmap for Installing and Configuring the Standard Installation Topologies](#)
- ✓ [Verify the Installation Checklist](#)
- ✓ [Install Infrastructure distribution](#) and the [appropriate components](#)
- ✓ [Verify the Installation](#)
- ✓ For a development or evaluation distribution, see ["Downloading Oracle Fusion Middleware 12c \(12.2.1\) Development Distributions"](#)



Upgrade Process | Step-by-Step - Infrastructure (3)

6. Database Schemas

- ✓ [Create the required Database Schemas](#)
- ✓ [Preparing to Upgrade SOA Schemas](#) (In-Place Upgrade only)
- ✓ [Upgrade Schemas with the Upgrade Assistant](#) (In-Place Upgrade only)

7. Domain (Re-) Configuration

- ✓ [Configure the Domain](#) (Side-by-Side Upgrade)
- ✓ [Reconfigure the Domain using the Reconfiguration Wizard](#) (In-Place Upgrade)
- ✓ [Upgrade the Domain Component Configurations using the Upgrade Assistant](#) (In-Place Upgrade)



Upgrade Process | Step-by-Step - Code Upgrade

8. Upgrade the projects (and deploy if needed)

- ✓ Open projects in JDeveloper 12c, the Migration Assistant migrates the project files
- ✓ or [Upgrade JDeveloper Projects in Bulk](#)
- ✓ [Migrate Oracle Service Bus Resources from Previous Releases](#)
- ✓ [Deploy Applications](#) (Side-by-Side Upgrade)

9. Post Upgrade Steps

- ✓ [General Post-Upgrade Tasks](#)
- ✓ [Post-Upgrade Tasks for Oracle Service Bus](#)
- ✓ [Post-Upgrade Tasks for Clusters](#)
- ✓ [Post-Upgrade Tasks for BAM](#)



Upgrade Process | Step-by-Step - Code Upgrade

10. Verify your results (Test)

- ✓ Testing before and after the upgrade is the key to success!
- ✓ Define and document all testcases in advance
- ✓ Make sure that you have a complete test approach in place before you start your upgrade
- ✓ Establish a test approach that covers all relevant test layers (Elementary Unit Tests, Component Tests, End-to-End Tests)
- ✓ Be aware of SOA Composite test framework: <http://www.oracle.com/pls/topic/lookup?ctx=fmw122110&id=SOASE1263>

- ✓ We decided to build our own **OC testing framework** based on JUnit Standard and SOA Suite APIs to integrate it within other implementations and to establish a proper test-driven development

- ✓ This allows us to
 - ✓ use **the same** test approach for BPEL, BPMN, OSB, Java, Human Tasks, XSLT and XQuery...
 - ✓ re-route external references to a **mock service** implemented in the same framework (in Java) including changing references to standard web services so that database or file adapters can also be mocked
 - ✓ Human task handling (finishing the human task with a predefined outcome and predefined values)
 - ✓ **Smooth** integration into **continuous integration** environment

- ✓ More details are available at <http://thecattlecrew.net>



Agenda

- 1 Useful docs / content
- 2 12c Upgrade Basics
- 3 **Upgrade Best Practices**



Upgrade Suggestions

- If upgrading now, go to 12.2.1.1 – Many compatibility fixes to allow XSLTs to upgrade without change. Need following two properties set at startup to turn on backward compatibility mode:
 - Doracle.xdkjava.compatibility.version=11.1.1
 - Doracle.soa.compatibility.version=11.1.1
- Perform pre-analysis for upgrade areas of complexity:
 - Do you use custom DB scripts for purge, partitioning, etc? (will have to be re-mapped to 12 – mostly don't need...)
 - Custom code using SOA locator APIs
 - Do you have significant performance tuning in 11g? (re-do performance tuning exercise with 12c)

A Few Component-Specific Comments

- **Instance Data Upgrade**

- UA upgrades active instances to continue execution in 12c
- Purge strongly recommended prior to upgrade
- Stale instances not upgraded, completed instances can be upgraded during upgrade or later, during downtime

- **Service Bus 12c Upgrade**

- Export project before upgrade and import after upgrade
- Migration from Eclipse to JDeveloper happens with Import/Export – prepare for this change

- **BAM 12c Upgrade**

- Major architecture changes in 12c – Data Objects migrated but not dashboards/alerts
- Can either create new dashboards and alerts in 12c or keep 11g BAM dashboards running and connect to it via supported interop between BAM 11g ↔ SOA 12c

Service Bus manual steps for In-Place Upgrade

- Need to export and delete all Service Bus metadata before upgrade and import after upgrade
- Need to deploy OWSM before upgrade
- Need to use OWSM policies instead of WLS WS-Security policies
 - WLS policies in wsdl in 11g
- Need to use OWSM auth policies instead of Xacml
 - Xacml policies visible in 11g console
- Run time may work without changes, but not design time

Benefits:

- Integrated JDeveloper experience after upgrade
- Oracle standard ADF UI for console after upgrade
- FMWControl like other Oracle products to manage
- Service Bus included in JDev integrated server for easier development

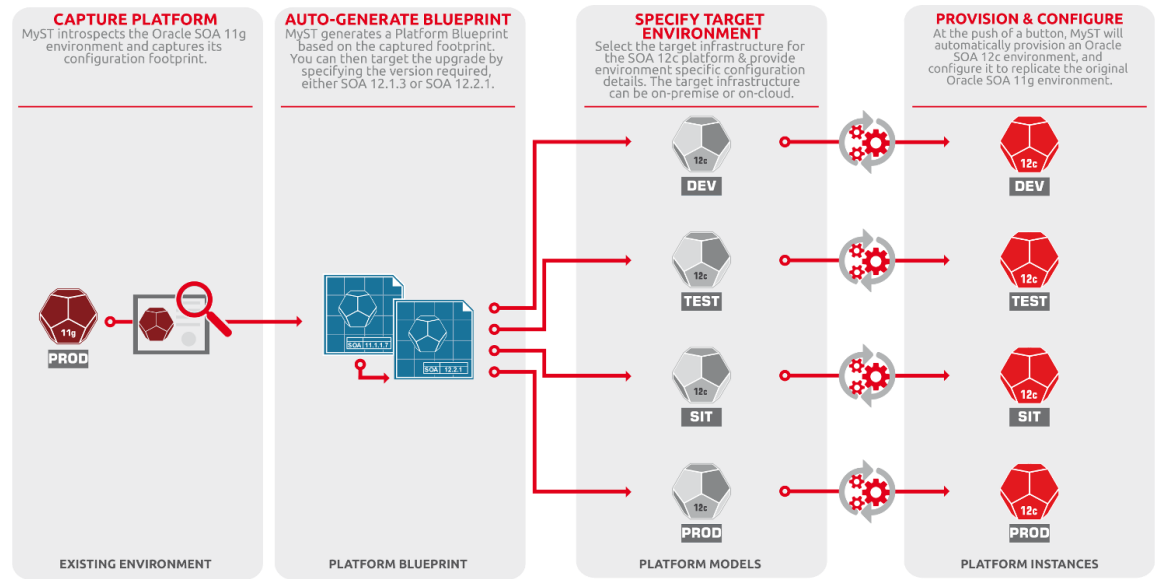
Side by Side Upgrade – Best Practices

- Need to systematically copy over configurations from the old domain to the new domain
 - JMS artifacts config
 - Datasource config
 - JCA adapter config
 - Work Manager/threads config
 - Custom J2EE apps
 - WLS config
 - SOA config
 - SOA shared metadata
 - SOA composites/Service Bus projects
 - DT@RT customizations
 - Custom OWSM Policies
 - Custom OPSS policies/roles/keys/certs
- If you already have automation in place to create new domain and deploy all the config, you could leverage this
- If not, tools exist from vendors such as Rubicon Red's MyST (<http://myst.rubiconred.com/>)



RubiconRed MyST for Side-by-Side Upgrade

- Automated provisioning tool for SOA/FMW with ability to extract existing configurations into a “blueprint”
- Some special features provided for upgrade
- For more info, see: www.middleworks.com/soaexpert/upgrade/rxr-soa12c-migration.pdf



In-Place Upgrade – Best Practices

- Carefully check prerequisites
 - Run the upgrade readiness check before starting (12.2.1)
 - Plan carefully and thoroughly test upgrade on a system similar to production. Could use T2P to create it.
 - Test composites thoroughly without redeploying after upgrade of test system and determine tuning to be applied.
 - BAM upgrade is more complex – read documentation carefully and plan.
- Test composites thoroughly after migrating them in JDeveloper after upgrade of test system. Could use OjMigrate to bulk Migrate composites
 - Speed up upgrade by purging unneeded instances before upgrade.
 - Make sure enough disk space is available for upgrade.
 - If issues are encountered, support can take time. Budget enough time.

Upgrade Troubleshooting Suggestions

- Reconfig of domain fails
 - Have you read the prerequisites?
 - Have you read the upgrade support notes on workarounds (example Knowledgebase Document 1958724.1)
 - Are you using non standard configurations different from EDG? Focus of upgrade testing was EDG.
- Server does not start after upgrade
 - Something went wrong in the upgrade.
 - Have you read the upgrade support notes on workarounds?
 - Did you carefully examine logs?
- Composites don't behave the same after upgrade
 - Maximum effort has been expended to make everything backwards compatible, but there may be corner cases.
 - Service Infrastructure API are not all backwards compatible.
 - Tuning is very different in 12c with use of work managers in SOA
 - Flow ID changes may impact composites setting composite title