Building WebLogic Domains with WLST

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  - Middleware support and services
- 13 years experience with WebLogic
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Agenda

- Problem Statement
- What is WLST?
- Why should we automate domain builds?
- How should we do it?

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Problem Statement

- Increasing demand for repeatable builds
  - Don’t just consider the application build
- Repeatable environment builds
  - Scaling out
  - New Environments
  - New projects
  - Disaster Recovery

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What is WLST?

- WebLogic Scripting Toolkit
  - Introduced in WebLogic 9.0
- Jython based scripting language for interacting with WebLogic
  - Anything you can do through the WebLogic console
  - And more...
- Better than other vendor equivalents
  - Full power of python based scripting
    - Logic, File IO, network IO etc

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How to use WLST

- Distributed with WebLogic
  - $FMW_HOME/wlserverXX/common/bin/wlst.sh
  - %FMW_HOME%/wlserverXX/common/bin/wlst.cmd
- Execute on its own to launch in interactive mode
  - Very useful for debugging and discovering resources you need
- Specify a file name to execute a script

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What can we do with WLST?

- View/Edit configuration
  - Server properties
  - Connection pools
  - JMS resources
  - Applications
  - Clustering

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What can we do with WLST?

- Read runtime metrics
  - Message queue sizes
  - Memory use
  - GC stats
  - Call stats
  - Anything available via JMX

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What can we do with WLST?

- Operations
  - Start servers
  - Stop servers
  - Deploy applications
  - Reset connection pools
  - Clear JMS queues

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WLST Basics – by example

```
# Connet to the admin server
connect('weblogic','password1','t3://localhost:7001');

#Lock configuration and start editing
edit();
startEdit();

# Navigate to the server start properties for FORMS_SERVER
cd('Servers/FORMS_SERVER/ServerStart/FORMS_SERVER');
```

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WLST Basics – by example

```
#Set the properties
set('Arguments','-Xms=2048m -Xmx=2048m -XX:NewSize=512M -XX:MaxNewSize=512M -
    XX:PermSize=256M -XX:MaxPermSize=256M');
set('Username','weblogic');
set('Password', 'welcome1');
set('BeaHome',os.environ["WL_HOME"]); //This needs an import that we have not shown
set('JavaHome',os.environ["JAVA_HOME"]); //This needs an import that we have not shown
set('JavaVendor','BEA');

#Save changes and apply
save();
activate();
```

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WLST Things to watch out for

- Python
  - Whitespace/indentation matters
  - String types (‘ ‘ vs “ “)
- Security
  - You can use a secure key/password store rather than username/password

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WLST Things to watch out for

- MBean trees
  - WLST splits the configuration into different “trees”
  - Switch to the appropriate tree
    - ServerRuntime, DomainConfig, ServerConfig, Custom

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Example WLST script

```
import sys
import datetime
def printf(format, *args):
   sys.stdout.write(format % args)
connect('weblogic','welcome1','t3://localhost:7001')
servers = domainRuntimeService.getServerRuntimes();
if (len(servers) > 0):
        print 'Time, Server, Destination, ConsumersCurrentCount, MessagesCurrentCount, MessagesHighCount,
        MessagesPendingCount, MessagesReceivedCount';
        while True:
          for server in servers:
                  jmsRuntime = server.getJMSRuntime();
                  jmsServers = jmsRuntime.getJMSServers();
                  for jmsServer in jmsServers:
                          destinations = jmsServer.getDestinations();
                          for destination in destinations:
                                  printf('%s, %s, %s, %i, %i, %i, %i, %i\n',datetime.datetime.now().time(), server.getName(),
        destination.getName(), destination.getConsumersCurrentCount(), destination.getMessagesCurrentCount(),
        destination.getMessagesHighCount(), destination.getMessagesPendingCount(), destination.getMessagesReceivedCount());
          java.lang.Thread.sleep(1000);
```

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Recording WLST scripts

- You can record WLST scripts using the WebLogic admin console
  - Any changes you make get written to a script
  - Hard codes in variables (URLs etc)
  - Can be a good basis for change scripts

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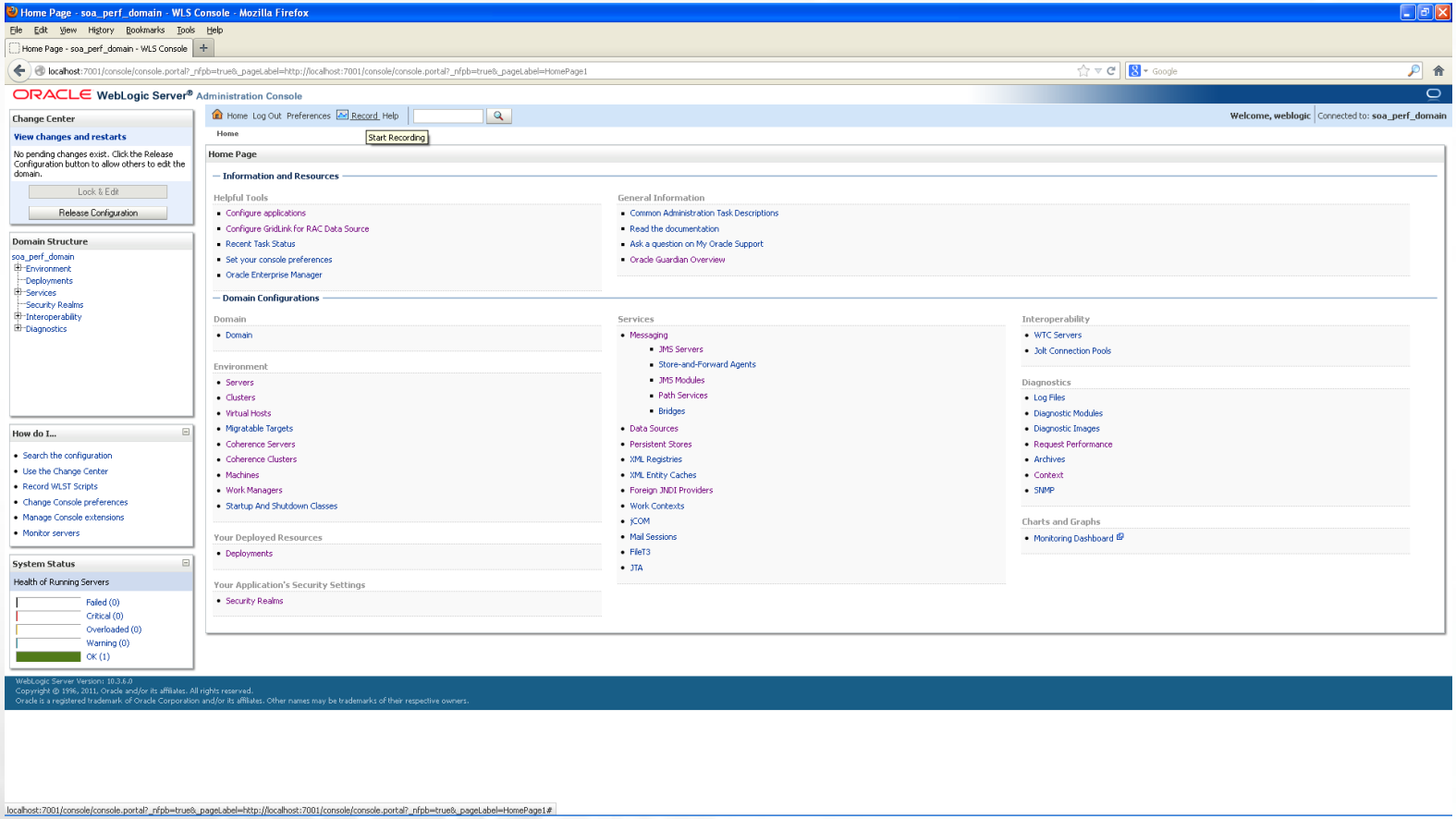
Recording WLST



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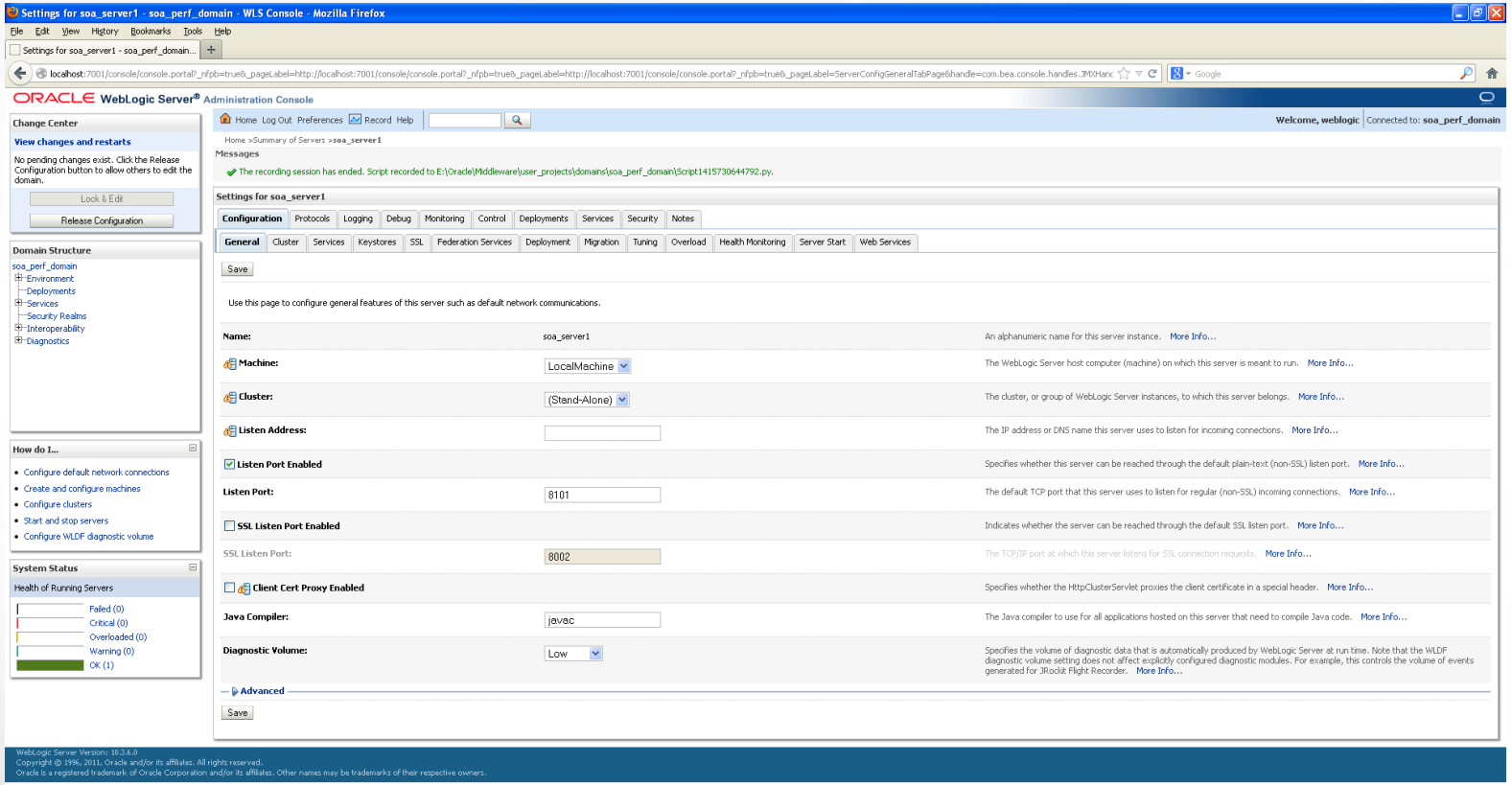
Recording WLST



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Recorded WLST

```
startEdit()

cd('/Servers/soa_server1')
cmo.setListenPort(8101)
cmo.setCluster(None)

activate()
```

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Automating domain building

- Why automate a domain build?
  - Consistency between environments
  - Build new environments quickly
  - Disaster Recovery
  - Consistency over time

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Building a domain

- Key steps
  - Install software
  - Create domain
  - Customise configuration

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Install software

- Not done with WLST
- Automate using silent installers for the relevant products
  - No standard approach across oracle products
  - Response files used to answer the installer "Questions"
    - Can generate the response files

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Create domain

- A number of options available
  - WLST script creates from a domain template
  - Configuration wizard creates from a domain template
  - Create with a WLST script generated from an existing domain
  - Write a WLST script from scratch

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Create base domain

- Create from template
  - WLST *createDomain* command
  - Template can be re-used by conifguration wizard
    - And pack/unpack commands
  - Can open template ‘offline’ and edit it
  - Not human readable
  - Hard to edit the template
  - Brittle to version changes

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Create base domain

- Create a script from existing domain
  - WLST *configToScript* command
  - Script can only be run by WLST
  - Script can be edited to customise it

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configToScript

```
wls:/offline> configToScript("E:\Oracle\Middleware\user_projects\domains\soa_perf_domain");
configToScript is loading configuration from E:\Oracle\Middleware\user_projects\domains\soa_perf_domain\config\config.xml ...
Completed configuration load, now converting resources to wlst script...
Creating the key file can reduce the security of your system if it is not kept in a secured location after it is created. Creating
 new key...
Using existing user key file...
Using existing user key file...
.
Using existing user key file...
Using existing user key file...
Using existing user key file...
Using existing user key file...
Using existing user key file...
configToScript completed successfully The WLST script is written to E:\Oracle\Middleware\user_projects\domains\soa_perf_domain\con
fig\config.py and the properties file associated with this script is written to
        E:\Oracle\Middleware\user_projects\domains\soa_perf_domain\config\config.py.properties
WLST found encrypted passwords in the domain configuration.
These passwords are stored encrypted in E:/Oracle/Middleware/user_projects/domains/soa_perf_domain/config/c2sConfigsoa_perf_domain

and E:/Oracle/Middleware/user_projects/domains/soa_perf_domain/config/c2sSecretsoa_perf_domain. WLST will use these password values
while the script is run.
wls:/offline>
```

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configToScript

```
def create_WLDFSystemResource_14(path, beanName):
  cd(path)
  try:
    print "creating mbean of type WLDFSystemResource ... "
    theBean = cmo.lookupWLDFSystemResource(beanName)
    if theBean == None:
      cmo.createWLDFSystemResource(beanName)
  except java.lang.UnsupportedOperationException, usoe:
    pass
  except weblogic.descriptor.BeanAlreadyExistsException,bae:
    pass
  except java.lang.reflect.UndeclaredThrowableException,udt:
    pass
```

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Customise configurations

- Once the domain is created you can customise it further with WLST
- Standard WLST commands
  - Set attributes
  - Create MBeans
  - Set Options
  - Deploy applications

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Reading MBean values

- Reading existing values in scripts allows you to make changes based on existing values
  - 20% increase
  - mycompany.com -> dev.mycompany.com

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Advanced customisation

- Build a domain from the ground up
  - Start with just the admin server
  - Add all other resources using WLST
  - Create a framework that reads a set of scripts
    - New changes can be done with scripts and dropped in to the framework for new deployments
    - All scripts read from a single properties file

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Summary

- WLST provides a number of ways to build and configure your WebLogic domain
  - It won't install the software though
- Changes to domain configuration can be applied with WLST scripts rather than through the console
  - Can be repeated across environments

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Questions?

- @mbrasier, @c2b2consulting

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