

IBM Software

IBM UrbanCode Deploy Lab Workbook

Machine Setup and Lab Exercises



IBM

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1 Overview

The overall objective of this Lab Workbook is to introduce you to the basic concepts and tool usage of IBM UrbanCode Deploy.

This version of the workbook is based on version 6.1.1.4 of IBM UrbanCode Deploy. This lab book has been written for a machine running Microsoft Windows 7.

The modules in this workbook will guide you through the steps in understanding how to install and use IBM UrbanCode Deploy. In the exercises, you will be working with a sample application called JPetStore. It consists of three components: web content, database and JEE application. You will gain an understanding of how to install the IBM UrbanCode Deploy tool, configure and deploy the *JPetStore* application to two sample environments, Systems Integration Test (SIT) and User Acceptance Test (UAT). There are six lab modules in this workbook and each are described below:

Machine Setup: This lab walks the reader through installing all the software necessary to support UrbanCode Deploy and the JPetStore web application.

Install Urbancode Deploy Server and Agents: This lab's focus is the role of the Deploy Administrator. In this lab you will install the IBM UrbanCode Deploy server and agents, verify the communications between the server and agents, and finally create the sample application's (*JPetStore*) databases.

Creating Urbancode Components, Applications and Environments: In this lab you will use UrbanCode Deploy to create representation model for the *JPetStore* application, a sample enterprise Java application that you will deploy in following modules. In this module you import the components of the *JPetStore* application into the UrbanCode Deploy server. You will then define an Application and Components for *JPetStore*. Finally, you will define a set of named Environments for the application.

Defining Computer Resources and Groups: In this lab you will build the representation model for the computing topology in our example Data Center.

In the remaining exercises you will create processes on the Components and Application, and test a partial deployment against one of your environments. You'll then move on to deploy additional versions of the application and create a snapshot. You will then apply that snapshot by promoting the snapshot from the sample SIT environment to the UAT environment.

2 Machine Setup

When you have completed this chapter, you will have a completed machine that is ready for the IBM UrbanCode Deploy server and client software installation.

2.1 Windows 7 machine requirements

The following settings and packages were used in the prepared virtual machine environment for this workbook. This is the general minimum configuration which is assumed has been prepared before continuing with the setup of the IBM UrbanCode Deploy environment contained in this workbook.

Resource	Notes
MS Windows 7 64-bit	Other versions should work but this version was used for all screenshots and specific commands contained in the included instructions
MS Windows .NET Framework	Some elements in this demo (e.g, MySQL) require the MS .NET framework be installed.
VMWare Tools	If you are using a virtual machine and are using VMWare Workstation to manage your virtual machine, install the latest version of VMWare tools – see the VMWare documentation for instructions. This will enable features like higher resolution graphics, and the ability to move files to/from the virtual machine by using copy/paste.
Mozilla Firefox 24 or Greater OR another supported browser: <ul style="list-style-type: none">• Microsoft Internet Explorer version 9 or later• Apple Safari 8 or later• Google Chrome 39 or later	This lab is written for use with Firefox. If you use another browser, some of the graphics or instructions may vary slightly. See this page for all current system requirements, including supported browsers: http://www-03.ibm.com/software/products/en/ucdep
2 CPUs	Can be reduced at runtime if you don't have enough physical resources
8 GB RAM	Can be reduced at runtime if you don't have enough physical resources
30 GB disk storage	Can be reduced during initial image creation depending upon usage scenario. Creating the disk image as a single file can help improve performance. If this same image will be used to also install IBM UrbanCode Release it is recommended to start with 15 GB disk storage unless a separate USB storage device is used to hold the installation media.

2.2 Download the required software

The following software distributions are required and must be downloaded separately.

TIP – If you download them from a browser in your virtual machine, you can save the steps (and time) needed to copy them into the virtual machine from your host.

Package	Release	Download Location
MySQL Community Edition	5.6x or later	http://dev.mysql.com/downloads/mysql/
Java Developer Kit (JDK) and Runtime Environment (JRE) **Note – the full JDK is required to install and run UrbanCode Deploy. Just a JRE is not sufficient. 32-bit JDK and JRE are sufficient.	7.0x or later	<p>http://www.oracle.com/technetwork/java/javase/downloads/index.html</p> <p>System Environment Variables must be set after installation....</p> <p>JAVA_HOME - (set to location of the JDK base installation directory... e.g. “C:\Program Files (x86)\Java\jdk1.7.0_67”)</p> <p>JRE_HOME – (set to the location of the JRE base installation directory... e.g. “C:\Program Files (x86)\Java\jre7”)</p>
Mozilla Firefox	24 or later	https://www.mozilla.org/firefox
Apache Tomcat	7.0x or later	<p>http://Tomcat.apache.org</p> <p>Download zip file for tomcat from the “Core” section for the operating system you are using. This workbook is written for Windows 7.</p>
IBM UrbanCode Deploy Installation Package	6.1.x	<p>https://developer.ibm.com/urbancode/products/urbancode-deploy/</p> <p>For purposes of consistency, rename the file for this package to</p> <p>IBM_UCD_Server_Install_Package.zip</p>

Package	Release	Download Location
IBM UrbanCode Deploy Plug-Ins	various	<p>https://developer.ibm.com/urbancode/plugins/</p> <p>Locate and download the following plugins using the search facility in the web page:</p> <p>[Mandatory – these plugins are required]</p> <ul style="list-style-type: none"> • DBUpgrader-x.xxxx.zip • Tomcat-x.xxxx.zip <p>[Optional – download these plugins to make a more robust-looking demonstration]</p> <ul style="list-style-type: none"> • IIS-AdminScripts-x.xxxx.zip • IIS-AppCmd-x.xxxx.zip • IIS-MSDeploy-x.xxxx.zip • MCWASPlugin.zip • WebSphere Liberty-x.xxxx.zip • WebSphereMessageBroker.zip • WebSphereMQ-x.xxxx.zip
Artifacts.zip (contains the sample JPetStore Application)	1.0	<p>Release and Deploy Learning Circle on developerWorks:</p> <p>https://www.ibm.com/developerworks/community/groups/service/html/communityview?communityU id=860ff390-6cab-4f95-ab37-66d2ca7521b4#fullpageWidgetId=Wfd5260395f0747f9_aa1a_6eec1f65a7e0&file=2f4ca265-480e-4efd-ae63-57f815c87b95</p>

2.3 Add Entries to the Hosts File

In order to demonstrate UrbanCode capabilities to deploy to multiple machines and environments with different topologies, we will simulate multiple machines by creating multiple server name entries in your machine's **hosts** file.

The hosts file on Windows machines is located in:

`C:\Windows\System32\drivers\etc`

You will need administrator privilege to edit this file on Windows. Add the following lines to the end of your hosts file:

```
127.0.0.1 ucd.deploy-server.com  
127.0.0.1 ucd.uat-db-server.com  
127.0.0.1 ucd.uat-app-server.com  
127.0.0.1 ucd.sit-server.com
```

2.4 Install Mozilla Firefox

This lab is written using the Mozilla Firefox browser as the main interface. Microsoft Internet Explorer, Google Chrome and Apple Safari are also supported... but the pictures in this document reflect the use of Mozilla Firefox. For full details on supported browsers, see this page (click the tab named **Prerequisites**): << [UrbanCode Deploy System Requirements](#) >>

Download and run the install program for Firefox from the URL identified in the earlier section named “Download the Required Software”. Follow the prompts, but do not to install any extra items that are sometimes offered with open software (like 3rd party search engines, tool bars, adware, etc.)

2.5 Install the Java JDK

UrbanCode deploy requires the full Java Developers Kit (JDK), not just the Java Runtime Environment (JRE).

	<p><i>We recommend installing the 32-bit version of the JDK, even if you are using a 64-bit operating system.</i></p> <p><i>As of the writing of this book, Firefox only distributes a 32-bit version, so a 64-bit JRE won't work with it. Microsoft Internet Explorer runs in 32-bit mode by default, so you must change some options in order to make it run in 64-bit mode.</i></p> <p><i>For these reasons we suggest using a 32-bit JDK and JRE.</i></p>
---	---

Download and run the installation program for the Java Developers Kit from the URL identified in the earlier section named “Download the Required Software”. Follow the prompts, but do not to install any extra items that are sometimes offered with open software (like 3rd party search engines, tool bars, adware, etc.)

After the installation is complete you must set two system environment variables to the base directory where you installed Java. The **examples** below assume you installed JDK 1.7.0.67 in the default location. You need to alter the values to match the actual location of the JDK on your system:

```
JAVA_HOME = "C:\Program Files (x86)\Java\jdk1.7.0_67"
```

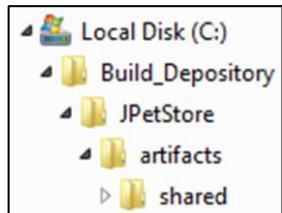
```
JRE_HOME ="C:\Program Files (x86)\Java\jre7"
```

2.6 Prepare the JPetStore Artifacts

Create a new folder on the **C:** drive --

```
C:\Build_Directory\JPetStore
```

Extract the contents of the [artifacts.zip](#) file into this new folder. The new folder structure should look like this:



This will represent a place where the development build system deposits compiled artifacts (war files, jar files, etc.) for us to use. UrbanCode Deploy will pull from this location and import new versions into the CodeStation technology (a code repository that is included with UrbanCode Deploy).

2.7 Install MySQL Community Edition

2.7.1 Overview

This lab uses the JPetStore JEE reference application as the subject of the demonstration. This particular build of the JPetStore application is configured to use MySQL. UrbanCode Deploy will support, but does not require that you use MySQL. For simplicity sake, we download and install MySQL for the JPetStore application. (UrbanCode Deploy, itself, will use Derby as its data store for this lab.)

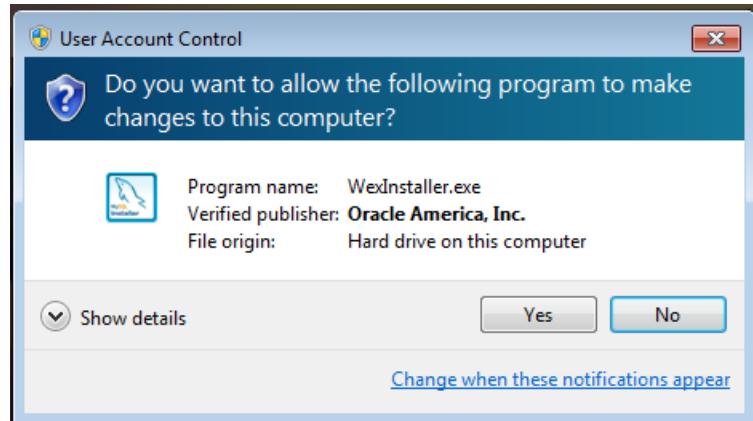
By default, MySQL will use port 3306 for communication. Make sure any firewalls will allow communication on this port.

**NOTE -- MySQL requires the Microsoft .NET Framework. Please install the latest version of the .NET Framework before continuing.

2.7.2 Run the MySQL Setup Program

Download and run the install program for MySQL from the URL identified in the earlier section named “Download the Required Software”.

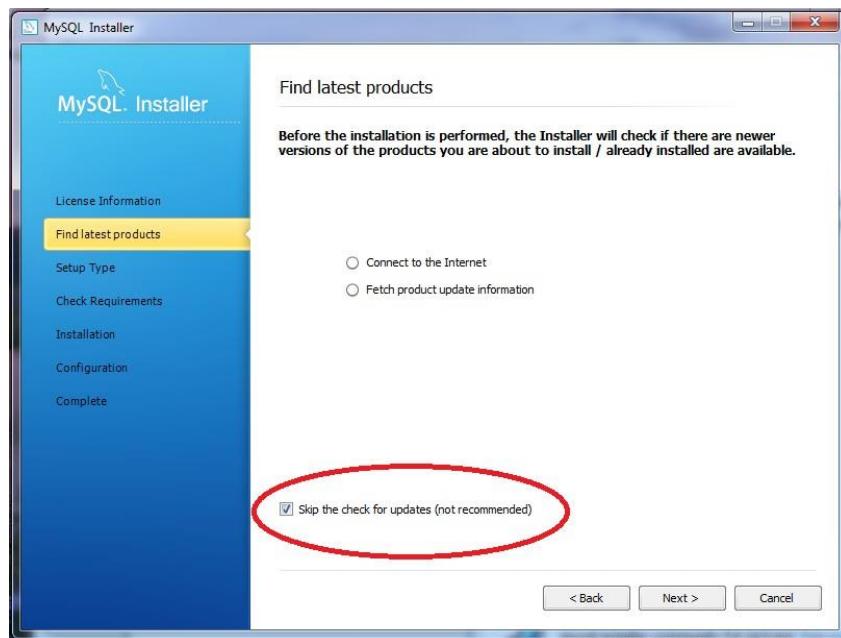
Answer “Yes” to any User Account Control dialogs asking if you want to allow the program to make changes on the computer.



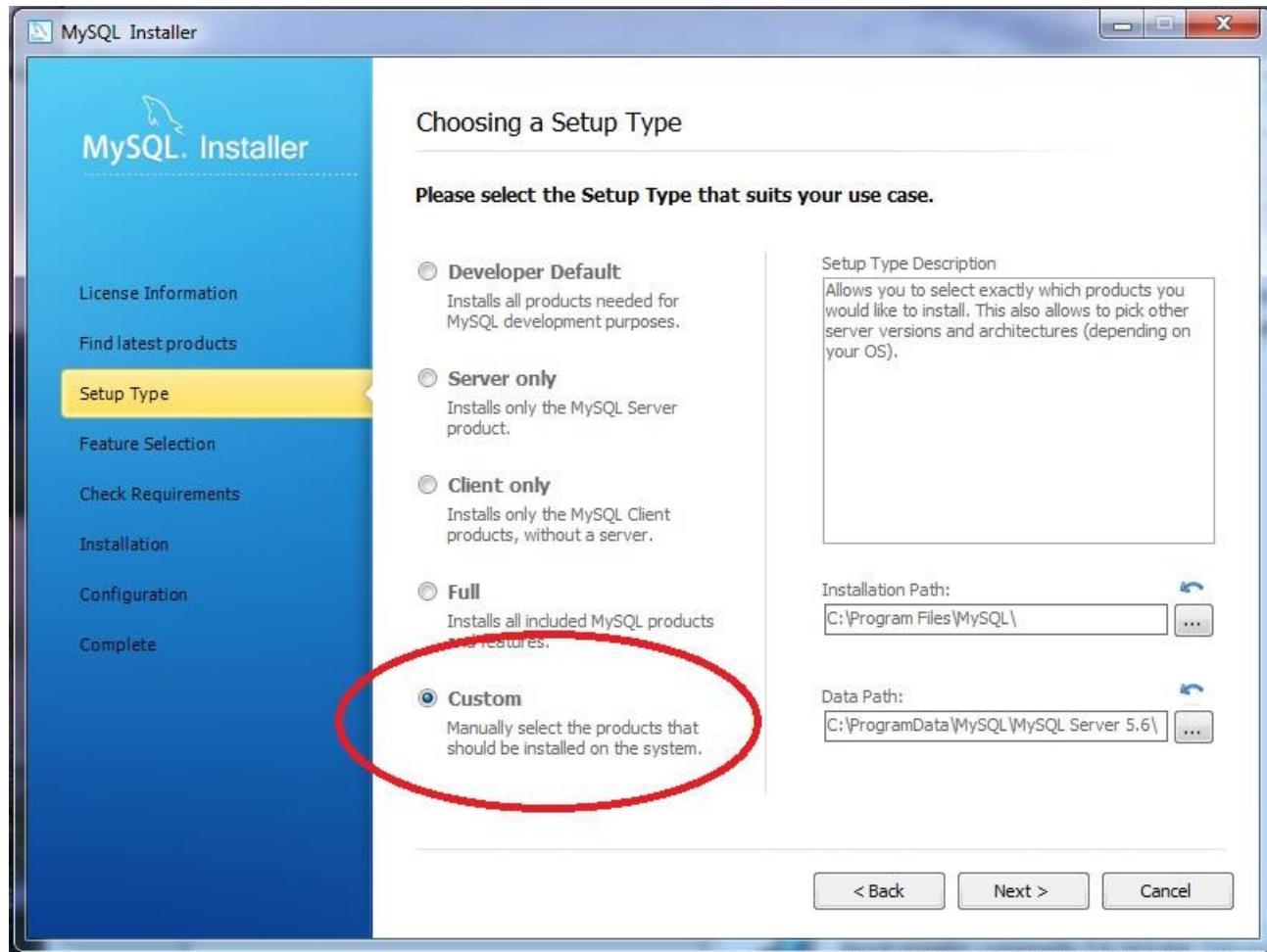
On the initial screen select **Install MySQL Products**.

On the **License Agreement** screen, check the box to accept the license terms and click the **Next** button.

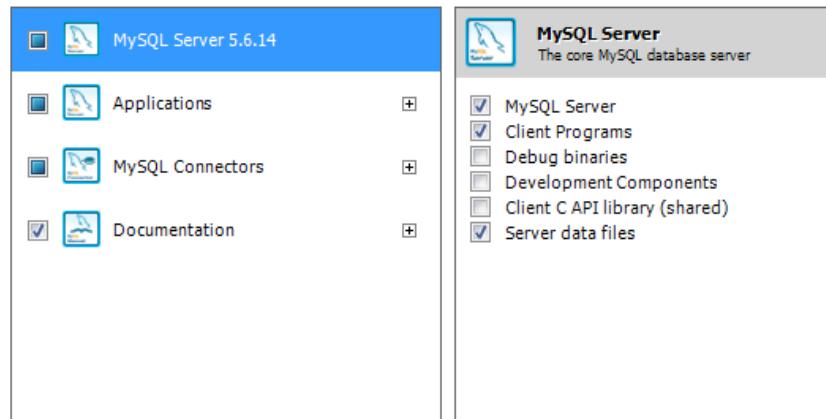
On the **Find Latest Products** screen, check the box to **skip the update check** and click the **Next** button. (NOTE – this is simply for expediency. If you do want to check for updates, no errors should be introduced, but some of your subsequent steps in the MySQL installation process may differ).



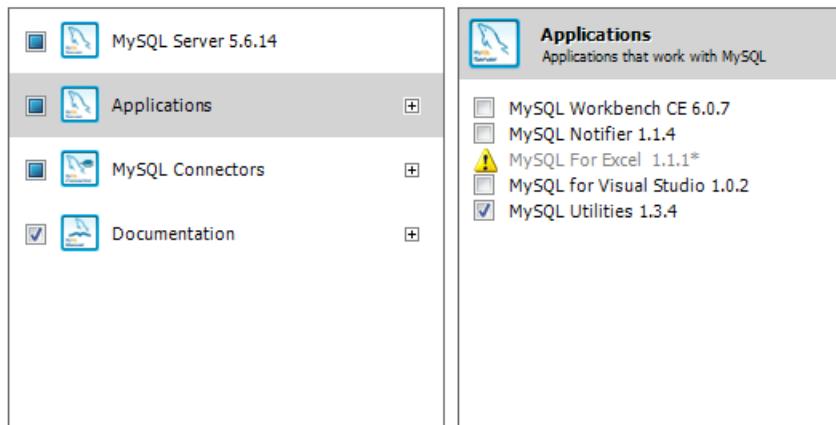
On the **Choosing a Setup Type** screen, select the **Custom** radio button - accept the defaults for the Installation and Data paths and click the **Next** button.



In the following screens, note the category selected on the left, and the options selected on the right:



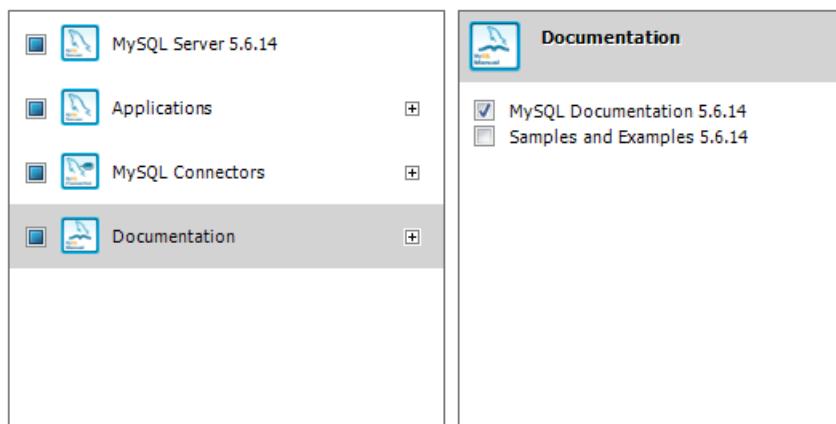
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** NOTE – if Microsoft Excel is not installed in your machine, you will see the warning icon as depicted above. Excel components are not needed for this lab.

Accept the default selections for **MySQL Connectors**.

Under the **Documentation** option, **do not** install the Samples.



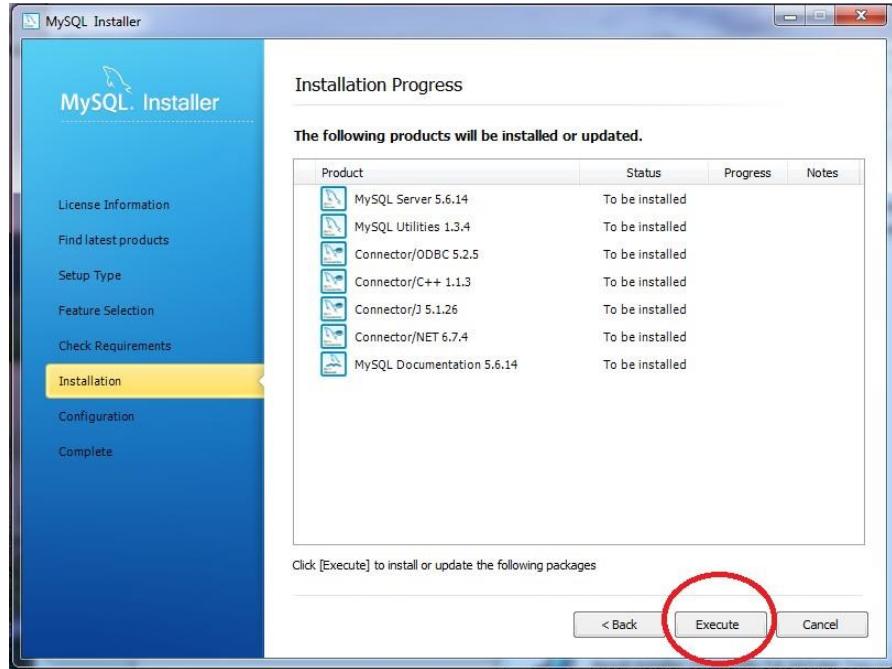
Click the **Next** Button.

On the **Check Requirements** screen, click the **Next** button.

NOTE – the MS .NET Framework must be installed before the MySQL installation will continue. If the installation program allows you to click the **Next button, then the requirement has been met.

On the **Installation Progress** screen, click the **Execute** button.

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This will take a few minutes to complete. After the installation completes, click the **Next** button to begin the configuration process.

On the **Configuration Overview** screen, click the **Next** button.

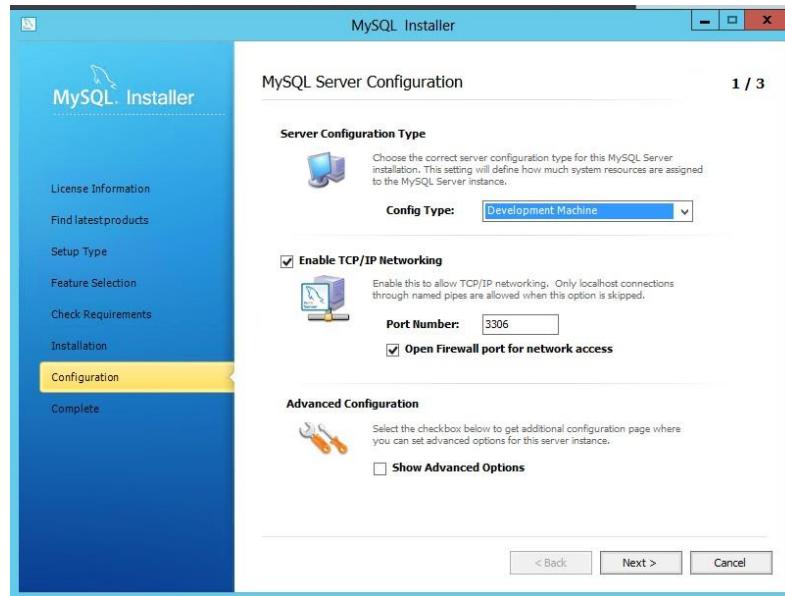
Several screens follow entitled **MySQL Server Configuration** – on the first, accept the defaults...

Server Configuration Type = **Development Machine**

Enable TCP/IP Networking = **Checked**

Port = **3306**

Open Firewall port for network access = **Checked**



Click the **Next** button.

On the next screen, set the **MySQL Root Password** = **password** (all lower case). There is no need to create any additional users at this time.

Click the **Next** button.

On the **Windows Service Details** screen, keep the defaults (allow to install as a service with the standard system account) and click the **Next** button.

On the **Configuration Overview** screen, click the **Next** button and then the **Finish** button to complete the installation.

2.7.3 Create the JPetStore Application Database

The JPetStore application requires a database. Create the empty database and verify that the database user can access it.

From the **Windows Start** menu, select

All Programs → MySQL → MySQL Server 5.6 → MySQL 5.6 Command Line Client

Enter the password (which is **password**, all lower case).

The system will respond with a **mysql>** prompt.

Type this command to create the database for the System Integration Test (SIT) environment:

```
create database jpetstore_sit;
```

You should receive the response –

```
Query OK, 1 row affected
```

Type this command to create the database for the User Acceptance Test (UAT) environment:

```
create database jpetstore_uat;
```

You should again receive the response –

```
Query OK, 1 row affected
```

Type this command to create the primary user:

```
create user 'jpetstore'@'localhost' identified by 'jppwd';
```

You should receive the response –

```
Query OK, 0 rows affected
```

Type these commands to grant privileges to the user for the two new databases:

```
grant all privileges on jpetstore_sit.* to 'jpetstore'@'localhost';
grant all privileges on jpetstore_uat.* to 'jpetstore'@'localhost';
```

After each command you will receive a response –

`Query OK, 0 rows affected`

Type `quit` to exit the MySQL program and close the command window.

2.7.4 Verify Database Access for the jpetstore User

	<p><i>In order for the following commands to work, you must add the location of the file mysql.exe to the PATH system environment variable. By default that location is:</i></p> <p><code>c:\Program Files\MySQL\MySQL Server 5.6\bin\</code></p> <p><i>(Note: – the reference to “5.6” may change dependent on the version of MySQL you have installed.)</i></p>
---	---

Open a command window and start the MySQL command interpreter as the `jpetstore` user by typing:

```
mysql -u jpetstore -pjppwd
```

Type the following command to test access:

```
show databases;
```

If the user has access, you should see the names of both the databases you just created (`jpetstore_sit` and `jpetstore_uat`).

```
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| jpetstore_sit |
| jpetstore_uat |
| test |
+-----+
4 rows in set (0.11 sec)
```

Type `quit` to exit the MySQL command interpreter. Close the command window.

2.8 Setup Tomcat Servers

2.8.1 Overview

In order to provide an environment that shows off the capabilities of UrbanCode deploy, we will create TWO separate instances of the Tomcat server – one to represent System Integration Testing (SIT), and one representing User

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Acceptance Testing (UAT). You could use this same technique to create even more Tomcat instances to exemplify other environments (e.g., Production), but this lab stops after only these two.

HTTP traffic will be directed between the two environments by setting up each server to listen on a different port – so browser requests must be modified to include the particular port as well as the host name.

Also, UrbanCode Deploy itself uses an embedded Tomcat instance that we will configure to listen on port 8080. The UrbanCode Deploy installation script takes care of installing this instance of Tomcat.

The following table enumerates all ports that need to be available for the processes involved in this demo (make sure they are not blocked by any firewalls in your machine).

Server:	Listens on Port(s):
MySQL	3306
UrbanCode Deploy Server	8080 8443 7918 (for JMS)
SIT Tomcat Instance	8005 8085 8445
UAT Tomcat Instance	8006 8086 8446

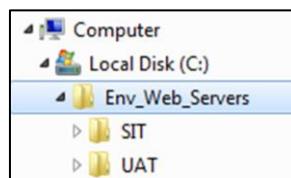
2.8.2 Create Locations to Hold Tomcat Servers

Create a folder on the C drive named **Env_Web_Servers**

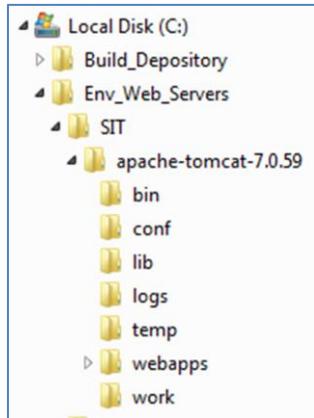
Create two sibling folders in the **Env_Web_Servers** folder you just made:

- **SIT**
- **UAT**

Your new folders should look like this:



Extract the zip file with Tomcat into the new **SIT** directory. Your **SIT** folder should now look like this:



2.8.3 Add user and role entries to the Tomcat users file in the SIT location

Navigate to the following directory, which contains the Tomcat SIT configuration files:

`c:\Env_Web_Servers\SIT\apache-tomcat-xxxx\conf`



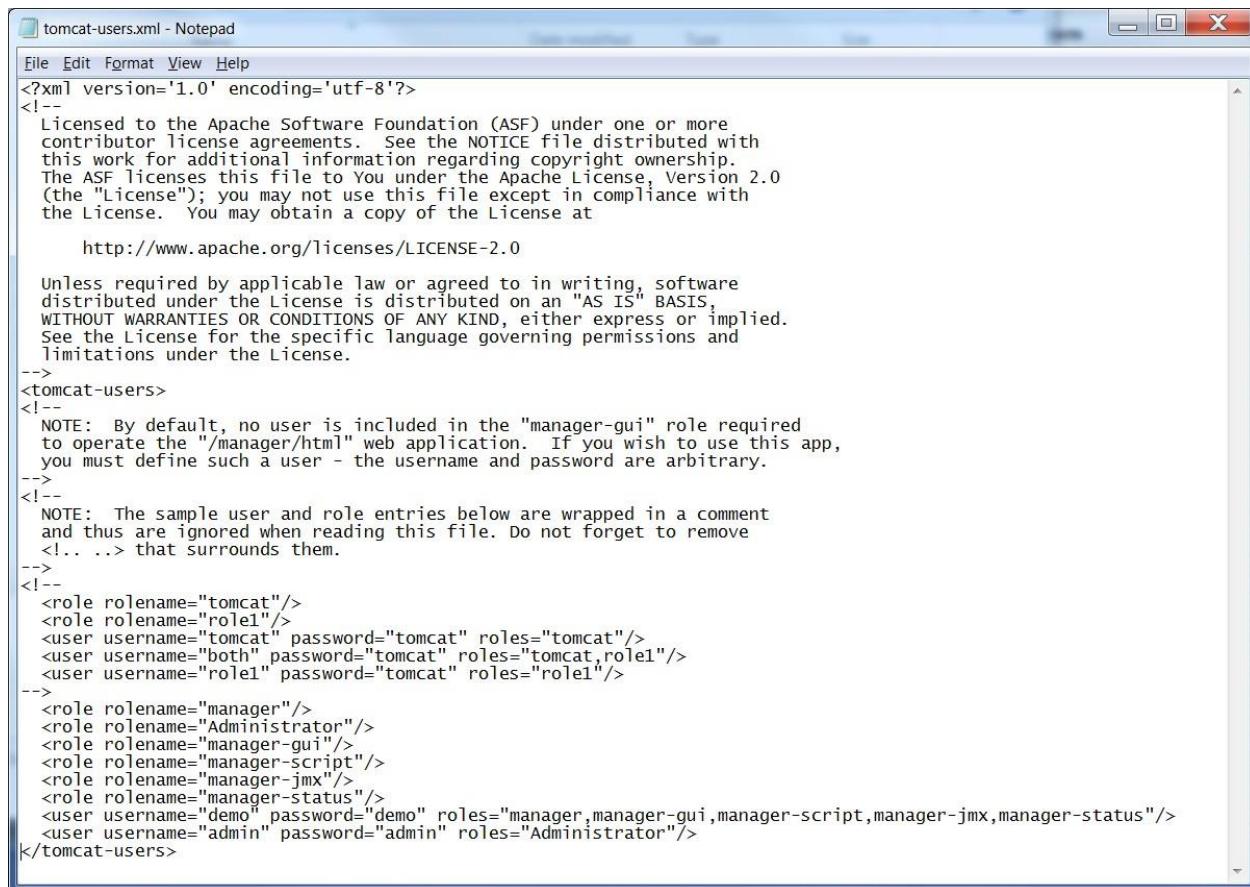
The reference to “xxxx” in the path above represents the version of Tomcat that you installed. Substitute the correct reference for the version number you actually downloaded to make the path correct.

Edit the file named `tomcat-users.xml`

Add the following lines AFTER the last comment block, but BEFORE `</tomcat-users>` tag. (Comments are demarcated by a block of text enclosed by `<!--` at the beginning, and `-->` at the end.)

```
<role rolename="manager"/>  
<role rolename="Administrator"/>  
<role rolename="manager-gui"/>  
<role rolename="manager-script"/>  
<role rolename="manager-jmx"/>  
<role rolename="manager-status"/>  
<user username="demo" password="demo" roles="manager,manager-gui,manager-script,manager-jmx,manager-status"/>  
<user username="admin" password="admin" roles="Administrator"/>
```

Your file should now look like this:



```
<?xml version='1.0' encoding='utf-8'?>
<!--
Licensed to the Apache Software Foundation (ASF) under one or more
contributor license agreements. See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
(the "License"); you may not use this file except in compliance with
the License. You may obtain a copy of the License at
http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<tomcat-users>
<!--
NOTE: By default, no user is included in the "manager-gui" role required
to operate the "/manager/html" web application. If you wish to use this app,
you must define such a user - the username and password are arbitrary.
-->
<!--
NOTE: The sample user and role entries below are wrapped in a comment
and thus are ignored when reading this file. Do not forget to remove
<!... > that surrounds them.
-->
<!--
<role rolename="tomcat"/>
<role rolename="role1"/>
<user username="tomcat" password="tomcat" roles="tomcat"/>
<user username="both" password="tomcat" roles="tomcat,role1"/>
<user username="role1" password="tomcat" roles="role1"/>
-->
<role rolename="manager"/>
<role rolename="Administrator"/>
<role rolename="manager-gui"/>
<role rolename="manager-script"/>
<role rolename="manager-jmx"/>
<role rolename="manager-status"/>
<user username="demo" password="demo" roles="manager,manager-gui,manager-script,manager-jmx,manager-status"/>
<user username="admin" password="admin" roles="Administrator"/>
</tomcat-users>
```

Save the file and close the editor.

2.8.4 Configure SIT Tomcat Ports

Edit the file named `server.xml` found in the same directory where we just found `tomcat-users.xml` (
`C:\Env_Web_Servers\SIT\apache-tomcat-xxxx\conf\`)

Perform a search and replace of all occurrences based on the following:

- Replace **8080** with **8085**
- Replace **8443** with **8445**

Save the file and close the editor.

2.8.5 Verify Access to the SIT Tomcat Server



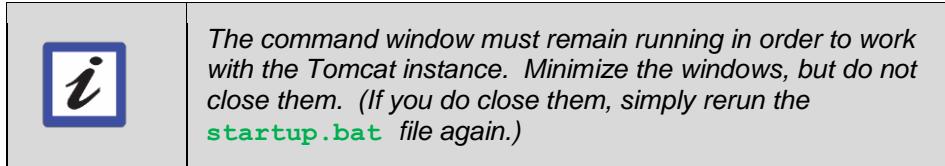
The system environment variables JAVA_HOME and JRE_HOME must be set to the location of your JDK and JRE, respectively. Otherwise you can start the Tomcat server. See the prerequisites at the beginning of this document.

Navigate to the folder:

C:\Env_Web_Servers\SIT\apache-tomcat-xxxx\bin

Double-click the file **startup.bat**.

A command window will appear and display status. In a few seconds you should see text that says “**INFO: Server startup in**” followed by the startup time in milliseconds. This indicates the Tomcat server has started without errors.



Open a browser and navigate to the URL: <http://ucd.sit-server.com:8085>

This should display the Tomcat web console.

A screenshot of a Microsoft Internet Explorer browser window displaying the Apache Tomcat 7.0.47 web interface. The address bar shows "http://localhost:8085/". The page title is "Apache Tomcat/7.0.47". A banner at the top says "If you're seeing this, you've successfully installed Tomcat. Congratulations!". Below the banner is a cartoon cat icon and links to "Recommended Reading" (Security Considerations HOW-TO, Manager Application HOW-TO, Clustering/Session Replication HOW-TO). To the right are buttons for "Server Status", "Manager App", and "Host Manager". The main content area is divided into three columns: "Developer Quick Start" (Tomcat Setup, First Web Application), "Documentation" (Tomcat 7.0 Documentation, Tomcat 7.0 Configuration, Tomcat Wiki), and "Getting Help" (FAQ and Mailing Lists, with links to announce@tomcat.apache.org, users@tomcat.apache.org, and taglibs-user@tomcat.apache.org).

2.8.6 Configure Tomcat for UAT Environment

In the previous section you updated two files in the SIT configuration:

- **tomcat-users.xml**
- **server.xml**

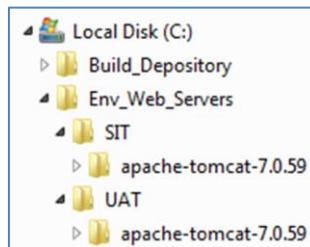
These files reside in this location:

`c:\Env_Web_Servers\SIT\apache-tomcat-xxxx\conf`

Now we want to create a companion web instance for the UAT configuration.

Copy the entire apache-tomcat directory from the **SIT** folder and paste a duplicate in the **UAT** directory

Your **SIT** and **UAT** directories should each now have an apache-tomcat folder below them.



Now navigate to the following folder in the **UAT** configuration:

`c:\Env_Web_Servers\UAT\apache-tomcat-xxxx\conf`

Edit the file named `server.xml`. Perform a search and replace of all occurrences of the values indicated below:

- Replace **8005** with **8006**
- Replace **8085** with **8086**
- Replace **8445** with **8446**

Save the file and close the editor.

2.8.7 Verify Access to the UAT Tomcat Server



*The system environment variables **JAVA_HOME** and **JRE_HOME** must be set to the location of your JDK and JRE, respectively, before you can start the Tomcat server. See the prerequisites at the beginning of this document.*

Navigate to the folder:

`C:\Env_Web_Servers\UAT\apache-tomcat-xxxx\bin`

Double-click the file `startup.bat`.

A command window will appear and display status. In a few seconds you should see text that says “**INFO: Server startup in**” followed by the startup time in milliseconds. This indicates the Tomcat server has started without errors.

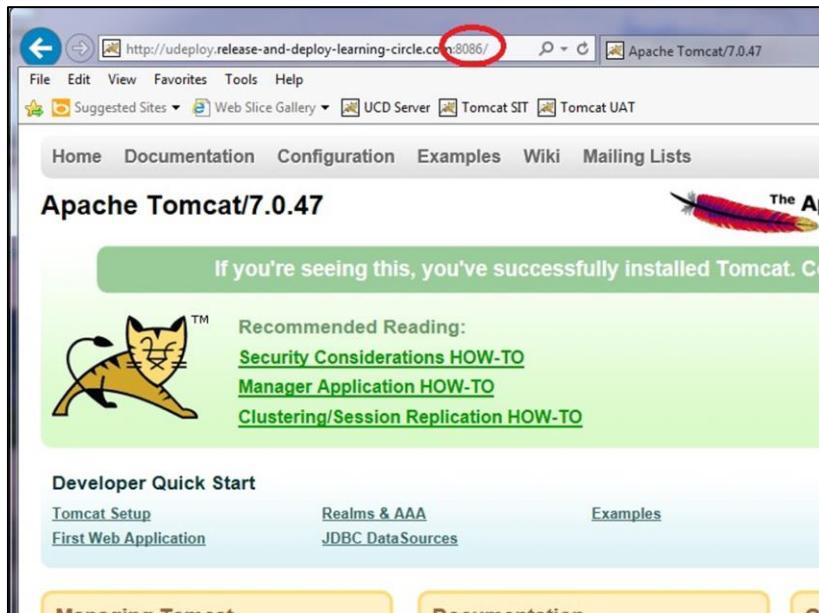
	<p>IMPORTANT</p> <p><i>The command window must remain running in order to work with the Tomcat instance. Minimize the window, but do not close it. (If you do close it, simply rerun the <code>startup.bat</code> file again.)</i></p>
---	---

Open a browser and navigate to the URL:

`http://ucd.uat-app-server.com:8086`

This should display the Tomcat web console.

Verify you can get to the default Tomcat web console, and ensure the correct port is being used to distinguish this **UAT** environment:



2.9 Summary

You have now set up the environment necessary to support the rest of the labs in this workbook. You have:

- Downloaded all required software and artifacts
- Modified your hosts file to support a demo that will look like multiple servers
- Installed Mozilla Firefox
- Installed a Java Developers Kit
- Extracted the components of JPetStore to a location that represents the location where developers deposit built artifacts
- Installed and configured MySQL to prepare for use as the JPetStore database.
- Set up 2 separate instances of Apache Tomcat to represent servers in 2 different environments (System Integration Test, and User Acceptance Test)

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Your machine is now ready to begin installing UrbanCode Deploy and run the JPetStore sample application.

3 Install UrbanCode Deploy Server and Agents

In this lab we will install and configure the IBM UrbanCode Deploy server and agents. When completed we will have a single system running with the main UrbanCode Deploy server, agent, SIT and UAT environments.

3.1 Install IBM UrbanCode Deploy Server

Create the following directory on the hard drive:

`C:\i`

	<p><i>The UrbanCode Deploy setup utility runs from a batch file, not a Windows installer. We will unzip all the files from the downloaded zip archive into this directory and run the setup routine from there.</i></p> <p><i>Because we will be working in a command window, it is expedient to use a directory right on the root with a very short name.</i></p>
---	--

Locate the file you downloaded for UrbanCode Deploy – it should have come in a single zip file, and you should have renamed it to `IBM_UCD_Server_Package.zip`. See the note in [Section 2.2](#).

Right-click on the zip file and select Extract All...

In the resulting dialog (Extract Compressed (Zipped) Folders, locate the field named “Files will be extracted to this folder” set this value to `C:\i`

Click the “Extract” button and wait for the files to be processed. This will extract all files into a new sub- directory under `C:\i` named `ibm-ucd-install`.

Open the Windows 7 Start menu and type `cmd` in the ‘Search Programs and Files’ area.

IMPORTANT!!! IN THE NEXT STEP YOU MUST RUN THE COMMAND PROMPT AS ADMINISTRATOR OR SOME PARTS OF THE INSTALLATION WILL NOT CONFIGURE CORRECTLY!!!

In the search results, locate `cmd.exe`... right-click on it and select “Run as Administrator”... confirm any dialogs that appear.

In the new command window, change directories to `C:\i\ibm-ucd-install\`

	<p><i>The system environment variables <code>JAVA_HOME</code> and <code>JRE_HOME</code> must be set to the location of your JDK and JRE, respectively, before you can install or run the server.</i></p> <p><i>See the prerequisites at the beginning of this document.</i></p>
---	---

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Start the installation by executing the batch file

`install-server.bat`

Respond to the prompts as indicated below. (Note: It is ok if the installation program reports that it can't find tools.jar.)

Enter **F** to display the full license agreement.

Enter **Y** to accept the license agreement.

UrbanCode Deploy Server installation directory: **C:\IBM\ibm-ucd\server (NOT default)**

If it prompts that the specified directory doesn't exist, respond: **Yes (default)**

Home directory of JRE/JDK used to run the server: **C:\Program Files (x86)\Java\jdk1.7.0_67 (default)**
- NOTE: Your value here will be different... confirm it is set to your JRE or JDK (JRE is sufficient in this particular value.)

Host name to access the Web UI: **ucd.deploy-server.com (NOT default)**

Web UI to always use secure connections using SSL: **Yes (default)**

Port on which Web UI listens for secure HTTPS requests: **8443 (default)**

Port on which Web UI redirects unsecured HTTP requests: **8080 (default)**

Initial password for the admin user: **admin (NOT default)**

- the system will ask you to confirm password in the next prompt

Port for agent communication: **7918 (default)**

Require mutual authentication: **No (default)**

Port and hostname of Rational License Key Server: **<none> (default)**

Create database schema: **Yes (default)**

Database type to use: **derby (default)**

Database username: **ibm_ucd (default)**

Database password: **password (default)**

	<p><i>At this point the system will process for a few minutes while the UrbanCode binaries are installed to the hard disk.</i></p>
---	--

Install Server as a Windows service? **Y (NOT default)**

Service name: **ibm-urbancode-deploy (default)**

User account to run the new UrbanCode service: **.\\localsystem (default)**

Start UrbanCode service automatically? **x (NOT default)**

Press the **Enter/Return** key when prompted to exit the installation script. Wait a few minutes to allow the server to start before continuing.

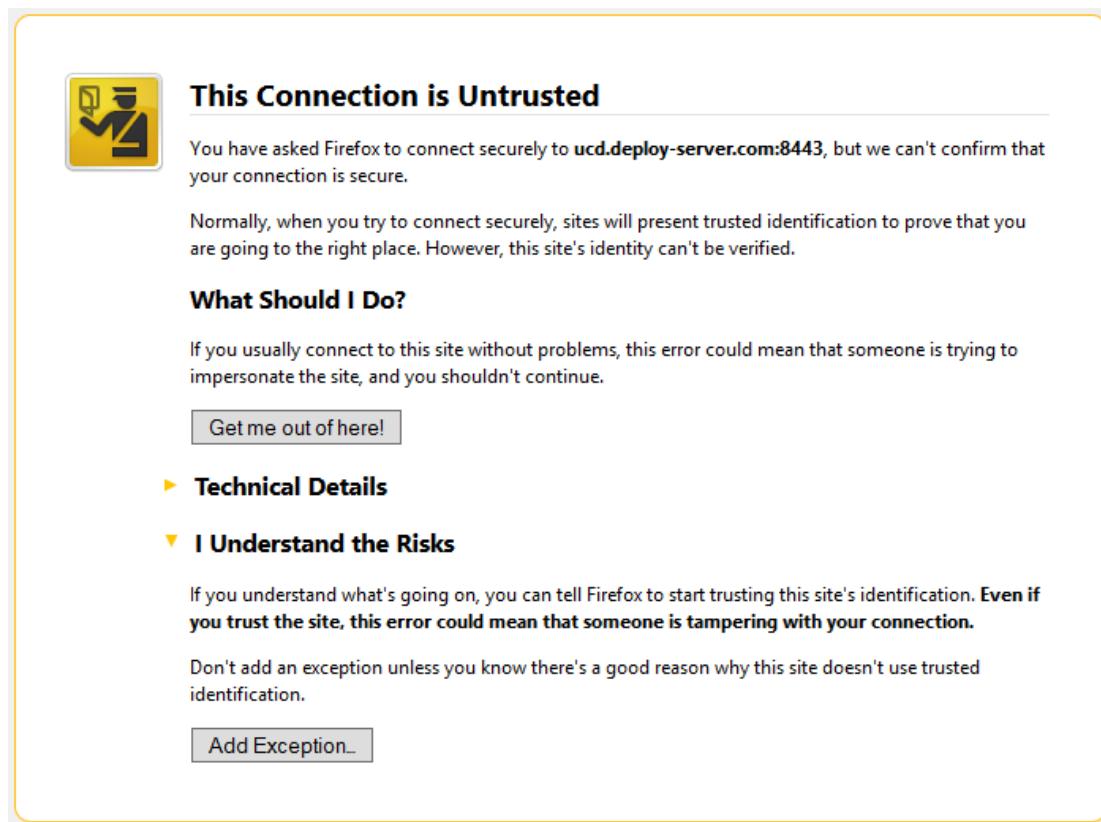
Open a browser window and enter the URL:

http://ucd.deploy-server.com:8080

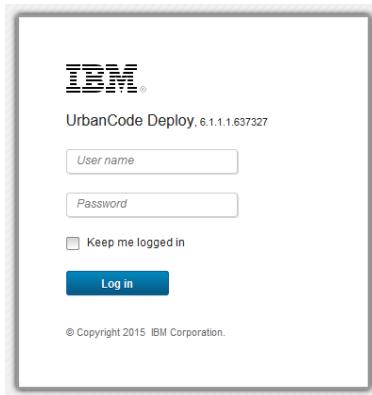
TIP – you may want to bookmark this URL for future reference.

If you are challenged with security warning about the connection, add an exception (this is just accessing the local server).

Below is the window Firefox shows:



If you see the login prompt for UrbanCode Deploy, then the server is running.

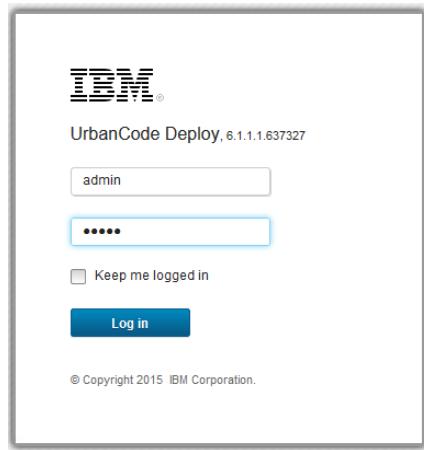


3.2 Install the IBM UrbanCode Deploy agent

UrbanCode Deploy uses software “agents” to perform work on remote servers. For our lab, we will only use the one machine (the same one we’ve just installed the UrbanCode Deploy server onto), but in a real-world installation, this one UrbanCode server would manage the applications on hundreds or thousands of remote machines. We simulate that in our lab by making clever use of domain names to make it *appear* as if there are multiple machines involved.

The agent software is available via the installed UrbanCode server. Since we have installed the server, we can now access the installation bits for the agent.

Log in using **admin** for both the **user name** and **password**.



Dismiss the advertisement to “Check out developerWorks” (click “Got it”).

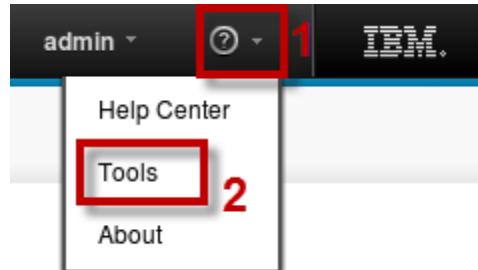
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The screenshot shows the IBM UrbanCode Deploy dashboard. A tooltip is displayed in the upper right corner with the title "Check out developerWorks!". It contains text about troubleshooting and connecting to the developerWorks forum. Two buttons at the bottom of the tooltip are "Remind Me Later" and "Got It!". The main dashboard area shows a "Current Activity" section with a table header and a message "No activity found." Below the table is a "Refresh" link.

Ignore the warning banners in blue and red for now.

Click the IBM UrbanCode Deploy **Help** menu button (upper right of the browser window).

Click **Tools**



Click the link for **IBM UrbanCode Deploy Agent** to initiate a file download

The screenshot shows the "Tools" page. A red oval highlights the "IBM UrbanCode Deploy Agent" link. To its right, the text "Click the link" is visible. Below this, there are other links: "IBM UrbanCode Deploy Agent Relay", "IBM UrbanCode Deploy Client", and "IBM UrbanCode Deploy z/OS Deploy Toolkit". Each of these also has the text "Click the link" to its right.



*The browser by default will download the file into the current OS user's **Downloads** folder.*

Log out of UrbanCode Deploy and close the browser.

Navigate to the location where the agent was downloaded (see info box above).

Right-click on the zip file and select **Extract All...**

In the resulting dialog (Extract Compressed (Zipped) Folders, locate the field named “Files will be extracted to this folder” set this value to **C:\i**

Click the “Extract” button and wait for the files to be processed. This will extract all files into a new folder under **C:\i** named **ibm-ucd-agent-install**.

Open the Windows 7 Start menu and type **cmd** in the ‘**Search Programs and Files**’ area.

IMPORTANT!!! IN THE NEXT STEP YOU MUST RUN THE COMMAND PROMPT AS ADMINISTRATOR OR SOME PARTS OF THE INSTALLATION WILL NOT CONFIGURE CORRECTLY!!!

In the search results, locate **cmd.exe**... right-click on it and select “Run as Administrator”... confirm any dialogs that appear.

In the new command window, change directories to **C:\i\bm-ucd-agent-install**



*The system environment variables **JAVA_HOME** and **JRE_HOME** must be set to the location of your JDK and JRE, respectively, before you can install or run the agent.*

See the prerequisites at the beginning of this document.

Start the installation by executing the batch file

install-agent.bat

Respond to the prompts as indicated below. (Note: It is ok if the installation program reports that it can't find tools.jar.)

Agent install directory: **C:\IBM\ibm-ucd\agent** (NOT default)

If it prompts you to create the installation directory: **Y (default)**

Home directory of JRE/JDK used to run the agent: **/usr/lib/jvm/ java-1.7.0-openjdk-1.7.0.25.x86_64/jre (default)**

- NOTE: Your value here will be different than the one shown above... confirm it is set to your JRE or JDK (JRE is sufficient in this particular value.)

Will the agent connect to an agent relay instead of directly to the server? **N (default)**

Hostname of UrbanCode Deploy server: **ucd.deploy-server.com** (NOT default)

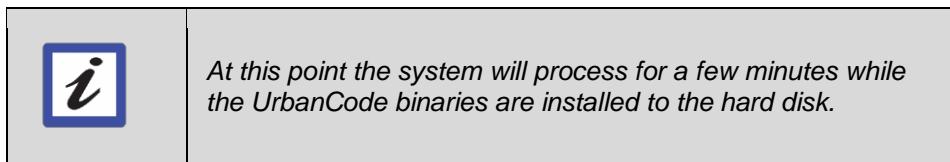
Enter the agent communication port for the server: **7918 (default)**

Configure a failover server connection? **N (default)**

Does the server agent communication use mutual authentication with SSL? **N (default)**

Enter the name for this agent: **localhost (NOT default)**

Enter teams for this agent: **None (default)**



Install Agent as a Windows service? **y (NOT default)**

Service name: **ibm-urbancode-deploy-agent (default)**

User account to run the new UrbanCode service: **.\\localsystem (default)**

Start UrbanCode service automatically? **y (NOT default)**

Press **Enter** when prompted to exit the installation script. Wait a few minutes to allow the agent to start before continuing.

3.3 Verify the IBM UrbanCode Deploy agent and server are communicating

Return to the UrbanCode Deploy browser window (or log in again if you have closed it -- username **admin** password **admin**.)

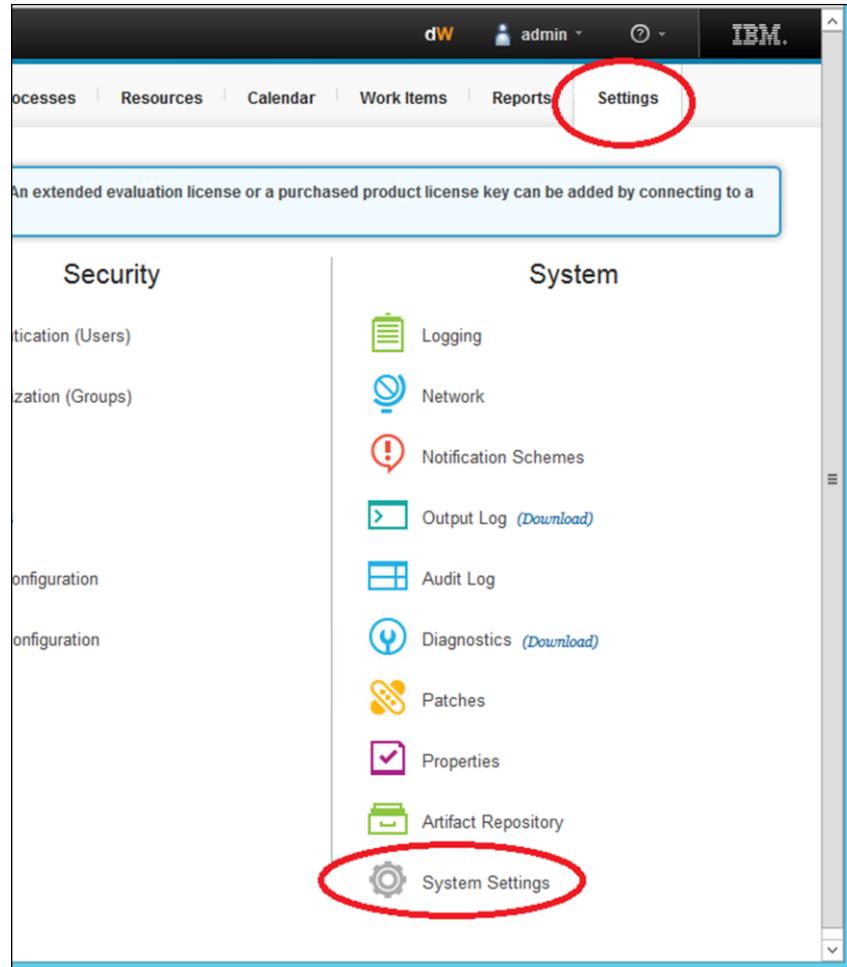
Click the Resources tab on the dashboard. On the Resources page click the **Agents** tab. You should see a resource named **localhost**, and the status value should be **Online**.

This screenshot shows the 'Agents' section of the IBM UrbanCode Deploy interface. The 'Agents' tab is active and highlighted with a red circle. Below the tabs, there is a banner message: 'There is no agent or tag configured to import new component versions, so no new versions will be imported. Please set this on the Settings > System Settings page.' A second red circle highlights this banner. The main table lists one agent: 'localhost', which is also circled in red. The table columns are: Name, Description, Status, License, and Version. The 'localhost' entry has a green 'Online' status indicator, a yellow 'Unlicensed' license status, and a version of '6.1.1.1628129'. At the bottom of the table, there are buttons for 'Refresh' and 'Find', and a 'Rows' dropdown set to '10'.

3.4 Assign Agent to Import Component Versions

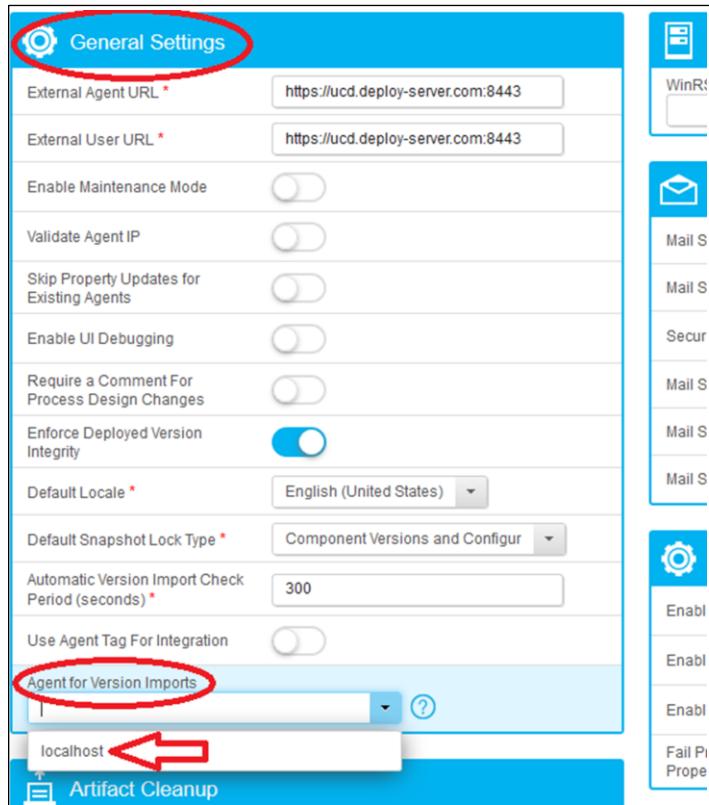
The banner in red warns that no agent has yet been assigned to work to import versions of artifacts that UrbanCode will deploy. We can rid ourselves of this banner by assigning this new agent.

In the top row of tabs, click **Settings**, and in the far right column, click **System Settings**.



Look in the **General Settings** section (left hand column) and scroll down until you see the field named **Agent for Version Imports**.

Set the value of that field to **localhost** using the drop-down box, then click the **Save** button. (You may have to scroll down further to see the button.)



This should dismiss the red banner from UrbanCode Deploy.

3.5 Install UrbanCode Deploy Automation Plugins

UrbanCode Deploy implements a core set of functions that ship with the server, and provides an extensible framework built around “plugin” functionality. Plugins are self-contained extension units that you can apply to UrbanCode Deploy to provide specific integration with 3rd party technology.

Only 2 plugins are required for this lab – DBUpgrader and Tomcat. The rest listed in [Section 2.2](#) are optional, but make for a good presentation to illustrate the extended capabilities of UrbanCode Deploy.

Make a new folder in `C:\i` named `plugins`. Copy the plugin zip files for **DBUpgrader** and **Tomcat** (and any others you downloaded) into this folder. (See [Section 2.2](#) about downloading the required software.)

Return to the UrbanCode Deploy browser. In the top row of tabs, click **Settings**, and in the far left column, click **Automation Plugins**.

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This screenshot shows the 'Settings' page in the IBM UrbanCode Deploy interface. The 'Automation' section is highlighted with a red circle around the 'Automation Plugins' link. The 'Automation' section also contains a link for 'Source Configuration Plugins'. Other sections visible include 'Security' (Authentication and Authorization) and 'System' (Logging and Network).

Click the **Load Plugin** button.

This screenshot shows the 'Automation Plugins' page. The 'Load Plugin' button is highlighted with a red circle. The page also includes tabs for 'Source Configuration Plugins' and 'Running'.

Click the **Browse...** button in the dialog and navigate to the `c:\i\plugins` folder – select the **DBUpgrader** plugin file, click the **Open** button, then the **Submit** button to load it.

You should then see **DBUpgrader** listed in the web page.

This screenshot shows the 'Automation Plugins' page with the 'DBUpgrader' plugin listed. The 'DBUpgrader' row is highlighted with a red circle. The table columns are 'Plugin' and 'Description'.

Plugin	Description
Application Deployment for WebSphere	WebSphere Application Server known as others WAS is supported on Windows, WebSphere Application Server
DBUpgrader	This plugin allows uDeploy to upgrade
File Utils	The FileUtils plugin allows users to perform this plugin includes steps for deleting or

Repeat these steps for the **Tomcat** plugin, and any other plugins you wish to load into UrbanCode Deploy.

3.6 Remove unneeded files

Log out of UrbanCode Deploy, close down any running programs and delete the **C:\ic** folder and all its contents from your system.

This will recover the disk space for all the temporary files we used so far.

3.7 Optional shutdown and backup

At this point in time, you can create a snapshot of the virtual machine. If you do so, shut down the virtual machines first.

3.8 Summary

The UrbanCode Deploy server and agent have been deployed. We've set up Tomcat with 2 instances to represent a System Integration Test (SIT) environment and a User Acceptance Test (UAT) environment (separated by different ports). Empty databases for the JPetStore application have also been created.

	<p><i>Note on License Keys – blue banner during evaluation period.</i></p> <p><i>IBM UrbanCode Deploy installs with a temporary 60 day license. During this period a blue banner appears on every screen until the administrator installs and configures the Rational License Key Server for use with a valid key. The remaining lab illustrations have been rendered after UrbanCode Deploy has been properly licensed. Although your own system will be displaying this blue banner throughout your lab exercises, all other aspects and functions of UrbanCode Deploy should follow this document.</i></p> <p>Installation and configuration of the Rational License Key Server is outside the scope of this document. For more information on this topic, please refer to this link:</p> <p>https://www-01.ibm.com/software/rational/support/licensing/</p>
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4 Creating UrbanCode Components, Applications and Environments

4.1 Overview

JPetStore is a sample enterprise Java application that you will deploy in the following labs. UrbanCode Deploy allows an administrator to model their computing infrastructure and applications in terms of discrete elements. This exercise will introduce you to those elements as you encode them into the product. Those elements include:

- Application Projects
- Components
- Environments
- Processes

In this lab you will:

- Create the JPetStore application project
- Break down JPetStore into individual components and load each component
- Define how the components are assembled to create the deployable application
- Define two named environments to represent infrastructure used by two main groups in the software development lifecycle:
 1. System Integration Test (SIT)
 2. User Acceptance Test (UAT)

You will define the JPetStore application project in terms of three components.

JEE Application Files – JPetStore Application Component. WAR file that contains the main pieces of the JPetStore application.

Database Scripts - Scripts and supporting files to create the JPetStore database. Subsequent versions of this component contain scripts to modify the database schema.

Web Files - Static web content for JPetStore, such as web page image files.

When you have completed this lab, you will have an application defined with its three components.

4.2 Create the JPetStore JEE Component

Components are the basic building block of the application you model in UrbanCode Deploy. Over time, a component changes (as the developers improve it). UrbanCode Deploy can keep track of, and deploy any version of any component anytime the situation demands.

When a developer builds an application, they create a unit that was built from multiple source files. That new unit is typically given a version number of its own. CAUTION – Please keep in mind that ‘version’ used in the context of UrbanCode Deploy is not referring to source code – but a version of a compiled artifact that has been built and dropped into a common area (file system, repository or asset management system) where it waits to be deployed onto a runtime platform. This is where UrbanCode picks up in the lifecycle of the software product.

4.2.1 Create the JEE Component

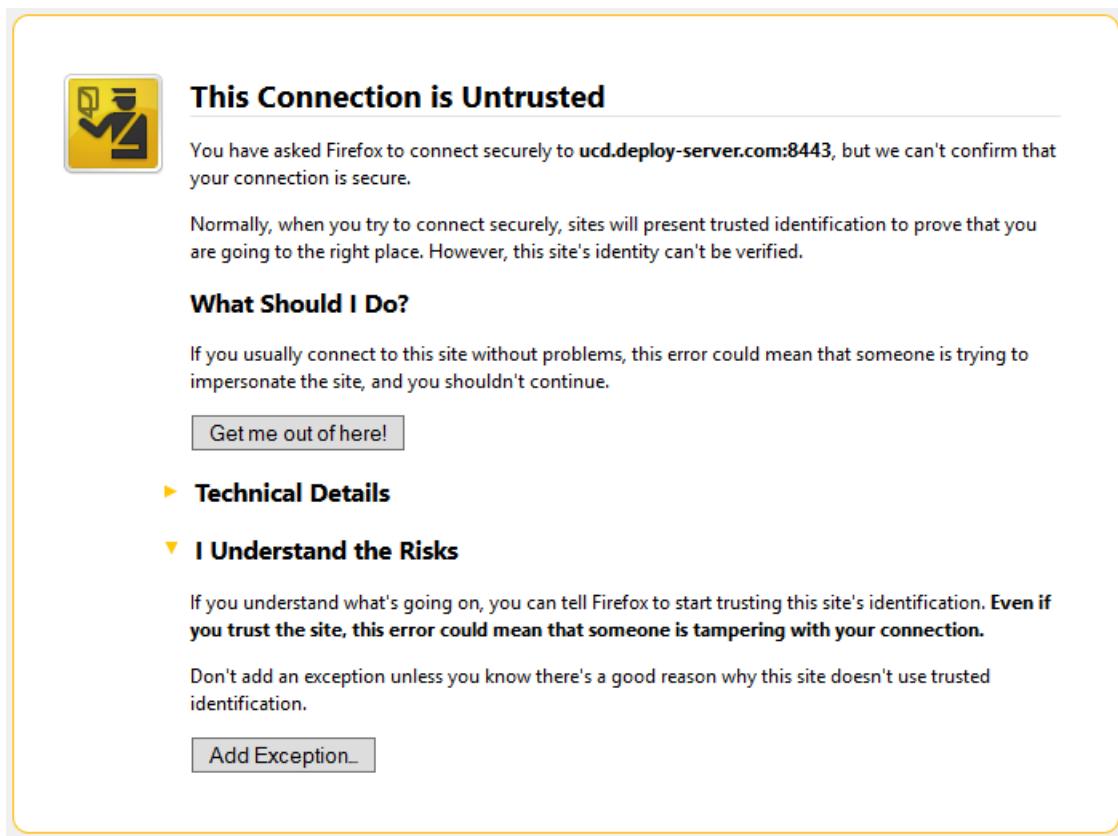
If it is not already running, launch a browser and log into UrbanCode Deploy.

Open a browser window and enter the URL:

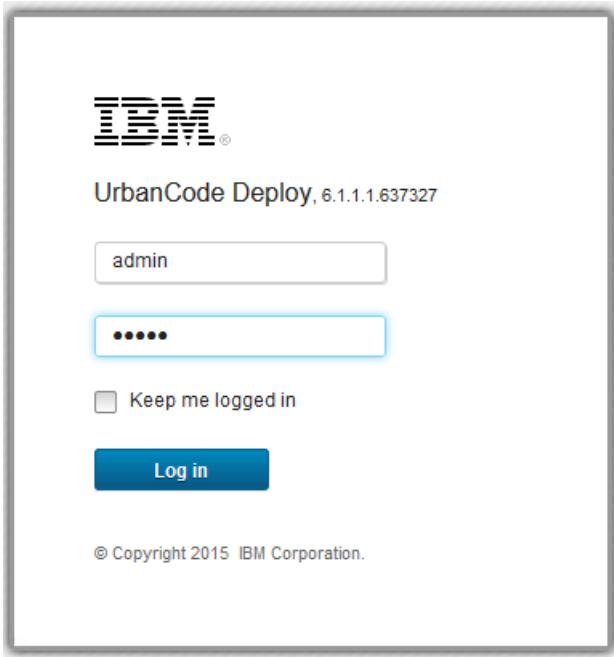
<http://ucd.deploy-server.com:8080>

TIP – you may want to bookmark this site for future reference.

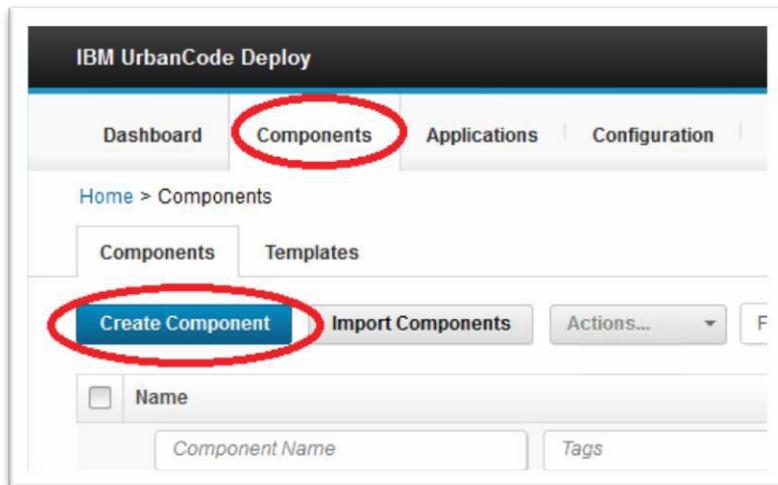
If you are challenged with security warning about the connection, add an exception (this is just accessing the local server). Below is the window Firefox shows:



Log in using **admin** for both the **user name** and **password**.



Click on the **Components** tab then on the **Create Component** button.



Name the new component **JPetStore-JEE**. Set other values as shown below:

Source Config Type = File System (Versioned)

Base Path = C:\Build_Depository\JPetStore\artifacts\shared\app

The screenshot shows the 'Create Component' dialog box. Key configuration settings include:

- Name:** JPetStore-JEE
- Description:** (empty)
- Teams:** (empty)
- Template:** None
- Component Type:** Standard
- Source Configuration Type:** File System (Versioned)
- Base Path:** C:\Build_Depository\JPetStore\artifacts\share\app
- Preserve Execute Permissions:** (unchecked)
- Text File Extensions:** .txt,.log,.properties
- Import Versions Automatically:** (unchecked)
- Copy to Code Station:** (checked)
- Default Version Type:** Full
 - Use the system's default version import agent/tag.
 - Import new component versions using a single agent.
 - Import new component versions using any agent with the specified tag.
- Cleanup Configuration:**
 - Inherit Cleanup Settings:** (checked)
 - Run Process after a Version is Created:** (unchecked)

Click the **Save** button at the bottom of the pop-up (NOTE – you may have **to scroll down** to see the **Save** button.)

This creates the component and immediately opens the **Dashboard** tab of the component (lower row of tabs in UrbanCode Deploy). To see the values you just entered, click on the **Configuration** tab. Here you could update or change any of the original settings you entered.

By using the **File System (Versioned)** setting, you are declaring that each folder under the **Base Path** folder is actually a named version of the component. Each of the versioned folders actually contains the files for that version. When a developer builds another version of the component and deposits it here, UrbanCode Deploy can sense this update and make the new version available for deployment (or even automatically deploy the new version if desired).

4.2.2 Import Version 1.0 of the JEE Component

Click on the **Versions** tab from the lower row of tabs.

Click on the **Import New Versions** button to load any versions that are found in the file system. For the JEE component, the only version defined is 1.0.

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The screenshot shows the 'Component: JPetStore-JEE' page in the IBM UrbanCode Deploy interface. At the top, there is a navigation bar with tabs: Dashboard, Components, Applications, Configuration, Processes, and Resources. Below the navigation bar, the URL is shown as Home > Components > JPetStore-JEE. The main title is 'Component: JPetStore-JEE'. Underneath the title, there are two details: 'Created By' (admin) and 'Created On' (3/20/2015, 10:51 AM). Below these details, there is a horizontal navigation bar with tabs: Dashboard, Usage, Configuration, Calendar, **Versions**, Processes, and Changes. The 'Versions' tab is highlighted with a red circle. Below this navigation bar, there is a blue button labeled 'Import New Versions' which is also circled with a red circle. Further down, there is a table header for 'Version', 'Statuses', and 'Type'. A message below the table says 'No versions found.' At the bottom of the page, there are links for 'Refresh' and 'Print'.

Wait a moment and click the **Refresh** link above the section named **Component Request History**. (UrbanCode Deploy does not automatically update this screen after the version import.)

The screenshot shows the same 'Component: JPetStore-JEE' page after refreshing. The navigation bar and component details are identical to the previous screenshot. The horizontal navigation bar at the top of the main content area has the 'Versions' tab selected. Below it, the 'Import New Versions' button is visible. The table below shows no versions found. At the bottom of the page, there is a section titled 'Currently Running Version Imports' which lists one entry: 'Manual Version Import' on 'localhost' starting at '3/20/2015, 11:11 AM' with a status of 'Executing'. Below this table, there is a link '1 record - Refresh Print' and a pagination control showing page 1 of 1. At the very bottom of the page, there is a 'Rows' dropdown set to 10.

This should refresh the page and you should see a new line indicating the component file(s) have imported successfully.

The screenshot shows the 'Components' page for the 'JPetStore-JEE' component. The 'Versions' tab is active. A red box highlights the first row of the table, which contains the version number '1.0'. To the right of this row is a 'Delete' link.

Version	Statuses	Type	Created By	Date	Description	Actions
1.0	Staged	Full	admin	3/20/2015, 11:11 AM		Compare Delete

4.3 Create JPetStore WEB and DB Components

4.3.1 Create JPetStore-Web and import new versions.

Repeat the steps above to create and import another component called **JPetStore-WEB**. Set other values as shown below:

Source Config Type = File System (Versioned)
Base Path = C:\Build_Dependency\JPetStore\artifacts\shared\web

When you import the versions, two versions are loaded 1.0 and 1.1. Initially, you only want to have version 1.0. Later you will add version 1.1 and update the deployment. For now, click on the **Delete** link to the far right of version 1.1 to delete that version.

Version	Statuses	Type	Created By	Date	Description	Actions
1.1		Full	admin	3/20/2015, 11:03 AM		Compare Delete
1.0		Full	admin	3/20/2015, 11:04 AM		Compare Delete

This should leave only the row indicating Version 1.0 of this component. NOTE – this action does not remove the component files from the repository – it only removes the reference from UrbanCode Deploy. Later in the labs we will re-import this component to illustrate how UrbanCode Deploy can discover new versions that have been made available by developers.

4.3.2 Create and import JPetStore-DB

Repeat the steps one more time to create a new component named **JPetStore-DB**. Set other values as shown below:

Source Config Type = **File System (Versioned)**
 Base Path = **C:\Build_Dependency\JPetStore\artifacts\shared\db**

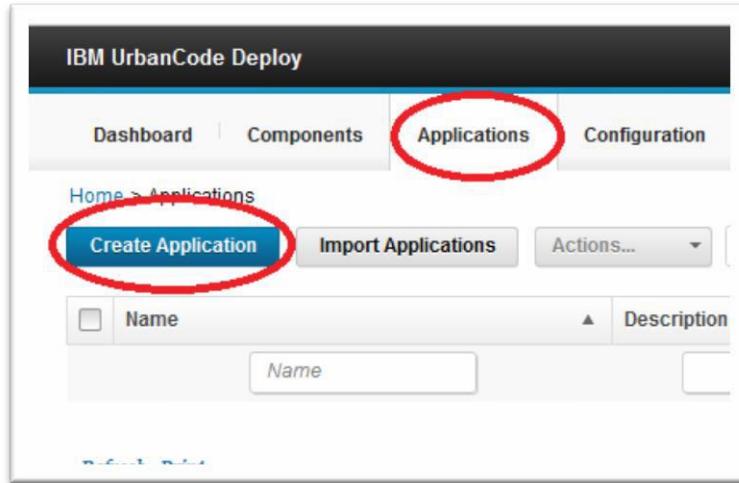
As with the previous component, delete all the imported versions except for version 1.0.

4.4 Create and Define the JPetStore Application

Now that you have defined the components for JPetStore, you can create an application that includes those components.

4.4.1 Create the JPetStore application

Click on the **Applications** tab from the *upper* row of tabs, then click on the **Create Application** button.

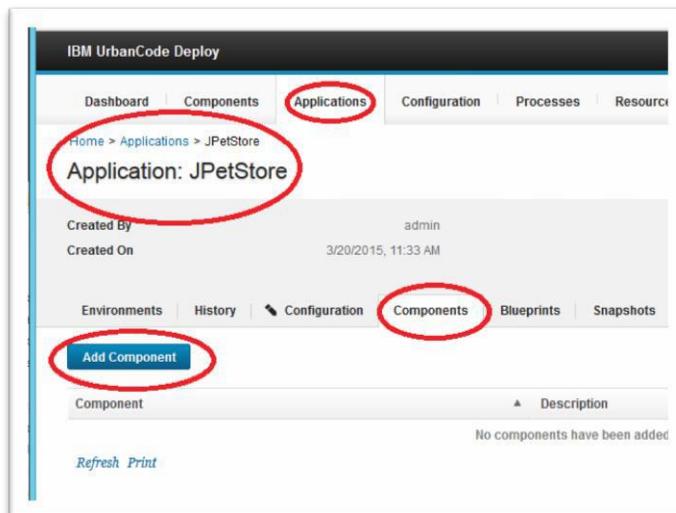


Enter **JPetStore** as the name of the application and then press the **Save** button.

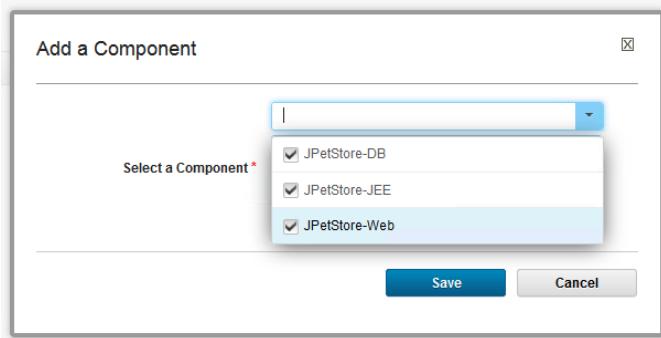
4.4.2 Add the components to JPetStore

UrbanCode Deploy should now be focused on the new application object.

Select **Components** from the *lower* set of tabs and click the **Add Component** button as shown.



Use the dropdown box in the dialog and check all three components (**JPetStore-JEE**, **JPetStore-DB** and **JPetStore-Web**) then click the **Save** button.



Your screen should now look like the picture below:

4.5 Create Environments for the JPetStore Application

So far we have created **components** and the **application** to which they belong in the UrbanCode representation model.

Next we will represent the different computing **environments** into which we will be deploying the JPetStore application.

The UrbanCode Deploy environments represent the groups of target machines (resources) onto which it will deploy the components of the JPetStore application. As part of the software development lifecycle, application pieces start in the computing environments of the development group, then move through several levels of testing, and finally are delivered to the operations group for deployment into production servers. UrbanCode Deploy can model the computing environments of each of those groups (who will certainly have different computing systems built to suite their own specific needs). Each of those groups of computing environments are represented in UrbanCode Deploy as "**Environment**" objects.

An UrbanCode Deploy architect will generally create separate Environment objects to represent each of the stages of a customer's software development life cycle (i.e., Development, System Integration Testing, User Acceptance Testing, Performance Testing, Production, etc.). UrbanCode Deploy can keep track of which versions of the pieces of an application that are deployed into each of those environments, and provides nice features to allow administrators to

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move the pieces through the development stages as a unit (snapshots... but more on that later).

For this lab, we will create only two environments to illustrate the value of UrbanCode Deploy – representing System Integration Test (SIT) and User Acceptance Test (UAT).

Modern web applications are comprised of different components that are usually deployed onto separate computer systems. For instance, Database Servers are usually run on their own dedicated systems in all environments except maybe a developer's test environment. Since we are using only one physical machine for our lab, we have taken steps to simulate an environment that is comprised of multiple machines. This way the UrbanCode Deploy representation model will look more like a real-world computing topology with multiple computer systems. We have laid the groundwork for this in the earlier sections of this document.

4.5.1 Create SIT and UAT Environments

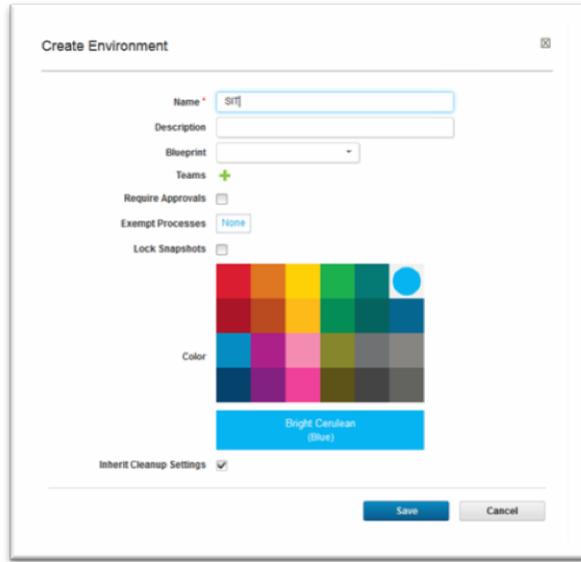
Click on the **Applications** tab (upper row of tabs) to see the list of defined applications. Click on the link for the **JPetStore** application.

The screenshot shows the IBM UrbanCode Deploy interface. At the top, there is a navigation bar with tabs: Dashboard, Components, Applications (which is circled in red), Configuration, and Processes. Below the navigation bar, the URL is shown as Home > Applications. There are buttons for Create Application, Import Applications, Actions..., and Flat list. The main area is a table with columns: Name and Description. There is one record listed: JPetStore. The name 'JPetStore' is also circled in red. At the bottom of the table, there are links for Refresh and Print.

In the lower row of tabs, click the **Environments** tab, then click the **Create Environment** button. Name the new environment **SIT**.

Set the Color to **Bright Cerulean (Blue)**. Click the **Save** button.

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Repeat the previous steps in this section to create another environment named **UAT**. Set the **Color** to **Cinnamon (Orange)**.

Verify this task by clicking on the **Applications** tab to see the list of defined applications and then click on **JPetStore** to open it. You should see the **SIT** and **UAT** Environments as shown below:

Environment	Snapshot	Compliance
SIT	None	0 / 0
UAT	None	0 / 0

4.6 Summary

You have defined an application in UrbanCode Deploy called **JPetStore** and loaded version 1.0 of the application's three components.

You have defined two environments associated with this application, named **SIT** and **UAT**.

5 Defining Computer Resources and Groups

5.1 Overview

In the following lab section, we will review the simple topology of the networks in our data center. This particular Data Center houses the machines that support:

- System Integration Test (SIT)
- User Acceptance Test (UAT)

The application, JPetStore, is a simple 3-Tier web application that consists of:

- Static Web Content
- Simple Business Logic
- Database Storage

Each of the pieces of the application are developed and managed by different groups.

Each of them is on a separate development schedule (and will produce different versions at different times), but all are designed to work together in order to function as a single application.

All the pieces must progress through the same software development lifecycle, which includes the two testing environments we've mentioned.

System Integration Test

The **System Integration Test** phase of development is managed by developers. The purpose of this phase is simply to confirm that all the pieces of the application will run, and no changes made to any single piece will prevent the application from operating as-designed.

This group runs all the pieces of the JPetStore application on a single machine (for administrative simplicity).

User Acceptance Test

The **User Acceptance Test** phase of development is managed by the QA group. The purpose of this phase is to test the pieces of the application for purposes of verifying that the application is satisfying the needs of the end users.

This group wants to run the application in a computing environment that more closely represents the production environment. The pieces of the JPetStore application are installed on two separate machines (one for the JEE and Web pieces, and a second dedicated machine for the DB piece).

For our lab, we have only one physical machine to use. But in the section for Machine Setup, we took steps to be able to mimic a multi-machine environment (by using different port numbers, and making several entries in the machine's hosts file.) In the next several labs we will build a model of resources in UrbanCode Deploy that will look more like a real-world environment (using multiple machines and different topologies between groups/environments). One major advantage of UrbanCode deploy is its ability to be able to distinguish between different topologies, and make adjustments at deployment time to automatically accommodate those differences.

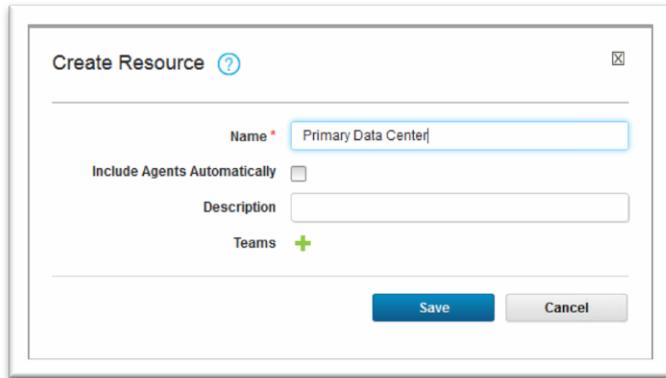
5.2 Defining Compute Resources in UrbanCode

5.2.1 Define a Resource Hierarchy to reflect the Data Center Topology

Select **Resources** from the upper row of tabs.

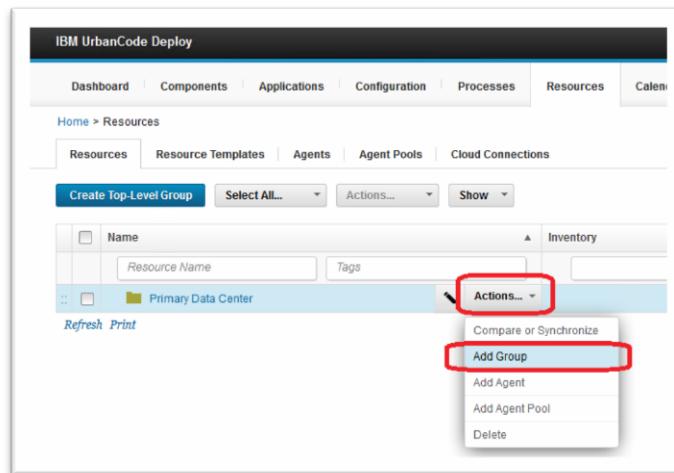
Make sure the lower row of tabs also has the **Resource Tree** tab selected.

Click the **Create Top-Level Group** button. Name the group **Primary Data Center**. Click the **Save** button.

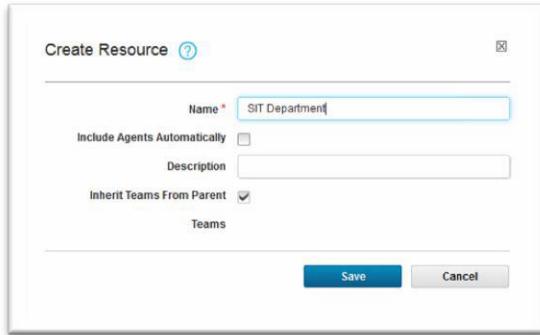


Find the new group in the list, and hover your mouse over it which will produce the **Actions...** context menu.

Click the **Actions...** context menu then select **Add Group** from the drop down list.



Name the new group **SIT Department**.



A new folder should appear as a child of the **Primary Data Center** folder in the browser.

Repeat these steps to add another child folder to the **Primary Data Center** named **UAT Department**.

Your screen should now look like this:

5.2.2 Add Computing Resources to Each Group

Now we will add the machines (agents) to our model.

Every machine with which UrbanCode Deploy interacts must have the Agent software running. When the Agent software is installed, we identified the UrbanCode Deploy server (hostname or IP address) to which it will communicate. This way, when the Agent software runs it calls back to the server to make itself known... and will appear in UrbanCode Deploy as a member of a list of agents available to do work for us.

In the earlier section, we described our topology as having three separate machines (one in the SIT group, and two in the UAT group). We will now create the representations for these machines (agents) in our model.

Hover your mouse over the entry for the **SIT Department** and the **Actions...** context menu will appear on that row, a little further to the right.

Click the **Actions...** context menu and select **Add Agent**.

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The screenshot shows the 'Resources' section of the IBM UrbanCode Deploy interface. In the 'Resource Tree' view, there is a folder named 'SIT Department' under 'Primary Data Center'. A context menu is open over the 'SIT Department' item, with the 'Actions...' option highlighted. The 'Add Agent' option in the menu is also circled in red.

In the **Agent** field, set the drop down box to **localhost** (our only selection, because we only have one actual Agent installed).

Change the **Name** field to:

ucd.sit-server.com

The 'Create Resource' dialog box is shown. The 'Agent' dropdown is set to 'localhost'. The 'Name' field contains 'ucd.sit-server.com'. The 'Inherit Teams From Parent' checkbox is checked. The 'Default Impersonation' checkbox is unchecked. At the bottom, there are 'Save' and 'Cancel' buttons.

Click the **Save** button.

Your screen should look like the picture below:

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The screenshot shows the 'Resources' section of the UrbanCode Deploy interface. At the top, there's a navigation bar with links like Dashboard, Components, Applications, Configuration, Processes, Resources, Calendar, and Work Items. Below that is a breadcrumb trail: Home > Resources. Under Resources, there are tabs for Resources, Resource Templates, Agents, Agent Pools, and Cloud Connections. A button for 'Create Top-Level Group' is visible. Below these are buttons for 'Select All...', 'Actions...', and 'Show'. The main area features a tree view on the left and a table on the right. The tree view shows 'Primary Data Center' expanded, revealing 'SIT Department' and 'UAT Department'. 'SIT Department' contains an agent entry for 'ucd.sit-server.com (View Agent)'. 'UAT Department' is collapsed. The table has columns for Name, Inventory, and Status. It lists three agents: 'ucd.sit-server.com' (Status: Online), 'ucd.uat-app-server.com' (Status: Online), and 'ucd.uat-db-server.com' (Status: Online). There are also 'Refresh' and 'Print' buttons at the bottom.

Now hover your mouse over the **UAT Department**, and use the **Actions...** context menu to **Add Agent** to *that group*.

Again, set the **Agent** dropdown to **localhost**. Change the **Name** field to:

ucd.uat-app-server.com

Add one more Agent to the **UAT Department**... The **Agent** dropdown must again be **localhost**. Change the **Name** field to:

ucd.uat-db-server.com

Your screen should now look like the picture below:

This screenshot shows the same 'Resources' page after adding two new agents to the 'UAT Department'. The tree view remains the same. In the table, the 'UAT Department' row now contains three entries: 'ucd.uat-app-server.com (View Agent)', 'ucd.uat-db-server.com (View Agent)', and another entry for 'ucd.uat-app-server.com (View Agent)'. All three agents are listed as 'Online' in the 'Status' column. The 'Refresh' and 'Print' buttons are at the bottom.

5.3 Associating Environments with Resources and Components

Now we've described our Data Center resources. Next we tell UrbanCode Deploy which of those resources are assigned to each of the environments (SIT and UAT).

5.3.1 Identify the resources for the SIT environment

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (SIT and UAT).

The screenshot shows the 'Applications' tab selected in the top navigation bar. Below it, a table lists the 'JPetStore' application. The 'Name' column contains 'JPetStore'. The 'Created' column shows '3/20/2015'. A red circle highlights the 'JPetStore' entry in the table.

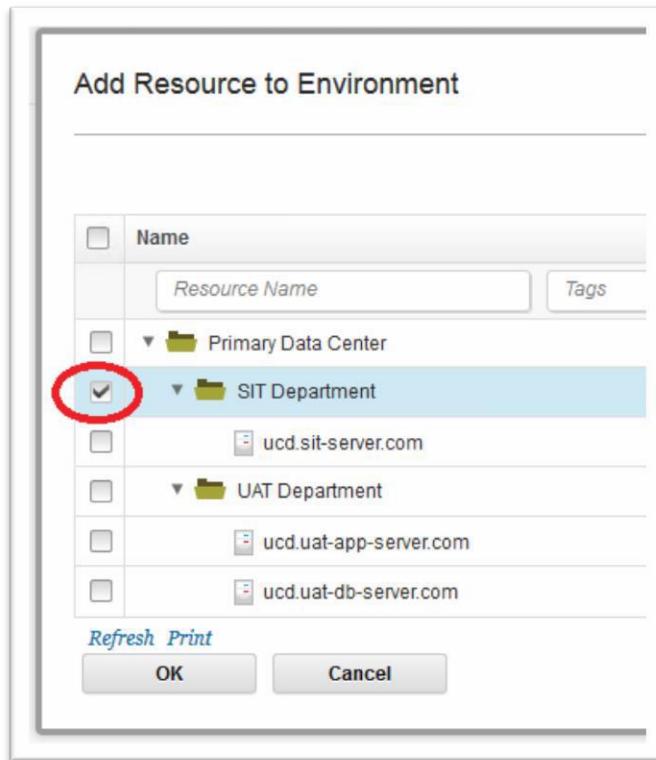
Click on the **SIT** environment (click on the text for **SIT** as shown below).

The screenshot shows the 'JPetStore' application details page. The 'Environments' tab is selected. It displays two environment entries: 'SIT' and 'UAT'. The 'SIT' entry is highlighted with a red circle around its name. Both entries have icons for play, stop, and more options.

From the **Resources** tab in the lower row of tabs click on the **Add Base Resources** button.

	<p><i>Note that some tabs on the upper and lower rows are named the same. Context is important... take note when you are asked to select a tab if it is on the <u>upper</u> or <u>lower</u> row!</i></p>
---	--

In the resulting list, click the check box next to the folder named SIT Department. This will include all the children of that object as well (in this case, that means the server named `ucd.sit-server.com`). In this way we tell UrbanCode Deploy which resources (machines) are associated with the SIT department.



Click the **OK** button. The environment (SIT) should now display the folders we just indicated.

The screenshot shows the 'Environment: SIT for JPetStore' page. At the top, there's a navigation bar with tabs: Dashboard, Components, Applications, Configuration, and Processes. Below the navigation is a breadcrumb trail: Home > Applications > JPetStore > Environments > Environment: SIT. The main title 'Environment: SIT for JPetStore' is circled in red. Below the title, there are tabs for Resources, History, Calendar, Configuration, and Changes. A message 'No Desired Inventory' is displayed. There are buttons for 'Add Base Resources', 'Select All...', 'Actions...', and 'Show'. A table lists resources under 'Name', showing 'Resource Name' and 'Tags'. One entry is circled in red: 'Primary Data Center / SIT Department'. At the bottom, there are 'Refresh' and 'Print' links.

5.3.2 Identify resources for the UAT environment

Repeat these steps in the previous section to add the **UAT Department** resource group to the **UAT** environment.

The screenshot shows the 'Applications' page. The 'Applications' tab is circled in red. Below the tabs are buttons for 'Create Application', 'Import Applications', 'Actions...', and 'Flat list'. A table lists applications with columns for Name, Description, and Created. One application, 'JPetStore', is circled in red. At the bottom, there are 'Refresh' and 'Print' links.

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The screenshot shows the IBM UrbanCode Deploy interface. The top navigation bar includes 'Dashboard', 'Components', 'Applications', 'Configuration', and 'Processes'. Below the navigation, the path 'Home > Applications > JPetStore' is displayed. The main title is 'Application: JPetStore'. Underneath, it shows 'Created By: admin' and 'Created On: 3/20/2015, 11:33:42'. A tab bar at the bottom includes 'Environments', 'History', 'Configuration', and 'Com...'. A blue button labeled 'Create Environment' is visible. Below this, there is a search bar with 'Search by Name' and an 'Or' dropdown. Two environment cards are listed: 'SIT' (blue background) and 'UAT' (orange background). The 'UAT' card is circled in red.

The screenshot shows the 'Environment: UAT for JPetStore' configuration page. The top navigation bar includes 'Dashboard', 'Components', 'Applications', 'Configuration', and 'Processes'. The path 'Home > Applications > JPetStore > Environments > Environment: UAT' is shown. The main title is 'Environment: UAT for JPetStore'. Below it, a tab bar includes 'Resources', 'History', 'Calendar', 'Configuration', and 'Changes'. A message 'No Desired Inventory' is displayed. A blue button labeled 'Add Base Resources' is circled in red. To its right are buttons for 'Select All...', 'Actions...', and 'Show'. A table below has columns for 'Name', 'Resource Name', and 'Tags'. The status 'No resource' is shown at the bottom right.

The top screenshot shows the 'Add Resource to Environment' dialog box. It has a 'Name' field with a 'Resource Name' input and a 'Tags' button. Below is a tree view of resources:

- Primary Data Center
 - SIT Department
 - ucd.sit-server.com
 - UAT Department** (highlighted with a red circle and checked)
 - ucd.uat-app-server.com
 - ucd.uat-db-server.com

Buttons at the bottom include Refresh, Print, OK, and Cancel.

The bottom screenshot shows the 'Environment: UAT for JPetStore' page. The URL in the browser is Home > Applications > JPetStore > Environments > Environment: UAT. The page title is 'Environment: UAT for JPetStore'. The navigation tabs are Dashboard, Components, Applications, Configuration, and Processes. The current tab is Applications. The page content shows:

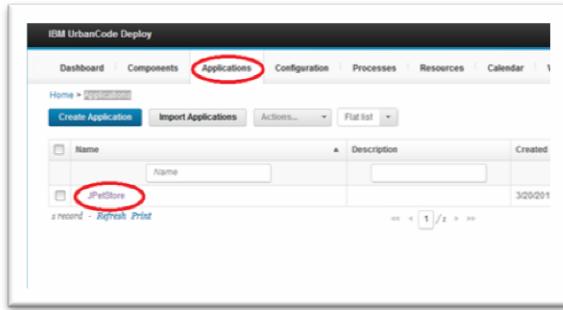
- No Desired Inventory
- Action buttons: Add Base Resources, Select All..., Actions..., Show
- A table with columns: Name, Resource Name, Tags. It lists:
 - Primary Data Center / UAT Department (highlighted with a red circle)

5.3.3 Assign the Application Components to be installed on the Resources in the SIT Environment

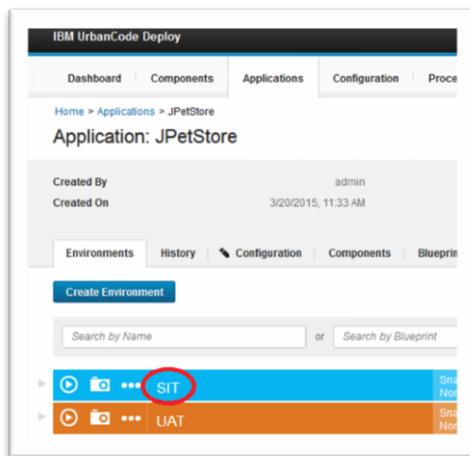
Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (**SIT** and **UAT**).

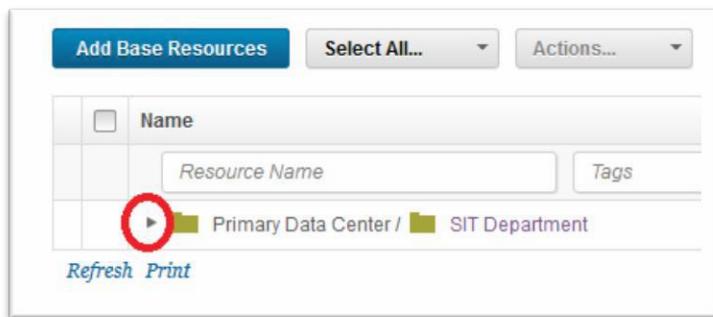
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Click on the **SIT** environment (click the text for SIT as shown below).



Click the ‘twistie’ control to expand the tree under the resource groups.



You should see the resource **ucd.sit-server.com** and the **Actions...** menu to the right. (If you do not see the **Actions...** menu, hover your mouse over the **ucd.sit-server.com** resource and it will appear.)

Click the **Actions...** menu and select **Add Component**.

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The screenshot shows the IBM UrbanCode Deploy application interface. The top navigation bar includes links for Dashboard, Components, Applications, Configuration, Processes, Resources, and Calendar. Below the navigation is a breadcrumb trail: Home > Applications > JPetStore > Environments > Environment: SIT. The main title is "Environment: SIT for JPetStore". Under the "Resources" tab, there is a table with one row: "ucd.sit-server.com (View Agent)". An "Actions..." button is shown to the right of the table, and a context menu is open over the "ucd.sit-server.com" entry. The context menu options are: Compare or Synchronize, Add Group, Add Component (which is highlighted and circled in red), Add Component Tag, and Delete.

In the **Create Resource** dialog box, set the **Component** dropdown to **JPetStore-Web** and hit the **Save** button.

The screenshot shows the "Create Resource" dialog box. It has fields for "Component" (set to "JPetStore-Web"), "Description" (set to "JPetStore-DB"), "Inherit Teams From Parent" (unchecked), "Teams" (list containing "JPetStore-JEE" and "JPetStore-Web" with "JPetStore-Web" selected), and "Default Impersonation" (unchecked). A note at the bottom states: "Default impersonation can be configured here. Any steps which do not specify their own impersonation settings will fall back to the settings provided here." At the bottom are "Save" and "Cancel" buttons.

Repeat this last step twice more to add **JPetStore-JEE** and **JPetStore-DB** to the **ucd.sit-server.com** resource as well.

Your screen should now look like this:

In this way, we've told UrbanCode Deploy that these three components (**JPetStore-DB**, **JPetStore-JEE** and **JPetStore-JEE**) will all be installed on the same machine, namely **ucd.sit-server.com**.

5.3.4 Assign the Application Components to be installed on the Resources in the UAT Environment

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (**SIT** and **UAT**).

Click on the **UAT** environment (click the text for **UAT** as shown below).

The screenshot shows the 'Application: JPetStore' page in the IBM UrbanCode Deploy interface. At the top, there are tabs for Dashboard, Components, Applications, and Configuration. Below the tabs, it shows 'Created By: adn' and 'Created On: 3/20/2015, 11:33'. There are tabs for Environments, History, Configuration, and Components. A prominent blue button labeled 'Create Environment' is visible. Below these, there is a search bar and a list of environments: SIT and UAT. The 'UAT' environment is highlighted with a red circle.

Click the ‘twistie’ control to expand the tree under the resource groups.

The screenshot shows the 'Add Basic Resources' screen. It has tabs for Add Basic Resources, Select All, Advanced, and Show. There is a search bar for Resource Name and a Tags field. Below is a table with a single row. The first column contains a checkbox and a twistie icon. The second column contains the name 'Resource Name' and the path 'Primary Data Center / UAT Department'. The twistie icon in the first column is highlighted with a red circle. At the bottom, there are Refresh and Print links.

You should now see the two resources we assigned to the UAT Department:

- [ucd.uat-app-server.com](#)
- [ucd.uat-db-server.com](#)

Hover your mouse over ucd.uat-app-server.com and you should see the **Actions...** menu appear to the right. Click the **Actions...** menu and select **Add Component**.

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The screenshot shows the 'Environment: UAT for JPetStore' page in the IBM UrbanCode Deploy interface. A context menu is open over a resource entry for 'ucd.uat-app-server.com (View Agent)'. The 'Actions...' menu is expanded, showing options like 'Compare or Synchronize', 'Add Group', 'Add Component' (which is highlighted with a red circle), 'Add Component Tag', and 'Delete'. The 'Add Component' option is the target for the next step.

In the **Create Resource** dialog box, set the **Component** dropdown to **JPetStore-Web** and hit the **Save** button.

The screenshot shows the 'Create Resource' dialog box. The 'Component' dropdown is set to 'JPetStore-Web'. The 'Description' field contains 'JPetStore-DB'. The 'Teams' dropdown shows 'JPetStore-JEE' and 'JPetStore-Web' as options, with 'JPetStore-Web' selected. The 'Default Impersonation' checkbox is unchecked. At the bottom are 'Save' and 'Cancel' buttons.

Repeat this last step once more to add **JPetStore-JEE** to the **ucd.uat-app-server.com** resource as well. (Do **NOT** add **JPetStore-DB** to this resource!!)

Next, use this same technique to add the **JPetStore-DB** component to the OTHER resource (machine), **ucd.uat-db-server.com**. Your screen should now look like this:

No Desired Inventory

Add Base Resources Select All... Actions... Show

	Name	Tags
ucd.uat-app-server.com	(View Agent)	
JPetStore-JEE		
JPetStore-Web		
ucd.uat-db-server.com	(View Agent)	
JPetStore-DB		

Refresh Print

As the name of the machine implies, `ucd.uat-db-server.com` is a database server. It is almost always the case that a database server is a dedicated server with no other processes or services running on it. We have designed the UAT environment to reflect this... with two application components installed on `ucd.uat-app-server.com` and the database component installed on `ucd.uat-db-server.com`. We do this to demonstrate the capability of UrbanCode Deploy to accommodate different topologies in different environments that still require the same application. (Please recall that the `SIT` environment has a different physical topology... only one machine named `ucd.sit-server.com` on which all three application components are installed.)

After we encode the deployment processes (in the upcoming sections), the UrbanCode Deploy users simply have to push a single button to deploy to any environment. This is a very powerful feature of UrbanCode Deploy that can enable authorized managers to initiate deployments without having to be application experts or IT specialists (or rely on others for those skills). One common scenario is that a QA manager can initiate a deployment for their test groups without having to wait for the developers or release engineers to become available. This can dramatically reduce the time it takes to schedule and conduct QA operations.

6 UrbanCode Component Processes

UrbanCode Deploy we can create processes to do whatever work is required. Processes can be attached to Application objects, Component objects, or they can be unattached general processes.

A Component Process is a script for deploying or managing the deployment of a component. In this section, you define the Process for deploying the JPetStore-Web component to a target computer.

Since the UrbanCode Deploy Component contains the Process or Processes it needs to deploy itself, that information is available no matter which environment (or on which machine) it must be deployed. The process can also be parameterized to accommodate configuration differences in different environments (or on different servers) so the UrbanCode Deploy operator needs only indicate the action to deploy the Application – and does not need to be concerned with (or have the knowledge of) *how* to deploy it (because the UrbanCode Components, themselves, already know!). Again, this removes bottlenecks for authorized managers who might need to wait for skilled technicians before they can continue with their work.

6.1 Deployment Process for JPetStore-Web component

6.1.1 Create the new Process – Deploy Web Component

In the top row of tabs click the Components tab. In the resulting list, click **JPetStore-Web**.

In the lower row of tabs, click the Processes tab. (NOTE - please note the upper row of tabs also has a tab named Processes... you need to pick the LOWER tab to associate this process with the **JPetStore-Web** component.) Click the **Create Process** button.

The screenshot shows the 'JPetStore-Web' component details page. At the top, there's a navigation bar with tabs: Dashboard, Components (which is active), Applications, Configuration, Processes (circled in red), Resources, and Calendar. Below the navigation bar, the component name 'JPetStore-Web' is displayed. Underneath the component name, there are three metadata items: 'Created By' (admin), 'Created On' (3/20/2015, 11:03 AM), and 'Used By' (JPetStore). At the bottom of the component details section, there's a row of tabs: Dashboard, Usage, Configuration, Calendar, Versions, Processes (circled in red), and Changes. Below these tabs, a large blue 'Create Process' button is circled in red. The main content area shows a table with two columns: 'Process' and 'Description'. A message at the bottom states 'No processes have been added to this comp'. At the very bottom of the page, there are 'Refresh' and 'Print' links.

Name the new process **Deploy Web Component**.

Make sure the **Process Type** field is set to **Deployment**.

Create Process	
Name *	Deploy Web Component
Description	
Process Type *	Deployment
Inventory Status *	Active
Default Working Directory *	<code> \${p:resource/work.dir}/\${p:component.name}</code>
Required Role	None
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

Note the field **Default Working Directory**. Processes are executed by UrbanCode Agents on the target machine (resource). (They are NOT executed on the UrbanCode Server machine.) The **Default Working Directory** is a temporary area in which the UrbanCode Agent may deposit temporary files while it does its work.

The value of the **Default Working Directory** includes UrbanCode “**properties**”, which allow us to parameterize processes. **Properties** are indicated by the characters `${p:` followed by the object to which they apply, and an identifier as to which property is desired. The property reference is terminated by a closing ‘squiggle bracket’ `}` .

In the **Default Working Directory** field there are two properties referenced:

`${p:resource/work.dir}` the working directory on the machine (resource) where the UrbanCode agent is installed. This could vary from machine to machine. The value is set when the UrbanCode Agent is installed, and can be referenced by processes from then on.

`${p:component.name}` the name of the component to which this process is attached. In our case, this is the **JPetStore-Web** component.

UrbanCode properties can be used in any editable field and are interpreted at runtime. There is a predefined and documented set of properties that are included with UrbanCode Deploy, and the operator can also create their own custom properties as needed.

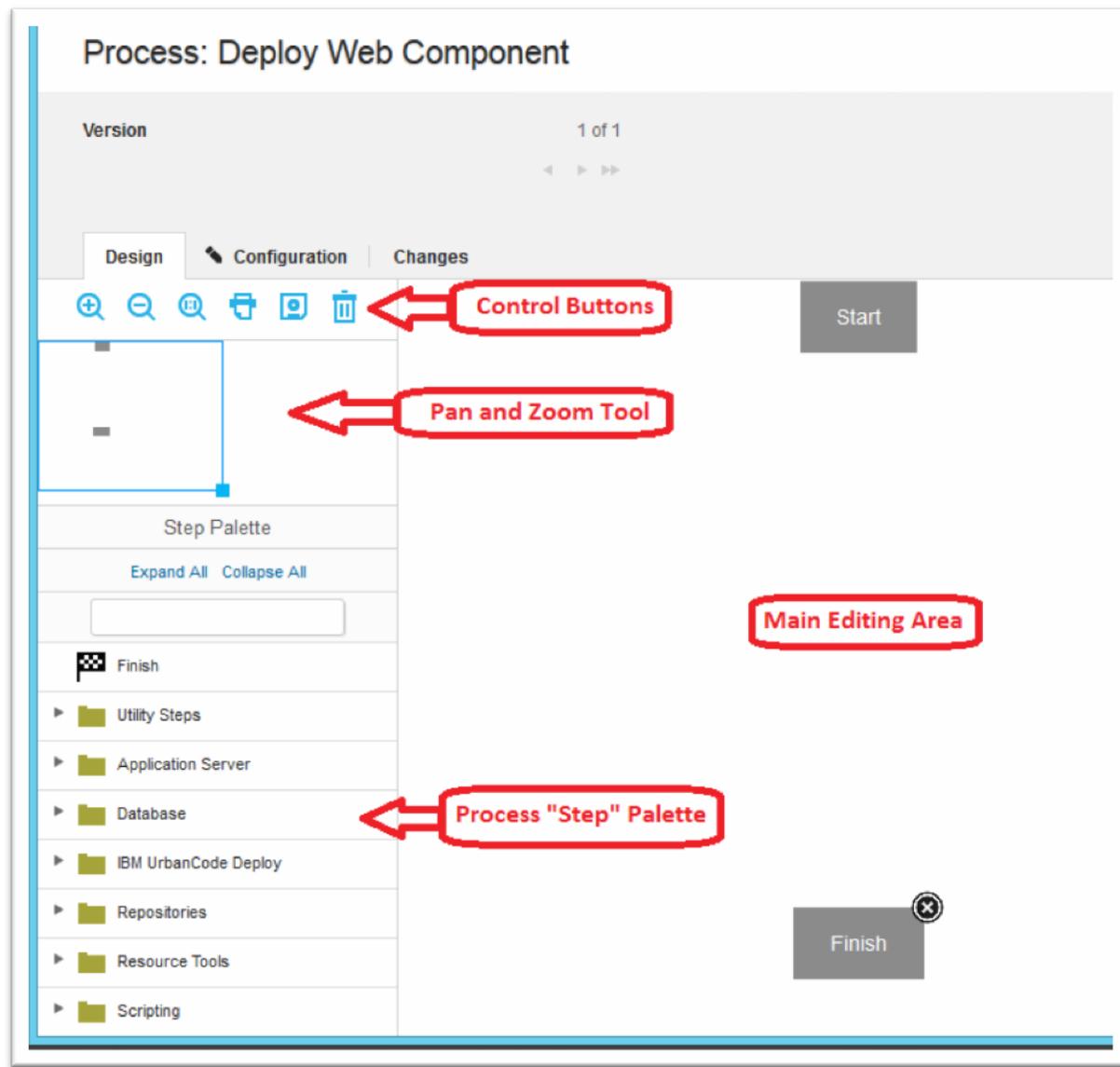
Most objects in UrbanCode Deploy can have properties associated with them – Components, Applications, Environments, Resources, etc.

(During the construction process, the UrbanCode operator can see the values expanded out. This is helpful for debugging processes, and also for audit trails to see exactly what is happening on a target server.)

Click the **Save** button to complete the **Create Process** action.

Click on the name of the new **Deploy Web Component** process. This will open the **UrbanCode Deploy Process**

Designer (a graphical editor that allows us to specify the steps and flow of execution for a process).



This editor allows us to drag-and-drop process “Steps” from the Palette (on the left) into the main Editing Area (on the right). Many steps are included by default with the base installation of UrbanCode Deploy. Others are included by loading the Plugins (which we did in earlier chapters). The DBUpgrader and Tomcat plugins have provided Steps in this Designer that we will use in the next section to describe what happens when this process is executed. (REMEMBER – the process will be executed by the UrbanCode Agent on the machine where the Agent is installed, not by the UrbanCode Server!)

6.1.2 Define the Process Steps in the Process Designer

Let's take a moment to describe the big picture of what we'll accomplish.

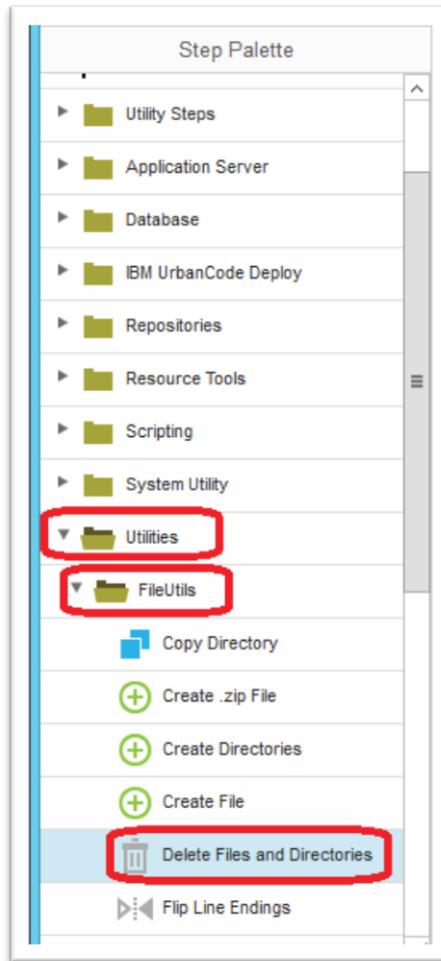
This component (JPetStore-Web) contains static web content that is intended to be deployed to a Tomcat server. This process will be responsible for the actions to make that happen. We will build steps to:

- Clean up the Agent's working directory (delete any files that might have been left by previous actions – this is a best practice we will employ in all deployment-related processes)
- Download new versions of the artifacts to the Agent machine
- Remove old content from the Tomcat server
- Deploy new content to the Tomcat server

The steps we put in this process will reflect these actions.

In the **Process Designer**, scroll down until you see the **Utilities** folder (NOTE – not the Utility Steps folder, but the Utilities folder lower in the Palette).

Expand the **Utilities** folder, then the **FileUtils** folder and look for the step named **Delete Files and Directories**.



Drag the **Delete Files and Directories** step from the **Palette** into the **Main Editing Area** and drop it just below the **Start** block. This will produce the **Edit Properties** dialog.

Set the properties as shown below:

Property	Value
Name	Clean Working Directory
Base Directory	.
Include	**/*

Click the **OK** button.

Your screen should look something like this:

The screenshot shows the 'Process: Deploy Web Component' configuration screen. At the top, there's a navigation bar with tabs: Dashboard, Components, Applications, Configuration, Processes, Resources, and Calendar. Below the navigation is a breadcrumb trail: Home > Components > JPetStore-Web > Processes > Process: Deploy Web Component. The main area has a title 'Process: Deploy Web Component'. Below the title, it says 'Version 1 of 1'. There are navigation arrows for navigating through steps. A toolbar above the process canvas includes icons for adding, deleting, and configuring steps. The process canvas itself shows a single step: 'Delete Files and Directories'. To the left of the canvas is a 'Step Palette' pane containing a tree view of available steps under 'System Utility' and 'Utilities'. Under 'Utilities', 'FileUtils' is expanded, showing 'Copy Directory', 'Create .zip File', 'Create Directories', 'Create File', 'Delete Files and Directories' (which is highlighted in blue), 'Flip Line Endings', and 'Monitor File Contents'. On the right side of the process canvas, there are 'Start' and 'Finish' buttons. A purple callout box points to the 'Delete Files and Directories' step in the palette, with the text 'Clean Working Directory Delete Files and Directories (v. 39)'.

Now we'll indicate the direction of process flow.

Hover the mouse cursor over the **Start** step and you'll notice a small arrow in a circle appear in the center. Move the mouse over this arrow and the cursor changes to a hand. Click and drag the arrow from the **Start** block to the **Clean Working Directory** block we just created and release the mouse button. This will create an arrow from the **Start** block to the **Clean Working Directory** step, which indicates the direction of process flow.

The start of your process should look like this now:



Next we'll create a step to download the files associated with this component.

In the **Palette**, look for the folder named **Repositories** and expand it. Then expand the **Artifact** and the **IBM UrbanCode Deploy** folders. Locate the step named **Download Artifacts** and drag it into the editing area just under the **Clean Working Directory** step.

The default values should be adequate – no changes are needed to the properties. The key values should be set to the following:

Property	Value
Name	Download Artifacts
Directory Offset	.
Includes	**/*

Click the **OK** button (you may need to scroll down in the dialog to see it).

Draw a Flow Arrow from Clean Working Directory to the new Download Artifacts step we just created.

Now add another step to delete the current content in the Tomcat folder. Expand the **Utilities** folder, then the **FileUtils** folder and look for the step named **Delete Files and Directories**.

Drag and drop the Delete Files and Directories step into the Main Editing Area just below the **Download Artifacts** step. Set the properties as shown below:

Property	Value
Name	<code>Remove Old Content</code>
Base Directory	<code> \${p:environment/tomcat.home} \webapps\JPetStore\images</code>
Include	<code>*</code>



*Note our use of UrbanCode Deploy properties in the **Base Directory** value. The property*

`${p:environment/tomcat.home}`

represents the install location of Tomcat, and could be different in each environment we address. This property lets us use this same Component and Procedure to install the component no matter where Tomcat has been installed.

For our lab we have created two environments: `SIT` and `UAT`. So we will set the value of the 'tomcat.home' property differently in each environment. (This is done a bit later in the lab.)

Click the **OK** button.

Draw a Flow Arrow from Download Artifacts to the new Remove Old Content step we just created.

One more step to add. In the **Palette** open the folders **Utilities** and **FileUtils** and locate the step named **Move Directory**. Drag and drop this step into the **Main Editing Area** just under **Remove Old Content**, but above the **Finish** block. (NOTE – you may have to drag the **Finish** block down in the diagram to make room.)

Set the properties as shown below:

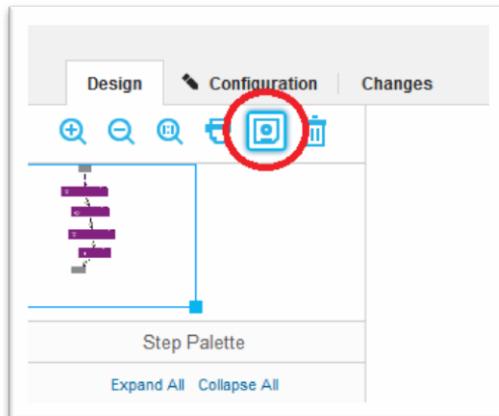
Property	Value
Name	<code>Deploy New Content</code>
Source Directory	<code>.\images</code>
Destination Directory	<code> \${p:environment/tomcat.home} \webapps\JPetStore\images</code>
Include Files	<code>**/*</code>

Click the **OK** button.

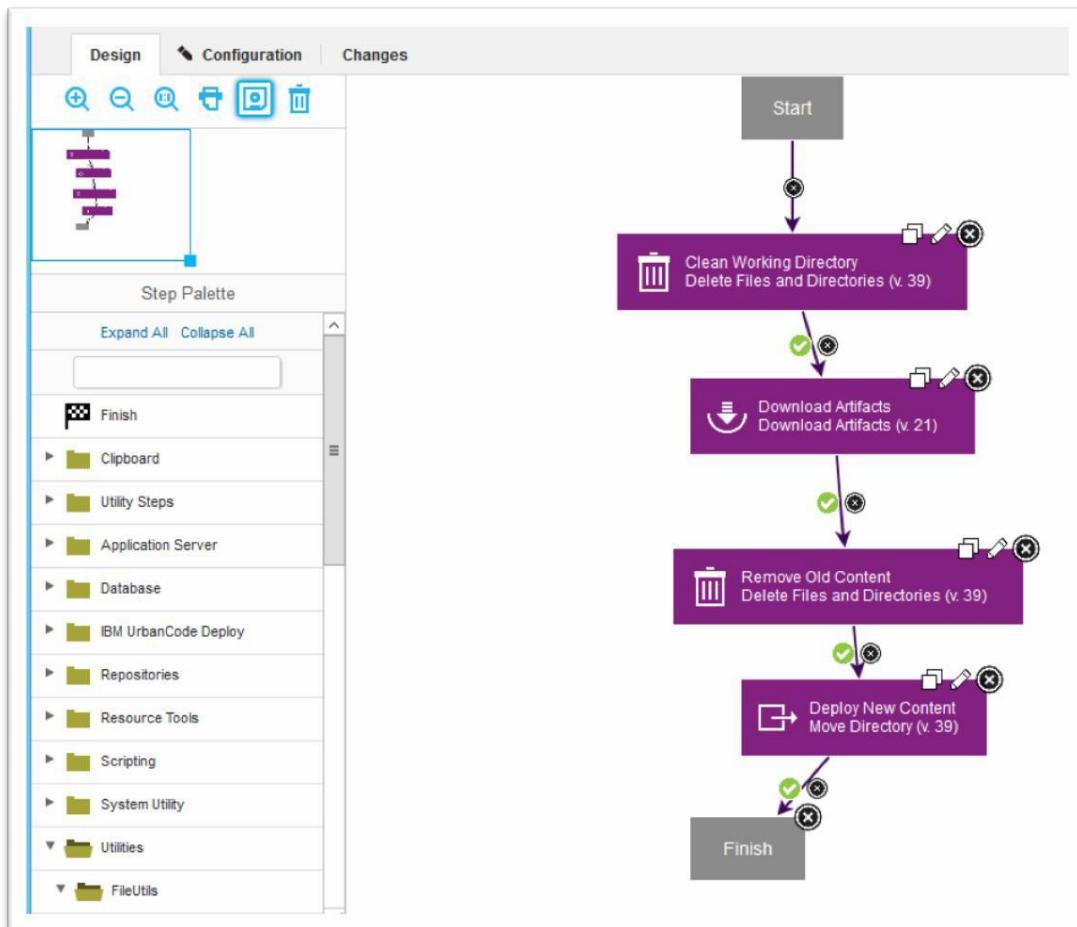
Draw a Flow Arrow from Remove Old Content to the new Deploy New Content step we just created.

Now draw a Flow Arrow from **Deploy New Content** to the Finish block.

At the top of the **Palette** click the icon to **Save** the work you've done in the **Process Designer**. (It looks like a small blue floppy disk.)



Your screen should now look something like this:



6.2 Deployment Process for JPetStore-JEE component

Once again let's take a moment to review the intentions for this process.

The UrbanCode JEE component holds the .WAR file for the JPetStore application. The .WAR file contains information in a property file that must be modified to match the computer where it is installed. Specifically, the WAR file contains

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the database connection information that will be different for SIT and UAT. We will use UrbanCode Deploy properties to modify that property file at deployment time.

Also, .WAR files need to be “Deployed” to the Tomcat server using API calls. The UrbanCode Deploy plugin for Tomcat makes this easy by including features to “Deploy” and “Undeploy” as process steps.

A Java .WAR file is compressed using ZIP technology. To modify configuration files, expand (unzip) the WAR file, update the appropriate files, and then compress (re-zip) the WAR file.

So the outline for this process will be to:

- Clean up the Agent’s working directory
- Download new versions of the artifacts to the Agent’s machine
- Extract the contents of the .WAR file so we can edit the properties file
- Edit the properties file to reflect the current Environment
- Re-zip the contents with the updated property file back to a .WAR file
- Signal the Tomcat server to start up
- Remove (un-deploy) the previous version of the .WAR file
- Deploy the new version of the .WAR file

The steps we use in this process will reflect these actions.

6.2.1 Create the new Process – Deploy JEE Component

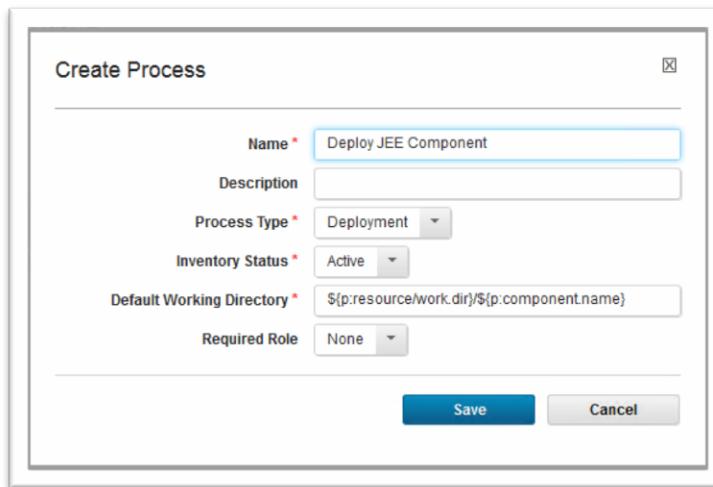
In the top row of tabs click the Components tab. In the resulting list, click **JPetStore-JEE**.

In the lower row of tabs, click the Processes tab. (NOTE – again, take care to pick the tab in the lower row.)

Click the **Create Process** button.

Name the new process **Deploy JEE Component**.

Make sure the **Process Type** field is set to **Deployment**.



Click the **OK** button.

6.2.2 Define the Process Steps in the Process Designer

In the previous section we navigated to process steps by opening folders and scrolling to find the step. But the Palette provides us a Search Bar to make the process easier – if we know the name of the step we’re looking for. We’ll use that feature to help create the next process.

Click on the name of the new **Deploy JEE Component** process. This will open the **UrbanCode Deploy Process Designer** (a graphical editor that allows us to specify the steps and flow of execution for a process).

In the **Palette Search Bar** type the words **delete files** and type the **Return** key. Notice that the list of folders and steps is reduced to just the one we’re looking for... **Delete Files and Directories!** This can be a very handy feature once you get to know the steps. You won’t have to remember which folder houses the step you are looking for.

Drag the **Delete Files and Directories** step from the **Palette** into the **Main Editing Area** and drop it just below the **Start** block. This will produce the **Edit Properties** dialog.

Set the properties as shown below:

Property	Value
Name	Clean Working Directory
Base Directory	.
Include	**/*

Click the **OK** button.

Draw a **Flow Arrow** from the **Start** block to the new **Clean Working Directory** step we just created.

Use the **Search Bar** again to locate the **Download Artifacts** step. Drag and drop one of these steps into the **Process Designer** below the **Clean Working Directory** step. The default values of all the properties should be sufficient.

Click the **OK** button.

Draw a Flow Arrow from Clean Working Directory to the new Download Artifacts step we just created.

Use the **Search Bar** again to locate the **Unzip** step. Drag and drop one of these steps into the **Process Designer** below the **Download Artifact** step. Set the properties as shown below:

Property	Value
Name	Expand WAR Contents
Extract directory	.\JPetStore_expanded
.zip files	JPetStore.war

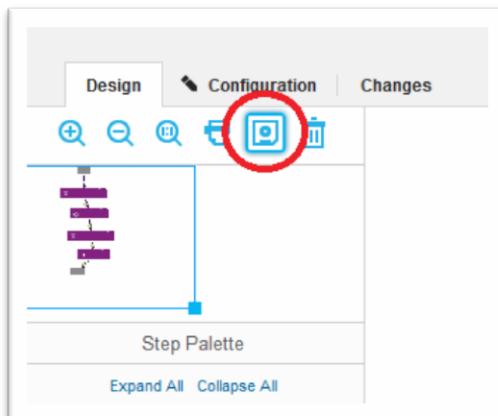
Include Files

**/*

Click the **OK** button.

Draw a Flow Arrow from Download Artifacts to the new Expand WAR Contents step we just created.

Click the **OK** icon in the Palette to preserve your process to this point.



Use the **Search Bar** again to locate the **Update Java Properties File** step. Drag and drop one of these steps into the **Process Designer** below the **Download Artifacts** step. Set the properties as shown below:

Property	Value
Name	Update Property File
Directory Offset	.\JPetStore_expanded\WEB-INF\classes\properties
File Includes	database.properties
Add/Update properties	url=\${p:environment/db.url}

Notice again that the value of the **Add/Update properties** field uses an UrbanCode property... we will set this property for each environment later in the lab.

Click the **OK** button.

Draw a Flow Arrow from Expand WAR Contents to the new Update Property File step we just created.

Use the **Search Bar** again to locate the **Create .zip File** step. Drag and drop one of these steps into the **Process Designer** below the **Update Property File** step. Set the properties as shown below:

Property	Value
Name	Update WAR File
.zip File Name	JPetStore.war
Base Directory	.\JPetStore_expanded
Include	**/*
Update Existing	<checked>

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Click the **OK** button.

Draw a Flow Arrow from Update Property File to the new Update WAR File step we just created.

Use the **Search Bar** again to locate the **Start Tomcat** step. Drag and drop one of these steps into the **Process Designer** below the **Update WAR File** step. Set the properties as shown below:

Property	Value
Name	Start Tomcat
Launcher	<code> \${p:environment/tomcat.start}</code>
Startup timeout	<code>30</code>
Port	<code> \${p:environment/tomcat.port}</code>
Catalina Home	<code> \${p:environment/tomcat.home}</code>

Click the **OK** button.

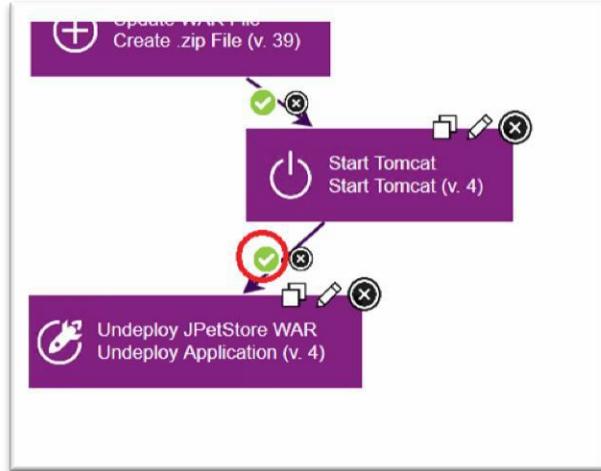
Draw a **Flow Arrow** from **Update WAR File** to the new **Start Tomcat** step we just created.

Use the **Search Bar** again to locate the **Undeploy Application** step. The one we want will be found in the **Tomcat** folder. Drag and drop one of these steps into the **Process Designer** below the **Start Tomcat** step. Set the properties as shown below:

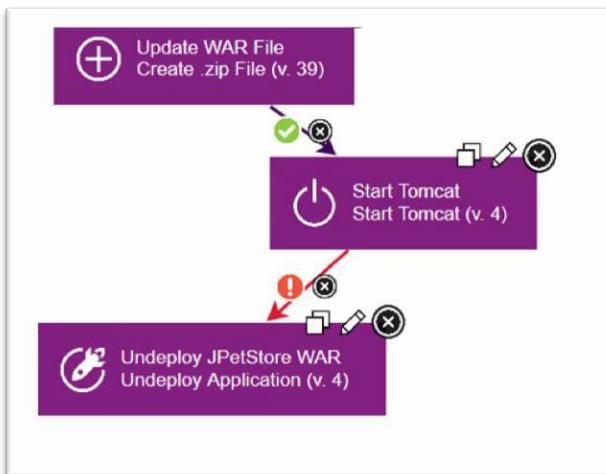
Property	Value
Name	Undeploy JPetStore WAR
Tomcat Manager URL	<code> \${p:environment/tomcat.url}:\${p:environment/tomcat.port}/manager/text</code>
Tomcat Manager Username	<code>demo</code>
Tomcat Manager Password	<code>demo</code>
Context Name	<code>/JPetStore</code>

Click the **OK** button.

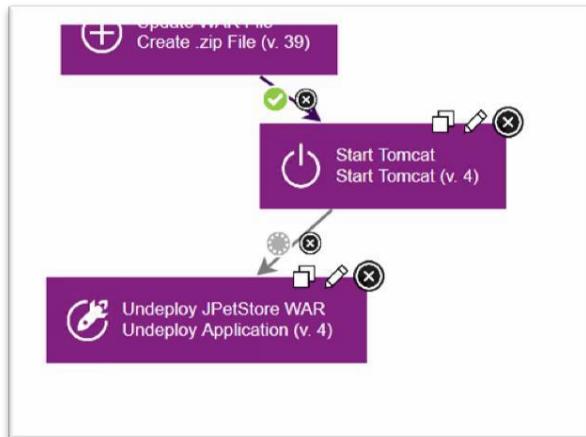
Draw a **Flow Arrow** from **Start Tomcat** to the new **Undeploy JPetStore WAR** step we just created. Now click on the green checkmark that appears on this last flow arrow:



The green check changes to a red exclamation point.



Click the red exclamation point and it changes to a grey circle.



	<p><i>Each of these states indicates some error control result in our process:</i></p> <ul style="list-style-type: none"> • <i>Green Check = continue only if step succeeds</i> • <i>Red Exclamation = continue only if step fails</i> • <i>Grey Circle = continue in all cases (failure or success)</i> <p><i>In our process, we've changed the state to a Grey Circle. Why? If the Tomcat server is already started, then the Start Tomcat step will fail with an error code. Because this situation is irrelevant to us (since all we want is the server to be started) we tell our process to continue whether or not the Start Tomcat step fails.</i></p> <p><i>We could also use this feature to indicate different paths based on whether a step fails or succeeds. (We can draw more than one arrow out of a step, and use the designations of green check or red exclamation to control process flow down two different paths.)</i></p> <p><i>There are also more complex steps for controlling flow logic (including a Switch step that allows us to traverse one of several paths based on some value) but that is subject for another lab.</i></p>
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Use the **Search Bar** again to locate the **Deploy Application** step. The one we want will be found in the **Tomcat** folder.

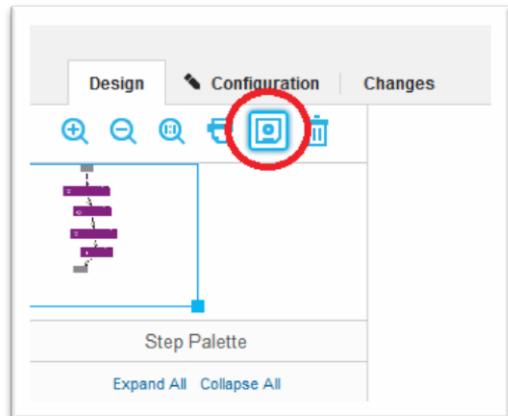
Drag and drop one of these steps into the **Process Designer** below the **Undeploy JPetStore WAR** step. Set the properties as shown below:

Property	Value
Name	<code>Deploy JPetStore WAR</code>
Tomcat Manager URL	<code> \${p:environment/tomcat.url}:\${p:environment/tomcat.port}/manager/text</code>
Tomcat Manager Username	<code>demo</code>
Tomcat Manager Password	<code>demo</code>
Context Name	<code>/JPetStore</code>
War File Path	<code>.\\JPetStore.war</code>

Click the **OK** button.

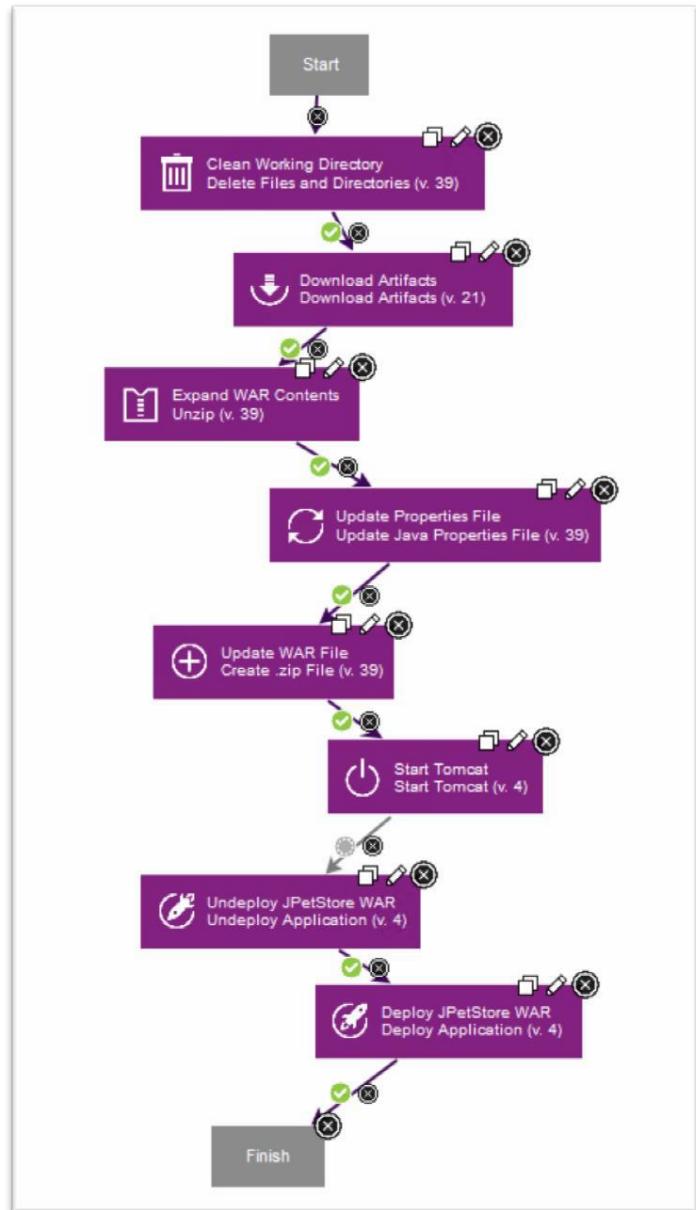
Draw a **Flow Arrow** from **Undeploy JPetStore WAR** to the new **Deploy JPetStore WAR** step we just created... then from the **Deploy JPetStore WAR** step to the **Finish** block.

Click the blue **Save** button on the **Palette** to save this process.



Your process diagram should now look something like this:

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7 UrbanCode Deploy Properties

7.1 Overview

As we mentioned earlier, UrbanCode Deploy allows us to use properties to improve the flexibility of our processes. Properties can be attached to several kinds of UrbanCode Deploy objects, including Environments (like our **SIT** and **UAT** environments). While building our processes we have been referencing properties in the fields of our steps. Many of those properties were “custom” and we must provide a value for them in the right context.

We can use UrbanCode Deploy properties to improve the flexibility and reusability of the elements we create. For instance, a property set on an Environment can be used to hold a value that is particular to that Environment (like the url for a database server in QA, which will almost certainly be a different value in the production environment).

To set a property value in the context of an Environment, we must add that property (and its value) to each of the UrbanCode Deploy Environment objects.

Several deployment properties have been referenced as shown below. You need to define values for these properties.

In this section we'll define the properties and their values for our two Environments.

7.1.1 Define SIT Environment Properties

Click the **Applications** tab in the top row of tabs. Click on the link for the **JPetStore** application.

The screenshot shows the UrbanCode Deploy interface with the 'Applications' tab selected. Below the tabs, there's a breadcrumb navigation showing 'Home > Applications'. There are buttons for 'Create Application', 'Import Applications', and 'Actions...'. A dropdown menu shows 'Flat list'. The main area displays a table with columns 'Name', 'Description', and 'Created'. One record is listed: 'JPetStore' with a creation date of '3/20/2011'. At the bottom left, it says '1 record'. On the bottom right, there are buttons for 'Refresh' and 'Print'.

Click on the **SIT** environment (click the text for **SIT** as shown below).

The screenshot shows the 'Applications' section of the UrbanCode Deploy interface. Under the 'JPetStore' application, the 'Environments' tab is selected. It lists three environments: SIT (highlighted with a red circle), UAT, and another unnamed environment. Below the environments, there are search fields for 'Search by Name' and 'Search by Blueprint'.

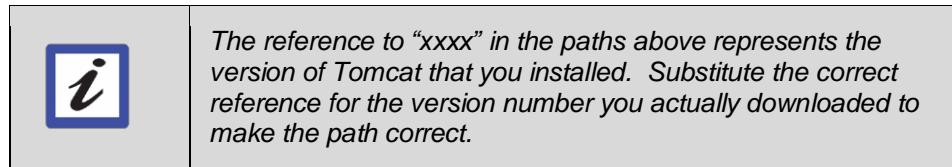
In the lower row of tabs, click on the **Configuration** tab then select **Environment Properties** from the left hand side of the screen. Then click the **Add Property** button on the right hand side of the screen.

This screenshot shows the 'Configuration' tab selected for the 'SIT' environment of the 'JPetStore' application. In the left sidebar, 'Environment Properties' is selected (circled in red). On the right, the 'Environment Properties' section is displayed, showing 'Version 1 of 1'. At the bottom right of this section, the 'Add Property' button is circled in red.

	<p><i>Note the text referring to the 'Version' (in the picture above it refers to version 1 of 1). Each time you make a change to the properties (and other objects in UrbanCode Deploy) a new version is created. You can review previous versions, and reinstate them as the new 'current' version by using the 'forward' and 'reverse' icons below the text for versions (small sets of arrows pointing left and right).</i></p> <p><i>This illustrates the audit trail maintained by UrbanCode Deploy. All actions and changes are tracked, and can be reviewed later.</i></p>
--	--

Add the following properties:

Property	Value
db.url	<code>jdbc:mysql://ucd.sit-server.com:3306/jpetstore_sit</code>
tomcat.home	<code>C:\Env_Web_Servers\SIT\apache-tomcat-xxxx</code>
tomcat.port	<code>8085</code>
tomcat.start	<code>C:\Env_Web_Servers\SIT\apache-tomcat-xxxx\bin\startup.bat</code>
tomcat.url	<code>http://ucd.sit-server.com</code>



7.1.2 Define UAT Environment Properties

Repeat the process above to add properties to the **UAT** environment.

The screenshot shows the 'Applications' tab in the IBM UrbanCode Deploy interface. A red circle highlights the 'Applications' tab in the top navigation bar. Another red circle highlights the 'JPetStore' application entry in the list below. The list includes columns for Name, Description, and Created. The 'JPetStore' entry has a creation date of 3/20/2011.

Name	Description	Created
JPetStore		3/20/2011

The screenshot shows the 'Applications' section of the UrbanCode Deploy interface for the 'JPetStore' application. It displays two environments: 'SIT' (in blue) and 'UAT' (in orange). The 'UAT' environment is circled in red.

The screenshot shows the 'Configuration' tab for the 'UAT' environment. The 'Environment Properties' section is highlighted with a red circle. The 'Add Property' button is also highlighted with a red circle.

Add the following properties:

Property	Value
db.url	<code>jdbc:mysql://ucd.uat-db-server.com:3306/jpetstore_uat</code>
tomcat.home	<code>C:\Env_Web_Servers\UAT\apache-tomcat-xxxx</code>
tomcat.port	<code>8086</code>
tomcat.start	<code>C:\Env_Web_Servers\UAT\apache-tomcat-xxxx\bin\startup.bat</code>
tomcat.url	<code>http://ucd.uat-app-server.com</code>

	<p><i>The reference to “xxxx” in the paths above represents the version of Tomcat that you installed. Substitute the correct reference for the version number you actually downloaded to make the path correct.</i></p>
--	---

8 UrbanCode Application Processes

In this section of the lab you define an **Application Process** to deploy the JEE and WAR components. Later, you will update the **Application Process** to include the DB component.

Applications consist of multiple components. Deploying an application consists of an organized process of deploying the *components* of that application.

In the prior sections, we have created two components each of which contains a process with the particulars of how to deploy that particular component. Next we will illustrate how the UrbanCode Deploy Application object can also have processes, which are used to coordinate the deployment of individual components associated with that application.

8.1 Deployment Process for the JPetStore Application

As stated earlier, each Component can contain a Process that carries with it the information needed to deploy itself. Now we will create a process on the UrbanCode Application logic to coordinate the execution of the individual component processes that make up that Application.

8.1.1 Create the New Application Process – Deploy JPetStore

From the upper row of tabs click the **Applications** tab.

Click the link for the **JPetStore** application.

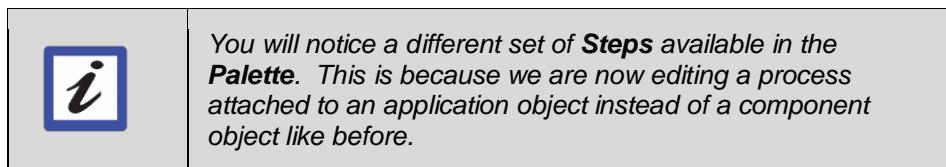
From the lower row of tabs click the **Processes** tab, and then click the **Create Process** button.

The screenshot shows the UrbanCode Deploy interface for the JPetStore application. At the top, there's a navigation bar with tabs: Dashboard, Components, Applications (which is the active tab), Configuration, Processes, Resources, Calendar, and Workflows. Below the navigation bar, the URL is shown as Home > Applications > JPetStore. The main title is "Application: JPetStore". Underneath, there are details about the application: Created By (admin) and Created On (3/20/2015, 11:33 AM). At the bottom of the main content area, there's a "Create Process" button highlighted with a red circle. Below it, there's a table with columns "Process" and "Description". A message says "No processes have been added to this application." At the very bottom, there are "Refresh" and "Print" links.

Name the new process **Deploy JPetStore**. Click the **Save** button.

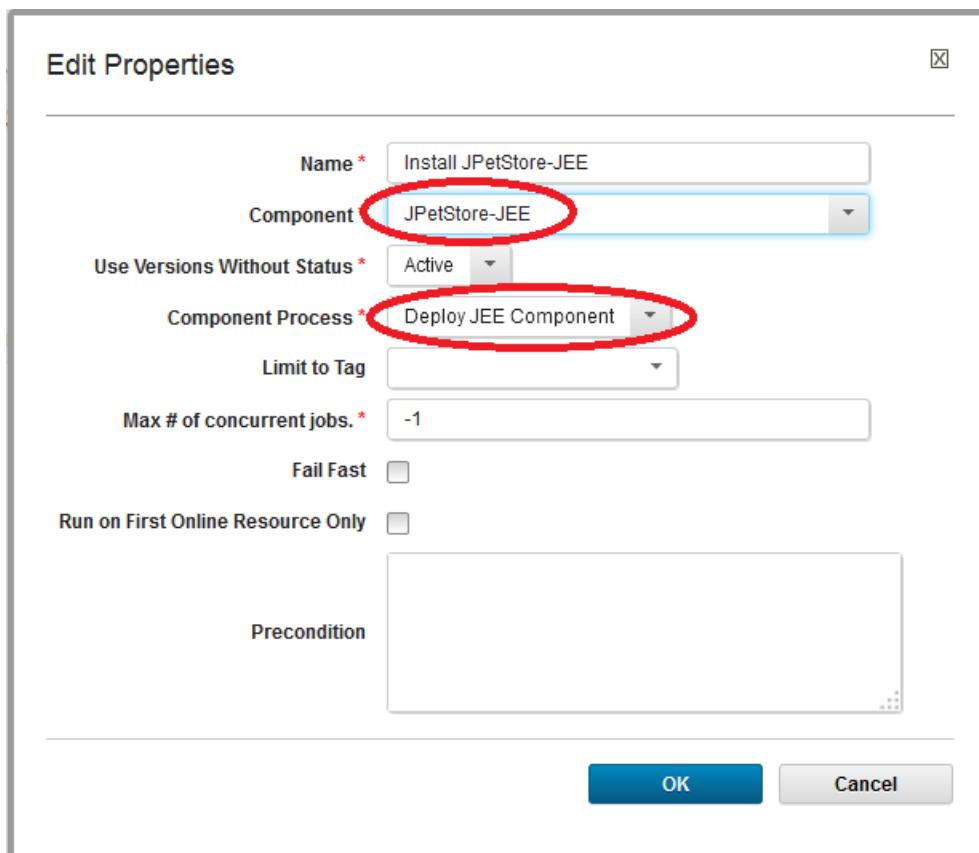
8.1.2 Define the Process Steps for the Application Process

Click on the name of the new **Deploy JPetStore** process. This will open the **UrbanCode Deploy Process Designer**.



Drag the **Install Component...** step from the **Palette** into the **Main Editing Area** and drop it just below the **Start** block. This will produce the **Edit Properties** dialog.

BEFORE changing the **Name** field, set the **Component** field to **JPetStore-JEE**. You will see that the **Name** field automatically updates to reflect the name of the component we are deploying. Make sure the **Component Process** field is set to **Deploy JEE Component**.



Click the **OK** button.

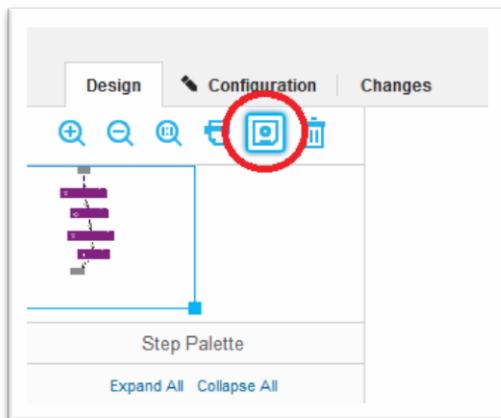
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Draw a **Flow Arrow** from the **Start** block to the new **Install JPetStore-JEE** step we just created.

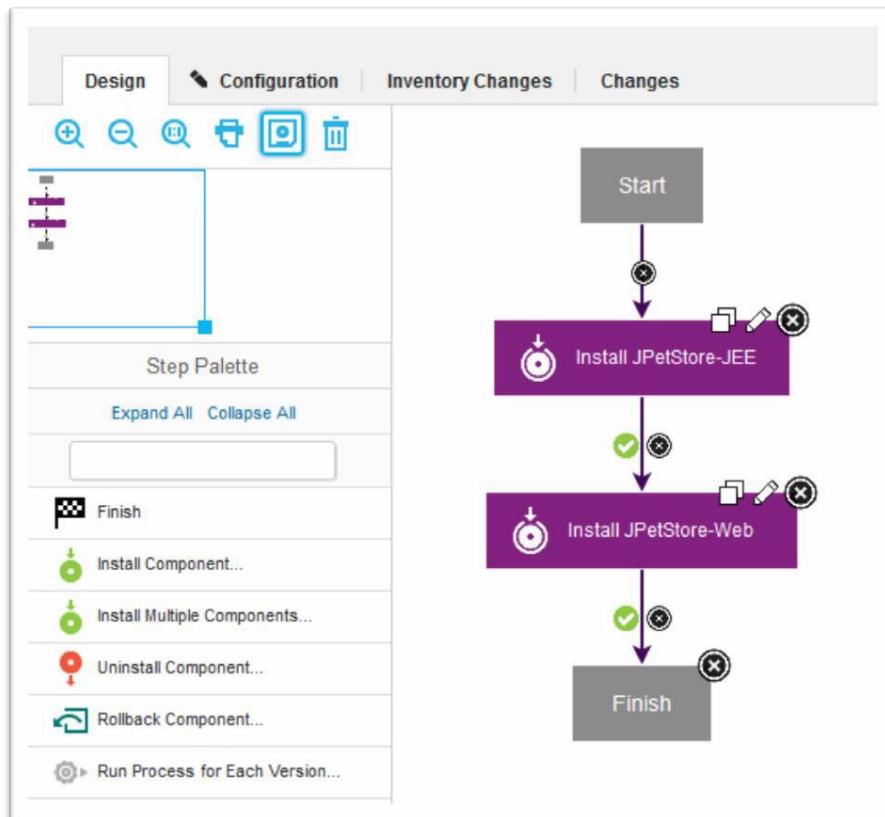
Repeat this process and add another **Install Component...** step to install the **JPetStore-Web** component, below the **Install JPetStore-JEE** step.

Draw a **Flow Arrow** from the **Install JPetStore-JEE** step to the **Install JPetStore-Web** step, then from **Install JPetStore-Web** to the **Finish** block.

Click the blue **Save** button on the **Palette** to save this process.



Your application process should look like this:

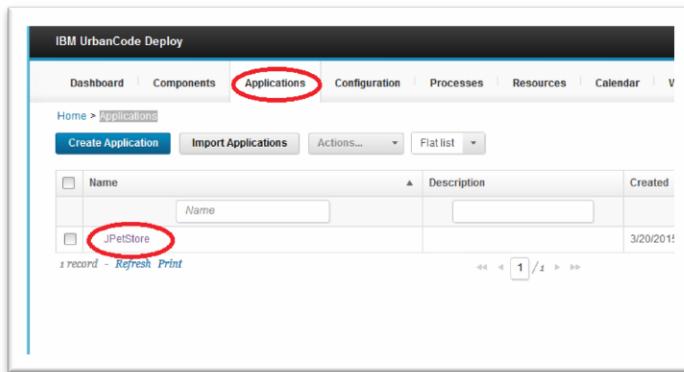


8.1.3 Test the Application Deployment Process in the SIT Environment

You are now ready to deploy part of the JPetStore application - the JEE and WEB components. (Without the DB component, the application won't run, but this is a good point to verify the work done so far.)

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (**SIT** and **UAT**).



Look at the row for the **SIT** environment – on the far left you see a small icon like a “Play” button. This is the **Request Process** button. Click this button to initiate an UrbanCode Deploy process.



The dialog appears to request a process that will run against the **SIT** environment. Set the **Process** field to **Deploy JPetStore**.

By the **Versions** field, click the link that says **Choose Versions...** another dialog appears.

Run Process on SIT

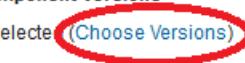
Only Changed Versions

Process * **Deploy JPetStore** 

Select a snapshot, or choose versions for individual components.

Snapshot 

Component Versions

Versions 0 selected **(Choose Versions)** 

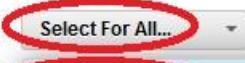
Schedule Deployment?

Description 

Submit **Cancel**

In the **Component Versions** dialog, set the **Select for All...** dropdown box in the top left to **Latest Available**.

Component Versions

Select For All... 

Show only changed components  Allow invalid versions 

	Current Environment Inventory	Versions to Deploy
	None	Add...
JPetStore-Web	None	Add...

2 records  Rows **10** 

OK

This will add the latest version of all components in the list to the **Versions to Deploy** column.

Component	Current Environment Inventory	Versions to Deploy
JPetStore-JEE	None	<button>1.0</button> <input type="button" value="Add..."/> <input type="button" value="Remove..."/>
JPetStore-Web	None	<button>1.0</button> <input type="button" value="Add..."/> <input type="button" value="Remove..."/>

2 records Rows 10

OK

Click the **OK** button.

Back on the **Run Process on SIT** dialog, click the **Submit** button and UrbanCode Deploy starts the deployment process.

The system displays the current application deployment status. You can see which components aren't started, are running, were successful, or failed. Use the 'twistie' on the far left of any component to expand it and see additional information.

Step	Progress	Start Time	Duration	Status
1. Install JPetStore-JEE	0 / 1	11:59:08 PM	0:00:06	Running
2. Install JPetStore-Web				Not Started
Total Execution	0 / 1	11:59:08 PM	0:00:06	Running

When expanded, you can see the steps that you created in the component process (on the left) and the status (on the right).

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right) if they were successful or they failed, or if they are running now or have not yet started.

Execution					
Step	Progress	Start Time	Duration	Status	
▼ 1. Install JPetStore-JEE	0 / 1	11:59:08 PM	0:00:44	Running	
▼ JPetStore-JEE	0 / 1	11:59:08 PM	0:00:44	Running	
▼ Deploy JEE Component (JPetStore-JEE 1.0)	0 / 1	11:59:08 PM	0:00:44	Running	
1. Clean Working Directory	0 / 1	11:59:09 PM	0:00:12	Success	
2. Download Artifacts	0 / 1	11:59:21 PM	0:00:07	Success	
3. Expand WAR Contents	0 / 1	11:59:28 PM	0:00:03	Success	
4. Update Properties File	0 / 1	11:59:32 PM	0:00:03	Success	
5. Update WAR File	0 / 1	11:59:35 PM	0:00:04	Success	
6. Start Tomcat	0 / 1	11:59:40 PM	0:00:13	Running	
7. Undeploy JPetStore WAR	0 / 1			Not Started	
8. Deploy JPetStore WAR	0 / 1			Not Started	
2. Install JPetStore-Web	0 / 1			Not Started	
Total Execution	0 / 1	11:59:08 PM	0:00:44	Paused	

When the system finishes, you will see that the overall process has failed because one of the steps has failed. Below is the final progress report where we can see that **Step 7 Undeploy JPetStore WAR** has failed.

Step	Progress	Start Time	Duration	Status
1. Clean Working Directory	0 / 1	11:59:09 PM	0:00:12	Success
2. Download Artifacts	0 / 1	11:59:21 PM	0:00:07	Success
3. Expand WAR Contents	0 / 1	11:59:28 PM	0:00:03	Success
4. Update Properties File	0 / 1	11:59:32 PM	0:00:03	Success
5. Update WAR File	0 / 1	11:59:35 PM	0:00:04	Success
6. Start Tomcat	0 / 1	11:59:40 PM	0:00:14	Success
7. Undeploy JPetStore WAR	0 / 1	11:59:54 PM	0:00:04	Failed
8. Deploy JPetStore WAR	0 / 1			Not Started
Total Execution	7 / 8	11:59:09 PM	0:00:49	Failed

This makes sense because the JPetStore application has never been deployed at all. But the failure of this step has caused the overall process to terminate without trying to run the last step, **Deploy JPetStore WAR**.

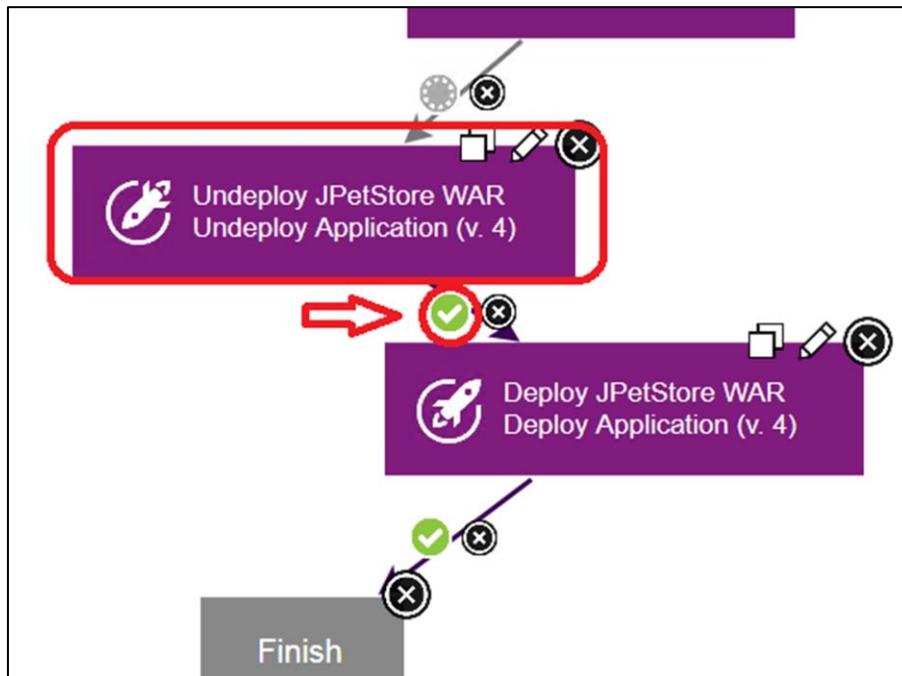
We can adjust our process to allow it to continue even if the **Undeploy JPetStore WAR** step fails. On the top row of tabs, click the **Components** tab.

From the list of components click the link for the **JPetStore-JEE** component. On the lower row of tabs, click the **Processes** tab.

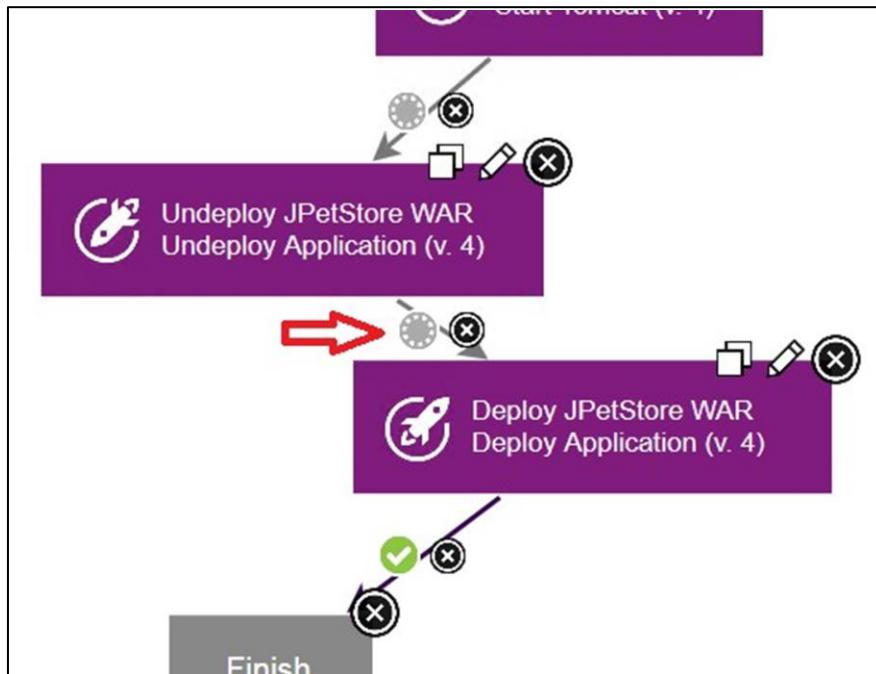
From the list of processes click the link for the **Deploy JEE Component** process.

In the **Process Designer**, scroll down until you can see the **Undeploy JPetStore WAR** step (and, more importantly,

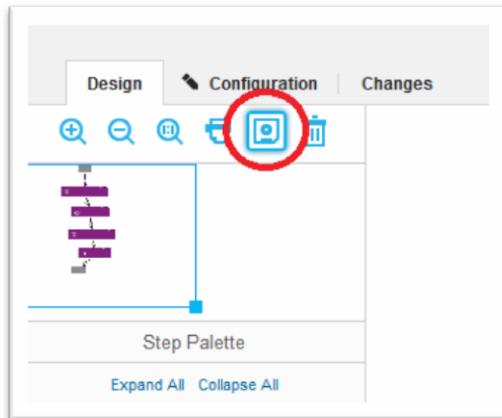
the **Flow Arrow** that leads out of it into the next step).



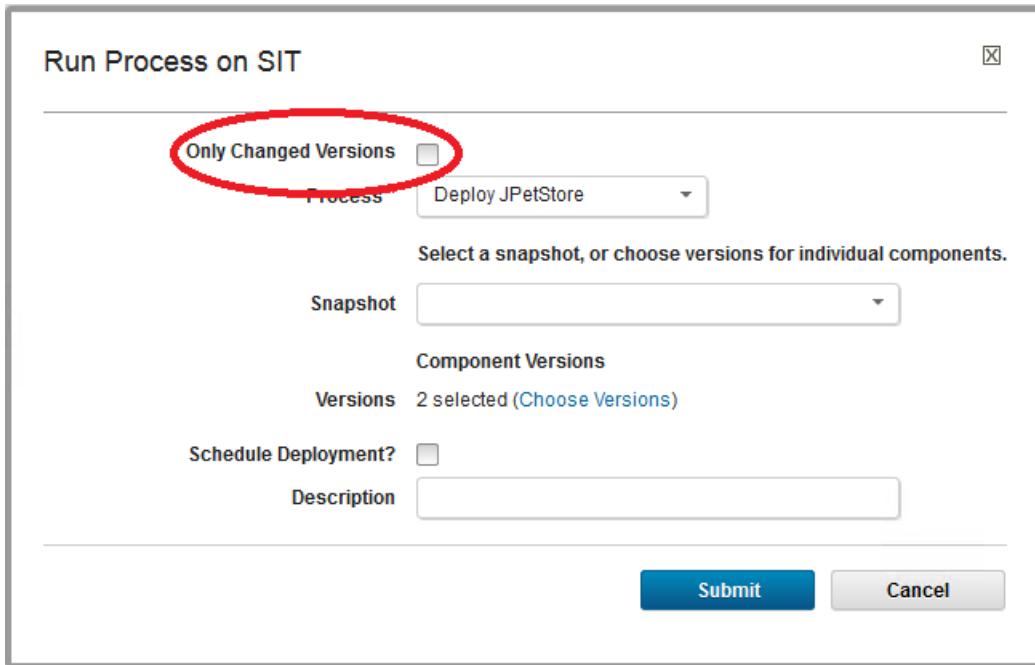
Click the green checkmark and it changes to a red exclamation point. Click it once more and it turns to a grey circle. This indicates to keep running even if the **Undeploy JPetStore WAR** step fails... and will allow us to reach the step where we actually deploy the JPetStore WAR file for the first time.



Click the blue **Save** button on the **Palette** to save this process.



Now, rerun the Application process **Deploy JPetStore in the SIT environment...** BUT this time you must clear the **Only Changed Versions** check box in the **Run Process on SIT** dialog. (Review the steps at the beginning of this section if needed.)



This time, the process continues even though **Undeploy JPetStore WAR** fails...and the **JPetStore-JEE** component is successfully deployed.

Expand all the components with the ‘twisties’ on the left to see the results.

Hover your mouse over any of the steps and you will see three icons appear to the right of the step name.

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					Expand All	Collapse All
Step	Progress	Start Time	Duration	Status		
▼ 1. Install JPetStore-JEE	1 / 1	12:53:04 AM	0:00:29	Success		
▼ JPetStore-JEE	1 / 1	12:53:04 AM	0:00:29	Success		
▼ Deploy JEE Component (JPetStore-JEE 1.0)		12:53:04 AM	0:00:29	Success		
1. Clean Working Directory		12:53:05 AM	0:00:03	Success		
2. Download Artifacts		12:53:08 AM	0:00:06	Success		
3. Expand WAR Contents		12:53:14 AM	0:00:03	Success		
4. Update Properties File		12:53:17 AM	0:00:03	Success		
5. Update WAR File		12:53:21 AM	0:00:03	Success		
6. Start Tomcat		12:53:25 AM	0:00:02	Success		
7. Undeploy JPetStore WAR		12:53:28 AM	0:00:02	Failed		
8. Deploy JPetStore WAR		12:53:30 AM	0:00:04	Success		
▼ 2. Install JPetStore-Web	1 / 1	12:53:34 AM	0:00:14	Success		

Clicking the blue icon will show you the console output of that command step, as if you executed it from the command line of the Agent machine.

The red icon shows errors, if any. (If there were no errors, that icon will not even be present.)

The white icon shows you the expanded value of any UrbanCode Deploy properties at runtime. Click on each one to see what the output looks like.

Now that the application has been deployed once, all steps should show success in future runs.

9 Adding the Database Component

In an earlier section we created 3 Components... so far we've included two – the Web Component (**JPetStore-WAR**) and the Application Component (**JPetStore-JEE**). To have our Application actually run, however, we must now include the Database Component in our project.

9.1 Deployment Process for JPetStore-DB component

The database deployment plugin used in this workshop is not based on providing SQL script files. Instead an XML file is provided which lets you define explicit apply and roll-back capabilities.

Deploying the DB Component consists of the following steps:

- Download the artifacts
- Upgrade the database

9.1.1 Create the new Process – Deploy DB Component

In the top row of tabs click the **Components** tab. In the resulting list, click **JPetStore-DB**.
In the **lower** row of tabs, click the **Processes** tab.

Click the **Create Process** button.

Name the new process **Deploy DB Component**.
Make sure the **Process Type** field is set to **Deployment**.

Create Process	
Name *	Deploy DB Component
Description	
Process Type *	Deployment
Inventory Status *	Active
Default Working Directory *	\${p:resource/work.dir}/\${p:component.name}
Required Role	None
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

Click the **Save** button.

9.1.2 Define the Process Steps in the Process Designer

Click on the name of the new **Deploy DB Component** process. This will open the **UrbanCode Deploy Process Designer** (a graphical editor that allows us to specify the steps and flow of execution for a process).

In the **Palette Search Bar** type the words **delete files** and type the **Return** key. Notice that the list of folders and steps is reduced to just the one we're looking for... **Delete Files and Directories!** This can be a very handy feature once you get to know the steps. You won't have to remember which folder houses the step you are looking for.

Drag the **Delete Files and Directories** step from the **Palette** into the **Main Editing Area** and drop it just below the **Start** block. This will produce the **Edit Properties** dialog.

Set the properties as shown below:

Property	Value
Name	Clean Working Directory
Base Directory	.
Include	**/*

Click the **OK** button.

Draw a **Flow Arrow** from the **Start** block to the new **Clean Working Directory** step we just created.

Use the **Palette Search Bar** to locate the **Download Artifacts** step. Drag and drop one of these steps into the **Process Designer** below the **Clean Working Directory** step. The default values of all the properties should be sufficient.

Click the **OK** button.

Draw a Flow Arrow from Clean Working Directory to the new Download Artifacts step we just created.

Use the **Palette Search Bar** to locate the **Upgrade DB** step. Drag and drop one of these steps into the **Process Designer** below the **Download Artifacts** step. Set the properties as shown below:

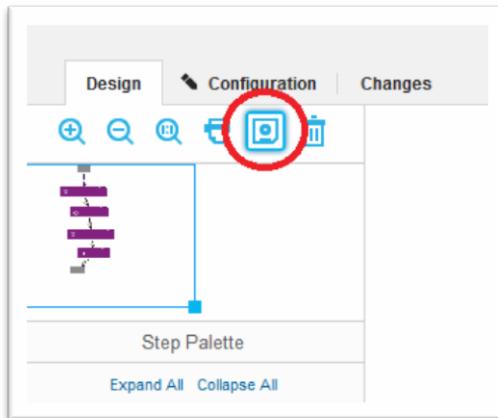
Property	Value
Name	Upgrade DB
Driver Classname	com.mysql.jdbc.Driver
DB Driver Jar	lib\mysql-connector-java-5.1.20-bin.jar
URL	 \${p:environment/db.url}
User	jpetstore
Password	jppwd
SQL File path	.
SQL File Include	*.xml
Current Version SQL	SELECT VER FROM DB_VERSION WHERE RELEASE_NAME = ?
Delete Version SQL	DELETE FROM DB_VERSION WHERE RELEASE_NAME = ?

Update Version SQL	<code>INSERT INTO DB_VERSION (RELEASE_NAME,VER) VALUES (?,?)</code>
--------------------	---

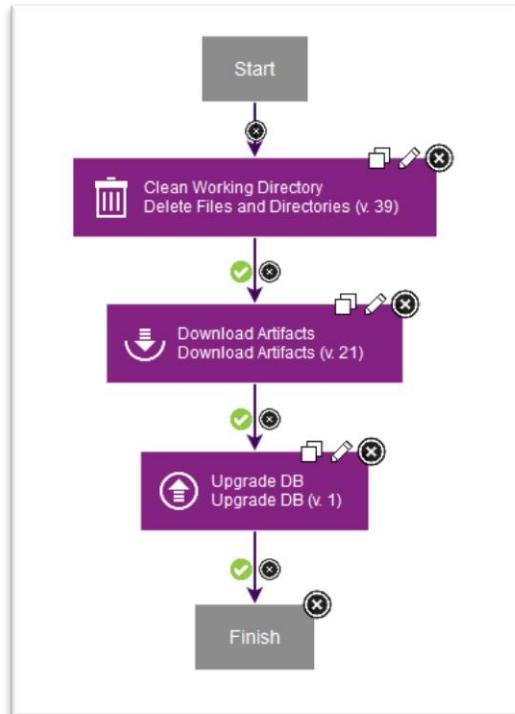
Click the **OK** button.

Draw a **Flow Arrow** from **Download Artifacts** to the new **Upgrade DB** step we just created. Now draw a **Flow Arrow** from **Upgrade DB** to the **Finish** block.

At the top of the **Palette** click the icon to **Save** the work you've done in the **Process Designer**. (It looks like a small blue floppy disk.)



Your screen should now look something like this:



9.2 Update the Application Deployment Process

9.2.1 Include the process to deploy the DB component

From the upper row of tabs click the **Applications** tab.

Click the link for the **JPetStore** application.

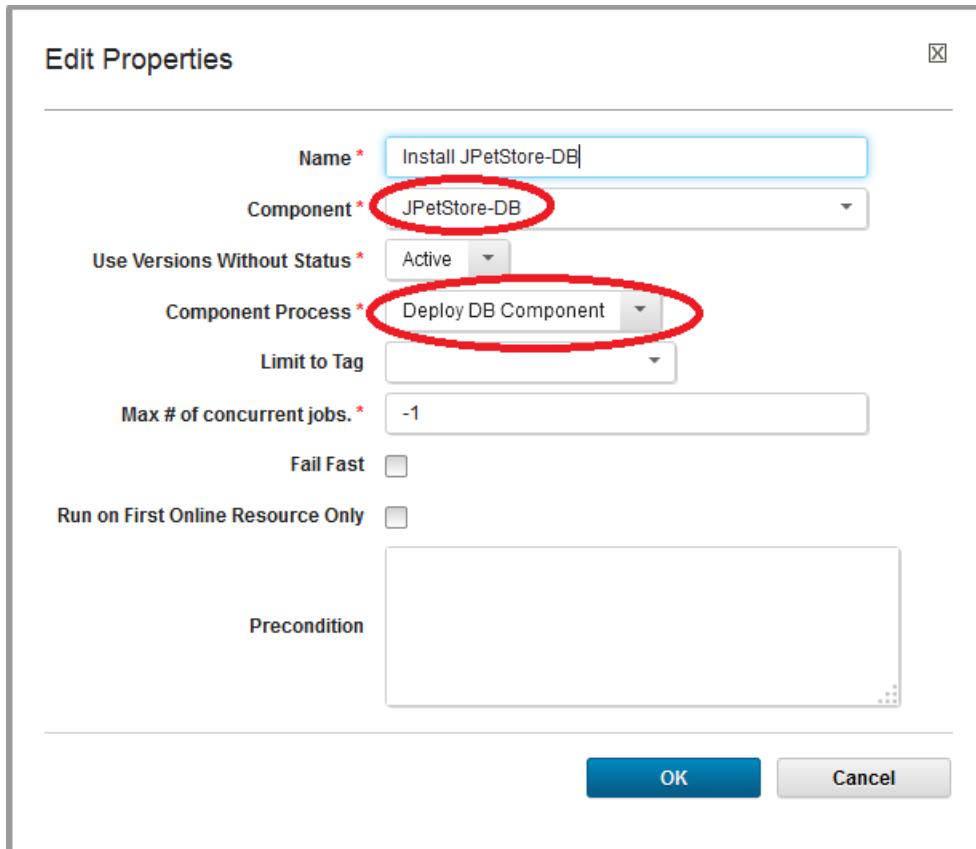
From the lower row of tabs click the **Processes** tab.

Click on the name of the new **Deploy JPetStore** process. This will open the **UrbanCode Deploy Process Designer**.

Drag the **Install Component...** step from the **Palette** into the **Main Editing Area** and drop it just below the **Install JEE Component** step and to the right of the **Install Web Component** step. This will produce the **Edit Properties** dialog.

BEFORE changing the **Name** field, set the **Component** field to **JPetStore-DB**. You will see that the **Name** field automatically updates to reflect the name of the component we are deploying.

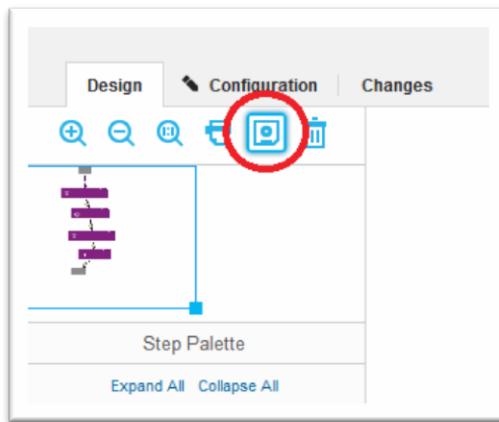
Make sure the Component Process field is set to **Deploy DB Component**.



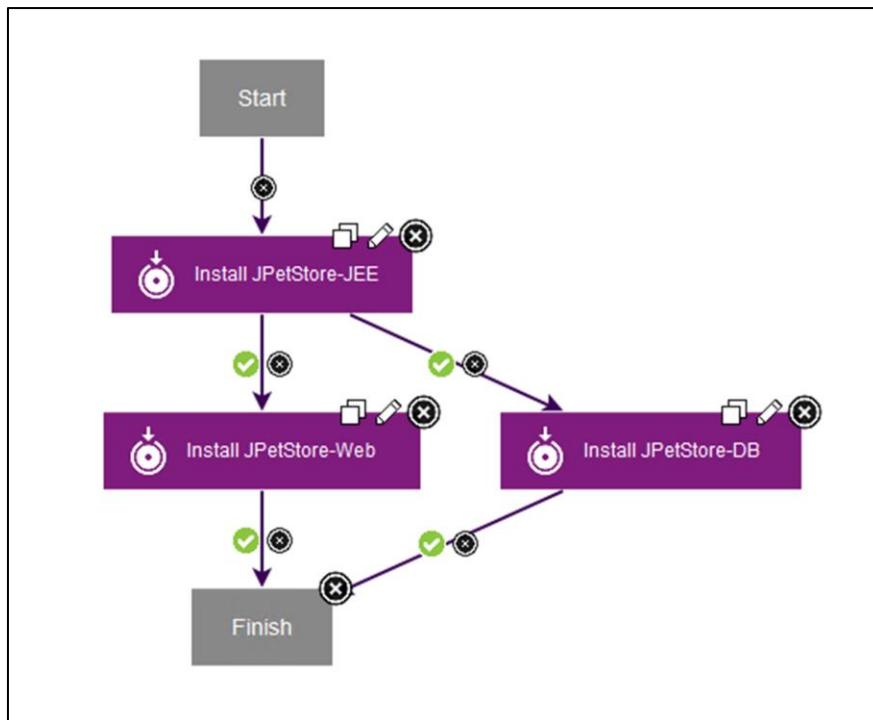
Click the **OK** button.

Draw a Flow Arrow from **Install JEE Component** to the new **Install JPetStore-DB** step we just created.

Draw a **Flow Arrow** from **Install JPetStore-DB** to the **Finish** block. Click the blue **Save** button on the **Palette** to save this process.



Your diagram should now look something like this:





Note how two flow arrows come out of the Install JPetStore-JEE step. Both flow arrows have the same green check, which means they will both be processed in parallel if the step is successful

The Web component and the DB component do not depend on each other. So we can try to install them both at the same time, maybe saving some time for the overall process.

10 Deploy the Complete Application into each Environment

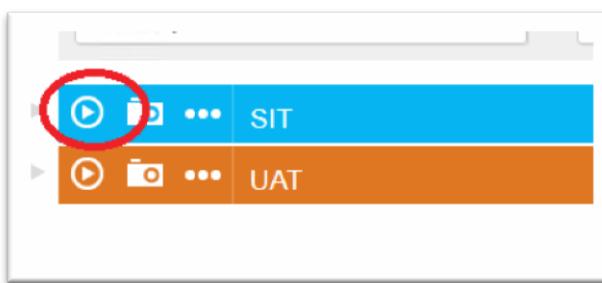
You are now ready to deploy all of the components of JPetStore v1.0 into the **SIT** environment and test the running application. We do this by executing the Application process ([Deploy JPetStore](#)) against one of the listed environments (**SIT**). Recall that the Application process will coordinate the installation of each of the components, by indicating the execution of each *Component*'s deployment process.

10.1 Deploy JPetStore into the SIT Environment

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (**SIT** and **UAT**).

Look at the row for the **SIT** environment – on the far left you see a small icon like a “Play” button from a video player. This is the **Request Process** button. Click this button to initiate an UrbanCode Deploy process.



The dialog appears to request a process that will run against the **SIT** environment. Set the **Process** field to [Deploy JPetStore](#).

By the **Versions** field, click the link that says **Choose Versions...** another dialog appears.

Run Process on SIT

Only Changed Versions

Process * Deploy JPetStore 

Select a snapshot, or choose versions for individual components.

Snapshot 

Component Versions

Versions 0 selected 

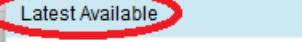
Schedule Deployment?

Description 

Submit **Cancel**

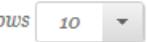
In the **Component Versions** dialog, set the **Select for All...** dropdown box in the top left to **Latest Available**.

Component Versions

Select For All...  Latest Available 

Show only changed components Allow invalid versions

	Current Environment Inventory	Versions to Deploy
None (Clear All)	1.0	Add...
JPetStore-Web	1.0	Add...
JPetStore-DB	None	Add...

3 records  Rows 

OK

This will add the latest version of all components in the list to the **Versions to Deploy** column.

Component	Current Environment Inventory	Versions to Deploy
JPetStore-JEE	1.0	1.0 x Add...
JPetStore-Web	1.0	1.0 x Add...
JPetStore-DB	None	1.0 x Add...

3 records Rows 10

OK

Click the **OK** button.

Back on the **Run Process on SIT** dialog, click the **Submit** button and UrbanCode Deploy starts the deployment process.

Monitor the status. When UrbanCode Deploy finishes processing, all the components should deploy successfully.

Step	Progress	Start Time	Duration	Status
1. Install JPetStore-JEE	0 / 0	2:06:44 AM	0:00:00	Success
2. Install JPetStore-Web	0 / 0	2:06:45 AM	0:00:00	Success
3. Install JPetStore-DB	1 / 1	2:06:45 AM	0:00:32	Success
Total Execution	1 / 1	2:06:44 AM	0:00:32	Success

Note that IBM UrbanCode Deploy records each version of a component deployed to a resource. This maintains a historical record and avoids deploying the same version twice. The operator can override this option manually and redeploy any component at any time, however.

If you expand all the process entries with the 'twisties' on the left, you can see that UrbanCode Deploy recognizes that Web 1.0 and App 1.0 have already been deployed to **SIT** and will not redeploy them. (See the status on the far right.)

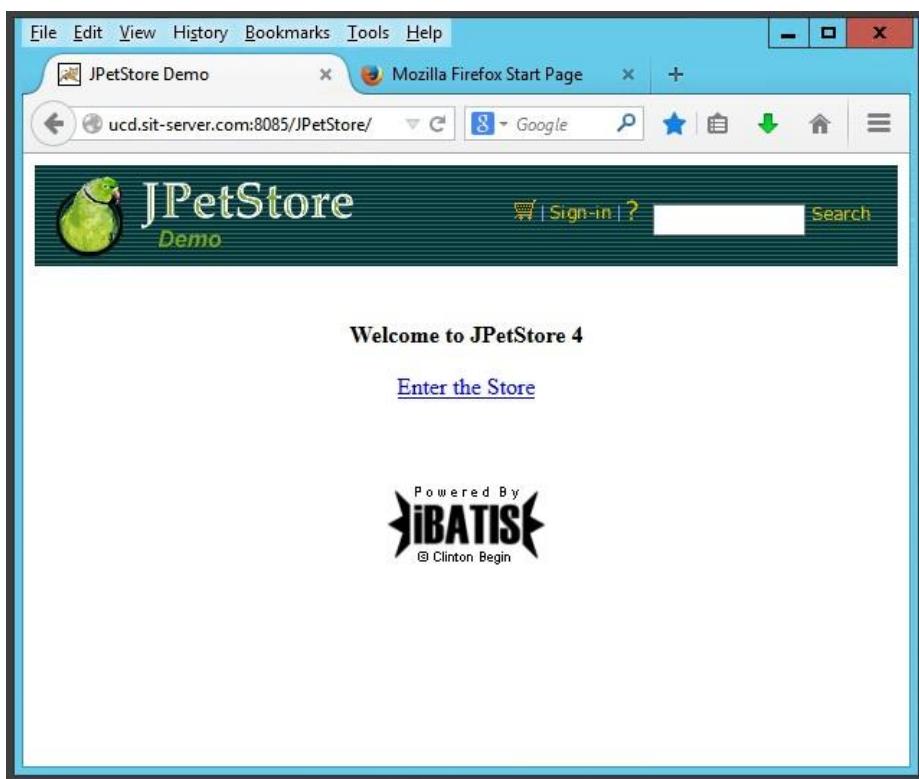
Step	Progress	Start Time	Duration	Status
▼ 1. Install JPetStore-JEE	0 / 0	2:06:44 AM	0:00:00	Success
JPetStore-JEE		2:06:45 AM	0:00:00	Already Installed
▼ 2. Install JPetStore-Web	0 / 0	2:06:45 AM	0:00:00	Success
JPetStore-Web		2:06:45 AM	0:00:00	Already Installed
▼ 3. Install JPetStore-DB	1 / 1	2:06:45 AM	0:00:32	Success
JPetStore-DB	1 / 1	2:06:45 AM	0:00:32	Success
Total Execution	1 / 1	2:06:44 AM	0:00:32	Success

10.2 Run and Test JPetStore in the SIT Environment

Open your browser and go to the site for the SIT version of JPetStore:

<http://ucd.sit-server.com:8085/JPetStore/>

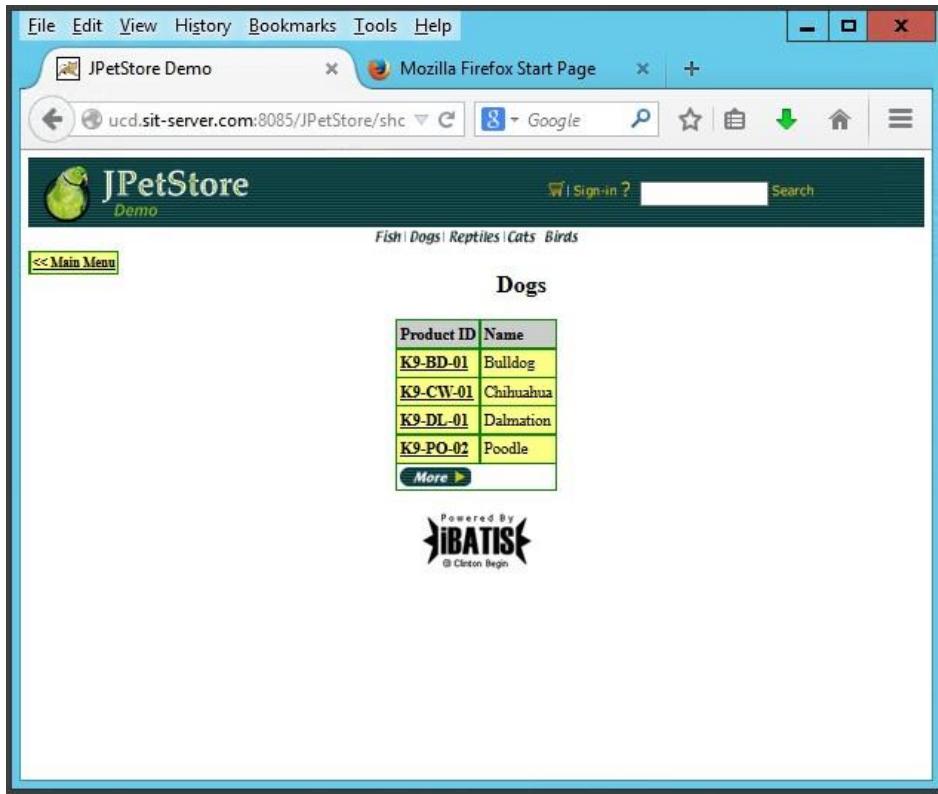
You should see the JPetStore application top page.



If the application has installed and is running correctly, you should be able to execute the following:

Click the **Enter the Store** link.

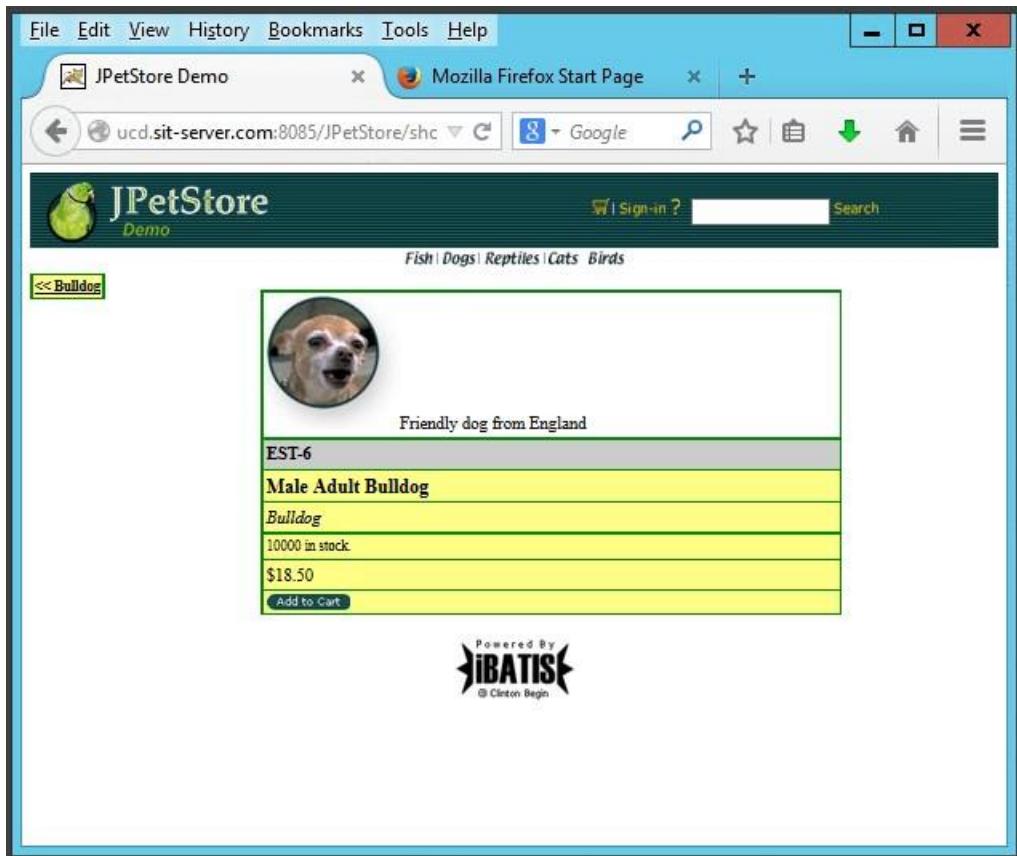
In the left-hand navigation bar, click **Dogs**.



In the main body of the page click the Product ID next to Bulldog (**K9-BD-01**).

In the main body of the next page click the Item ID **EST-6**.

This should show you the screen below. (Yes, the picture is not a bulldog, but that is an intentional content bug, used in our product demos.) If you see the screen below, then congratulations - the application deployment is a success!



10.3 Deploy JPetStore into the UAT Environment

Now repeat the last few sections and deploy the application into the **UAT** environment.

10.4 Run and Test JPetStore in the UAT Environment

Open your browser and go to the site for the UAT version of JPetStore:

<http://ucd.uat-app-server.com:8086/JPetStore/>

(NOTE – the port is different for the **UAT** environment... 8086)

As before, enter the store, select dogs and make sure you can see a picture of a dog.

10.5 Summary

In this module you created reusable deployment processes for the JPetStore components and application. You used

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the processes to successfully deploy version 1.0 of the application to the **SIT** environment.

As we've noticed, however, at least one of the pictures is not correct. There may be other errors in version 1.0 of this application as well. Thankfully the developers have updated some of the components. In the next sections we will examine how UrbanCode Deploy can make use of the updates.

11 Upgrade the SIT Environment and Promote to the UAT Environment

In this lab you will deploy additional versions of the components to upgrade the **SIT** environment to a newer version of the content and database components. You will then create a snapshot of the **SIT** environment and promote the snapshot to the **UAT** environment.

A snapshot is a collection of specific versions of components, usually versions that are known to work together. Typically, a snapshot is created when a successful deployment has been run in an environment.

As the application components advance through the software development lifecycle, they will be installed on multiple environments. Snapshots help manage collections of components that are known to work together as they move through these environments on their way to production systems.

When you have completed this exercise, you will have promoted the application version from the **SIT** environment to the **UAT** environment using a snapshot.

11.1 Check for New JPetStore-DB Versions

Now we'll check to see if our development group has produced any new versions of our components. Although we do this manually, UrbanCode Deploy supports the ability to continually check for new versions and automatically import them into CodeStation (a code repository that is included with UrbanCode Deploy).

First we'll check for any new versions of the database component.

11.1.1 Check for a new Component version

In the upper row of tabs click the **Components** tab.

In the resulting list, click **JPetStore-DB** to select that component. In the lower row of tabs click the **Versions** tab. Click the button to **Import New Versions**.

Wait a moment and click the **Refresh** link above the section named **Component Request History**. (UrbanCode Deploy does not automatically update this screen after the version import.)

The screenshot shows the 'Versions' tab selected in the top navigation bar. Below it is a table with three columns: 'Version', 'Statuses', and 'Type'. A single row is present, showing '1.0' in the Version column, an empty Statuses field, and 'Full' in the Type field. At the bottom of the table, there is a message '1 record' followed by blue links 'Refresh' and 'Print', with 'Refresh' circled in red.

Version	Statuses	Type
1.0		Full

Currently Running Version Imports

Import Type	Agent	Start
Manual Version Import	localhost	3/22/2015, 2:43

This should refresh the page and you should see that UrbanCode has discovered a new version of the database component and imported it into CodeStation! (Version 1.1)

The screenshot shows the 'Components' tab selected in the top navigation bar. Below it is a table with two rows, each containing a 'Version' and a 'Statuses' field. The first row has '1.1' in the Version field and an empty Statuses field. The second row has '1.0' in the Version field and an empty Statuses field. At the bottom of the table, there is a message '2 records' followed by blue links 'Refresh' and 'Print', with '1.1' circled in red.

Version	Statuses
1.1	
1.0	

Click on the new version of **JPetStore-DB** (Version 1.1).

In the lower set of tabs click the **Configuration** tab. Change the **Type Field** to **Incremental**.

The screenshot shows the UrbanCode Deploy interface for managing database versions. At the top, there's a navigation bar with tabs for Dashboard, Components, Applications, Configuration, Processes, Resources, Calendar, Work Items, and a search bar. Below the navigation, a breadcrumb trail indicates the current location: Home > Components > JPetStore-DB > Versions > Version: 1.1. The main content area is titled "Version: 1.1". It displays details such as "Created By: admin" and "Created On: 3/22/2015, 2:47 AM". A "Links" section with "add remove" buttons is also present. Below these details, there are three tabs: Main, Configuration (which is circled in red), and History. The "Configuration" tab is active, showing a form for "Basic Settings". The left sidebar of this form lists "Basic Settings" and "Version Properties". The main right panel is titled "Basic Settings" and contains fields for "Name" (set to "1.1") and "Description". A dropdown menu for "Type" is open, showing "Incremental" as the selected option (also circled in red). At the bottom of the form are "Save" and "Cancel" buttons.

Click the **Save** button.

Versions that are termed as “incremental” are dependent on previous versions. So in this case, we’ve told UrbanCode Deploy that Version 1.1 of the database is only an incremental update to the previous version.

JPetStore-DB version 1.0 loads a listing of all dogs EXCEPT the listing for the Bichon dog. **JPetStore-DB** version 1.1 is an incremental version that only contains one addition; the listing for the Bichon dog.

11.2 Deploy Updates to the SIT Environment

In this section you will update the deployed version of the **JPetStore** application out on the **SIT** Tomcat server. This should update the listing to include the Bichon dog.

11.2.1 Verify the current contents of the SIT environment

In the upper row of tabs click the **Applications** tab.

Click on the link for the **JPetStore** application.

Click the ‘twistie’ to the left of the **SIT** environment to expand it.

See how it shows the version of each component that UrbanCode Deploy installed last (1.0 for each component).

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The screenshot shows the 'Environments' tab selected in the top navigation bar. Below it, there's a search bar for 'Search by Name' or 'Search by Blueprint'. A 'Create Environment' button is visible. The main area displays two environments: 'SIT' and 'UAT'. The 'SIT' environment is highlighted with a blue border. Inside the 'SIT' section, there's a table with columns: Component, Version, Snapshot, Properties, Status, Compliance, and Actions. The 'JPetStore-DB' component has a version of '1.0'. The 'Compliance' section at the top right shows '3 / 3'. The 'UAT' environment below it has a compliance of '0 / 0'.

Open another browser window and go to SIT version of the JPetStore website:

<http://ucd.sit-server.com:8085/JPetStore/>

Enter the store and navigate to the **Dog breed** page.

Confirm that there are only 6 products on the list of dogs. (Click on the **More** button to see the last two entries.) Note specifically the absence of a listing for a Bichon.

V1.0 of the **JPetStore-DB** component does NOT have any listings for Bichons.

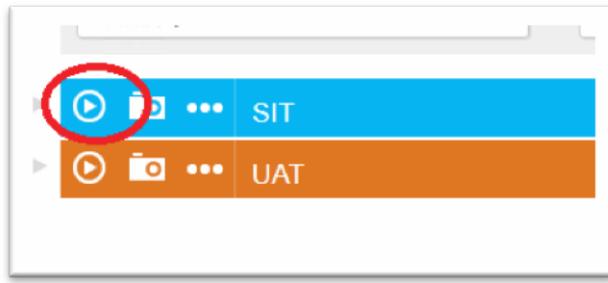
11.2.2 Re-Deploy JPetStore into the SIT Environment with the New Component Version

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (**SIT** and **UAT**).

The screenshot shows the 'Applications' tab selected in the top navigation bar. Below it, there's a search bar for 'Create Application' or 'Import Applications'. The main area displays a table with columns: Name, Description, and Created. The 'JPetStore' application is listed. The 'Applications' tab is highlighted with a red circle.

Look at the row for the **SIT** environment – near the left of the row you see a small icon like a “Play” button. This is the **Request Process** button. Click this button to initiate an UrbanCode Deploy process.



A dialog appears which allows us to request a process that will run against the **SIT** environment. Set the **Process** field to [Deploy JPetStore](#).

By the **Versions** field, click the link that says **Choose Versions...** another dialog appears.

Run Process on SIT

Only Changed Versions

Process * [Deploy JPetStore](#)

Select a snapshot, or choose versions for individual components.

Snapshot

Component Versions

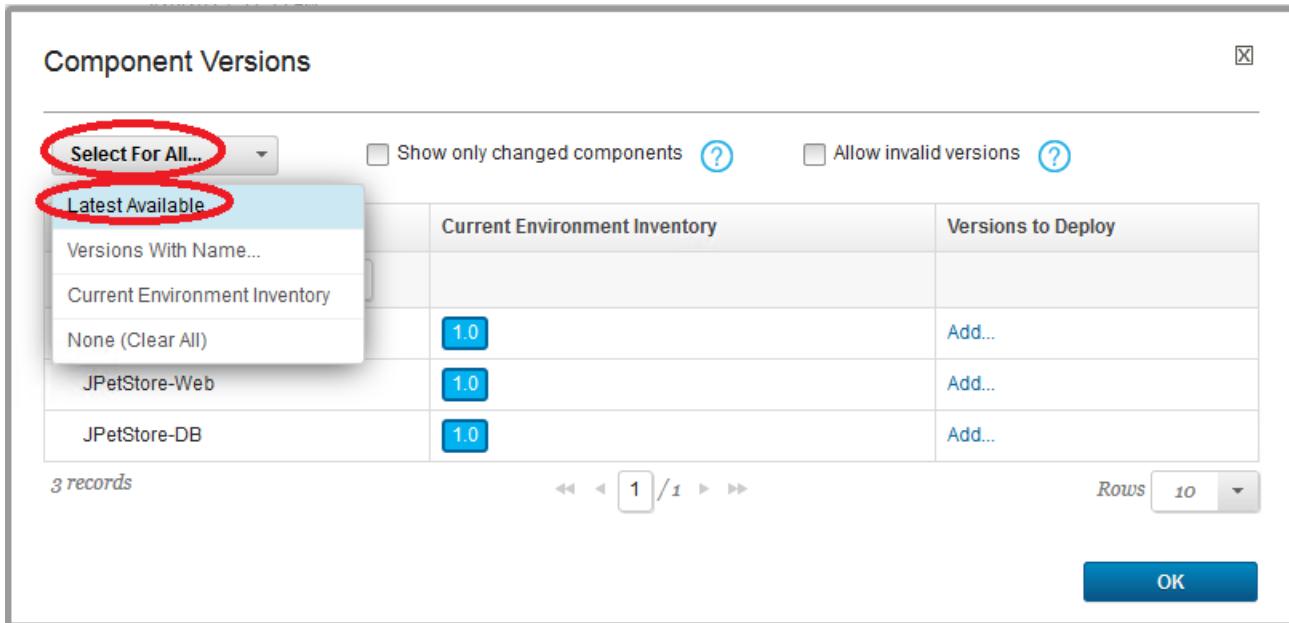
Versions 0 selected [\(Choose Versions\)](#)

Schedule Deployment?

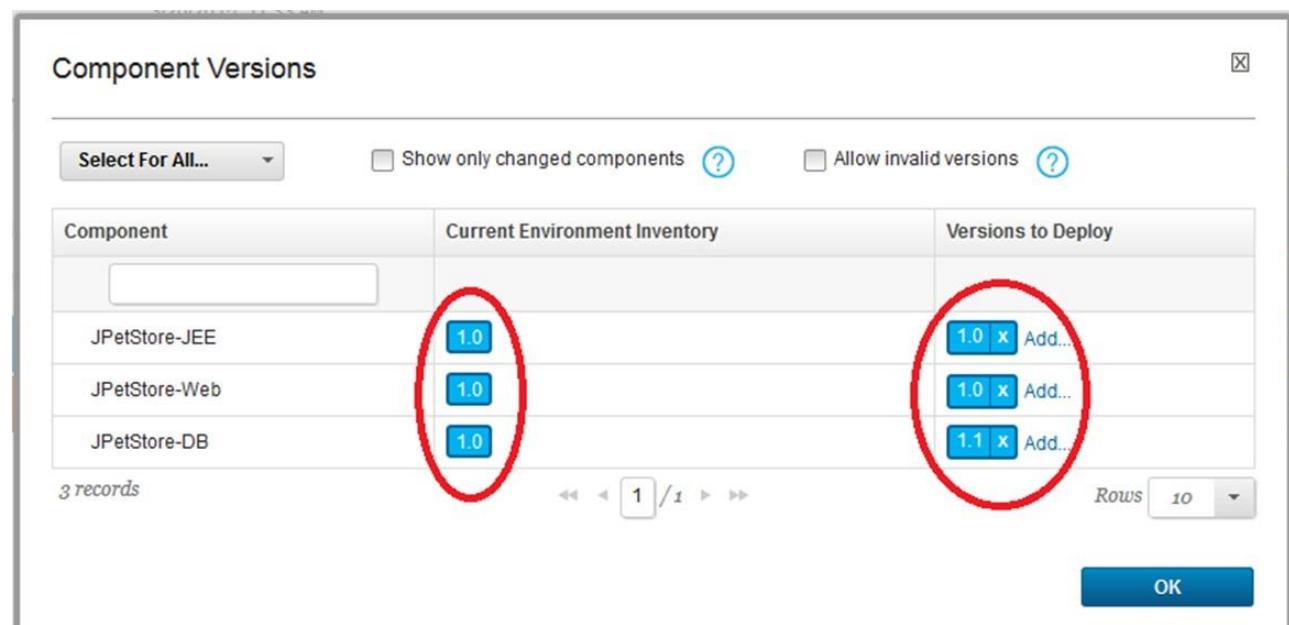
Description

[Submit](#) [Cancel](#)

In the **Component Versions** dialog, set the **Select for All...** dropdown box in the top left to [Latest Available](#).



Compare the two columns to see what versions are currently installed, and what versions will be installed next.



Click the **OK** button.

Back on the **Run Process on SIT** dialog, click the **Submit** button and UrbanCode Deploy starts the deployment process.

Monitor the status. When UrbanCode Deploy finishes processing, all the components should deploy successfully.

Return to the Application Environment page and expand the **SIT** environment again to see that the **JPetStore-DB** component has been updated to version 1.1.

Component	Version
JPetStore-DB	1.1 (+ 1 more)
JPetStore-Web	1.0
JPetStore-JEE	1.0

[Refresh](#) [Print](#)

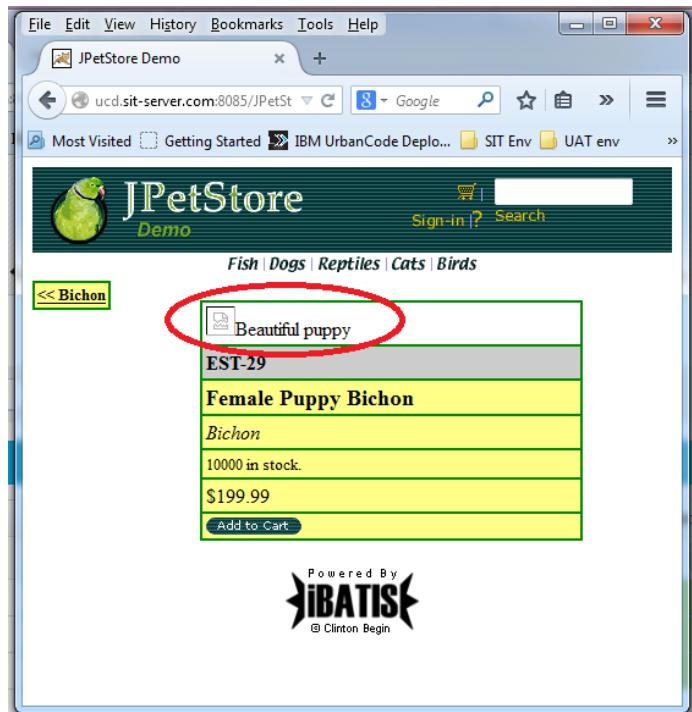
Return to the browser window showing the Pet Store application, and navigate to the list of dogs again. Note the list includes Bichon now!

Product ID	Name
K9-BC-01	Bichon
K9-BD-01	Bulldog
K9-CW-01	Chihuahua
K9-DL-01	Dalmation
More >	

In the main body of the page click the Product ID next to the new Bichon listing (**K9-BC-01**).

Again in the main body of the next page click the Item ID **EST-29**.

Note that the picture of the Bichon is missing. This is an indication that the developers may have provided updates to other components of our application.



If you are using this document to build a Virtual Machine for a product demo, you should stop at this point and take a snapshot of your Virtual Machine.

11.3 Check for New JPetStore-Web Versions

Now we'll check for any new versions of the web component (which contains the image files).

11.3.1 Check for a new Component version

In the upper row of tabs click the **Components** tab.

In the resulting list, click **JPetStore-Web** to select that component. In the lower row of tabs click the **Versions** tab. Click the button to **Import New Versions**.

Wait a moment and click the **Refresh** link above the section named **Component Request History**. (Again, UrbanCode Deploy does not automatically update this screen after the version import.)

The screenshot shows the 'Versions' tab selected in the top navigation bar. Below it is a table titled 'Import New Versions' with three columns: 'Version', 'Statuses', and 'Type'. A single row is present, showing '1.0' in the Version column, a dropdown menu in the Statuses column, and 'Full' in the Type column. At the bottom of the table, there is a message '1 record' followed by links 'Refresh' and 'Print', with 'Refresh' circled in red.

Version	Statuses	Type
1.0	Statuses	Full

1 record - Refresh Print

Currently Running Version Imports

Import Type	Agent	Start
Manual Version Import	localhost	3/22/2015, 2:43

1 record - Refresh Print

Like before, you should see that UrbanCode has discovered a new version of this component and imported it into CodeStation! (Version 1.1)

The screenshot shows the 'Versions' tab selected in the top navigation bar. Below it is a table titled 'Import New Versions' with three columns: 'Version' and 'Statuses'. Two rows are present, showing '1.1' and '1.0' in the Version column, and a dropdown menu in the Statuses column. At the bottom of the table, there is a message '2 records' followed by links 'Refresh' and 'Print', with '1.1' circled in red.

Version	Statuses
1.1	Statuses
1.0	

2 records - Refresh Print

Currently Running Version Imports

Import Type	Agent
	Agent

Refresh Print

11.3.2 Deploy Updates Again to the SIT Environment

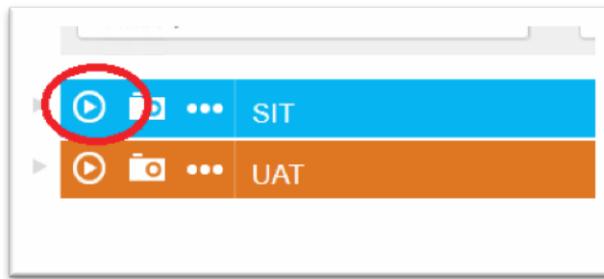
Now that we have found another new version of a component, we need to rerun the deployment process for this application. Notice now that this is the on-going procedure that we use when new versions of components come out of development. This is what we mean when we talk about “one button deployments”. The configuration has been done in the application, components, environments and properties in UrbanCode Deploy – and ongoing deployments simply amount to executing the deployment processes.

11.3.3 Re-Deploy JPetStore into the SIT Environment with the New Component Version

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application. This will display the two environments we created earlier (**SIT** and **UAT**).

Again, click the **Request Process** button for the **SIT** environment.



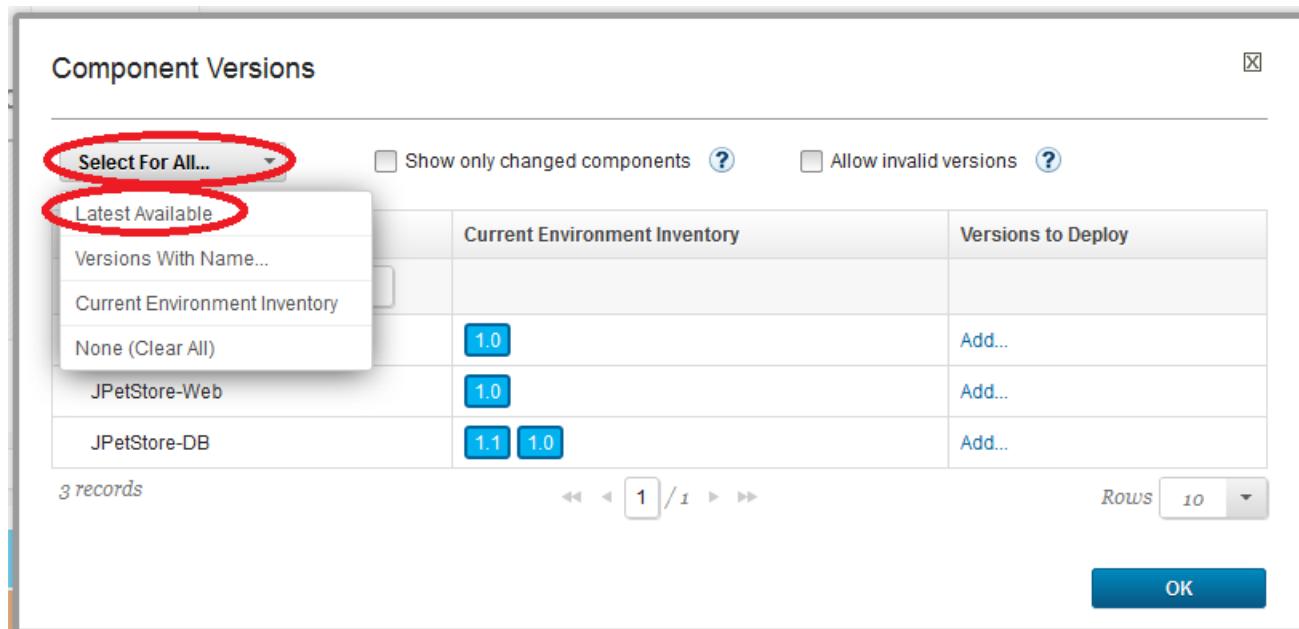
The dialog appears to request a process that will run against the **SIT** environment. Set the **Process** field to **Deploy JPetStore**.

In the **Run Process on SIT** dialog set the Process field to **Deploy JPetStore**.

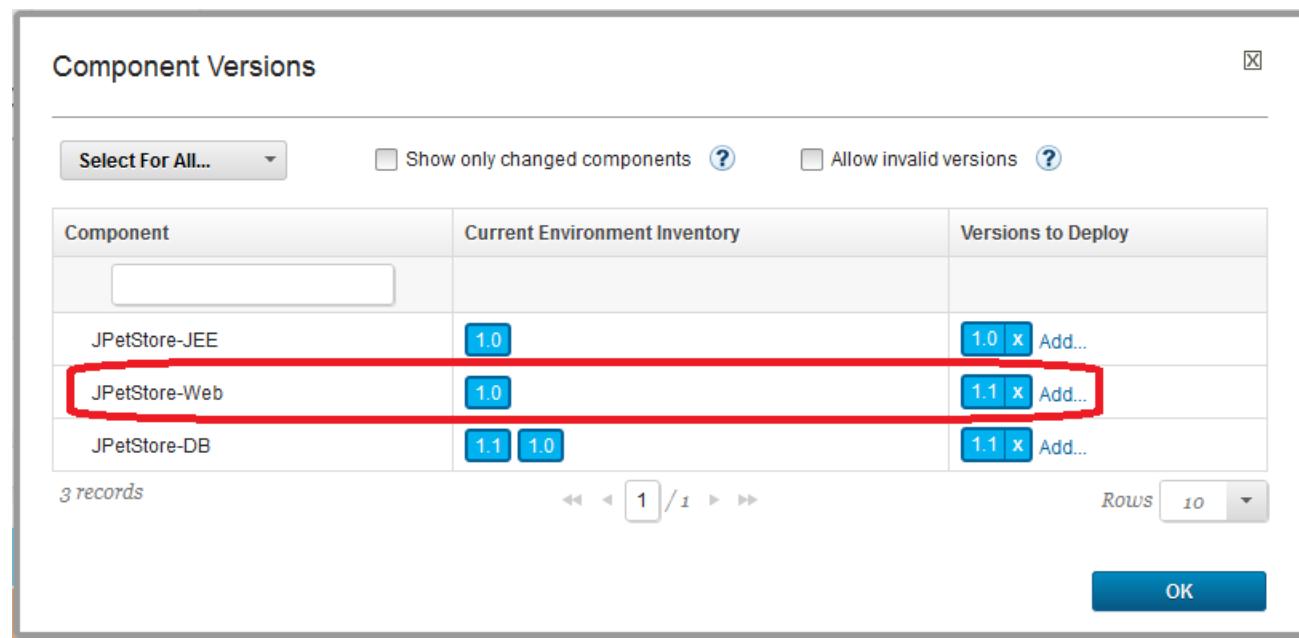
By the **Versions** field, click the link that says **Choose Versions...** another dialog appears.

A screenshot of a dialog box titled "Run Process on SIT". It contains fields for "Only Changed Versions" (checkbox checked), "Process" (dropdown set to "Deploy JPetStore" and circled in red), "Snapshot" (dropdown), "Component Versions" (label), "Versions" (text input "0 selected" and a "Choose Versions..." link circled in red), "Schedule Deployment?" (checkbox), and "Description" (text input). At the bottom are "Submit" and "Cancel" buttons.

In the **Component Versions** dialog, set the **Select for All...** dropdown box in the top left to **Latest Available**.



Compare the two columns to see what versions are currently installed, and what versions will be installed next. Note that the **JPetStore-Web** component will be upgraded to version 1.1.



Click the **OK** button.

Back on the **Run Process on SIT** dialog, click the **Submit** button and UrbanCode Deploy starts the deployment process.

Monitor the status. When UrbanCode Deploy finishes processing, all the components should deploy successfully.

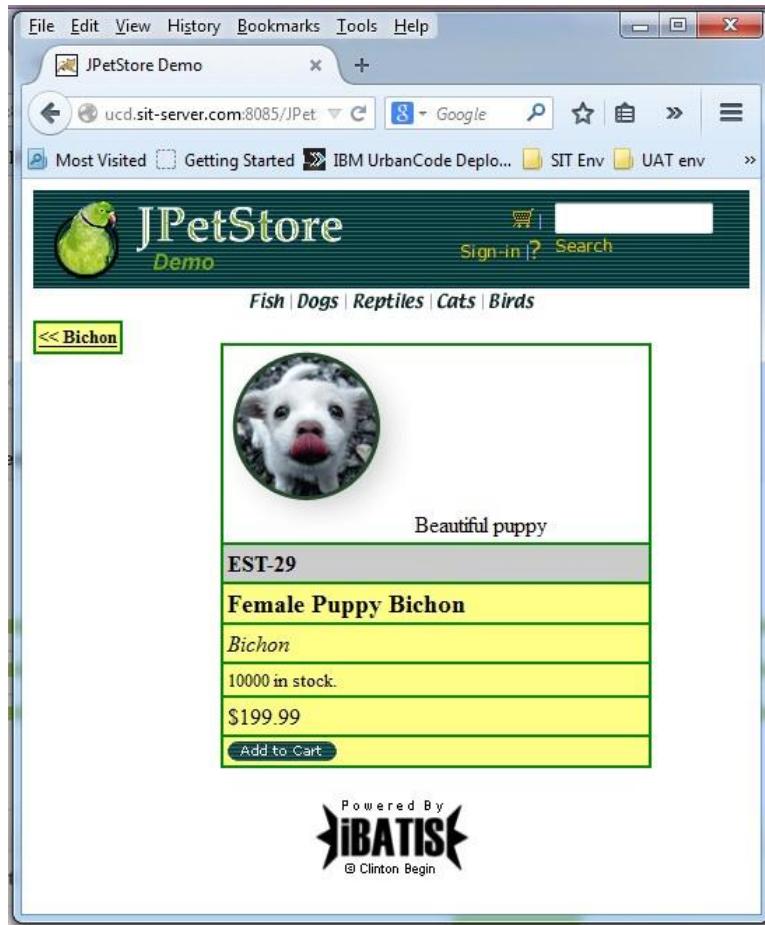
Return to the Application Environment page and expand the **SIT** environment again to see that the **JPetStore-Web** component has been updated to version 1.1.

Return to the browser window showing the Pet Store application, and navigate to the list of dogs again.

In the main body of the page click the Product ID next to the Bichon listing (**K9-BC-01**).

Again in the main body of the next page click the Item ID **EST-29**.

You should now see a picture included with the Bichon listing. (Although the picture is not a Bichon... it is a Pitt Bull puppy -- so our developers have more work to do! But this is ok for now.)



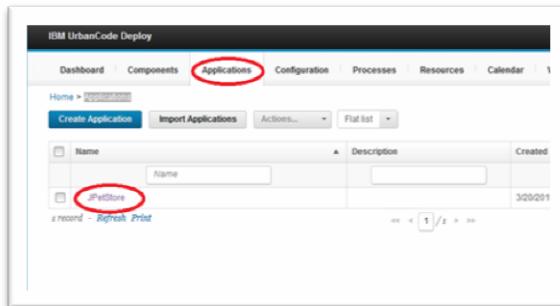
11.4 Promote JPetStore from SIT to UAT with a Snapshot

In this lab you will create a snapshot of the component versions now deployed into the **SIT** environment and then promote those components to the **UAT** environment by using that snapshot.

11.4.1 Create the snapshot of SIT

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application.

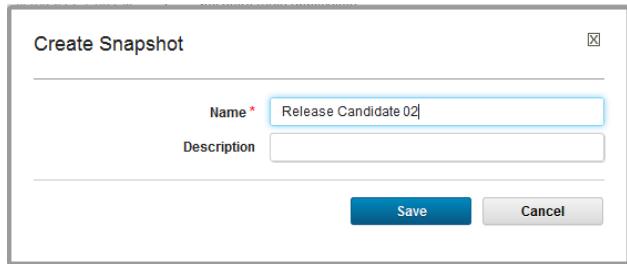


In the row for the **SIT** environment, click the icon that looks like a camera – this starts the process to create a snapshot of whatever versions of components are currently deployed in that environment.

A screenshot of the IBM UrbanCode Deploy 'Application: JPetStore' details page. The top navigation bar includes links for Dashboard, Components, Applications (selected), Configuration, and Processes. The breadcrumb trail shows 'Home > Applications > JPetStore'. Below the header is a section with 'Created By' (admin) and 'Created On' (3/20/2015, 11:33 AM). A 'Create Environment' button is present. The main content area displays a table of environments. The first row, 'SIT', is highlighted with a red circle around its camera icon. The second row, 'UAT', is orange. The table columns include Environment, Configuration, Components, Blueprints, and Snapshot. The 'SIT' row shows 'Snapshot: None'.

Enter **Release Candidate 02** in the **Name** field and click the **Save** button.

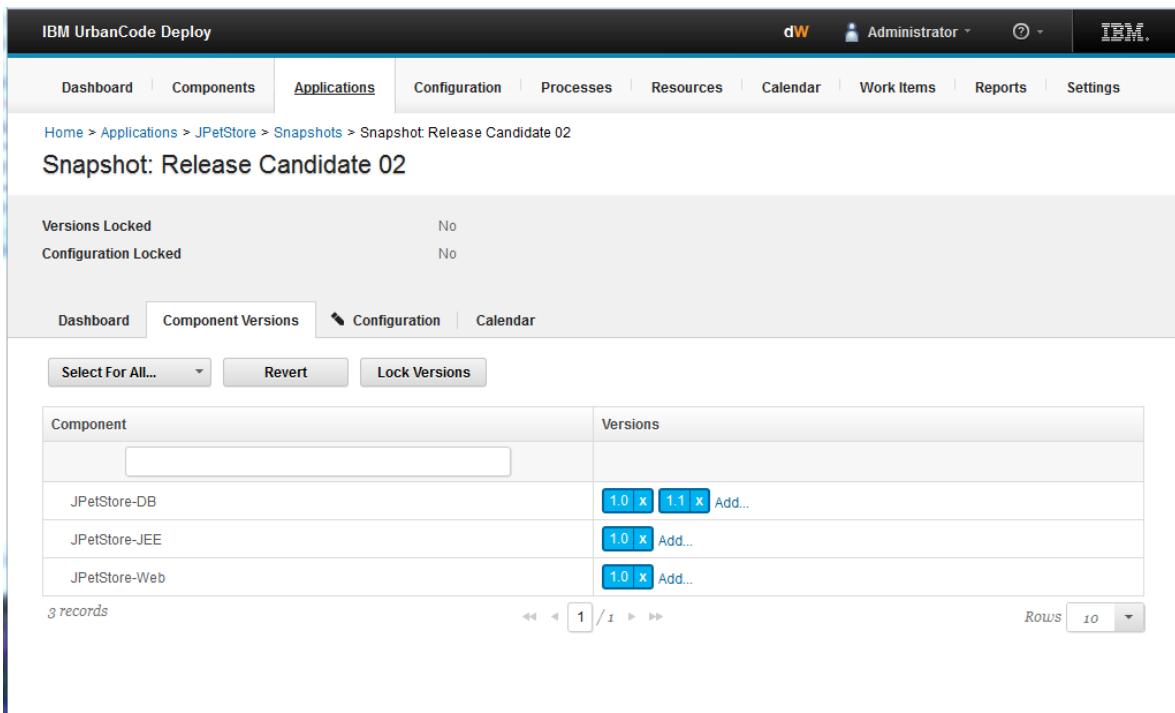
IBM Software – IBM UrbanCode Deploy Lab Workbook



The dialog box is titled "Create Snapshot". It has two input fields: "Name" (containing "Release Candidate 02") and "Description". At the bottom are "Save" and "Cancel" buttons.

The snapshot is populated with the current content of the **SIT** environment.

Go to **Component Versions** tab. Notice that the Database component includes two versions – the Incremental version 1.1 is not sufficient to recreate the environment, so both are automatically included. Both are needed to re-create the application currently deployed in **SIT**.



The screenshot shows the UrbanCode Deploy interface with the "Applications" tab selected. Under the "JPetStore" application, the "Situations" section shows a snapshot named "Release Candidate 02". The "Component Versions" tab is active, displaying a table of components and their versions:

Component	Versions
JPetStore-DB	1.0 x 1.1 x Add...
JPetStore-JEE	1.0 x Add...
JPetStore-Web	1.0 x Add...

Below the table, it says "3 records". On the right, there are "Rows" and "10" buttons. At the top of the page, the navigation bar includes "Dashboard", "Components", "Applications" (selected), "Configuration", "Processes", "Resources", "Calendar", "Work Items", "Reports", and "Settings". The top right shows "dw", "Administrator", and "IBM".

11.4.2 Promote the Snapshot to the UAT Environment

Before we actually run the deployment, UrbanCode Deploy gives us a way to see what will happen to the **UAT** environment ahead of time. The **Preview** feature of UrbanCode Deploy Snapshots provides this capability.

Click the **Applications** tab in the top row of tabs.

Click on the link for the **JPetStore** application.

On the lower row of tabs click the **Snapshots** tab.

In the list of snapshots, click the link for **Release Candidate 02**.

Scroll down until you can see the environments and click the icon that looks like an **eye** to the left of the **UAT** environment.

Statuses

[Add a Status](#)

Status	Description	Created	By	Actions
No statuses have been assigned to this snapshot.				

[Refresh](#) [Print](#)

Tasks

[Expand All](#) [Collapse All](#)

Name	Approval Process	Target	Status	Completed By	Actions
No work items found.					

[Refresh](#) [Print](#)

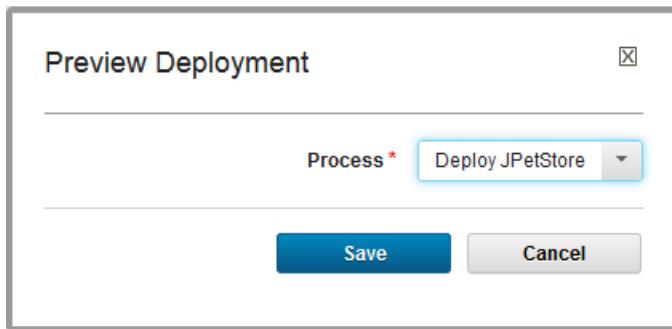
Environments

Drag environments by their names to re-order them. [2 Environments](#)

[Collapse All](#) [Expand All](#)

	Search by Name	or	Search by Blueprint	
▶		SIT	4 / 4 Snapshot Versions Found	
▶		UAT	2 / 4 Snapshot Versions Found	

Click this **Preview** button and the **Preview Deployment** dialog appears.



Make sure the **Process** field is set to **Deploy JPetStore** and click the **Save** button.

In the resulting view, look in the section entitled **Changes Per Resource** and use the 'twisties' on the left to expand each row. On the right you can see the version of each component that UrbanCode Deploy will install if you use this snapshot.

Changes Per Resource

Expand All Collapse All

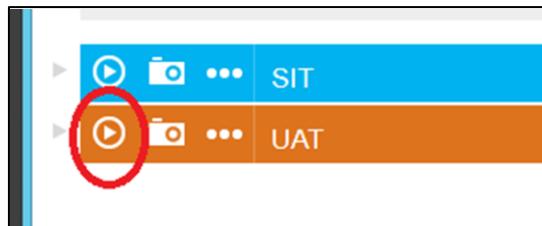
Resource / Component	Process	Version	Change Type
▼ /Pittsburgh Data Center/UAT Department/ucd.uat-db-server.com/JPetStore-DB			
JPetStore-DB	Deploy DB Component	1.1	+ Active
▼ /Pittsburgh Data Center/UAT Department/ucd.uat-app-server.com/JPetStore-Web			
JPetStore-Web	Deploy JPetStore Web Component	1.1	+ Active

[Refresh](#) [Print](#)

Changes Per Component

Now that you have verified what will be promoted to the **UAT** environment with this snapshot, you are now ready to request the deployment to be carried out.

Click the **Applications** tab in the top row of tabs. Click on the link for the **JPetStore** application. On the row for the **UAT** environment, click the Request Process button (near the left).



In the **Run Process on UAT** dialog set the Process field to **Deploy JPetStore**.

Set the Snapshot field to **Release Candidate 02**.

Run Process on UAT

Only Changed Versions

Process * **Deploy JPetStore**

Select a snapshot, or choose versions for individual components.

Snapshot **Release Candidate 02**

Schedule Deployment?

Description

Submit **Cancel**

Click the **Submit** button to start the deployment.

Monitor the progress and look for errors. The process should complete successfully.

Now the **SIT** environment is promoted to **UAT** environment.

You can also verify the promotion by opening a new browser and pointing to the **UAT** application server machine:

<http://ucd.uat-app-server.com:8086/JPetStore>

You should see the top page, be able to enter the store and see pictures of the animals – including the new Bichon with picture.

11.5 Summary

In this lab, you learned how to deploy specific component versions, in this case version 1.1 of **JPetStore-Web** and **JPetStore-DB** to the **SIT** environment. You also learned how to create a snapshot using the components in the **SIT** environment and promote that snapshot to the **UAT** environment.

12 Appendices

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