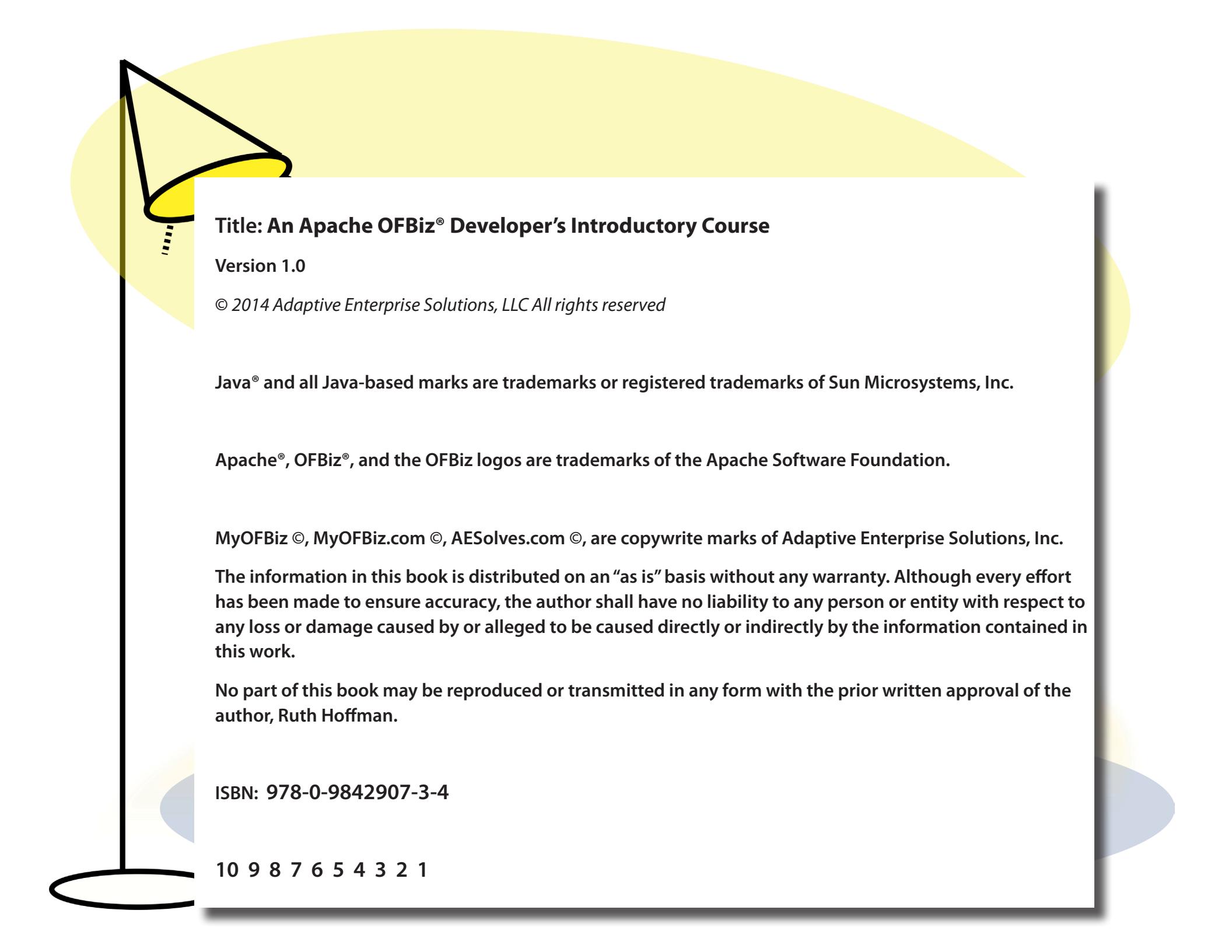


An Apache OFBiz®

DEVELOPER'S INTRODUCTORY COURSE COURSE SLIDES

Ruth Hoffman, Author
Summer 2014
OFBiz Release 10.x - 13.x
Course #TR9780-0734



Title: An Apache OFBiz® Developer's Introductory Course

Version 1.0

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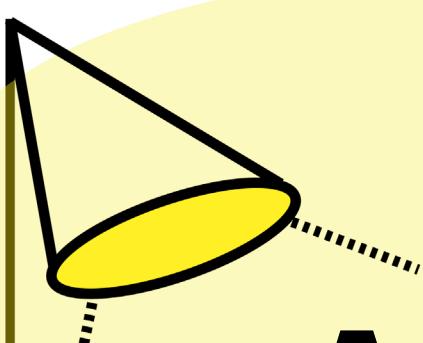
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DEVELOPER'S INTRODUCTORY COURSE
DAY 1: Getting Started

Presented By Ruth Hoffman



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Day 1: Getting Started

Course Overview



- ▶ **General Housekeeping**
- ▶ **Who Am I?**
- ▶ **Introductions**
- ▶ **What To Expect From This Course**

Day...1-2

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Day 1: Getting Started

OFBiz Project Overview

- ▶ Putting OFBiz In Perspective
- ▶ What You Get Out-Of-The-Box
- ▶ Versions
- ▶ Releases
- ▶ Release Migration

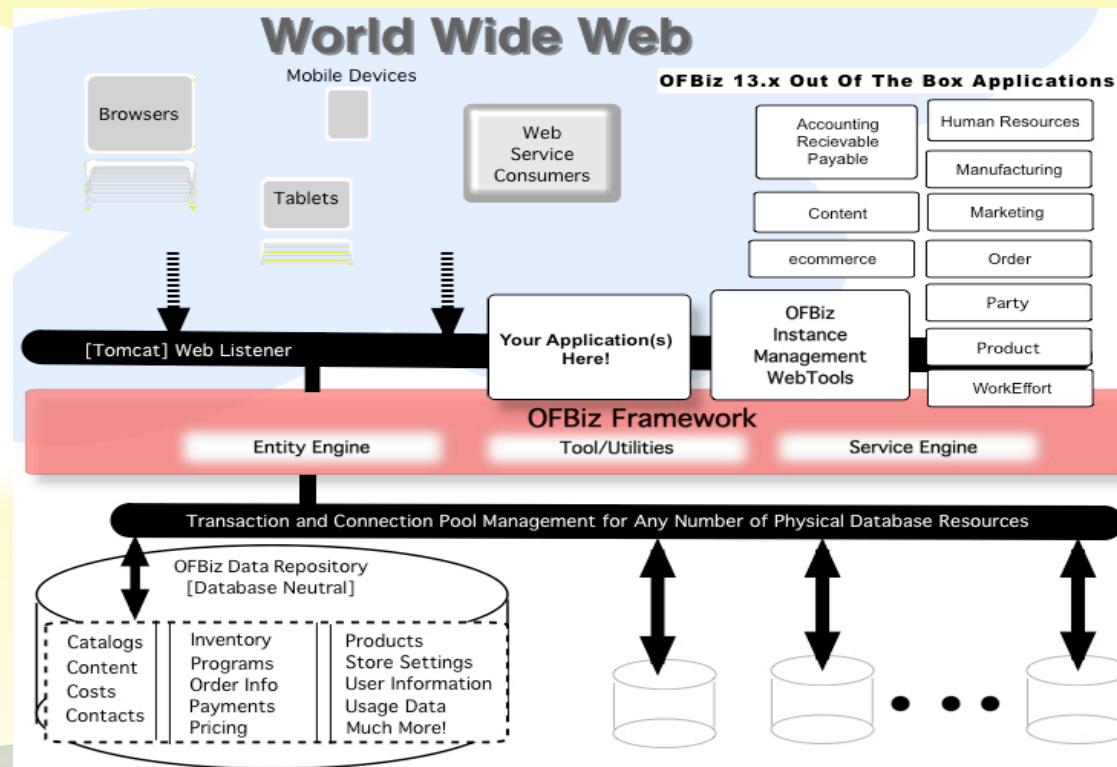


Day...1-3

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Day 1: Getting Started

OFBiz Out-Of-The-Box



Day...1-4



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Day 1: Getting Started

Versions & Releases



- ▶ **Versions Refer To (Subversion) SVN Version Numbers**
- ▶ **Releases Are What Is Distributed Via Download Site**
- ▶ **Most Current Release Is 13.x**
- ▶ **First Apache Release: OFBiz 4.0**



Day...1-5



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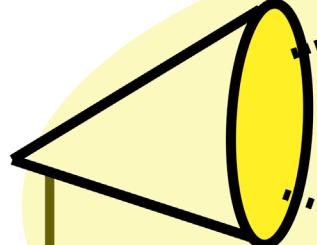
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Release Migration



- ▶ **No Major Structural Changes Since 4.0**
- ▶ **Managing a Migration**
- ▶ **Why Migrate?**
- ▶ **How To Migrate?**





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Release Feature Changes



- ▶ **Data Model**
- ▶ **Seed Data**
- ▶ **Business Logic**
- ▶ **User Interface**
- ▶ **Support & Operations**



Day...1-7



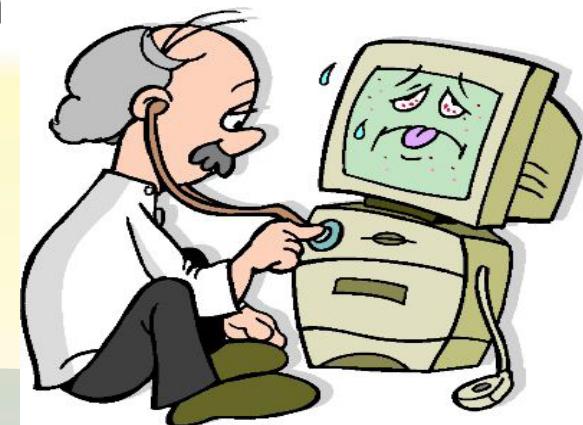
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Getting An Instance Up And Running



- ▶ **Downloading Code**
- ▶ **Building An Instance From The Distribution**
- ▶ **Instance Startup/Shutdown**
- ▶ **What Could Go Wrong?**



Day...1-8



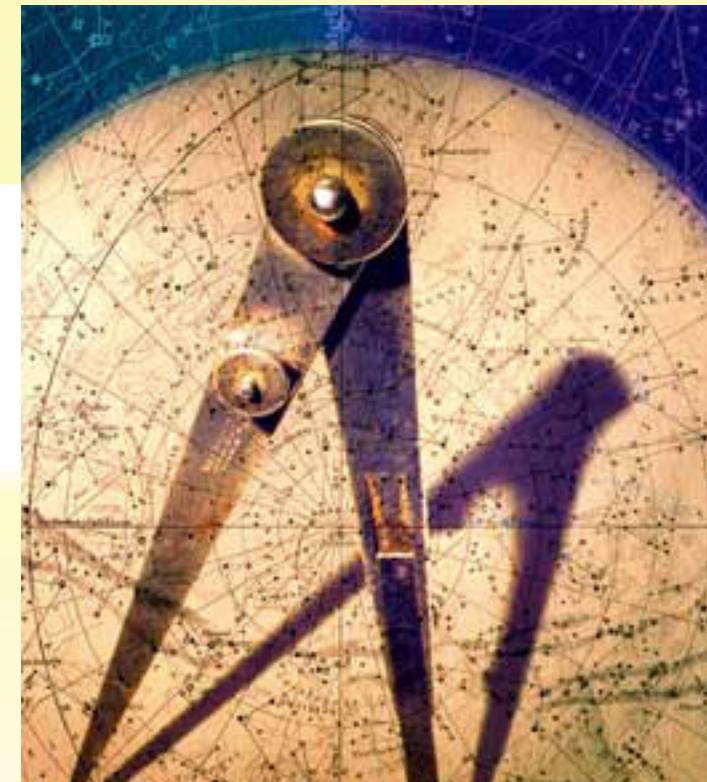
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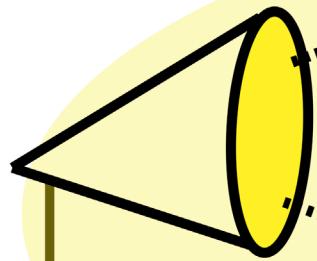
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Navigating The Project



- ▶ **Directory And File Layout**
- ▶ **Basic Building Blocks**
 - **“Components”**
 - **“Webapps”**
- ▶ **Support Cast**
 - **Config Files**
 - **Logfiles**





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Day 1: Getting Started

Navigating The Project

Finding Your Way Around

- ▶ **Install/Home Directory**
- ▶ **Component/Component “Parent” Directories**
- ▶ **Applications/Webapps**
- ▶ **Everything Else**



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Navigating The Project



Components

- ▶ **Components = Building Blocks**
- ▶ **Unlimited Number**
- ▶ **May Be Added/Removed At Any Time**
- ▶ **Configuration Changes Require Restart**
- ▶ **Loaded At Instance Startup**
- ▶ **Hierarchy & Ordering Is Important**
- ▶ **Hot-Deploy - What Is It?**



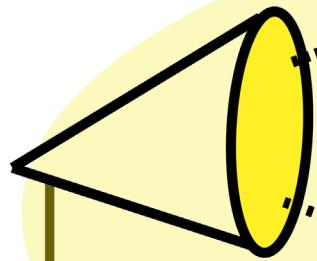
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Navigating The Project

Webapps

- ▶ Basis For User Interface(s)
- ▶ An OFBiz Instance Has Many Webapps
- ▶ Unlimited Number May Be Present
- ▶ Components May Have None, Many or 1
- ▶ May Be Added/Removed At Any Time
- ▶ No Dependencies Between Webapps



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Day 1: Getting Started

Other Useful Getting Started Hints

- ▶ **Instance Configuration**
- ▶ **The OFBiz “admin” User**
- ▶ **Log Files**
- ▶ **Webtools**



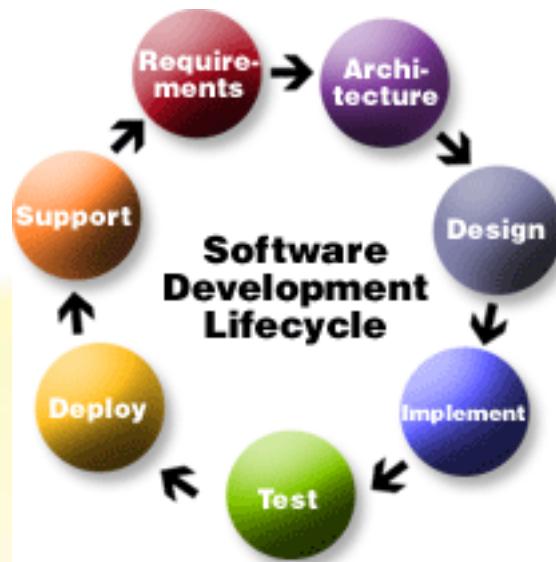
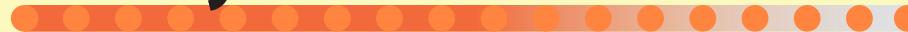
Day...1-13



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Day 1: Getting Started

Lifecycle Considerations





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Day 1: Getting Started

Day 1 Summary



- ▶ **OFBiz is a fully featured ERP software suite.**
- ▶ **Open source and open book make it the ideal platform for just about any enterprise software automation project.**
- ▶ **Getting OFBiz up and running can, at times be frustrating.**
There really isn't too much that can go wrong, but because of the packaging and lack of simple, end-user oriented instructions, it does not always work on the first try.
- ▶ **Project Navigation**
- ▶ **Other Startup Hints**
- ▶ **OFBiz Lifecycle Considerations**





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Day 1: Getting Started

Day 1 Exercises



Objectives:



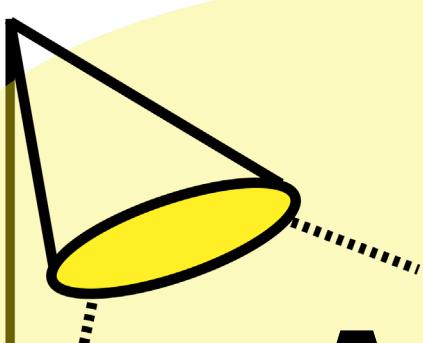
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Challenges:



Please See The Student Guide.

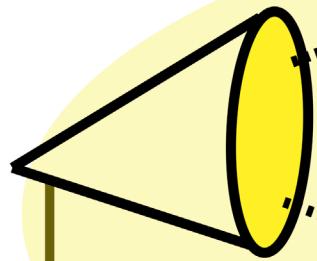


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DAY 2: The User Interface

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Day...2-1



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Day 2: The User Interface

What Is The OFBiz User Interface?



Rini

“You can't just punch in 'let there be light' without writing the code underlying the user interface functions.”

Day...2-2



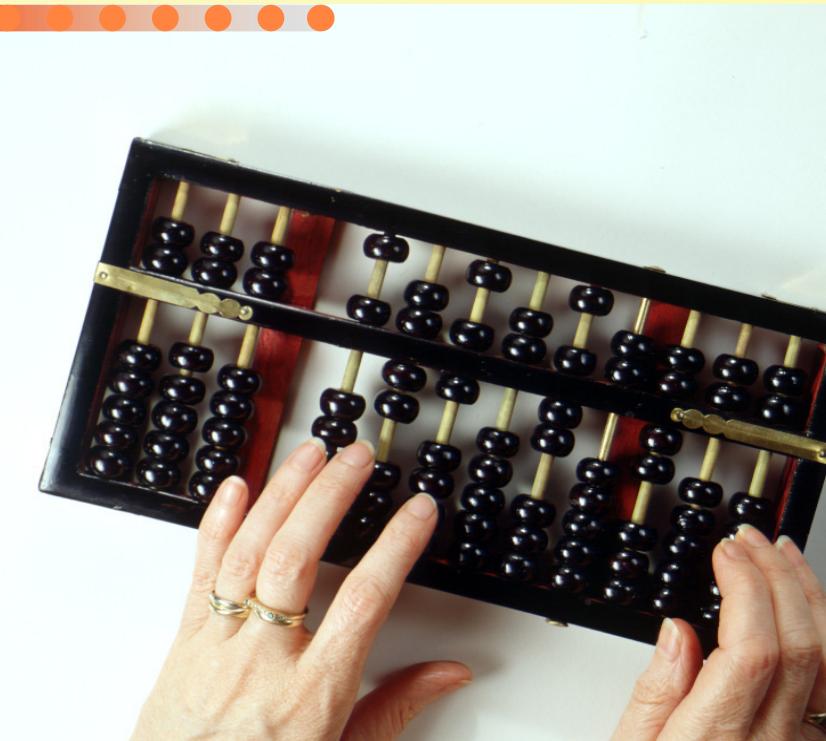
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How Does It Work?



- ▶ Architectural “Theory”
- ▶ OFBiz Implementation



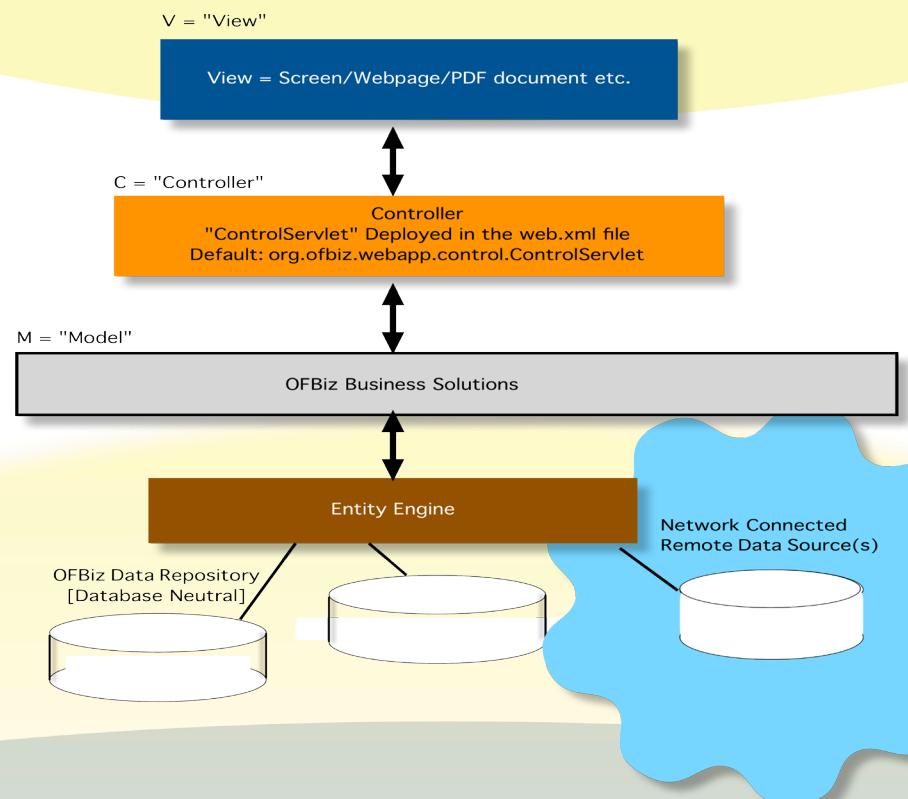
Day...2-3



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Day 2: The User Interface

UI Architecture Overview



Day...2-4



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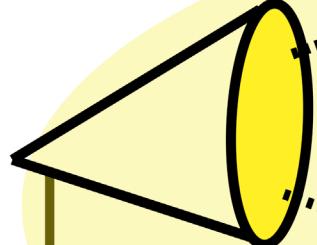
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UI Model-**View**-Controller Design Pattern

The “View”

- ▶ **Screen Widgets Demystified**
- ▶ **Screen Widget Definitions**
- ▶ **FreeMarker Templates**
- ▶ **UI Best Practices**

Day...2-5



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Day 2: The User Interface

The OFBiz UI Business Model



- ▶ **The Data Model**
- ▶ **Back-End Business Logic**
- ▶ **Data Preparation**
 - **Groovy**
 - **Bean Shell Scripting**
 - **FreeMarker Template API Calls**

Day...2-6



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Day 2: The User Interface

The OFBiz UI Controller



The “Controller”

- ▶ **How It Works**
- ▶ **The “controller.xml” File**
- ▶ **Configuring Webapp URLs**



Day...2-7



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Day 2: The User Interface

The “View” Revisited



- ▶ **Menu Widgets**
- ▶ **Form Widgets**
- ▶ **Tree Widgets**



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Day 2: The User Interface

User Interface Testing

► Your Options:

- **Browser Compatibility Challenges**
- **Develop Your Own Test Plans**
- **Other?**



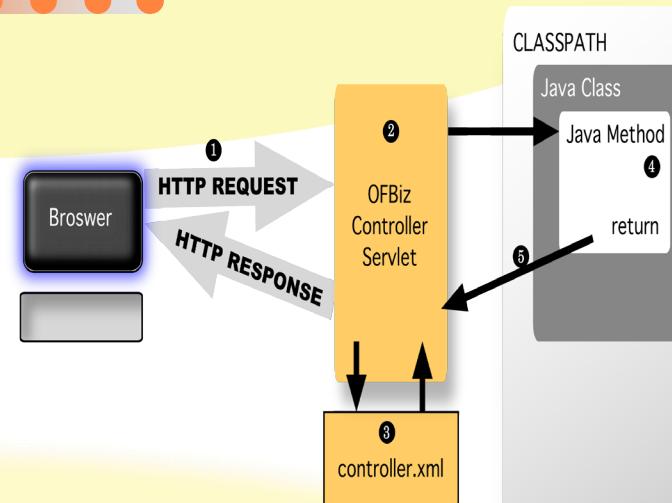
Day...2-9

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Day 2: The User Interface

OFBiz“Events”

- ▶ **How Events Work**
- ▶ **Writing Your First Event**
- ▶ **Some Useful OOTB Utilities**
- ▶ **Some Best Practices**



OFBiz Events are Java Methods
on the CLASSPATH
Called by the Controller Servlet

Day...2-10



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Day 2: The User Interface

Final UI Thoughts



- ▶ **Cascading Style Sheets (CSS)**
- ▶ **Javascript**
- ▶ **Images**
- ▶ **Visual Themes**



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Day 2: The User Interface



Day 2 Summary

- ▶ **An OFBiz User Interface is implemented in a “Webapp”.**
- ▶ **OFBiz follows the Model-View-Controller design pattern in architecting a framework that supports an unlimited number of Webapps.**
- ▶ **HTML webpages are built using OFBiz widget tools. Widget rendering engines preserve context and allow webpages to be dynamic.**
- ▶ **The OFBiz Controller is like the traffic cop that handles URL redirection, re-write, authentication and general Webapp access.**
- ▶ **“Events” are the primary method of accessing back-end business logic.**
- ▶ **Testing a Webapp is a challenge.**



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Day 2: The User Interface

Day 2 Lab Exercises



Objectives:

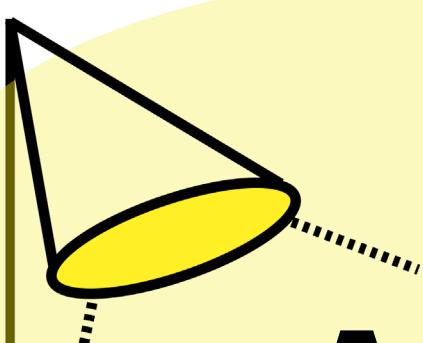


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Objectives:



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DAY 3: The Entity Engine

Presented By Ruth Hoffman

Day...3-1



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Day 3: The Entity Engine

Entity Engine Basics



- ▶ **Design & Overview**
- ▶ **OFBiz Data Sources**
- ▶ **An OFBiz Entity Revealed**
- ▶ **Look Ma, NO SQL**
- ▶ **Seed Data**
- ▶ **Out-of-the-box (OOTB) Data Model**
- ▶ **Best Practices**

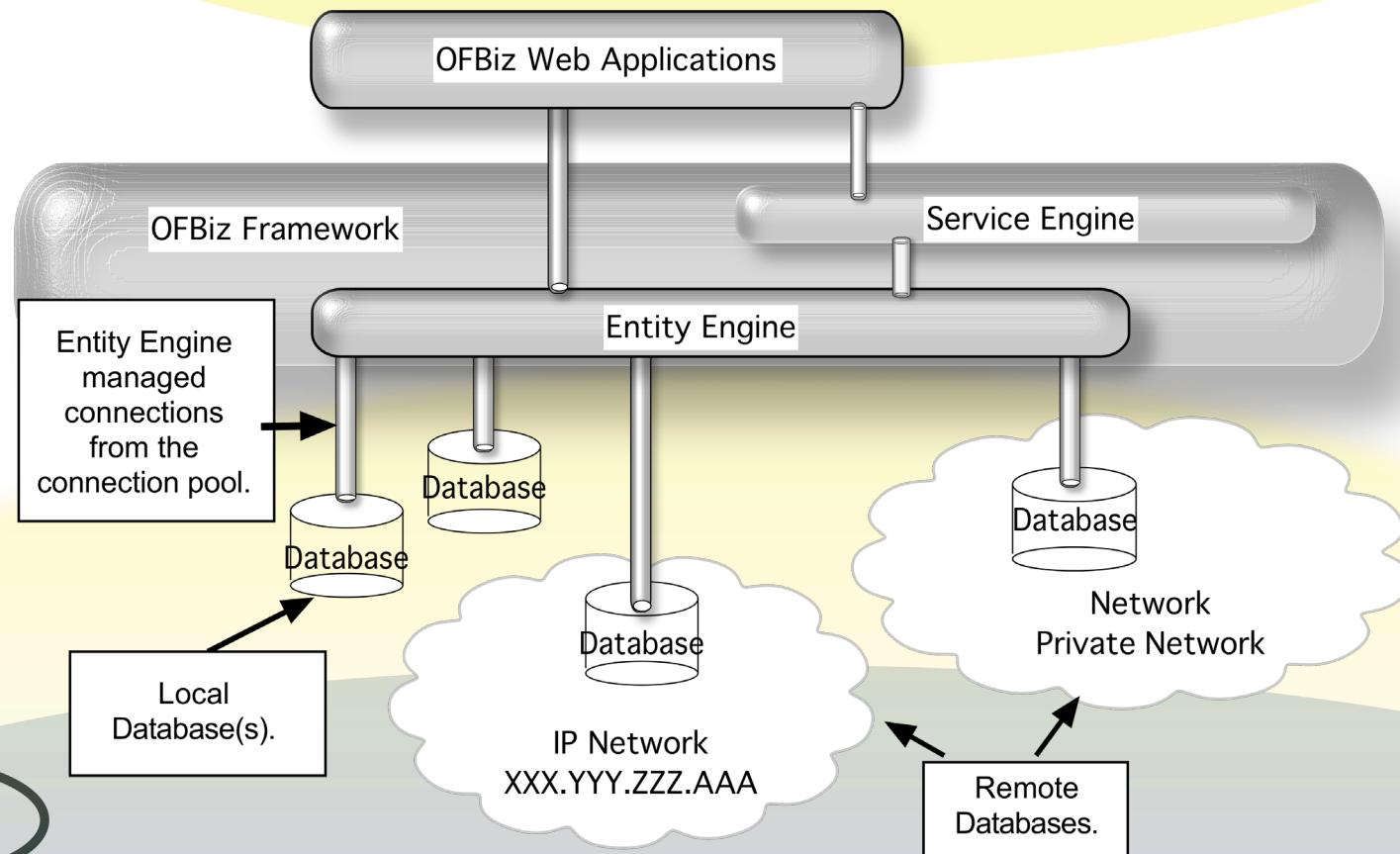


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Day 3: The Entity Engine

Entity Engine Basics

Design & Overview





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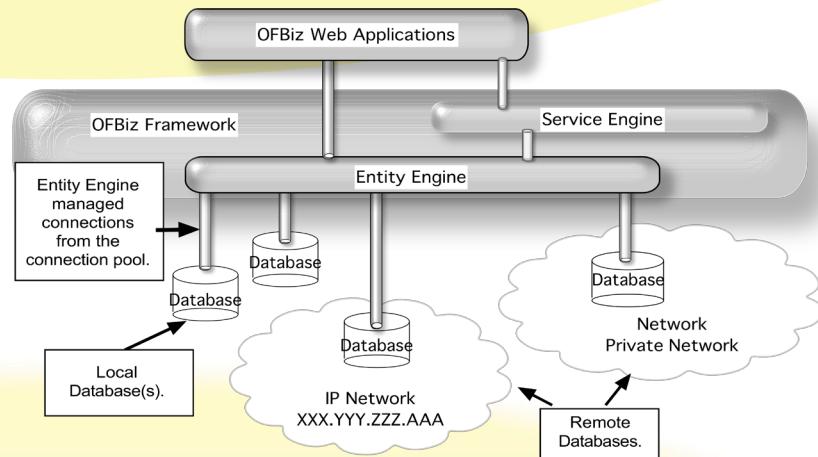
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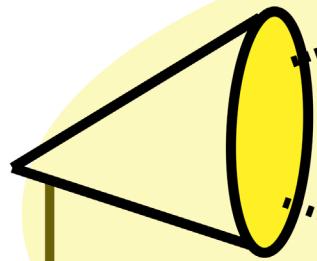
Entity Engine Basics

GenericValue Objects



Object
Relational
Mapping





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Entity Engine Basics

OFBiz Data Sources

- ▶ A “Data Source” is a **physical data repository**.
- ▶ Only **SQL based databases** are currently supported by the Entity Engine.
- ▶ A “Local” data source runs in the same JVM as OFBiz.
- ▶ A “Remote” data source is one that is not running in the same JVM as OFBiz.
- ▶ OFBiz supports a mix of local and remote data sources.



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Entity Engine Basics



Data Sources Configuration

- ▶ **Changing The Default Database.**
- ▶ **Multiple Database Data Sources.**
- ▶ **Non-OFBiz Databases.**



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Entity Engine Basics

Changing The Default Database

- ▶ **Default Apache Derby database is local.**
- ▶ **It is strongly recommended NOT to use a local database for production systems.**
- ▶ **All Entity Engine aware data sources are configured in:**
`~framework/entity/config/entityengine.xml`
- ▶ **All configuration changes require restart.**



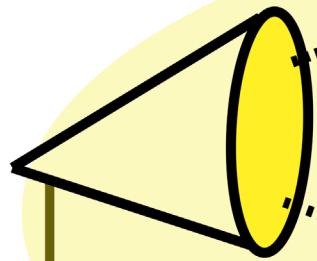
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Day 3: The Entity Engine

Entity Engine Basics

Configuring Multiple Data Sources

- ▶ **Support for unlimited number (and mix) of data sources.**
- ▶ **Each data source has its own “helper” object.**
- ▶ **Write code one time, run against any data source.**
- ▶ **All Entity Engine data sources are configured in:**
`~framework/entity/config/entityengine.xml`



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Day 3: The Entity Engine

Entity Engine Basics

Configuring NON-OFBiz Data Sources

- ▶ The Entity Engine can manage access to data sources not hosting OFBiz data.
- ▶ Configure NON-OFBiz database field types in:
`~framework/entity/fieldtype/<fieldtypefile>.xml`
- ▶ Basic “FieldType” definitions and are provided.
- ▶ You may change or add to a FieldType definition file at any time.



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Day 3: The Entity Engine

Relational Refresher



- ▶ **Tables**
- ▶ **Columns**
- ▶ **Primary Keys**
- ▶ **Foreign Keys**
- ▶ **Table Relationships**



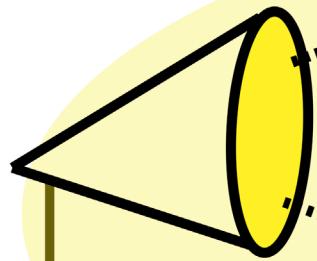
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Entity Engine Basics

An OFBiz “Entity” Revealed

- ▶ **Entity = Model of a Relational Database Table**
- ▶ **Entity Model Includes:**
 - **Name**
 - **Field Definitions (Equivalent To Table Columns)**
 - **Primary Keys**
 - **Relationship(s) Specifier To Other Entities.**



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Entity Engine Basics

An OFBiz "Entity" There's More...

- ▶ **Models are defined in Entity Definition files.**
- ▶ **Each Component may have any number of Entity Definition files.**
- ▶ **Entity definitions are loaded and checked at instance startup.**
- ▶ **Entity Event Control Action (EECA)**



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Entity Engine Basics

An OFBiz “View-Entity” Revealed

- ▶ **View-Entities are SQL joins.**
- ▶ **Memory resident only.**
- ▶ **Define View-Entities in Entity Definition files.**
- ▶ **Build “dynamic” View-Entities in your code.**



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Day 3: The Entity Engine

Entity Engine Basics

Look Ma, NO SQL - Usage

- ▶ Any Combination OF The Following:
 - ▶ The Application Programming Interface (API)
 - ▶ Form, Menu and Tree Widgets
 - ▶ Mini-Language
 - ▶ Webtools



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Day 3: The Entity Engine

Entity Engine Basics

Look Ma, NO SQL - The API

- ▶ **Supported by Java, BeanShell, Groovy, Freemarker & Mini-Lang.**
- ▶ **Get a “Delegator” object.**
- ▶ **Invoke methods on the Delegator object.**
- ▶ **Pass “where” and other SQL like condition statements.**
- ▶ **If reading, iterate through the result set to process data.**
- ▶ **If writing, prepare and pass a GenericValue Object.**



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Day 3: The Entity Engine

Entity Engine Basics



Look Ma, NO SQL - The Widgets/Mini-Lang

- ▶ **OFBiz Mini-Language Support**
 - ▶ **Simple Methods**
 - ▶ **Widgets:**
 - ▶ **List**
 - ▶ **Menu**
 - ▶ **Form**



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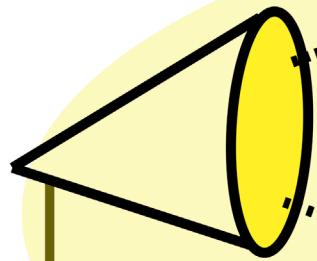
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Entity Engine Basics



Look Ma, NO SQL - There's More...

- ▶ **Handling Large Result Sets**
- ▶ **Managing Transactions**
- ▶ **Caching**



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Entity Engine Basics

Look Ma, NO SQL - Webtools

- ▶ “Entity Reference - Interactive Version” could be your best friend.
- ▶ Gives a view of all data for all configured entities.
- ▶ Allows database updates for all NON-View entities.
- ▶ Webtools XML Data Import & Data Export utilities load and unload data.
- ▶ An entity reference PDF is available.
- ▶ A synch tool used to synchronize databases.
- ▶ Database Cache maintenance .



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Entity Engine Basics

Seed Data

- ▶ **Seed data initializes a database.**
- ▶ **You can add your own seed data at any time.**
- ▶ **Hierarchy of seed data types allows for staged loading.**
- ▶ **To load data at instance startup, use the ANT command with the appropriate target.**
- ▶ **“Reset” an OFBiz instance at any time by cleaning the database and reloading seed data.**



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The OFBiz Data Model

Out-of-the-box Data Model

- ▶ **Data Model = Database Schema.**
- ▶ **Patterns Based On Len Silverston's Books.**
- ▶ **Data Model, including seed and demo data included with the download.**
- ▶ **Easy to extend the OFBiz data model using Entity Engine tools.**



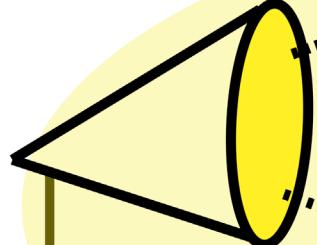
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Day 3: The Entity Engine

Entity Engine Basics

Best Practices

- ▶ Data model patterns mostly follow the Len Silverston books.
- ▶ The Entity Engine is database agnostic. That makes OFBiz database agnostic.
- ▶ To keep applications portable and maintainable use the Entity Engine.
- ▶ Use Webtools “Entity Reference-Interactive Version” to check your work and manipulate databases directly.
- ▶ Use the factory methods provided to access database data. Don't “Roll Your Own”.



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Day 3: The Entity Engine

But if you really want SQL...



- ▶ **Embed SQL Statements In Code**
- ▶ **The Webtools SQL Processor**



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Day 3: The Entity Engine

Useful Tools & Techniques



- ▶ **Entity Engine References**
 - ▶ DTDs
 - ▶ JavaDocs <http://ci.apache.org/projects/ofbiz/site/javadocs/>
 - ▶ The Code
- ▶ **Entity Sequence Generator**
- ▶ **Utility Methods**



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Useful Tools & Techniques



Utility Methods

- ▶ **Filter, Sort & Search In Memory Entities**
- ▶ **Find Entities, Get Specific Entities**
- ▶ **Extract Lists Of Field Values**
- ▶ **Retrieve Related Entities (From Disk)**



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Day 3: The Entity Engine

Day 3 Summary



- ▶ **The OFBiz Entity Engine is database agnostic.**
- ▶ **Write code one time, run against any database.**
- ▶ **Many people ask why it isn't ORM? It just isn't!**
- ▶ **Data source = database.**
- ▶ **Most SQL databases have been successfully connected to the OFBiz Entity Engine.**
- ▶ **Many useful and reusable tools and techniques exist to make using the Entity Engine easy.**
- ▶ **The code is the best place to start for examples.**



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Day 3: The Entity Engine

Day 3 Lab Exercises



Objectives:



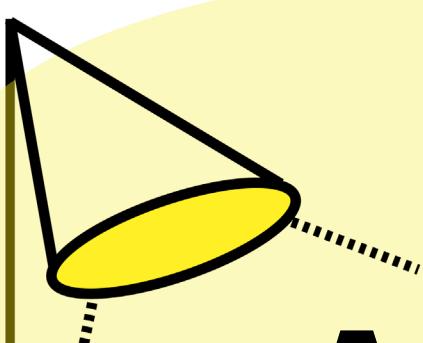
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Challenges:



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DAY 4: The Service Engine & Other Topics

Presented By Ruth Hoffman

Day...4-1



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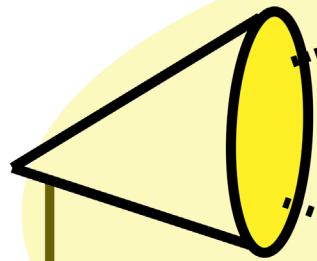
Day 4: The Service Engine And Other Topics

Today's Topics

- ▶ **The OFBiz Service Engine**
- ▶ **OFBiz And Web Services**
- ▶ **Introduction To Security**
- ▶ **Understanding Internationalization**
- ▶ **Open Mic**



Day...4-2

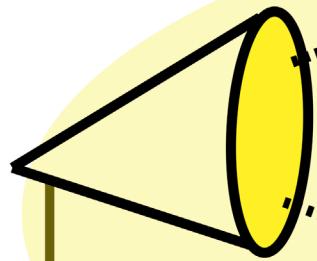


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Day 4: The Service Engine And Other Topics

The OFBiz Service Engine

- ▶ **What is The OFBiz Service Engine?**
- ▶ **What is An OFBiz Service?**
- ▶ **Building A Service**
- ▶ **Configuring A Service**
- ▶ **Using A Service**



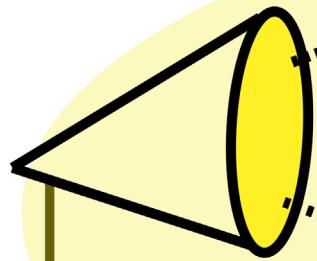
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Day 4: The Service Engine And Other Topics

The OFBiz Service Engine

What Is The Service Engine?

- ▶ **Unique, Out-Of-The-Box OFBiz Feature**
- ▶ **Similar To A “Job” Manager**
- ▶ **Runs And Manages OFBiz “Services”**
- ▶ **Supports Single, Recurring and Batch Usage**



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Day 4: The Service Engine And Other Topics

The OFBiz Service Engine

What Is An OFBiz Service?

- ▶ Reusable Pieces Of Code
- ▶ Implement Business Logic
- ▶ Invoked By Name At Runtime
- ▶ Context Handled By Service Engine
- ▶ Access To Entity Engine And OFBiz API

Day...4-5



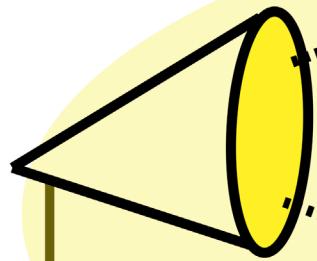
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Day 4: The Service Engine And Other Topics

The OFBiz Service Engine

Building An OFBiz Service

- ▶ **Create the Service Definition**
- ▶ **Implement Service Logic**
- ▶ **Service Definition Changes Require System Restart**
- ▶ **Once Defined, Call From Anywhere, Anytime**



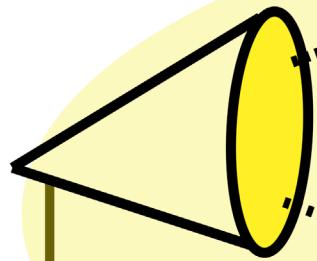
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Day 4: The Service Engine And Other Topics

The OFBiz Service Engine

Configuring A Service

- ▶ **Create Service Definition**
- ▶ **Add Implementation Type (Java, Simple etc.)**
- ▶ **Add Permission Checks**
- ▶ **Add Required & Optional Input/Output Parameters**
- ▶ **Add Default Entity Association**



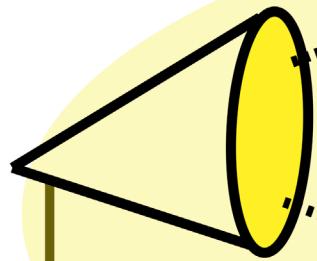
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The OFBiz Service Engine

Configuring A Service, There Is More...

- ▶ **Service Event Control Action (SECA)**
 - ▶ **Service “Chains”**
 - ▶ **Context Preserved**
 - ▶ **Maybe Enclosed In Single Transaction**
- ▶ **Service Groups**
- ▶ **Routing Services**



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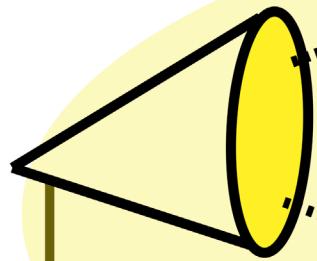
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The OFBiz Service Engine

Using An OFBiz Service

- ▶ **Invoke In**
 - ▶ **Form**
 - ▶ **Data Prep Script**
 - ▶ **Another Service**
 - ▶ **Event**
- ▶ **Call As Synch or Asynch**
- ▶ **Wrap In Transaction Or Take Default**

Day...4-9



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Using An OFBiz Service, There Is More....

- ▶ **Webtools:**
 - ▶ **Service Reference**
 - ▶ **Job Scheduler**
 - ▶ **Service Logs**



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The OFBiz Service Engine

Best Practices

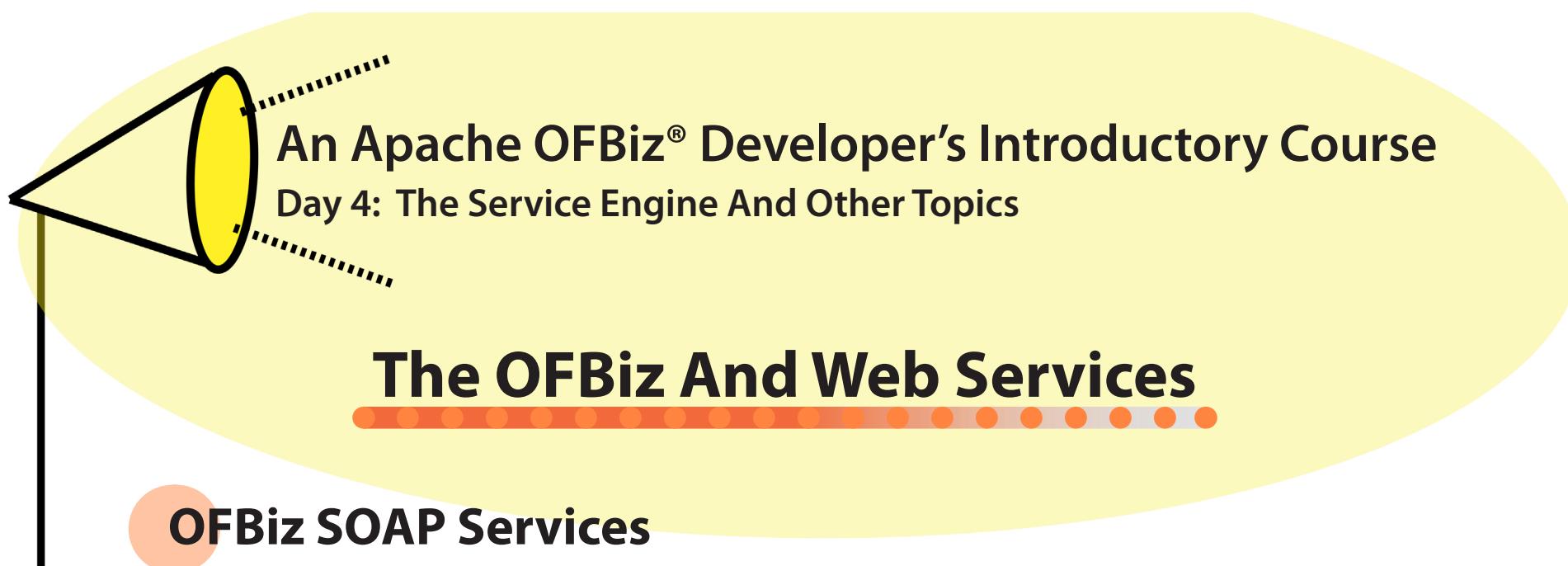
- ▶ **Naming Conventions**
- ▶ **Service Error Handling**
- ▶ **SECA Cautions**



OFBiz And Web Services

How To Make A Web Service

- ▶ **Set "Export=TRUE" On Service Definition**
- ▶ **That's All!**
- ▶ **Well, Not Exactly...**



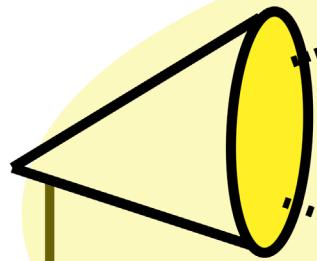
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The OFBiz And Web Services

OFBiz SOAP Services

- ▶ **Implementation of Apache AXIS**
- ▶ **WSDL Automatically Generated**
- ▶ **May Act As SOAP Client Or Server**



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Introduction To OFBiz Security

Built-In User Access Controls

- ▶ **Set Per Webapp**
- ▶ **Set Per Widget**
- ▶ **Set Per Service**
- ▶ **Requires User Authentication**
- ▶ **Authentication Forces Login**



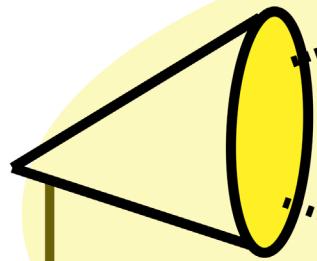
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Introduction To OFBiz Security

Login And “Security Groups”

- ▶ **“Security Groups” Assign Permissions To Users**
- ▶ **Webapps Can Be Protected By “Security Group” Settings**
- ▶ **User Must Be In Security Group To Access Protected Webapps**



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Introduction To OFBiz Security

Beyond Webapp Protections

- ▶ **Permissions**
- ▶ **Party Roles**

Security Permission Services

- ▶ **Part Of Framework**
- ▶ **Use As Needed For Any Asset**
- ▶ **Extend Data Model As Needed**



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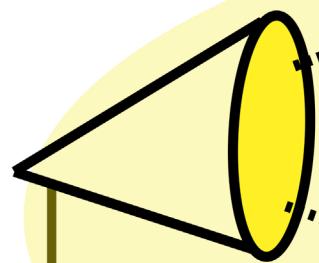
Understanding Internationalization

Locale Aware

- ▶ Based On Java Locale Support
- ▶ Numbers, Currency, Language Codes etc.
- ▶ Default May Be Changed From “en”

Translations

- ▶ Implemented Using Java Resource Bundles
- ▶ Many Translations Out-Of-The-Box
- ▶ OFBiz Label Manager



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Open Mic



Questions?

Comments?

Suggestions?



Day...4-18



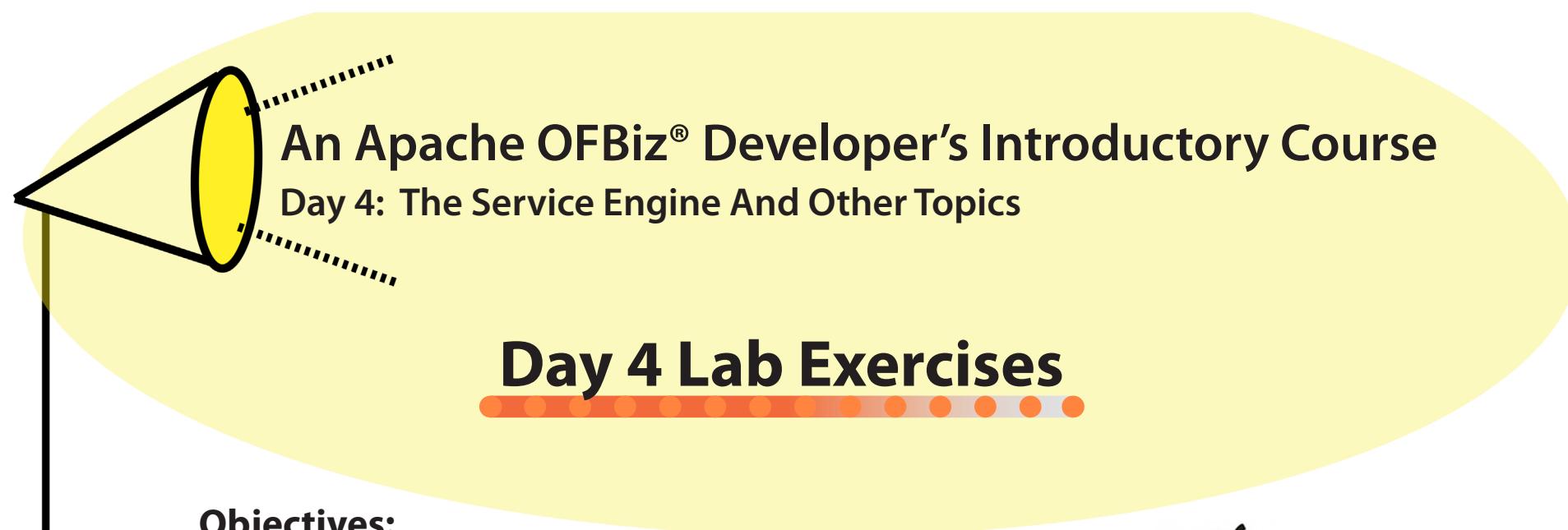
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Day 4: The Service Engine And Other Topics

Day 4 Summary



- ▶ **OFBiz Services Engine Supports Single, Recurring, Batch and Synch/Asynch Operations**
- ▶ **Call OFBiz Services By Name Anywhere, Anytime**
- ▶ **Services Configured In Service Definition Files**
- ▶ **SOAP Service Can Be OFBiz Service Where Export = “true”**
- ▶ **OFBiz Security May Be Set At Many Levels**
- ▶ **Role Based Access Control Supported**
- ▶ **Internationalization And Localization Supported**



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Day 4 Lab Exercises



Objectives:

Please See The Student Guide.



Challenges:

Please See The Student Guide.