

EnergyOS

OpenESPI

Project Deep Dive

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Updated: Mar 12, 2012

Agenda

Session 1 – OpenESPI Project Overview

- Mission/Vision
- Open Source License – Apache 2
- Links and Access
- Getting Started
- The Working Parts

Session 2 – OpenESPI/javaSpring Development Environment

- GitHub.com/energyos/OpenESPI
- VMWare Ubuntu Virtual Machine
- Eclipse Indigo, Apache Maven
- Eclipse AspectJ, Apache Tomcat6

Session 3 - What is Spring Framework?

- About
- Overview of the Basics
- Spring Data
- Spring Security/OAuth
- Spring JAX-RS

Session 4 – What is Apache Wink

- About
- Overview of the Basics
- Example
- Annotations

Session 5 – OpenESPI/javaSpring Code Walk

- Development Tree
- Eclipse Projects
- Project Structure

Session 1 – Project Overview

The mission of the OpenESPI project is to provide an open source, public licensed implementation of the NAESB REQ.21 Energy Services Provider Interface (ESPI) standard, including profiles and testing frameworks, suitable for commercial deployments.

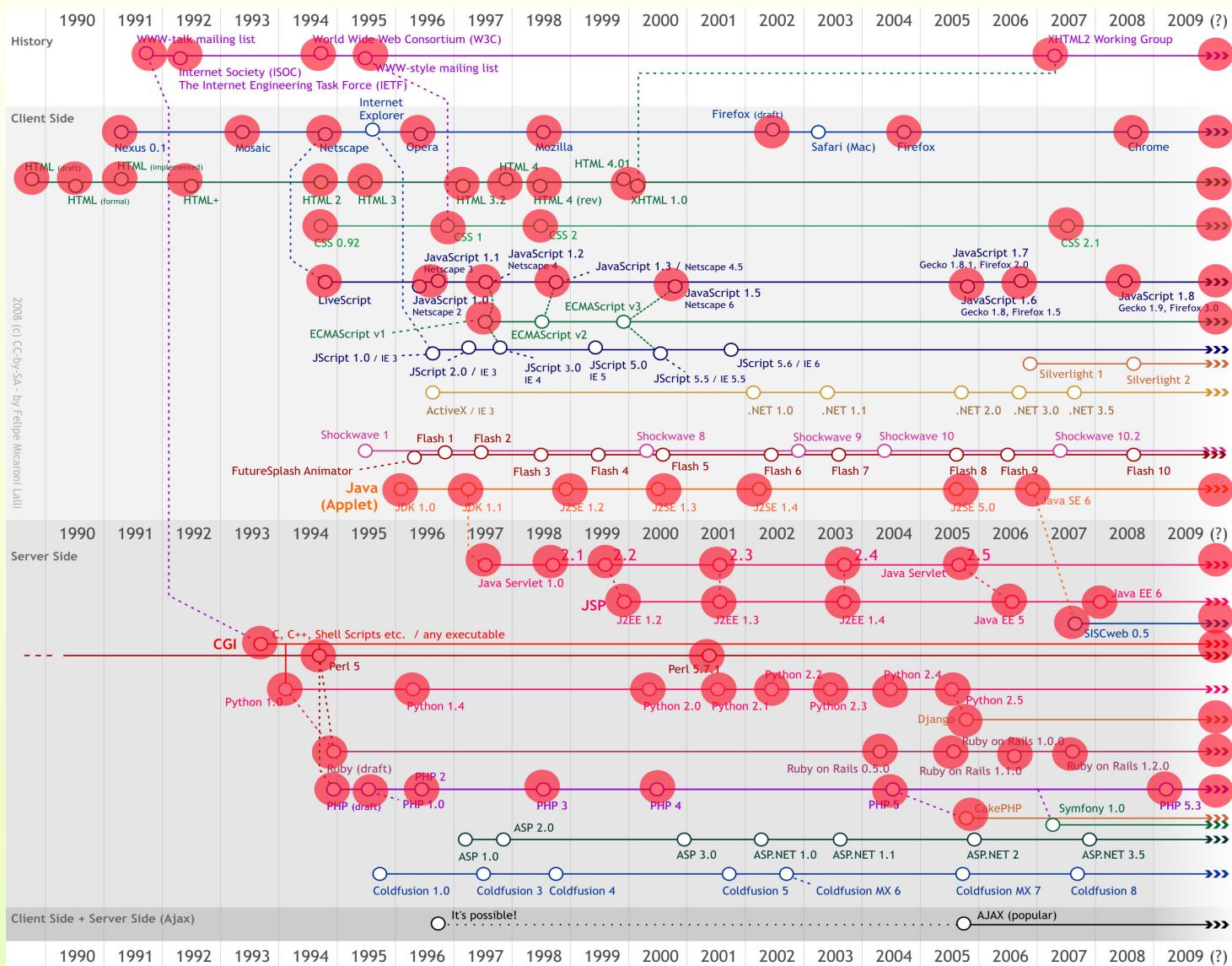
- **Open Source**: All contributions are provided with open and transparent access
- **Public License**: All IP developed and/or provided must adhere to the Apache 2 License
- **ESPI Standard**: The baseline requirements of the implementation are as described in the NAESB REQ.21 and associated artifacts
- **Profiles**: specific profiles of the ESPI standard will be supported
- **Frameworks**: We intend to leverage the works of active collaboration efforts as we develop specific ESPI implementations

Session 1 – Open Source

The Web

- 1990
 - 2009

Open Source Public License



Session 1 – Public License

There are many to choose from (<http://www.opensource.org/licenses>)

Our intent is to insure that the contributions of the community can be re-used and that the re-use may be either placed back within the community, or used for innovations within the private/commercial space.

Apache License, Version 2.0

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You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

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Our Goal is to provide a platform to accelerate innovation!

Session 1 – Public License

```
*****
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* "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
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*
*****/
```

Session 1 – Links and Access

Primary Home Page

<http://www.openespi.org>

GitHub Project

- Requires GitHub ID
- Code Repository
- Issues
- Wiki
 - Project Description
 - Project FAQ
 - GitHub Usage & Setup
- Development Packages & Frameworks
- IDE (Eclipse) Setup
- Testing Tools
- Virtual Machine Setup
- Meeting Minutes
- Project Descriptions
- Java Spring Project
- Green Button SDK
- Testing

Discussion Group

http://groups.google.com/group/energyos_espi/



Helping to Build

The Green Button!

Join the OpenESPI discussion

Subscribe

Enter Your Email



An EnergyOS Project

Feb 29 GreenButton

Workshop

[Home](#) || [Discussions](#) || [GitHub Project](#) || [Project Wiki](#) || [SGIP TWiki Green Button](#) || [SGIP PAP10 ESPI Work Area](#) || [NAESB ESPI Workarea](#) || [OpenSGI/OpenADE](#)

The Energy Services Provider Interface (ESPI) provides a way for Energy Usage Information (EUI) to be shared, in a controlled manner, between participants in the energy services markets.

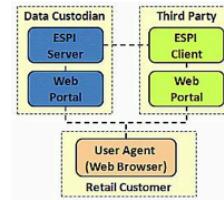
The OpenESPI project provides support for the development of deployable ESPI components that will help to rapidly and consistently engage the community with this exciting and enabling technology. Please read the [OpenESPI Project Description](#) and [OpenESPI FAQ](#) for further information! In addition:

- [Description of the Open ESPI Project \(DOAP\)](#)
- [NAESB ESPI Workarea](#)
- [Order a Copy of the ESPI Standard \(PDF\)](#)
- [Green Button SDK Repository](#)
- [GitHub Source Code Repository](#)
- [Virtual Machine - Pre-Loaded Ubuntu/Eclipse Development Environment](#)
- [OpenESPI Project Overview and Status Presentation](#)
- [Background on Frameworks Used in OpenESPI](#)

As described in the [NAESB REQ.21 Energy Services Provider Interface \(ESPI\) specification \(PDF\)](#):

The UCAIug OpenADE Task Force submitted a request for the initiation of NAESB Model Business Practices on July 29, 2010 to standardize the interface which allows for the exchange of energy usage information between designated parties.

These Model Business Practices will build on the NAESB Energy Usage Information (EUI) Model and, will help enable Retail Customers to share energy usage information with authorized Third Parties. This Energy Services Provider Interface (ESPI) will provide a consistent method for Retail Customers to authorize a Third Party to gain access to energy usage data. Doing so will help enable Retail Customers to choose Third Party products to assist them to better understand their energy usage and to make more economical decisions about their usage. ESPI will contribute to the development of an open and interoperable method for Third Party authorization and machine-to-machine exchange of Retail Customer usage information.



Current Working Calendar:

OpenESPI Working Roadmap

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	Mar 1	2	3
4 10am OpenESPI	5	6	7	8	9	10
11 10am OpenESPI	12	13	14	15	16	17
18 10am OpenESPI	19	20	21	22	23	24
25	26	27	28	29	30	31

Events shown in time zone: Mountain Time



Session 1 – Getting Started

- Purchase the NAESB Standards (REQ21, REQ18, REQ19)
 - http://www.naesb.org/misc/naesb_matl_order_espi_standards.pdf (\$50 each)
- Review the ESPI and PAP10 EUI Artifacts
 - http://naesb.org/termsofuse_form.asp?doc=espi_model.eap
 - http://naesb.org/termsofuse_form.asp?doc=espi.xsd
 - http://www.naesb.org/pdf4/naesb_EUI_model_supporting_docs.zip
- Download and Initialize the ESPI Development Virtual Machine
 - <http://www.openespi.org/vm.html>
 - Instructions in the GitHub energyos/OpenESPI wiki (with links from the above)
 - VM Ware required (free for windows, \$s for the Mac)
- Setup the your GitHub access (see the VM and GitHub in ESPI FAQ)
- Fork the energyos/OpenESPI repository
- Start Eclipse and Import the projectSet.pfs (ref: VM setup):

```
<?xml version="1.0" encoding="UTF-8"?>
<psf version="2.0">
    <provider id="org.eclipse.egit.core.GitProvider">
        <project reference="1.0, https://github.com/{gitUserName}/OpenESPI.git, master, javaspring/common"/>
        <project reference="1.0, https://github.com/gitUserName}/OpenESPI.git, master, javaspring/DataCustodian"/>
        <project reference="1.0, https://github.com/{gitUserName}/OpenESPI.git, master, javaspring/ThirdParty"/>
    </provider>
</psf>
```

Session 1 – Getting Started

Github.com Repository: <http://github.com/energyos/OpenESPI>

The screenshot shows the GitHub repository page for 'energyos / OpenESPI'. It displays basic repository statistics: 9 pull requests, 2 issues, 10 wiki pages, and 13 commits. The 'Code' tab is selected. A note at the top says 'The Open Source Energy Services Provider Interface Project --- Read more http://www.openespi.org'. Below this, there are tabs for 'Code', 'Network', 'Pull Requests', 'Issues', 'Wiki', and 'Stats & Graphs'. The 'Code' tab shows a file tree with 'branches: master', 'Files', 'Commits', 'Branches', 'Tags', and 'Downloads'. A commit message from 'energyos' is visible: 'Removed the java springServers as they must be re-created at the work...'. The 'Wiki' tab shows a single page titled 'OpenESPI DOAP'.

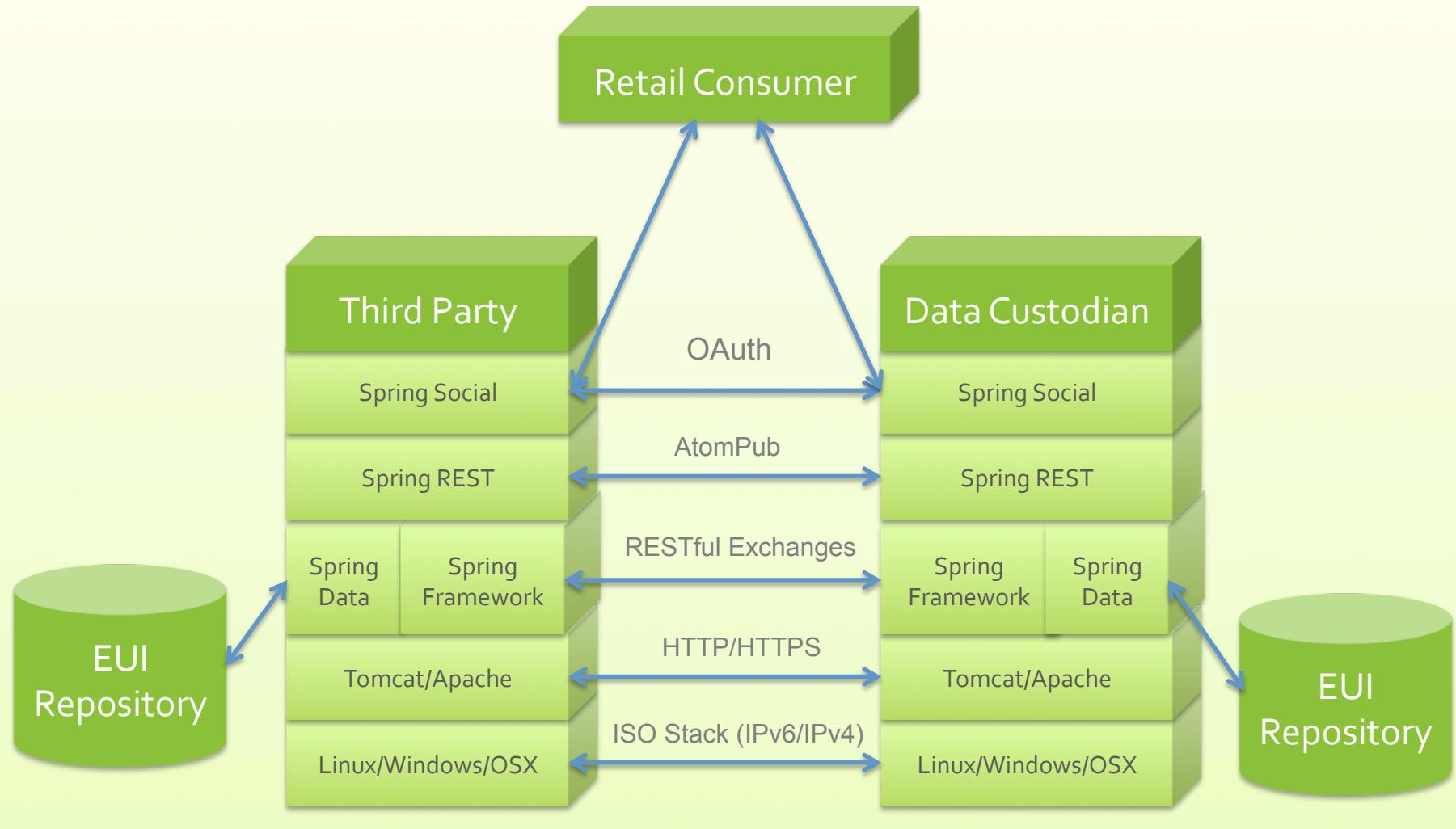
The screenshot shows the 'OpenESPI DOAP' page from the 'Wiki' section of the repository. It includes a 'Short Description' and a 'Long Description' block. The 'Long Description' details the project's mission to provide an open source, public licensed implementation of the NAESB REQ.21 Energy Services Provider Interface (ESPI) standard. It also describes the components: Data Custodian and ThirdParty, and their roles in the standard. It mentions the use of a test harness for conformance testing. The 'Long Description' is followed by a list of four interfaces: Authentication, Transfer, Back End, and Test Orchestration. The 'Java Button Framework' is mentioned as a sub-project. The page is last edited by 'MartyBurns' 6 days ago.

The screenshot shows the 'Background and FAQs' page. It contains sections for 'GitHub Getting Started', 'GitHub Usage', 'VM Setup', 'Development Packages & Frameworks', and 'Eclipse Indigo'. The 'GitHub Getting Started' section has links for 'Windows Setup Instructions', 'SSH & Authorization Token Setup', 'Java & Multiple Public/Private Keys', and 'Common SSH Issues & Answers'. The 'GitHub Usage' section lists 'Git Clients' like 'Docker', 'GitHub', 'GitHub Desktop', 'GitHub CLI', and 'GitHub Gitea'. The 'VM Setup' section has a link to 'Horton Service VM'. The 'Development Packages & Frameworks' section lists 'SpringFramework' (with links to 'A Convention of Spring Tutorials', 'Introduction to Spring Webinar (3 Parts)', 'Spring Security', and 'Quarkus Intro'), 'Testing Tools' (with links to 'Debugging Tomcat', 'No Browser Quick Start', and 'JUnit'), and 'JUnit'.

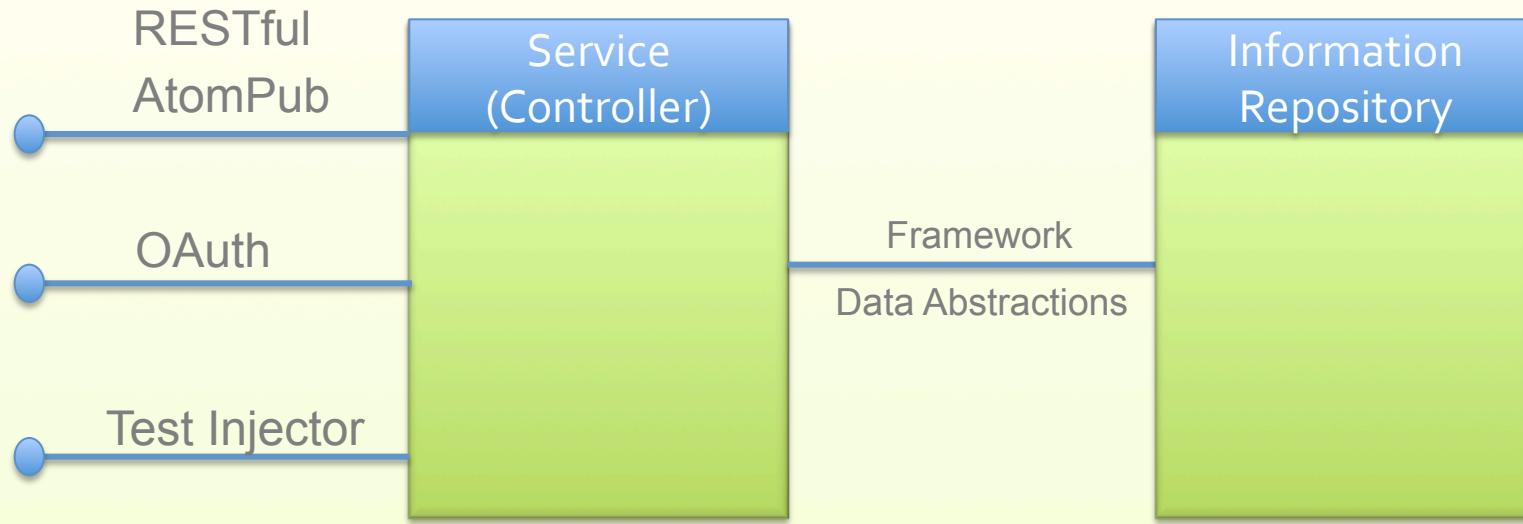
The screenshot shows the 'greenbuttonsdk' subrepository page. It displays a commit history with entries from 'GreenButtonDemoPage', 'InitialSDK', and 'README.txt'. The 'README.txt' file content is shown below the commit history: 'Date: 20120105', 'Author: Marty Burns', and 'This directory contains the Green Button SDK'.

The screenshot shows the 'javaspring' subrepository page. It displays a commit history with entries from '.metadata', 'DataCustodian', 'ThirdParty', 'common', 'DataCustodian.rrn', 'NOTICE', 'README.md', 'ThirdParty.rrn', and 'projectSet.pdf'. The 'README.md' file content is shown below the commit history: 'The Open Energy Services Provider Interface (ESPI) Repository' and 'Providing implementations of the interface used to exchange energy usage information within the interoperable smart grid.'

OpenESPI/javaSpring Working Parts



Session 1 – Working Parts



Session 1 – Working Parts - Models, Views, & Controllers

Models

- EUI Profiles
- ESPI Contexts
- Services Hooks

Views

- Management
- Operations
- Testing

Controllers

- Data Custodian
- Third Party Service Provider
- Retail Consumer

The screenshot shows two views of the OpenESPI interface. The left view is titled "Third Party Provider" and displays a "DataCustodian" view. The right view is titled "DataCustodian" and displays a "Usage Point Asset View". Both views have a green header bar with the "OpenESPI" logo. The left view has a sidebar with various menu items like "THIRD PARTY", "RETAIL CUSTOMER", "USAGE POINT", etc. The right view also has a sidebar with similar menu items. The main content area shows some data entries and buttons.

The screenshot shows the "Open ESPI Control Panel" interface. It features a top navigation bar with links for "Refresh The Whole Page", "Update Third Party ESP", "Update Retail Consumer", and "Update Message Traffic". Below this is a section for "Data Custodian" with a timestamp of "8/9/2011 11:48:36 AM" and buttons for "Update Data Custodian", "Update 3rd Party ESP", "Update Retail Consumer", and "Update Message Traffic". To the right is a "Retail Consumer" section with a timestamp of "8/9/2011 11:48:36 AM" and a link to "Refresh Retail Consumer". At the bottom is a "Message Traffic Viewer" section with a timestamp of "8/9/2011 11:48:36 AM" and the message "This is the viewer".

Agenda – Session 2

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- GitHub.com/energyos/OpenESPI
- VMWare Ubuntu Virtual Machine
- Eclipse Indigo, Apache Maven
- Eclipse AspectJ, Apache Tomcat6

Session 3 - What is Spring Framework?

- About
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Session 4 – What is Apache Wink

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Session 5 – OpenESPI/javaSpring Code Walk

- Development Tree
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Session 2 – OpenESPI/javaSpring Development Environment

GitHub.com -- Source Code Management



VMWare & Ubuntu -- Pre-Configured Dev. Environment



Eclipse Indigo – Integrated Development Environment



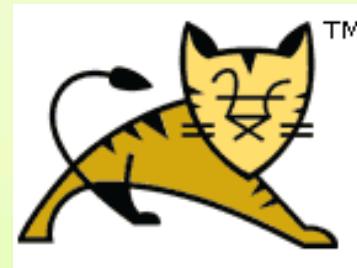
Apache Maven – Project Build & Deployment Management



Eclipse AspectJ – Aspect Oriented Programming (Security/REST/Testing)



Apache Tomcat6 – Web Services



Session 2 – GitHub Repository

Code

- Documents
- Artifacts
- javaSpring
- GreenButtonSDK
- Test



Wiki

- Description of a Project (DOAP)
- FAQ
- Setup Guides
- Meeting Notes



Issues & Milestones

- Kinds
- Tags
- #hashTags
- Owners
- Dates



Session 2 – VMWare Ubuntu Virtual Machine



Downloading & Setup

- www.openespi.org/vm.html
- Wiki Setup Pages

Ubuntu

- Version 11.10
- One User Account
- Authorized User
- User1 : Password

Basic Components

- Eclipse Indigo
- Tomcat 6
- Emacs
- Desktop and Tools

Future Releases

- Issues Tag: #VM
- Quarterly Milestones

Session 2 – Eclipse Indigo

Baseline Start

- Basic Components
- Future Releases
- Issues Tag: #eclipse



Basic Components

- Spring (IDE STS)
- Eclipse Web Tools Platform
- Eclipse m2e (maven)
- Eclipse Packaging
- Eclipse Egit
- Eclipse AspectJ
- Eclipse Modeling
- VMWare
- Eclipse Data Tools
- Eclipse Mylyn

Session 2 – Apache Maven

Overview

- Build Environment
- Software Project Management
- Project Comprehension
- Guidelines for Best Practices
- Quality Project Information

POM Files

- Project Object Model
- XML Representation
- Who – What – Where Lifecycles
- One Stop Shop for All Things Project
- Issues Tag: #maven

<http://maven.apache.org/what-is-maven.html>

http://maven.apache.org/pom.html#What_is_the_POM

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0  http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId>org.energyos.espi</groupId>
  <artifactId>DataCustodian</artifactId>
  <version>0.0.1</version>
</project>
```

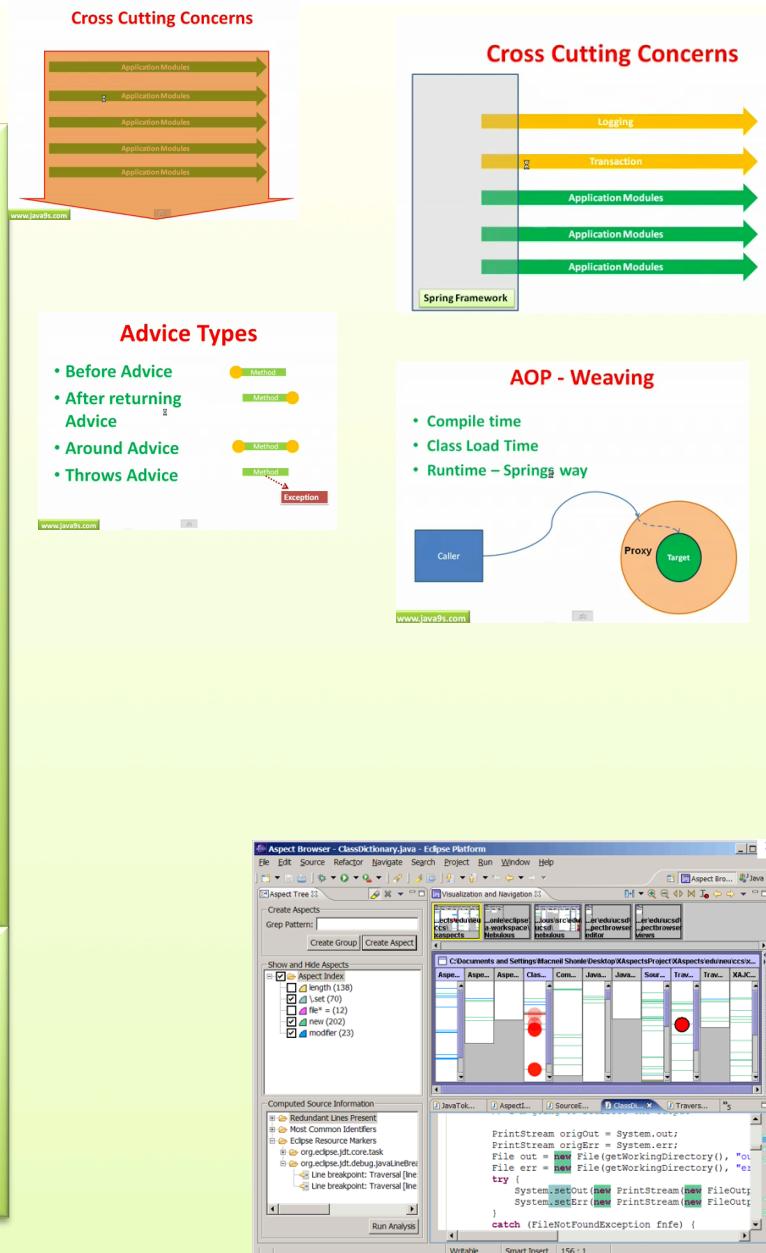
Session 2 – Eclipse AspectJ

Overview

- Aspect Oriented Programming (AOP)
- Modularizing Cross-Cutting Concerns (like Transaction Mgmt, Security & Logging)
- Advice – Defines what needs to be applied and when. Information (security credentials or logging info) relevant to the cross-cutting concerns.
- Jointpoints – where the advice is applied
- PointCuts – Combinations of different jointpoints where advice needs to be applied. Places in application where Cross-Cutting Concerns apply (where transactional, security or logging behaviors might happen)
- Aspects – Applying the advice at Pointcuts
- Aspect “Weaving” – Injecting advice code into the application: Compile time, Load time, Run time - Spring way
- Currently in Code Base from SpringRoo constructions
- Related to the testing infrastructure of the codebase
- Numerous (1000+) “Markers” to AspectJ
- Issues Tag: #AspectJ

References:

- <http://eclipse.org/aspectj/docs.php>
- <http://eclipse.org/aspectj/doc/released/quick5.pdf>
- <http://www.eclipse.org/articles/Article-Introducing-AJDT/article.html>
- <http://www.youtube.com/watch?v=6XzvLAeo2pA>
- <http://www.youtube.com/watch?v=j5JeFZLla5o&feature=related>



Session 2 – Apache Tomcat

Overview

- Java Servlet
- JavaServer Pages
- Scalable
- Mission Critical
- Issues Tag: #TC

Tomcat6

- Servlet 2.5
- JSP 2.1
- Tested and Stable
- Should we use Tomcat 7?

Eclipse Integration

- Multiple Server Instances
- Dynamic Configurations
- Automatic Deployments

Deployment

- Multiple Platform
- Eclipse and Maven Integration
- Integrated Testing

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