EASE-ily Make the Most of Eclipse with Python

EclipseCon France Workshop

7th June 2016

https://github.com/jonahkichwacoders/EASE-Python-Examples
Agenda

Introduction

Scripting Eclipse with Python

Break

Writing EASE modules

Conclusion & Resources

https://github.com/jonahkichwacoders/EASE-Python-Examples
Who We Are

Tracy Miranda
Eclipse evangelist, Science steering committee member

Jonah Graham
January project lead, CDT committer

Christian Pontesegger
EASE project lead, Code & Me blogger

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SCRIPTING ECLIPSE WITH PYTHON

https://github.com/jonahkichwacoders/EASE-Python-Examples
AGENDA

- Hello World
- Python & EASE Background
- Getting started
  - EASE Modules
  - Executing EASE Scripts
  - Magic Keyword Headers
- Python & EASE: The Vision & The Roadmap
- Hands-on-Scripting
  - Automate, Extend, Integrate & Share with EASE

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HELLO WORLD

https://github.com/jonahkichwacoders/EASE-Python-Examples
Setup for Exercises

Setup Instructions :

Open up EASE.htm in Eclipse or in a browser

https://github.com/jonahkichwacoders/EASE-Python-Examples

Virtual conversation:

https://mattermost-test.eclipse.org/eclipse/channels/ease
Disclaimer

We will be writing and running powerful scripts that manipulate files, projects and settings in your workspace.

While we have done our best to ensure the scripts are safe for general consumption, please ensure there is nothing too precious in your workspace!
Hello World!

1. Launch Eclipse & switch to Scripting Perspective
2. Ensure you have a ‘Py4J Script Shell’ open
3. Open file EASE.htm and follow the instructions for ‘Hello World’ section
4. When you finish, paste in your Python version (sys.version) to Mattermost!

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EASE & PYTHON BACKGROUND

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EASE Scripting Framework

Allows for easy extension and control of Eclipse IDE using your favourite scripting language.

Eclipse Advanced Scripting Environment

- Python (Py4J)
- Jython
- Javascript (Rhino, Nashorn)
- Groovy
- Native Java
- [Your Interpreter Here]

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Python & EASE: A brief history

EclipseCon France, June 2015:
“Integrating Python and Java in Eclipse”

EclipseCon Europe, October 2015:
“I Love Scripting”

EclipseCon France, June 2016:
“EASE-ily Making the Most of Eclipse with Python”

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Why Python?

• Great beginner language
• Heavily used for Science
• Heavily used for Embedded e.g. GDB
• Lots and lots of fast, powerful libraries e.g. numpy

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Enabling Technology: Py4J

- “A Bridge between Java and Python”
- Allows Python to access JAVA classes and vice versa
- Open source, BSD licence
- Used by Apache Spark for PySpark
- Developed by Barthelemy Dagenais
- New ‘Pinned-thread’ threading model to work with Eclipse/SWT

https://github.com/jonahkichwacoders/EASE-Python-Examples
Eclipse Advanced Scripting Module

- Eclipse Project in Incubation
- Modular approach
- Good Eclipse integration e.g. Keywords, script explorer, etc

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GETTING STARTED

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EASE MODULES

- Logical groupings of functionality
- Provide easy access to Eclipse and Java APIs

UI
Resources
Platform
Launch
Charting
Modeling

https://github.com/jonahkichwacoders/EASE-Python-Examples
Modules Exercises

Exercise 2.1 UI Module

Hint: `showInputDialog, showInfoDialog`

Exercise 2.2 Resources Module

Hint: `createProject, getProject`

Hint: `IProject.addFile, createFile, refreshResource`
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PYTHON & EASE: VISION AND ROADMAP

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Extending Eclipse (Traditional)

1. **Code** - Java only plug-in
2. **Test** - Separate Eclipse instance
3. **Build** - Build & deploy plug-in
4. **Install** - Install plug-in & restart Eclipse
5. **Success**

[https://github.com/jonahkichwacoders/EASE-Python-Examples](https://github.com/jonahkichwacoders/EASE-Python-Examples)
Extending Eclipse with EASE

Code
Python Script (or choice of language)

Deploy
Point EASE at script in running Eclipse instance

Success

https://github.com/jonahkichwacoders/EASE-Python-Examples
Extending Eclipse with EASE

Open up Eclipse extensibility to a whole new world of developers!

https://github.com/jonahkichwacoders/EASE-Python-Examples
Python Scripting with EASE

- Be more productive
- Extend Eclipse quickly
- Integrate Python libraries
- Share scripts with others easily

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Python Scripting RoadMap

**Short Term (Funded)**
- Py4J Interpreter Integration
- Critical bug fixes
- Release Engineering

**Near Term**
- Pythonic Behaviour (Usability)
- PyDev Integration
- AnalysisRPC
- CDT Integration

**Future**
- Remote Support
- Debugging Support
- IPython Notebook
- Recording

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Pythonic Behaviour (Usability)

Namespace pollution
Running scripts with Python directly
More Python-friendly API
PyDev Integration

Autocompletion in console
Autocompletion in editor
Integration of PyDev Console
IPython terminal support
Shared/Automatic Interpreter Configuration

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AnalysisRPC

Custom solution to move data around

Enhanced Remote Procedure Call

- Datasets (ndarrays)
- Regions Of Interest (ROIs)
- Exceptions

Language Independent

Server and client written for Java and Python

Integration with Science WG Projects
(Visualisation, Workflows and Data Structures)
Python

```python
x = numpy.ndarray(...)  
y = numpy.ndarray(...)  
rpcclient.Plotter.line(x, y)
```

Java

```java
import org.eclipse.dawnsci.IDataset

class Plotter {
    public void line(IDataset x, IDataset y) {
        // ...
    }
}
```

Transport

(XML-RPC + Disk/Memory)

- **Meta and simple data:**
  - Target ➔ Plotter
  - Method ➔ line
  - $x$ ➔ /tmp/x
  - $y$ ➔ /tmp/y

- **Datasets:**
  - /tmp/x
  - /tmp/y
Java

```java
interface IFilter {
    IDataset filter(IDataset data);
}
//create client for PyFilter
client.newProxyInstance(IFilter.class)
IDataset result = proxy.filter(data)
```

---

Python

```python
class PyFilter:
    def filter(data):
        # manipulate ndarray data
        return data

# create server
server.add_handler(PyFilter())
```

---

**Transport**

(XML-RPC + Disk/Memory)

**Datasets:**

```
/tmp/data
```

**Meta and simple data:**

```
Target → PyFilter
Method → filter
data → /tmp/data
```
CDT Integration

Visual Studio Macro-like support
Debug Module
C Editor Support Module
GDB Python Interface Integration

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EXERCISES

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Python Scripting with EASE

- Be more productive
- Extend Eclipse quickly
- Integrate Python libraries
- Share scripts with others easily

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WRITING EASE MODULES

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CONCLUSION
EASE-ily Make The Most of Eclipse

AUTOMATE

EXTEND

INTEGRATE

SHARE

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Thank you & Questions

Tracy Miranda
tracy@kichwacoders.com
@tracymiranda

Jonah Graham
jonah@kichwacoders.com

Christian Pontesegger
christian.pontesegger@web.de

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