Webinar Python Scripting in FME

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Poll: About You #1

- How long have you been using FME?
  - Never
  - Less than 1 year
  - 1-2 years
  - More than 3 years
Powering the Flow of Spatial Data
FME Workbench
Agenda

• What is Python?
• FME and Python
• Best Practice
Poll: About You #2

- Do you have any experience with Python?
  - Yes, long time Python user
  - Yes, also within FME
  - Some
  - None
What is Python?

- Programming/Scripting Language
- Easy to learn and use, well documented
- Great user community
- Platform independent
- Great for GIS automatization tasks
- It’s free!

- More details on www.python.org
Python Basics

- **Variables (data-types)**
  - String, Integer, Float, List, Dictionary, Tuple
  - Dynamic typing
- **Built-In methods**
  - `len()`, `max()`, `min()`, ...
- **Modules**
  - Thematic-grouped extensions
  - e.g. math, os, numpy, zip, re
- **IDEs**
  - IDLE, PyWin, PyDev for Eclipse, PyScripter, ...

```python
a = 1  # integer
b = 'Hello, World!'  # string
```
Sample #1

# Sample #1
# print even numbers from 1 to 9
a = range(1,10)  # list from...to [excluded]
# for-loop
for i in a:
    if i%2 == 0:  # condition
        print 'number %i is even' %i
    else:
        print 'number %i is odd' %i

Line indentation is very important in Python!
Why and when should one make use of Python with FME Workbench?

Want to do automatization tasks?
> Call Workspace from your Python script

Missing the right transformer?
> Write a few lines of python code in PythonCaller

Want to carry out tasks before or after translation automatically?
> Use Python Startup or Shutdown Scripts

ALWAYS look for an existing FME Transformer or functionality first!
Sample #2

- Run FME Workspaces from a Python script (IDLE)

```python
import os

os.system('fme.exe AnyWorkspace.fmw \n    --SourceData AnySource \n    --DestinationData AnyDest \n    --AnyParam ParamValue')
```
Python in FME Workbench

- Startup Script
- Shutdown Script
- Transformer PythonCreator & PythonCaller
- Private Scripted Parameter

- *Short Introduction into FME Objects API*
Startup Script

- **Executed prior the actual FME translation process**

- **Potential uses**
  - Define your own Python functions
  - Check database connectivity
  - Move data or copy a template file
  - Add your custom messages to Logfile
  - Access any FME Macro Values:

  \[ \text{FME}_\text{MacroValues}['\text{SourceDataset}_\text{ACAD}'] \]
Shutdown Script

- Executed after all Reader/Writer work is done and process is finished either with SUCCESS or FAILURE
- Potential use
  > Any kind of post processing (e.g. calling ArcGIS scripting through ArcPy)
  > Accessing statistical information about translation
  > Copy result files
  > Send an Success/Failure email

- Sample #3
PythonCreator & PythonCaller

- Both Transformers can execute Python scripts to manipulate or create FME Features.
PythonCreator & PythonCaller

- **Parameters**
  
  - Python Script
  - Entry Point
  - Attributes To Expose (opt)

```python
1# Template Function interface:
2def processFeature(feature):
3    # manipulate feature
4    # e.g.
5    feature.setAttribute("STATUS", "OK")
```
Function

- Using a Function (per-feature-manipulation)
  > The function gets called for every feature passing the Transformer.
- PythonCaller only

```python
# Template Function interface:
def processFeature(feature):
    # manipulate feature
    feature.buffer(10.0)
    feature.setAttribute("STATUS", "Buffered")
```
Class

- **Class**: Allows to manipulate a group of features and create new features.

- **PythonCaller and PythonCreator**

```python
class MyClass(object):
    def __init__(self):
        # Constructor is called only once
    def input(self, feature):
        # input() is called for every feature passing
        # self.pyoutput() can be called in input() to
        # output the processed feature
        self.pyoutput(feature)
    def close(self):
        # close is called only once when the last feature has been
        # processed in input().
        # self.pyoutput() can be called to output new features.
        self.pyoutput(newFeature)
```
FMEObjects module

- Python API to access FME functionality
  > FMEFeature()
  > FMEGeometry()
  > FMELogFile()
  > ...

- Documentation
  > %FME_Home%/help/python/apidoc
  > %FME_Home%/fmeobjects/python/apidoc (more detailed) ->
  Requires installation of SDK

Requires installation of SDK
Sample #4

- Python Olympics
Private Scripted Parameter

- Python script for assigning the value of a parameter to the workspace at runtime.
- An additional type of User Parameter
- Usage
  - Hide (complex) functionality

- Sample #5
Best Practice I

- Custom Transformer
  > Create Custom Transformer from PythonCreator or PythonCaller to extend your Transformer Gallery
Best Practice II

- Use FME logging instead of print() statements
- Choose Severity Level (Info, Warn, Error, …)
- Messages are included into written Logfile

```python
import fmeobjects
LogFile = fmeobjects.FMELogFile()
LogFile.logMessageString("Message", fmeobjects.FME_INFO)
```
Documentation

- FME Workbench Transformer Description
- Help -> Workbench Help
- FME Store (e.g. FuzzyStringComparer)
- FMEpedia
  > Example-scripts-for-deleting-Excel-files-prior-to-writing
  > Python-and-FME-Basics
  > What-is-Python-and-How-Can-I-Install-It
The Road ahead

- Python begin and end transformers
- Allow creation of input and output ports with PythonCaller transformer
- Using Python in place of TCL in FME transformers where performance would benefit
- Return more than one parameter from a Scripted Parameter
- Python Plug-In SDK
  - allow ability to create transformers using Python plugin SDK
  - more samples and documentation for Python Plugin SDK

Priority on YOUR request and feedback!
Poll #3

- Are you interested in an online FME & Python training course?
  - Yes, absolutely
  - Maybe
  - No, thanks
What’s Next?

- See FME 2012 on the FME World Tour: http://fme.ly/2012tour
- Read our latest newsletter www.safe.com/newsletter
- Download FME 2012: www.safe.com/downloads
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- Today’s webinar was recorded
Thank you!

- Questions about Python and FME?
- Interested in FME Training?
  - Basic and Advanced trainings
  - On-site training
  - FME Certified Trainers + Professionals

- Send an email to fme@conterra.de

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