

eGenix PyRun

Single file Python run-time environment

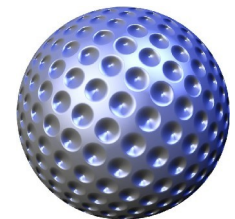
EuroPython 2012
Florence, Italy

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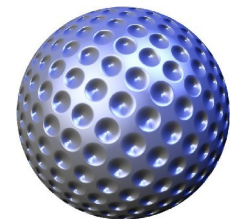
Agenda

1. Introduction
2. Use Cases
3. Technical Details
4. Discussion



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eGenix PyRun: Motivation

- Simple installation without side-effects
- Small footprint and download
- Easy to add to installers
- **Extensible:** Load .py, .pyc und .so modules

eGenix PyRun: Project

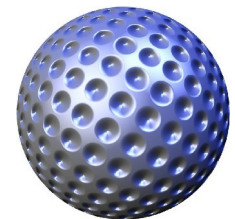
- Python Runtime Environment in *single* file
- Builds upon our old [mxCGIPython project](#) which was active during the years 1999-2006

eGenix PyRun: Platforms in PyRun 1.0

- Python versions: 2.5, 2.6 and 2.7 ... no 3.x yet
- Binaries available on for Linux / FreeBSD / Mac OS X
Sources should work on any Unix based system.
- **Windows support** may follow

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eGenix PyRun: Use Cases

- **Distribution of scripts and applications**
 - eGenix uses it in mxODBC Connect Server
- **virtualenv replacement**
- Testing and scripting
- Application private Python installations
- Embedded devices
- Many other use cases ...

eGenix PyRun: Ideal for applications and scripts

- Loads almost twice as fast as regular Python
 - Python2.7: 0.054u 0.014s
 - PyRun 2.7: 0.026u 0.014s
- Uses only a fraction of a regular installation's disk space
 - Python 2.7: ca. 100MB
 - PyRun 2.7: 12 MB
 - PyRun 2.7 with gzexe: 4 MB, but start up time 0.160u 0.054s
 - PyRun 2.7 with upx: 3.5 MB, but start up time 0.124u 0.017s

eGenix PyRun: virtualenv Replacement (1/3)

- **Easy to setup**
 - simply copy the PyRun file into a directory and optionally:
 - setup the dir structure
- Setup could be made even easier using a shell script
- **No activation script necessary** to start working

eGenix PyRun: virtualenv Replacement (2/3)

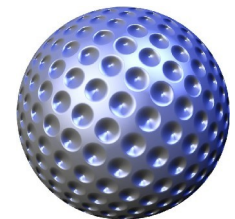
- Independent of a system Python installation
- Works without Python installed on the target system
- No quirks or special variations of the system Python to worry about
- No symlinks to manage
- Fully relocatable

eGenix PyRun: virtualenv Replacement (3/3)

- Small enough to have multiple copies
- 13MB with pip, setuptools
 - can run pure Python code
 - can run precompiled shared extensions
- 36MB with pip, setuptools, include files and extra libs
 - can also compile shared extensions
 - can use standard lib modules that are not standard part of PyRun
 - include files and extra shared libs can be shared between copies

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eGenix PyRun: How does it work ?

- Based on Python's **Tools/freeze**
 - with a couple of patches
- **Details**
 - Uses a generated Python startup script and a few generated helper modules to store configuration data
 - Adds more entries to the Modules/Setup file to be able to include extensions
 - Runs freeze on nearly the whole standard library

eGenix PyRun: Directory structure

- PyRun searches relative to its executable directory, making it **easily relocatable**
- Uses its own lib/ directory for extensions – **doesn't get in the way of a system Python installation**
- **Directory structure:**
 - ./bin/pyrun2.7
 - ./lib/python2.7/ (optional, for extensions)
 - ./include/python2.7/ (optional, needed to compile extensions)

eGenix PyRun: Module search

- **PyRun searches relative to its executable directory**
<pyrun dir> when called to run script.py:
 - <script.py dir>
 - <PYTHONPATH directories>
 - <pyrun dir>/../lib/python2.7/
 - <pyrun dir>/../lib/python2.7/lib-dynload/
 - <pyrun dir>/../lib/python2.7/site-packages/
- **Only existing directories are added to sys.path**

eGenix PyRun: Compatible to distutils/setuptools/pip

- Made PyRun compatible to **distutils**
 - required patching in the Python configuration
 - forced us to keep the standard Python directory layout
- Made PyRun compatible to **setuptools** and **pip**
 - required adding the -c command line option
 - nothing much else
- May work with **zc.buildout** as well
 - not yet tested

eGenix PyRun: What is missing ?

- **A few modules are missing** in PyRun:
 - *dbm, crypt, readline, parser, tkinter
 - all test packages/sub-packages
- These can be loaded as regular external **.so modules** or **packages**, if needed

eGenix PyRun: What doesn't work ?

- Some of the Python test suite modules don't work when run under control of [regptest.py](#)
 - They do work when run stand-alone
 - Still to be investigated
- Standard library modules that require **file access to resource files** embedded in packages won't work
 - idlelib
 - distutils bdist_wininst
 - Many test packages (but these aren't included anyway)

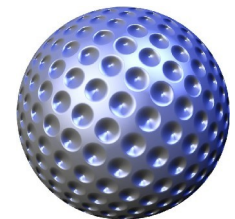
eGenix PyRun: Open Source License

- **eGenix Public License**
 - derived from the CNRI Python License
 - Open Source compatible

- **Standard Python License**
 - PyRun embeds Python

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eGenix PyRun: Similar Tools

- Other freeze tools
 - py2exe – Windows
 - py2app/bdist_mpkg – Mac OS X
 - cx_Freeze – Unix, Windows
 - PyInstaller – Unix, Windows
 - bbfreeze – Unix, Windows, Mac OS X
- Different focus
 - other tools try to put *applications* into just a few files

eGenix PyRun: The Future

- Better documentation
- More flexible configuration
- Windows support ?!
- setup.py style command line interface

eGenix PyRun: Questions



Time for lunch ...



Thank you for your time.

Contact

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