How Python is developed

Python-Dev, PEPs, PSF, the BDFL and the cast of thousands

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Speaker Introduction: Marc-André Lemburg

- **CEO eGenix.com Software GmbH, Germany**
  - Founded in 2000
  - Core business: projects and products using Python and C
  - Popular products: *mxODBC, mxDateTime, mx* etc.

- **Consultant**
  - More than 20 years software experience
  - Diploma in Mathematics
  - Expert in Python, OOP, Web Technologies and Unicode
  - Python Core Developer
  - Python Software Foundation Board Member (2002-04)
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Introduction to Python Development

1. Introduction

2. Development

3. Future
Introduction: Python Acronyms and Terms

• Python
  – Object Oriented Programming Language (OOPL)
  – Monty *Python* Flying Circus

• BDFL
  – Benevolent Dictator For Life
  – Guido van Rossum (GvR), original author of Python and chief architect

• PSF
  – Python Software Foundation
  – Intellectual Property (IP) owner of Python 2.1 and later developments
Introduction: Python Acronyms and Terms (cont.)

- **PyCon, EuroPython, IPC, PythonUK**
  - Python Conferences
  - Low cost: PyCon, EuroPython
  - High cost: IPC (now part of OSCON), PythonUK

- **comp.lang.python, python-dev**
  - Public Python newsgroup: comp.lang.python
  - Public Python mailing list: python-list@python.org
  - Semi-public mailing list: python-dev@python.org

- **PEP**
  - Python Enhancement Proposal
  - Formal proposal format for language changes
Introduction: History (Python 0.9 – 1.6)

• Christmas 1990
  – Guido van Rossum started work on Python for CWI, NL
  – Scripting language for the Amoeba OS project

• 1995
  – Guido van Rossum moved to the US
  – formed initial Python development team for CNRI, US

• 1997
  – Python-Dev mailing list started
  – about 30 core developers with CVS check-in rights:
    Python Core Development Team
Introduction: History (Python 2.0 – 2.4)

• 2000
  – CVS moves to SourceForge
  – Python Enhancement Proposal (PEP) process initiated
• May 2000
  – Guido formed Python development team PythonLabs for BeOpen Inc., US (now defunct)
  – First time working full-time for Python development
• October 2000
  – PythonLabs moves to Zope Corp., US
• 2001
  – Python Software Foundation (PSF) founded
• 2004 (today)
  – 150 PEPs: 57 open, 38 completed, 24 rejected, (rest informational)
Python Development

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Development: Evolution of the Development Process

• 1990 – 1997
  – Tiny to small team around Guido van Rossum
  – All patches, proposals, bug fixes, etc. go through him

• 1997 – today
  – Mid-sized core team of developers (python-dev mailing list) around BDFL Guido van Rossum
  – Team slowly grows (started with 16 members, today about 60 members)
  – Guido van Rossum can focus on key design decisions

• 2000
  – New PEP process opens Python development up to the general public
Development: Python Development Team (today)

- **Chief Architect**
  - Guido von Rossum (BDFL)

- **Core Team**
  - about 60 members with about 10-20 being active
  - membership by nomination
  - CVS write access
  - design decisions are discussed mainly on python-dev
  - members handle bugs, contribute new implementations, enhancements and changes, review and manage external submissions
  - communication mostly by email

- **PythonLabs Team**
  - Tim Peters, Jeremy Hylton, Barry A. Warsaw, Fred L. Drake Jr.
  - Subset of the Core Team with GvR as project manager

- **Cast of Thousands**
  - People donating bug fixes, code contributions, patches, ideas, etc.
Development: **PEP Process (PEP 1)**

- **Method**
  - Predefined proposal format (e.g. PEP 9)
  - Public domain proposals only

- **Process**
  - Discussion on comp.lang.python / python-dev
  - Submission of proposal in PEP format to PEP editor
    (assigns a PEP number and publishes the initial version)
  - Several rounds of discussions and PEP refinements
  - Core team members issue their opinion using
    the –1 / 0 / +1 voting system (PEP 10)
  - Submission for **BDFL pronouncement**
  - PEP gets marked rejected or accepted

- **Process can be bypassed by BDFL**

- **Public influence on the design decisions varies**
Development: Code Contributions

• Process:
  – Submission via SourceForge as patch or directly to the PSF
  – Review by core team members
    • After approval: check-in by the team members
    • Or: request to start a PEP

• Problems:
  – IP transfer, copyright, patent and license rights
  – PSF tries to solve this using a new contribution agreement

• Requirements for acceptance:
  – Usefulness
  – Code quality
  – Documentation
  – Unit tests
  – Maintainer
Development: Python Evolution

- **New features**
  - Implementation triggers update of the code base to these new features
- **Removal of features** (PEP 4, 5, 11)
  - Three step process: deprecation, warnings, removal (errors)
- **Deprecations** (PEP 5)
  - Planned changes in the Python feature set (to fix design mistakes or inaccuracies from the past)
  - Warning system to help migrate existing code
- **Upgrade paths**
  - Often easy to have (e.g. helper scripts)
  - Sometimes require application design changes (e.g. removal of package relative imports)
Development: Speed of Evolution

- 1990 – 1995
  - Very slow (CWI)
  - Much resistance to new features

- 1995 – 2000
  - Slow (CNRI)
  - New developments triggered by requests from the industry

- 2000 – 2003
  - Fast (BeOpen, Zope Corp)
  - Many new features – too many, if you ask me…

- 2003 – today
  - Reasonable speed (Zope Corp and beyond)
  - Focus is now on performance via lazy evaluation
Future of Python Development

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Future: Python grows up

• Some questions to consider…

  – Python development under **PSF control** !?
    • Design by committee !?
    • Managed and financed by the PSF ?

  – Influence of the PSF and its contributors on Python development ?

  – Who will write **Python3k** and what will change ?
And finally...

Thank you for your time.
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