# How Python is developed

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

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Marc-André Lemburg

EGENIX.COM Software GmbH Germany

## **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)
  - Contact: mal@egenix.com



## **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

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## **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



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## **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)



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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



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## **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

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#### **Future of Python Development**

1. Introduction

2. 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 ?



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# And finally...



## Thank you for your time.

#### Contact

eGenix.com Software, Skills and Services GmbH Marc-André Lemburg Pastor-Löh-Str. 48 D-40764 Langenfeld Germany

eMail:	mal@egenix.com
Phone:	+49 211 9304112
Fax:	+49 211 3005250
Web:	http://www.egenix.com/