Guido Van Rossum and Python

A Language Made For The People, By The People

What do Instagram, Netflix, Reddit, Google, Spotify and Industrial Light and Music (ILM) all have in common? Aside from being world class companies, they all rely on Python libraries and frameworks to help them provide the quality products their customers love. The language has grown in use over the past 30 years and has climbed to fourth place of the TIOBE index, which is regarded by its creators as an indicator of the popularity of a programming language[1]. Many aspects of its inception have contributed to the huge success of Python, the most important of those was the vision Guido van Rossum, the man behind it all, had for the future of the language. Van Rossum is a tech-loving geek who only until July this year, acted as a 'Benevolent Dictator For Life' (BDFL) (a term given to open source project founders who get final say in disputes arising in the development of said project [2]) of the Python programming language project. His contribution to the open source world has been monumental and his continued passion for the project, refreshing.

The creation of Python was powered by Van Rossum's desire to have a 'professional programming language for those using C and Bourne Shell' and to have Python be somewhere in between those two tools [3]. His initial objectives were met and completely surpassed by his final product language. To what does he owe this triumph? Simply put, his personal experience in the field of software engineering. Van Rossum had worked on a number of projects in the lead up to Python's development, which contributed to his view of the technical requirements of a programming language as well as the very structure and syntax of it.

Guido van Rossum's technical skills had humble beginnings, originating in his love for electronics. When he was younger his parents bought him a electronics kit with which he learned the basics and went beyond, creating his own personal projects [4]. His skills continued to grow as he gained a better understanding of Physics and Mathematics, eventually graduated from high school as top of his class and attending University of Amsterdam to pursue a degree in Mathematics. As it happened, during the 80's when he attended college, programming was still done through the use of punch cards and his university encouraged students to program by providing free punch cards and some limited access to the mainframe. During his first year Van Rossum spent his free time learning Algol in the basement of the Mathematics department and in his second year realised that the course he was studying was not for him, thus changing majors to Computer Science.

There in the basement grew a small community of students and staff that worked on programs in the mainframe together, exchanging algorithms and ideas [4]. Van Rossum's time on the mainframe was limited as a student but upon gaining a position working with the mainframe's operating system group he had access to not only unlimited disk space, but the very source code of the OS. To him this job opened a new world of software development that is arguably the source of his keen interest in language design. By working alongside brilliant programmers he gained a vast understanding of deep level software design which

formed the foundation of his skills in designing complicated systems, giving him the experience to go further and work on programming languages of his own.

One such programming language was ABC. After graduating, in 1983 Guido Van Rossum began working at the Centrum voor Wiskunde en Informatica (CWI) with a team building ABC [5]. The language aimed to be a tool for teaching non-programmers computer science concepts and to give them the ability to make their own programs. It was borne out of the growing difficulty and frustration that came with the language BASIC and was intended to replace it. The language still exists today however, it never gained speed in the development community and remains mostly unused. In 1986 Van Rossum moved to a different project where the team were working on Amoeba, a distributed operating system. Amoeba was last updated in 1998 [6] but its relevance today lies in the need it created for the development of a scripting language like Python. In the late 80's Van Rossum took the task upon himself to put together a scripting language, taking parts of ABC which he liked and replaced the ones he didn't.

The very structure of Python today is the result of its creators developed frustrations with the languages he worked with in the past. He dropped curly braces, semicolons and begin-end blocks for simple indentation in statement groupings. He used lowercase instead of ABCs uppercase to identify keywords and most importantly, brought community to the language. Van Rossum knew he wanted Python on many platforms across multiple operating system. He also knew he could never design a language that would suit them all. So Van Rossum then decided they would "provide a bunch of built-in object types, such as dictionaries, lists, the various kinds of numbers, and strings, to the language" but would "also make it easy for third-party programmers to add their own object types to the system." It was a language that was not only built by its creator, but by his confidence and trust in the developer community to improve it and to meet the needs of users he could never predict.

Thus were the early days of Python. With the motto of 'release early, release often' Python grew alongside the developments in technology such as sockets and HTTP as well as through the developments of libraries such as Numeric Py which is still used to this day [7]. Python continues to grow today, both in libraries and in popularity. Its applications are numerous but it is most widely seen as an educational tool, a web and app development language and as an instrument with which scientists and data scientists conduct analysis.

As an educational tool, it has surpassed Java as the most popular introductory programming language [8]. This is due to the simplicity of the language and its syntax, and in this modern day, the sheer amount of resources available to students looking to acquire proficiency in Python. The community that has cultivated around the language today also contributes to its widespread use as an entry language. Some of the biggest programming communities are focused on python such as PyLadies and PySlackers as well as the big annual convention PyCon which brings together Python programmers of all levels from across the world [9]. This would have never been possible in a language that was completely monolithic and relied on a sole team of developers to determine the needs of their users.

Python has without a doubt become common place for app development, owing to the vast collection of libraries and the open source community that supports developers everyday. In fact the Django framework was developed by developers who created a responsive website with many features and found themselves building a framework as a result of the growing needs of their application. This framework is one

of the most widely used in web-apps and powers some of the most popular websites today such as Instagram, Eventbrite, Pinterest, BitBucket and many more.

Today, Python is used very often in data science and machine learning applications. A simple search on Google for 'Python data science' will yield 153 million results. The corporate giant Google has created a data science framework tensorflow in which the primary language used was Python. Furthermore, packages such as NumPy, pandas and SciPy provide the tools for programmers to develop complex programmes in data analysis and to implement deep learning and machine learning capabilities for programs. This and many other reasons make it the leader in data science and AI applications.

What does the creator of this phenomenal project today? Currently, Guido Van Rossum works at Dropbox where, until July 18th, he was granted 50% of his time on the job to work on Python. However, today he is no longer the presiding BDFL over the project and has left it in the hands of the Python community. His view was that he had contributed enough to the project to let it grow on its own, deciding that it was best for both the community and himself. The last Python Enhancement Proposal (PEP) left him in a lot of stress and met with a lot of negativity upon its release [10]. He has retired from this position and will continue to live out the rest of his days working on other projects, including his family.

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