INSIGHTS FROM THE STACK OVERFLOW DEVELOPER SURVEY

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EXECUTIVE SUMMARY

This Executive Summary presents key insights from the Stack Overflow Developer Survey, highlighting current and emerging trends in programming languages, databases, cloud platforms, web frameworks, and developer demographics

Programming Languages

JavaScript, SQL, and HTML/CSS are the most widely used programming languages.

Developers increasingly wish to work with Python, TypeScript, and Go, showing a move toward modern and scalable languages.

Databases

PostgreSQL leads as the most used database, followed by MySQL and SQLite.

PostgreSQL remains the most desired, while MongoDB and Redis are gaining attention for flexibility and performance.

EXECUTIVE SUMMARY(CONTINUED)

Cloud Platforms

Amazon Web Services (AWS) dominates, with Microsoft Azure and Google Cloud following closely.

Developers express growing interest in Google Cloud and Azure due to their integration with AI and data analytics tools.

Web Frameworks

React, Node.js, and Next.js are the top frameworks in current use.

Developers want to work more with Next.js, Vue.js, and Angular, highlighting a shift toward dynamic and high-performance frameworks.

Demographics and Education

Most developers are between 25–44 years old and hold a Bachelor’s or Master’s degree. The largest number of respondents come from the United States, India, and Germany.

INTRODUCTION

❖ **Objective of the report**

Analyze the results of the **Stack Overflow Developer Survey**.

Identify **current and future trends** in programming languages, databases, cloud platforms, and web frameworks.

Provide **data-driven insights** for developers and technology decision-makers.

❖ **Target Audience**

Developers and engineers

IT managers and project leads

Students and instructors in IT and data science

❖ **Value / Usefulness**

Supports **data-driven decision-making** regarding technology trends.

Helps understand **the evolution of developer skills and preferences**.

Enables visualization of **both demographic and technological data** through IBM Cognos Analytics dashboards.

METHODOLOGY(PART 1)

❖**Data Source**:

The dataset used in this project comes from the **Stack Overflow Developer Survey** , a global dataset that captures developers' skills, tools, and work preferences.

It was **provided as part of the Capstone Project** for analysis purposes.

❖**Data Collection**:

Data was imported and analyzed in **Jupyter Notebook** using Python.

Core libraries included:
Pandas – for data manipulation and cleaning
NumPy – for numerical operations
These tools enabled structured analysis and preparation of the dataset before visualization.

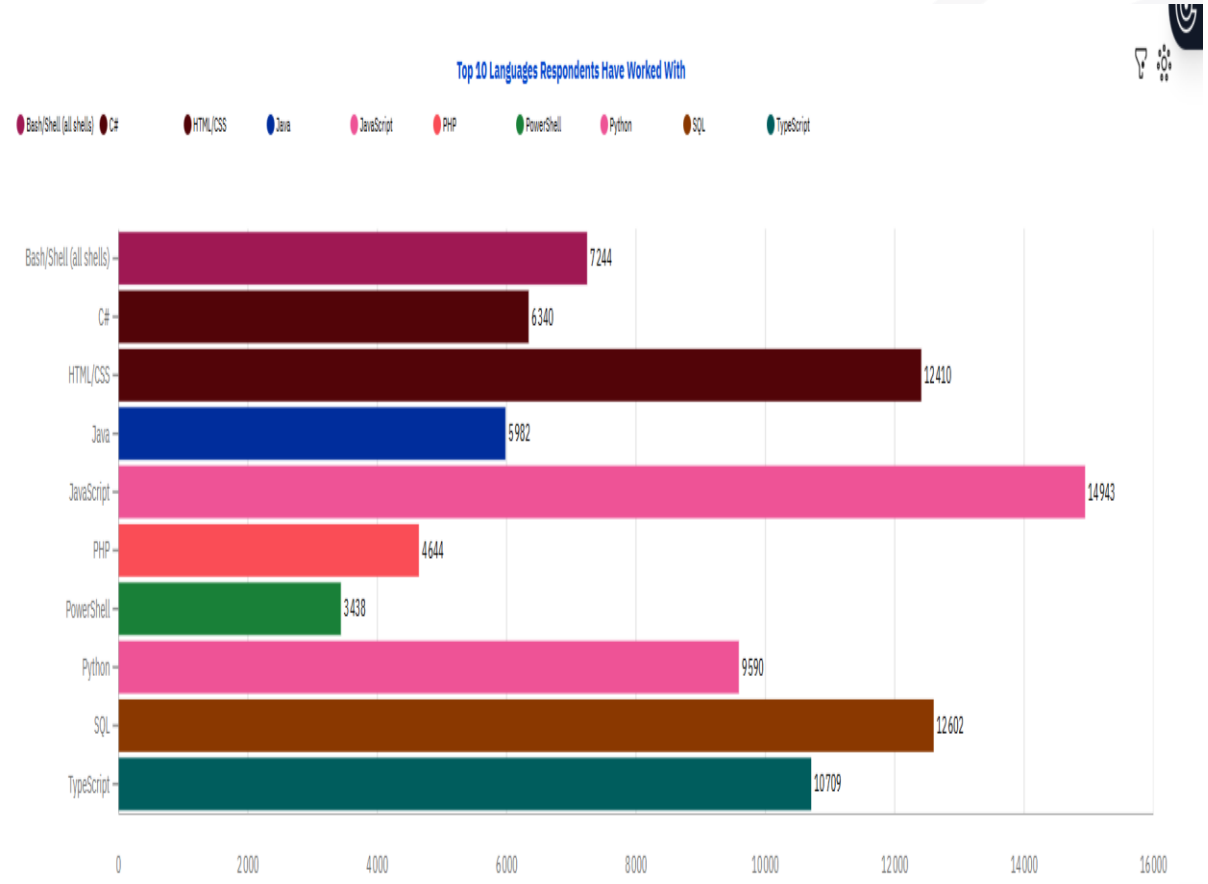
METHODOLOGY(PART 2)

❖**Data Wrangling** *The data wrangling phase involved cleaning, transforming, and structuring the dataset to make it ready for visualization and analysis.*

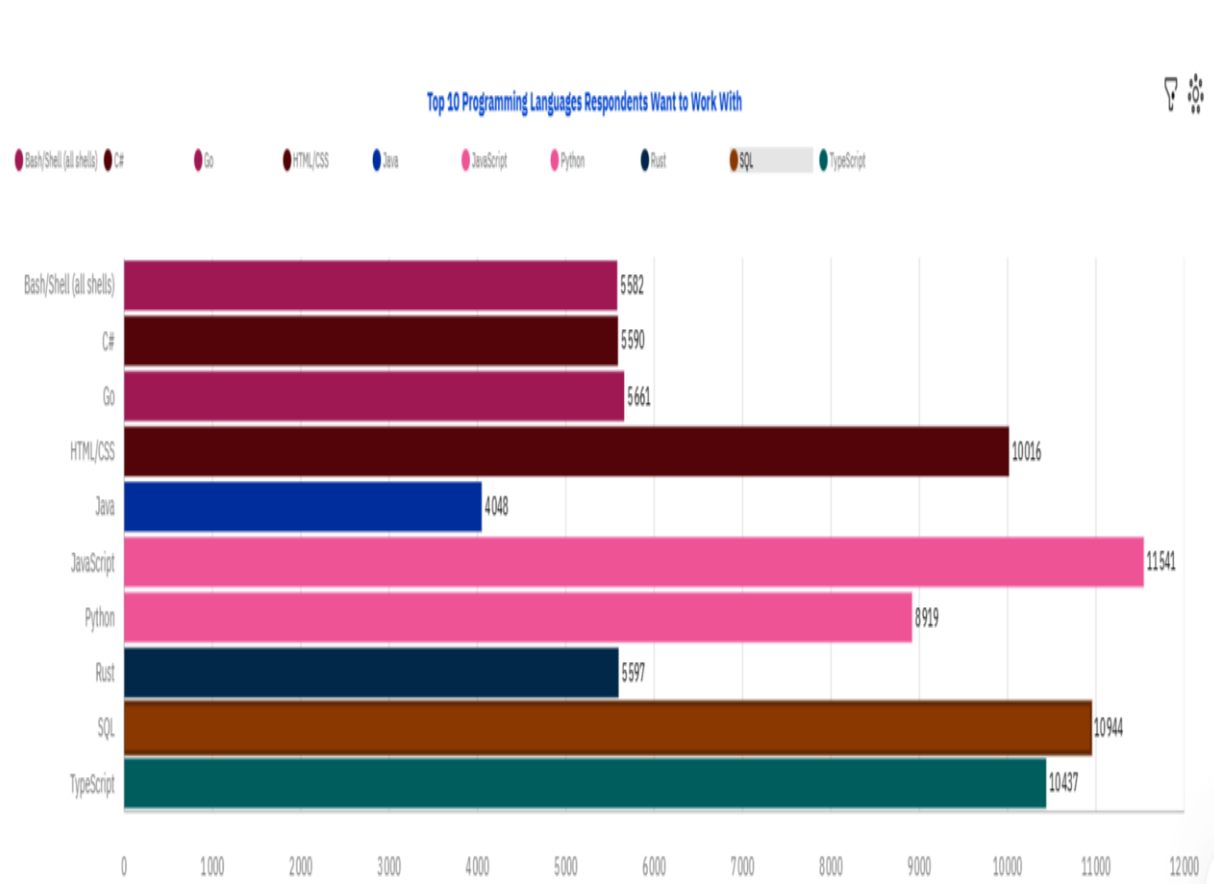
- **Exploding multi-valued columns:**
- Columns such as **Programming Languages**, **Databases**, **platforms**, and **Web Frameworks** contained multiple responses per developer. Each of these columns was **exploded** to create individual rows, making the data easier to count, group, and visualize.
- **Standardizing categorical data:**
- Country names were **normalized** to ensure consistency (e.g., “U.S.A.” and “United States” were merged).
- Similarly, education levels were **grouped** because some categories included **sub-levels or variations** (e.g., “Bachelor’s degree (BA, BS, B.Eng.)” unified under “Bachelor’s”)

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

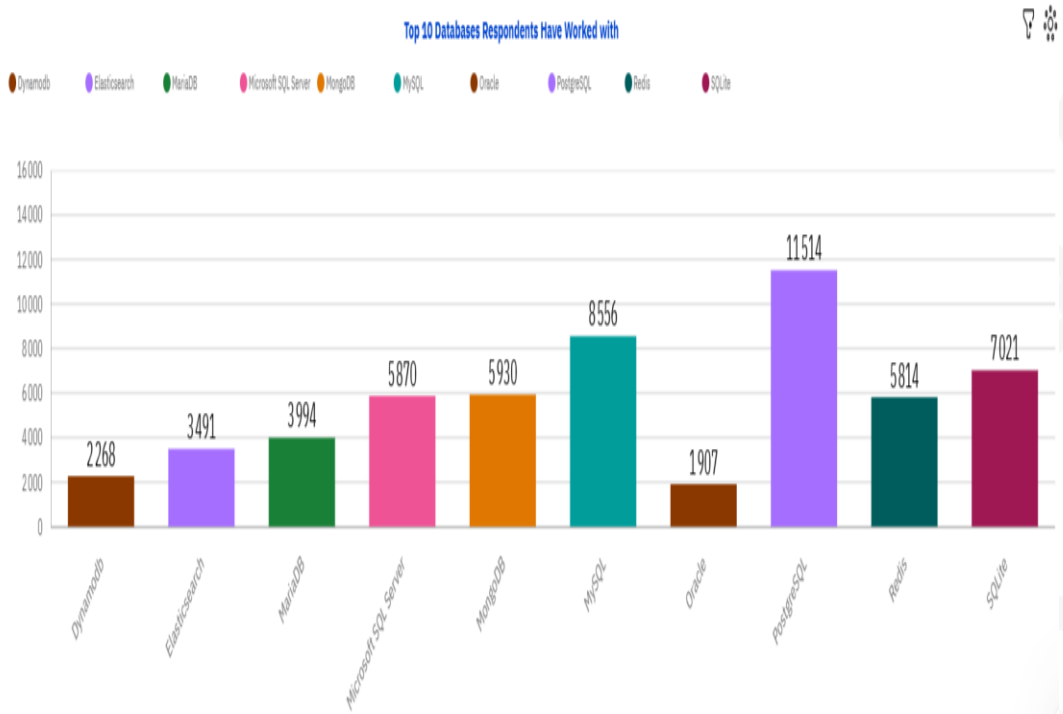
- JavaScript remains the most widely used language, while Python, TypeScript, and Go are rapidly growing for the future. This reflects a combination of proven technologies and modern languages suited for cloud, AI, and analytics.
- SQL and Python are essential today and continue to be highly desired tomorrow, confirming their central role in data analysis, automation, and continued adoption by developers.
- TypeScript, C#, Java, and Go represent a shift toward modular and scalable languages. While some traditional languages like PHP and C++ show slight declines, modern languages are gaining popularity to meet performance and scalability needs.

Implications

- Developers should combine learning dominant current languages (JavaScript, Python, SQL) with emerging languages (TypeScript, Go) to remain competitive and versatile.
- Companies must balance maintaining skills in current technologies with progressively adopting modern languages to support both existing systems and innovative projects.
- Overall trends show that adaptability and continuous learning are essential. Tech teams should anticipate evolution and prepare for technologies shaping the future of software development.

DATABASE TRENDS

Current Year



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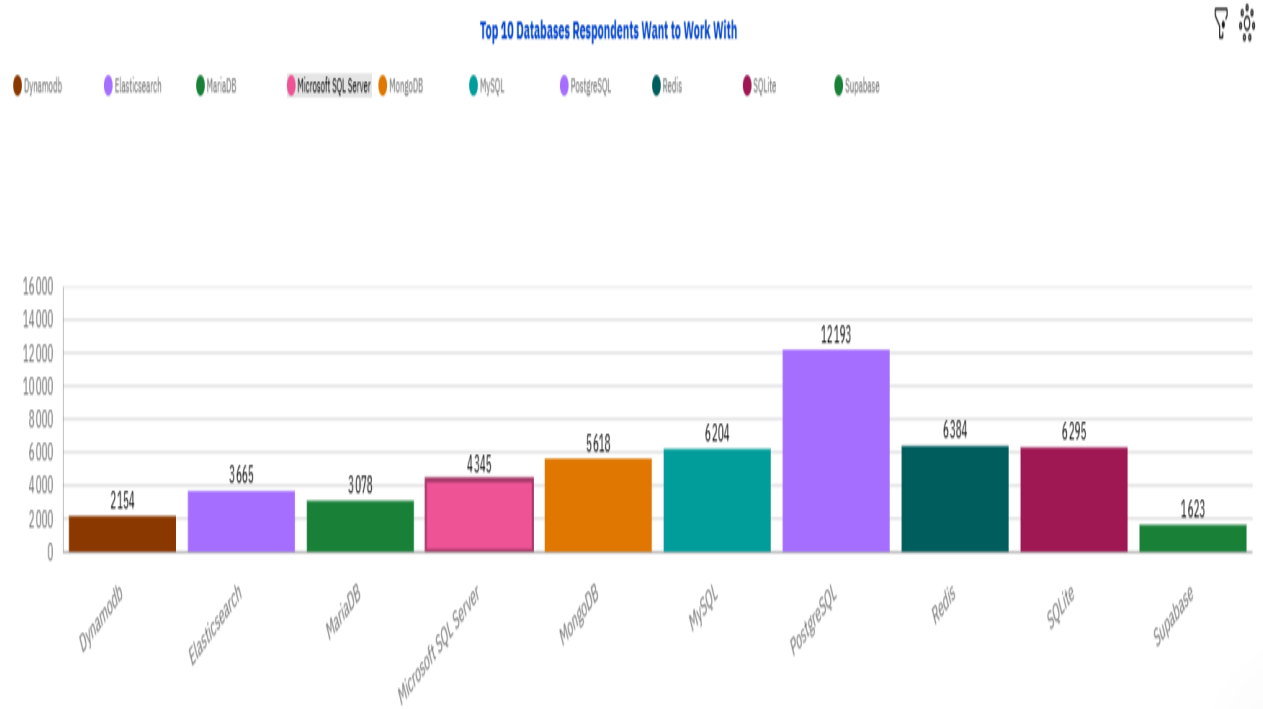


DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- PostgreSQL is currently the most widely used database and remains the most desired for the future. This indicates a strong preference for reliability, flexibility, and open-source solutions.
- MySQL, SQLite, and MongoDB are widely adopted today, while MongoDB and Redis are increasingly desired, reflecting growing interest in performance, scalability, and NoSQL capabilities.
- Traditional enterprise databases like Microsoft SQL Server and Oracle maintain steady usage, but emerging databases such as DynamoDB and Supabase show potential growth, highlighting a shift toward cloud-native and managed solutions.

Implications

- Developers and organizations should prioritize mastering PostgreSQL while staying updated with emerging databases like MongoDB, Redis, and cloud-native options.
- Companies need to maintain support for traditional enterprise databases while exploring flexible, scalable, and cloud-ready solutions to meet evolving technical requirements.
- Overall trends suggest that database expertise must combine stability with adaptability, ensuring teams can handle both current production systems and future technological innovations.

DASHBOARD

The following slides present the dashboards created in **IBM Cognos Analytics**, highlighting current and future trends in technology usage, as well as demographic insights of the respondents.

These visualizations include:

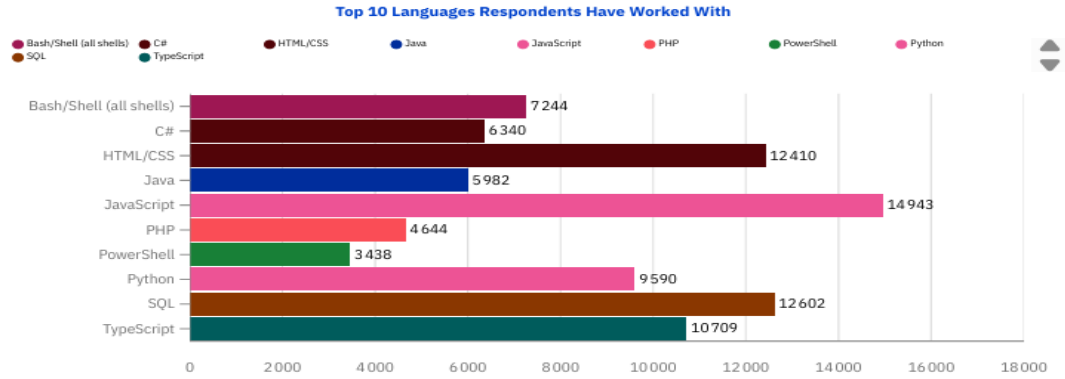
- **Current Technology Usage** (languages, databases, platforms, web frameworks)
- **Future Technology Trends** (languages, databases, platforms, web frameworks)
- **Demographics** (age, country, education level)

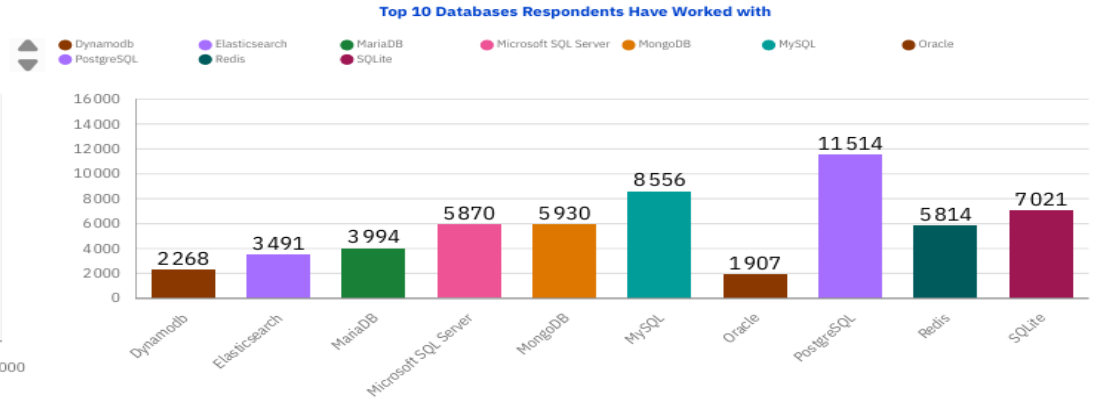
Each dashboard illustrates the patterns and trends uncovered in the survey, providing a clear view of both the present landscape and future directions in the developer community.

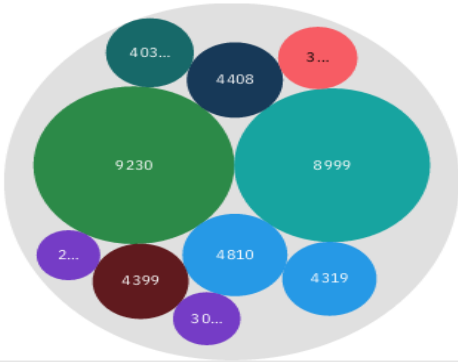
https://github.com/maguisandra/CapstoneDeveloperSurvey-Analytics.git

DASHBOARD TAB 1: CURRENT_TECH_USAGE

Current Technology Usage

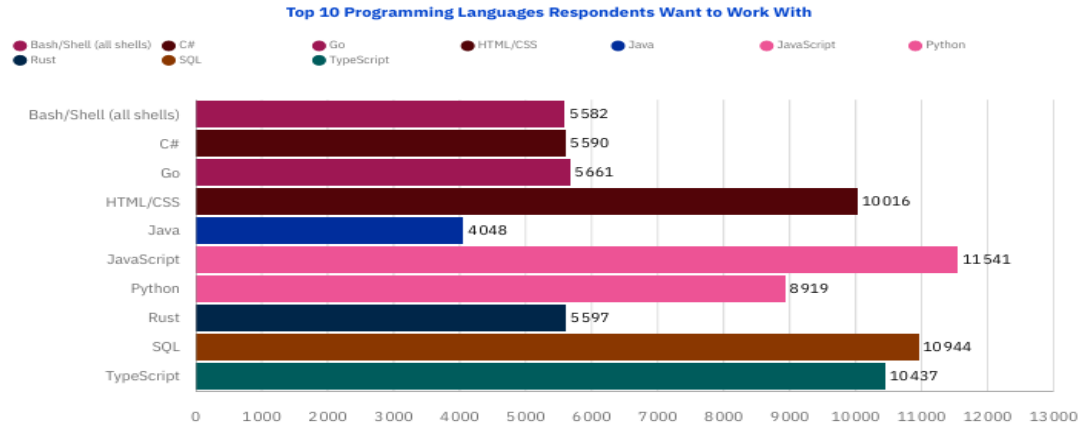


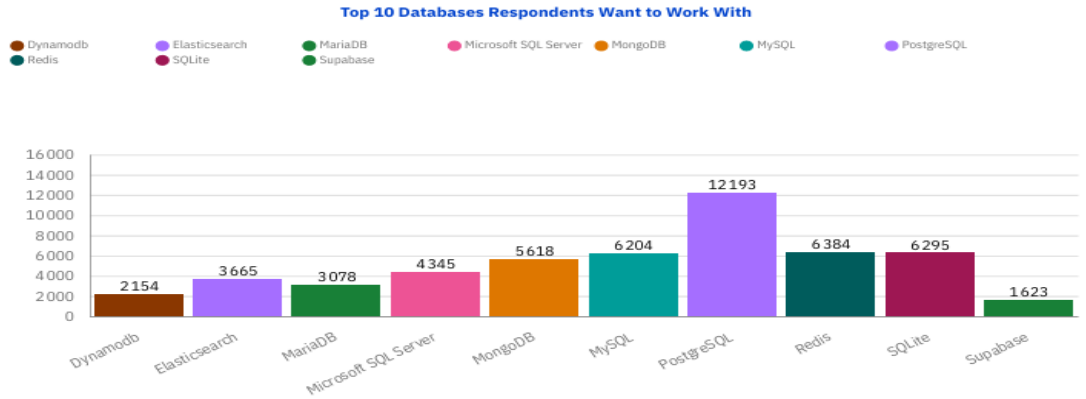


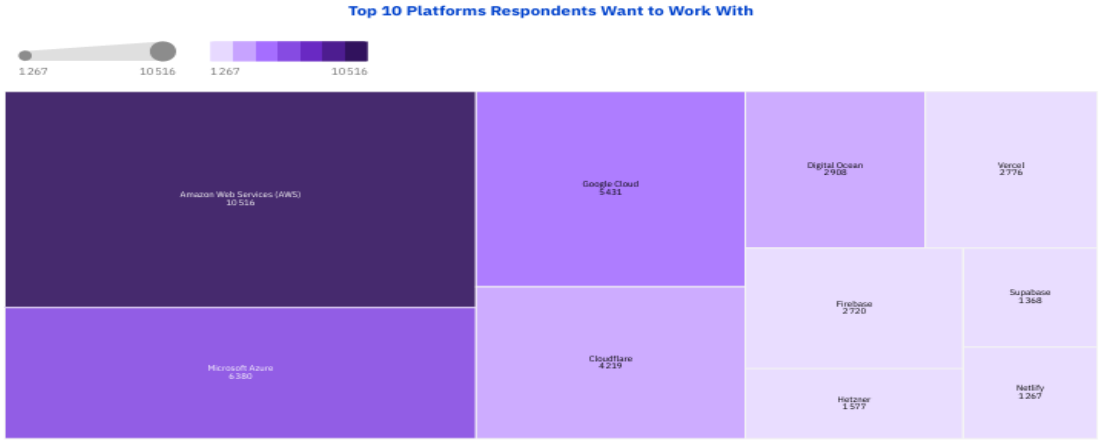


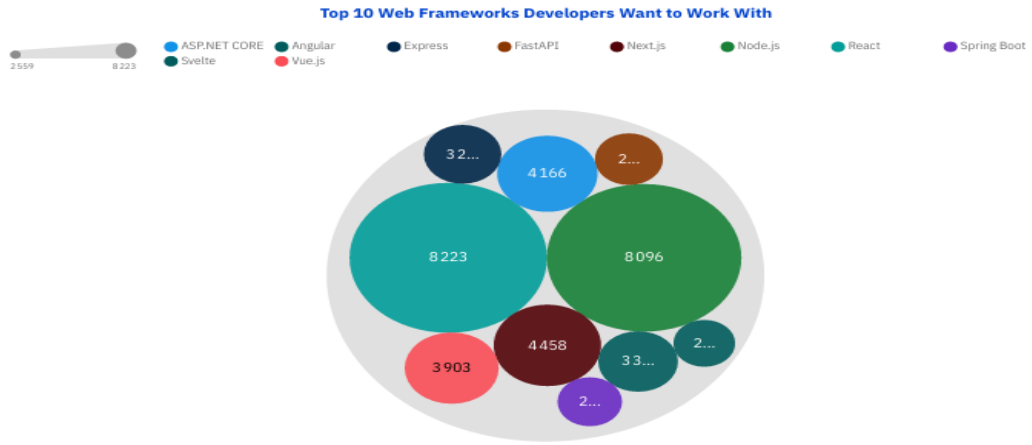
DASHBOARD TAB 2: FUTURE_TECH_TREND

Future Technology Trend



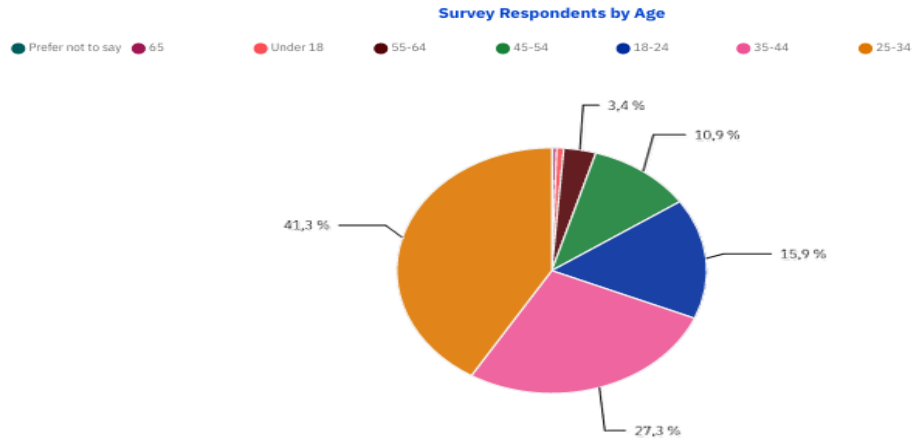


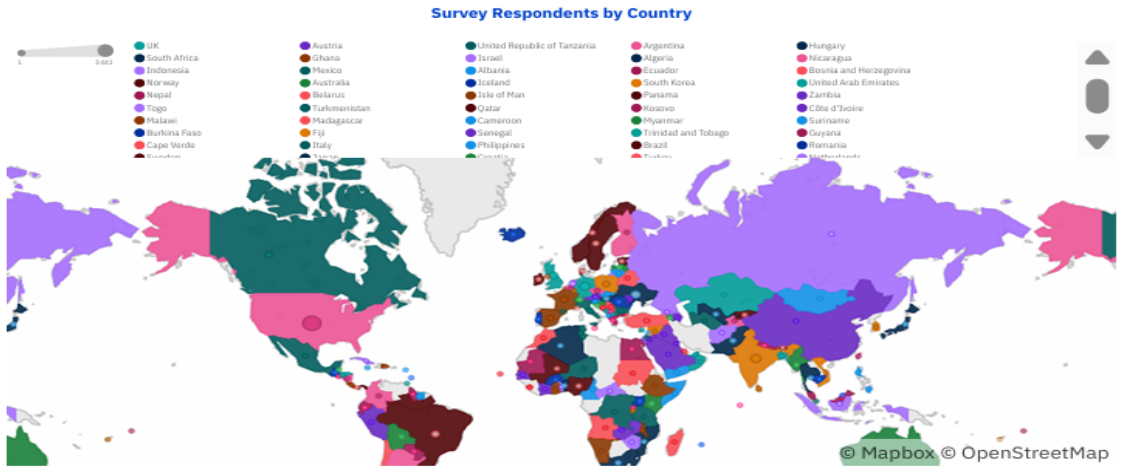


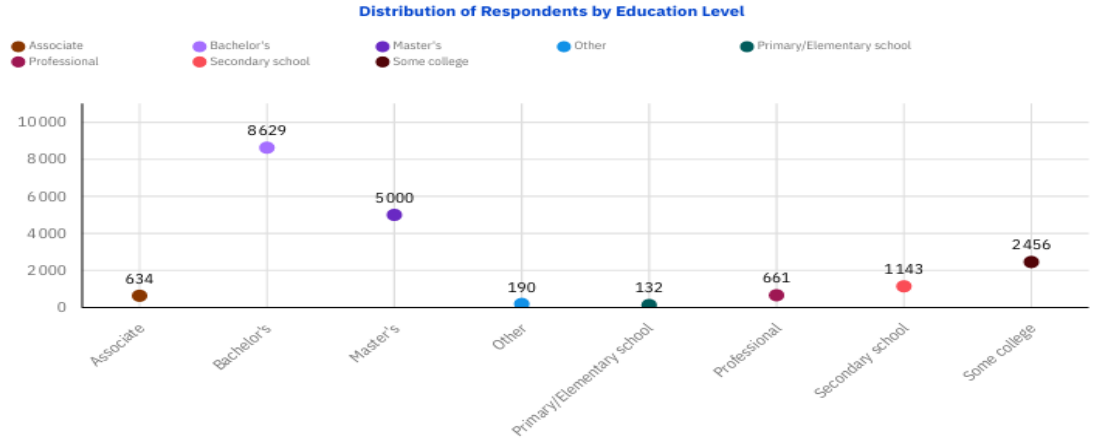


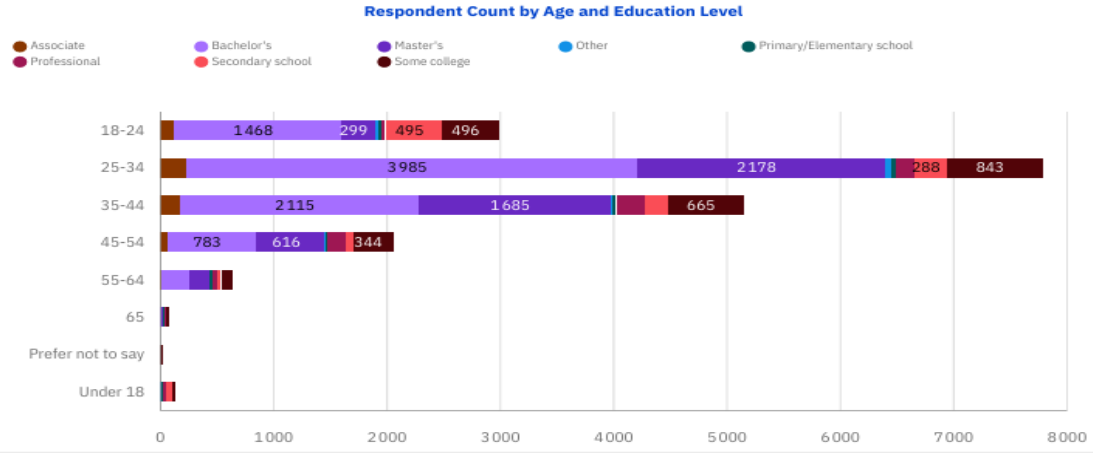
DASHBOARD TAB 3: DEMOGRAPHICS

Demographics









DISCUSSION

The results reveal that **JavaScript, SQL, and Python** continue to dominate current development practices, while **Python, TypeScript, and Go** show increasing future interest — indicating a transition toward modern, scalable, and AI-friendly languages.

- **PostgreSQL's popularity** highlights a growing trend toward open-source and data-driven solutions.
- The **rise of cloud technologies** like AWS and Azure emphasizes how developers are moving toward more flexible and AI-integrated infrastructures.
- **React and Next.js** demonstrate the continued importance of responsive and dynamic web frameworks.

OVERALL FINDINGS & IMPLICATIONS

Findings

- JavaScript, SQL, and Python remain the most widely used programming languages across developers worldwide.
- There is a growing interest in modern and scalable languages such as TypeScript, Go, and Python, driven by AI and data science applications.
- Cloud platforms (AWS, Azure) and open-source databases (PostgreSQL) are gaining prominence, emphasizing a shift toward flexible and data-driven infrastructures.

Implications

- Organizations should invest in training for **TypeScript** and **Go**, which represent the new generation of tools for building high-performance and scalable applications.
- The rise of **open-source tools** and **cloud computing** highlights the need to adopt more agile and interconnected infrastructure strategies.
- Developers and institutions must strengthen a **culture of continuous learning** to keep up with the rapid evolution of modern frameworks such as **React** and **Next.js**.

CONCLUSION

The analysis confirms that JavaScript, SQL, and Python remain the dominant languages in current development practices.

Increasing interest in TypeScript and Go indicates a shift toward modern, scalable, and AI-driven technologies.

The growing adoption of open-source databases and cloud platforms demonstrates the move toward more flexible, data-centered infrastructures.

Demographic insights reveal that most respondents are young professionals from the United States, with the majority holding Bachelor's or Master's degrees ,reflecting a well-educated, globally aware developer community.

These findings underline the importance of continuous learning and international collaboration to stay aligned with fast-evolving technological and educational trends.

APPENDIX

Top 10 Technologies by Job Postings

This bar chart presents the ten most requested technologies based on the number of job postings extracted from the API dataset. It highlights that JavaScript, SQL, Python are among the most in-demand skills in the job market.

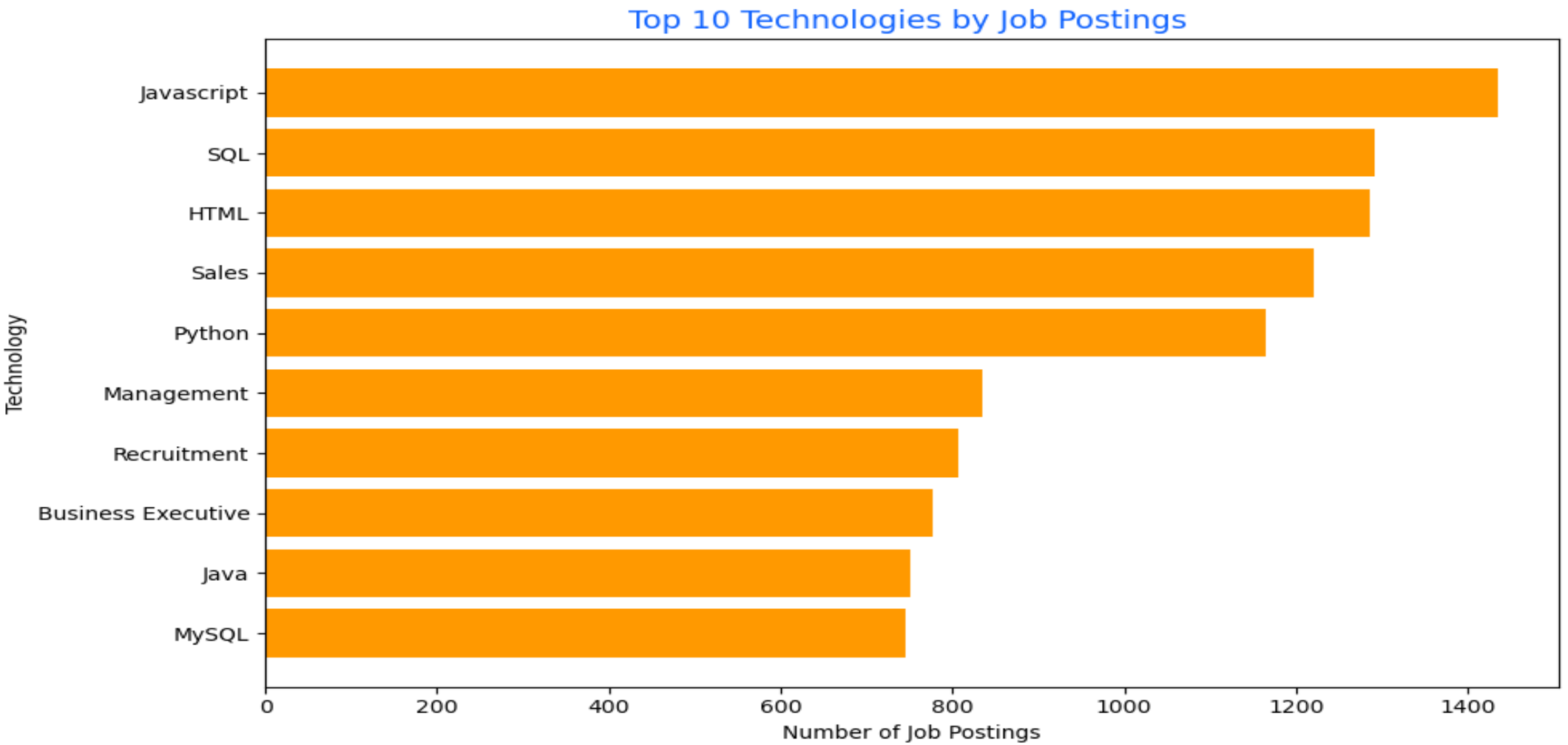
Average Annual Salary by Programming Language

This chart shows the average annual salary associated with different programming languages. It provides insights into how demand and compensation vary across technologies, with higher salaries often linked to specialized or high-demand skills.

Additional Insights

Additional charts generated during the analysis phase are presented below to provide further insights into job demand and salary distribution across programming languages.

JOB POSTINGS



POPULAR LANGUAGES