



# Technologies Trends for Developers: Stack Overflow Survey Analysis

Adel Al-Alawiyat

July 22, 2024

# OUTLINE

---



- Executive Summary
- Introduction
- Methodology
- Results
  - Visualization – Charts
  - Dashboard
- Discussion
  - Findings & Implications
- Conclusion
- Appendix

# EXECUTIVE SUMMARY

---

- **Developer Landscape:**

- Dominated by JavaScript, SQL, and cloud technologies (AWS, Google Cloud, Azure).

- **Emerging Trends:**

- Python's rapid rise for data science and machine learning.
- PostgreSQL gaining ground as a preferred relational database.
- Continued emphasis on cloud and containerization technologies.

- **Demographic Profile:**

- Predominantly young, male developers with bachelor's degrees, concentrated in North America and Europe.

- **Skill Gaps:**

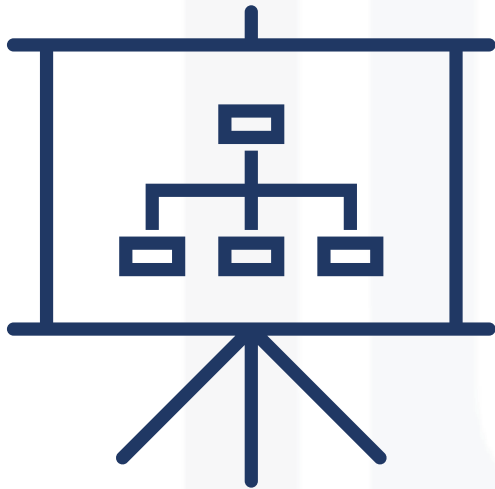
- Industry needs more Python and PostgreSQL expertise, and increased gender diversity.

- **Industry Outlook:**

- Focus on upskilling in emerging technologies, promoting diversity, and tapping into growing developer markets.

# INTRODUCTION

---



- The **technology** landscape is constantly evolving, shaped by **emerging trends** and innovations.
- Understanding these shifts is **crucial** for **businesses**, **developers**, and **technology** enthusiasts alike.
- Stack Overflow, a renowned platform for developers, conducts an annual **survey** to capture **current** and **emerging** technology **trends**.
- The 2019 **survey**, deep dived into the preferences, challenges, and aspirations of nearly **90,000 developers** worldwide.
- The **data analysis** of the survey uncovered valuable **insights** into the most popular **technologies**, **developer** demographics, and **future trends**.
- This presentation **explores** the key **findings** and **implications**.

# METHODOLOGY

---



- **Data Source:**
  - Leveraged the 2019 Stack Overflow Developer Survey encompassing responses from 88,883 developers across 179 countries with diverse education.
- **Data Acquisition and Processing:**
  - Utilized IBM Coursera labs to master essential data science techniques such as web scraping, data exploration, cleaning, analysis, and visualization.
- **Data Analysis Tool:**
  - Employed IBM Cognos Analytics for in-depth data exploration, analysis, and visualization..
- **Data Visualization:**
  - Created a variety of visuals to effectively communicate key findings and trends.
- **Insight Generation:**
  - Extracted meaningful insights and patterns from the data to inform conclusions and recommendations.

# RESULTS

---

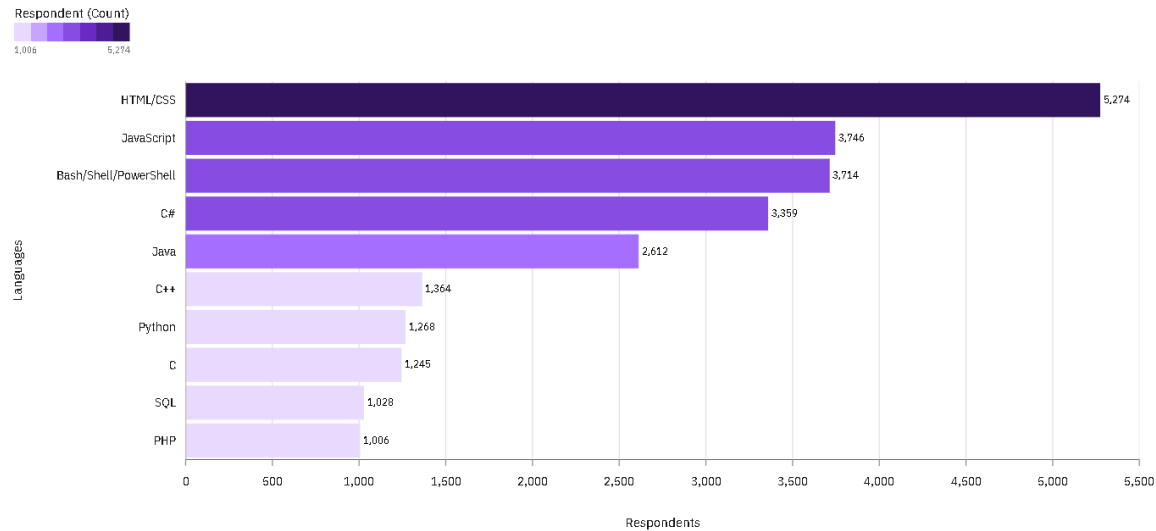


- **Dominant Technologies:** JavaScript, HTML/CSS, SQL, and Python are the most widely used languages, with MySQL as the leading database. Cloud platforms (AWS, Google Cloud, Azure) and frameworks like React.js are prevalent.
- **Shifting Language Preferences:** Python is rapidly gaining popularity, potentially surpassing JavaScript as the most desired language.
- **Database Evolution:** PostgreSQL is emerging as a strong competitor to MySQL, indicating a growing preference for open-source relational databases.
- **Platform Migration:** There's a notable shift towards cloud platforms, with AWS and Kubernetes leading the charge.
- **Mobile and Embedded Expansion:** Mobile development (Android, iOS) and embedded systems (Raspberry Pi, Arduino) gain traction.
- **Framework Stability:** React.js maintains its dominance, while Vue.js and Angular are emerging as strong contenders.
- **Developer Demographics:** The industry is predominantly male-dominated (93.5% male), with a concentration of young (27-29 years) developers holding bachelor's degrees.
- **Geographic Disparity:** Developer talent is concentrated in North America and Europe, with emerging markets showing potential.
- **Future Outlook:** The industry is undergoing rapid transformation, with a focus on cloud technologies, data science, and addressing diversity challenges.

# PROGRAMMING LANGUAGE TRENDS

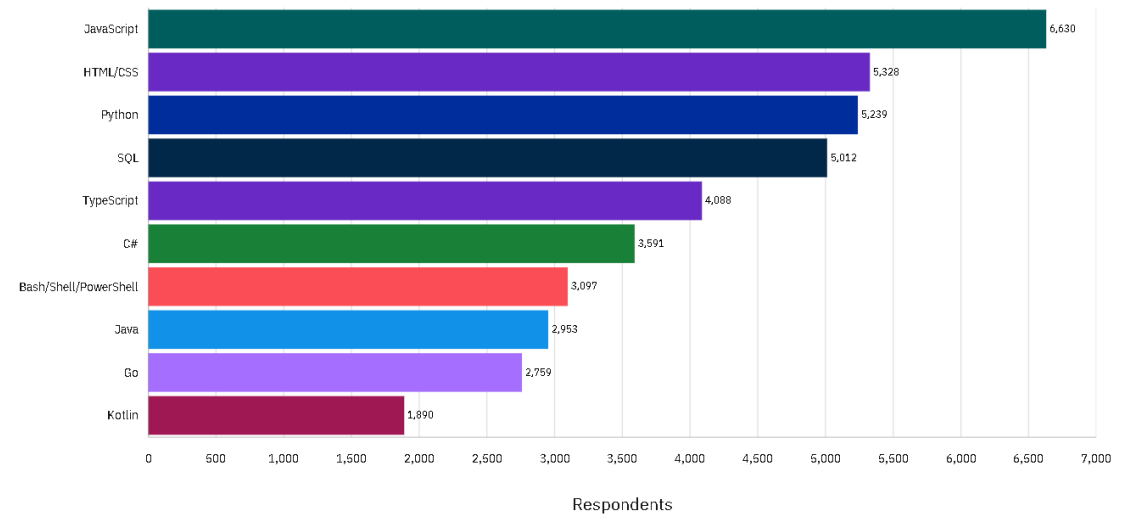
Year 2019

To 10 Languages Worked With



Next Year

Top 10 Languages Desire Next Year



# PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

---

## Findings

- **JavaScript and HTML/CSS** remain foundational for web development, holding strong positions in both current usage and desired skills. **SQL**, **Bash/Shell/PowerShell**, and **Python** follow closely behind.
- **Python** is rapidly gaining traction, driven by its versatility in data science, machine learning, and general-purpose programming. **Java**, **C#**, **TypeScript**, **PHP**, and **C++** round out the top 10
- **SQL** maintains its importance for data management, despite the rise of NoSQL options.
- **Language Diversity:** The developer community utilizes a broad range of languages, reflecting the multifaceted nature of software development.

## Implications

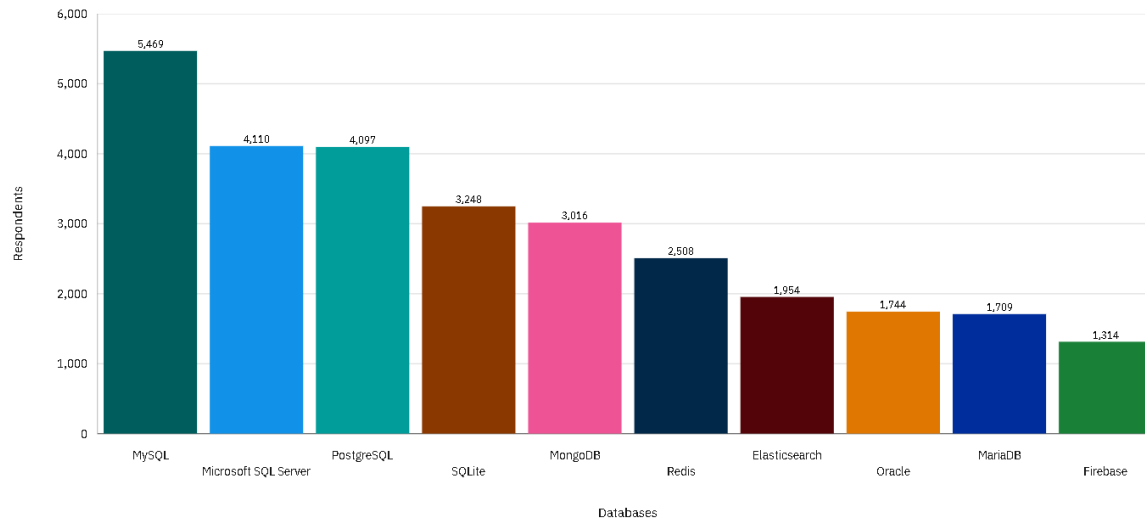
- **Skillset Expansion:** Developers need to expand their skill sets to include Python, especially for roles involving data analytics and/or machine learning.
- **Web Development Foundation:** A solid grasp of JavaScript and HTML/CSS remains essential for web-based applications.
- **Data Management Proficiency:** SQL skills continue to be valuable for database interactions.
- **Language Specialization:** While generalist developers are in demand, specialization in specific languages can offer career advantages.
- **Upskilling:** The programming landscape evolves rapidly, necessitating continuous learning and adaptation to new languages and technologies.



# DATABASE TRENDS

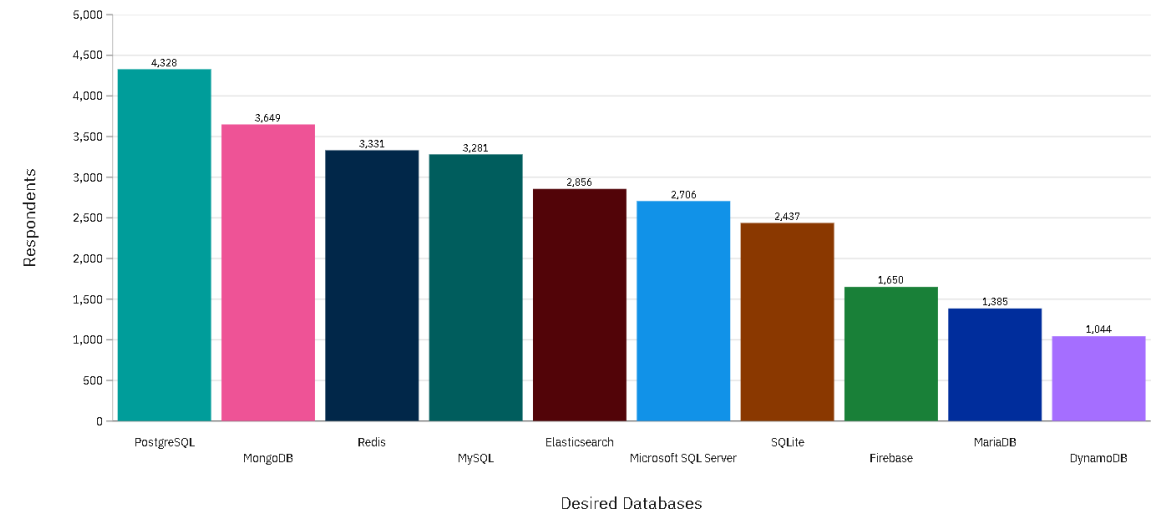
Year 2019

To 10 Databases Worked With



Next Year

Top 10 Databases Desire Next Year



# DATABASE TRENDS - FINDINGS & IMPLICATIONS

---

## Findings

- **MySQL** remains the most widely used database, but its dominance is being challenged.
- **PostgreSQL** is gaining significant traction, driven by its open-source nature, scalability, and advanced features.
- **NoSQL databases** like **MongoDB** are increasingly adopted for specific use cases demanding flexibility and scalability.
- **Hybrid database environments** are emerging, combining relational and NoSQL databases to address diverse data needs.
- **Redis, Elasticsearch, Oracle, and MariaDB** also have significant usage.

## Implications

- **Database Diversity:** Organizations should consider a polyglot persistence approach, utilizing multiple database technologies to optimize for different workloads.
- **Skillset Expansion:** Database professionals should acquire expertise in both relational and NoSQL databases to enhance their value.
- **Data Modeling and Architecture:** Careful data modeling and architecture are essential for effective database management and performance.
- **Cloud Migration:** Exploring cloud-based database services can offer scalability, cost-efficiency, and managed services benefits.
- **Data Governance:** Robust data governance practices are crucial to ensure data quality, security, and compliance.

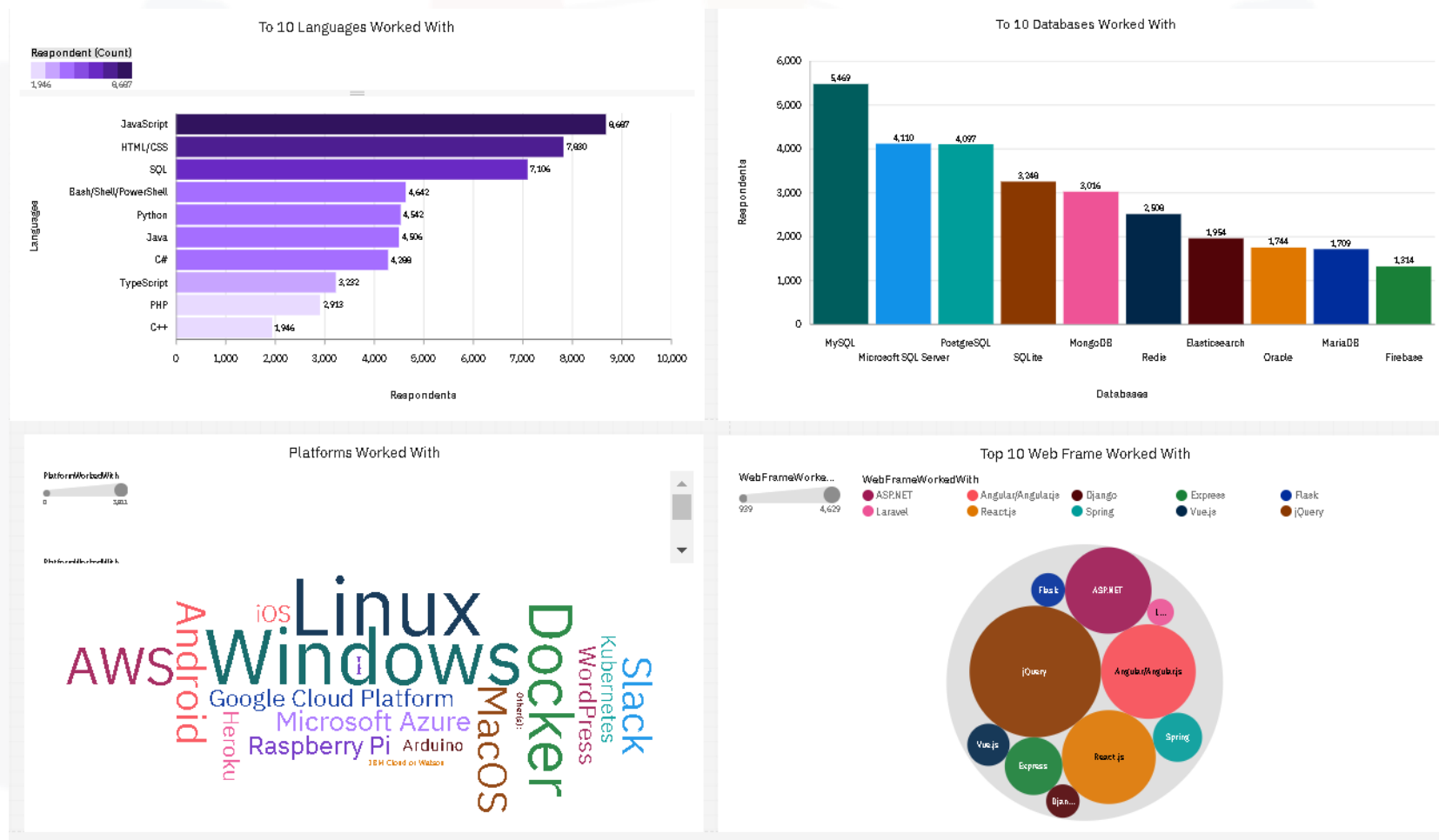
# DASHBOARD



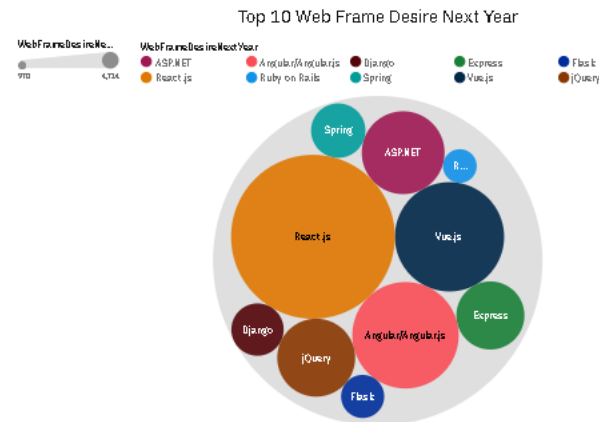
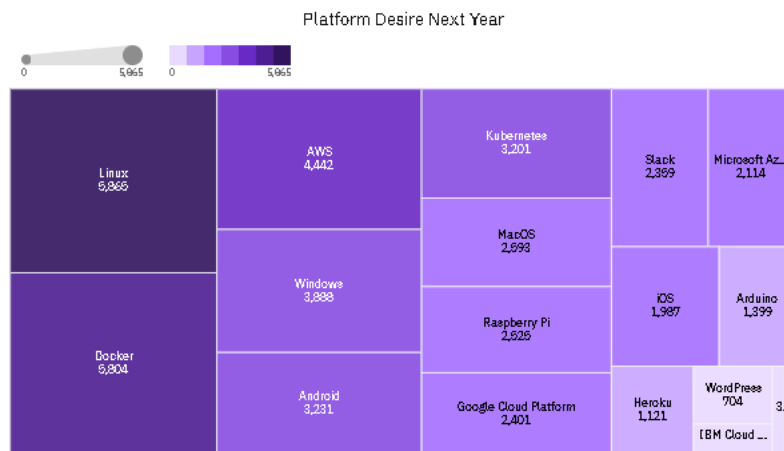
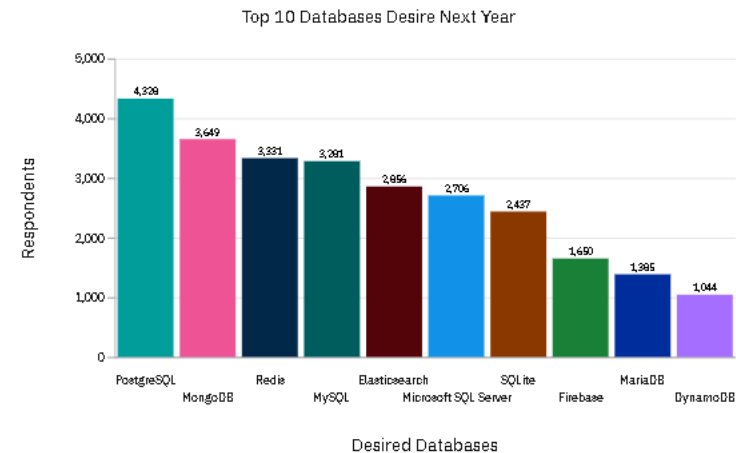
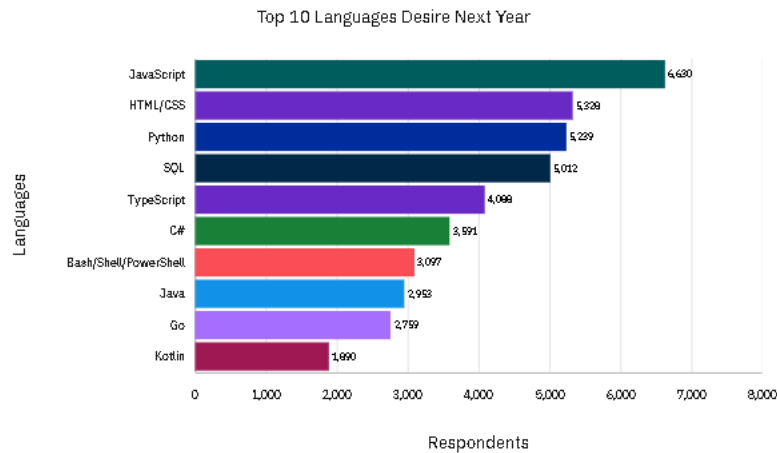
Click [here](#) to access the analysis dashboard on GitHub or copy the following URL to your browser:

<<https://github.com/adelmka/DSRepo/blob/abffabb61bdb74a521f0211a5de3cbdeb1358af0/Part%20A%20-%20Cognos%20Analytics.pdf>>

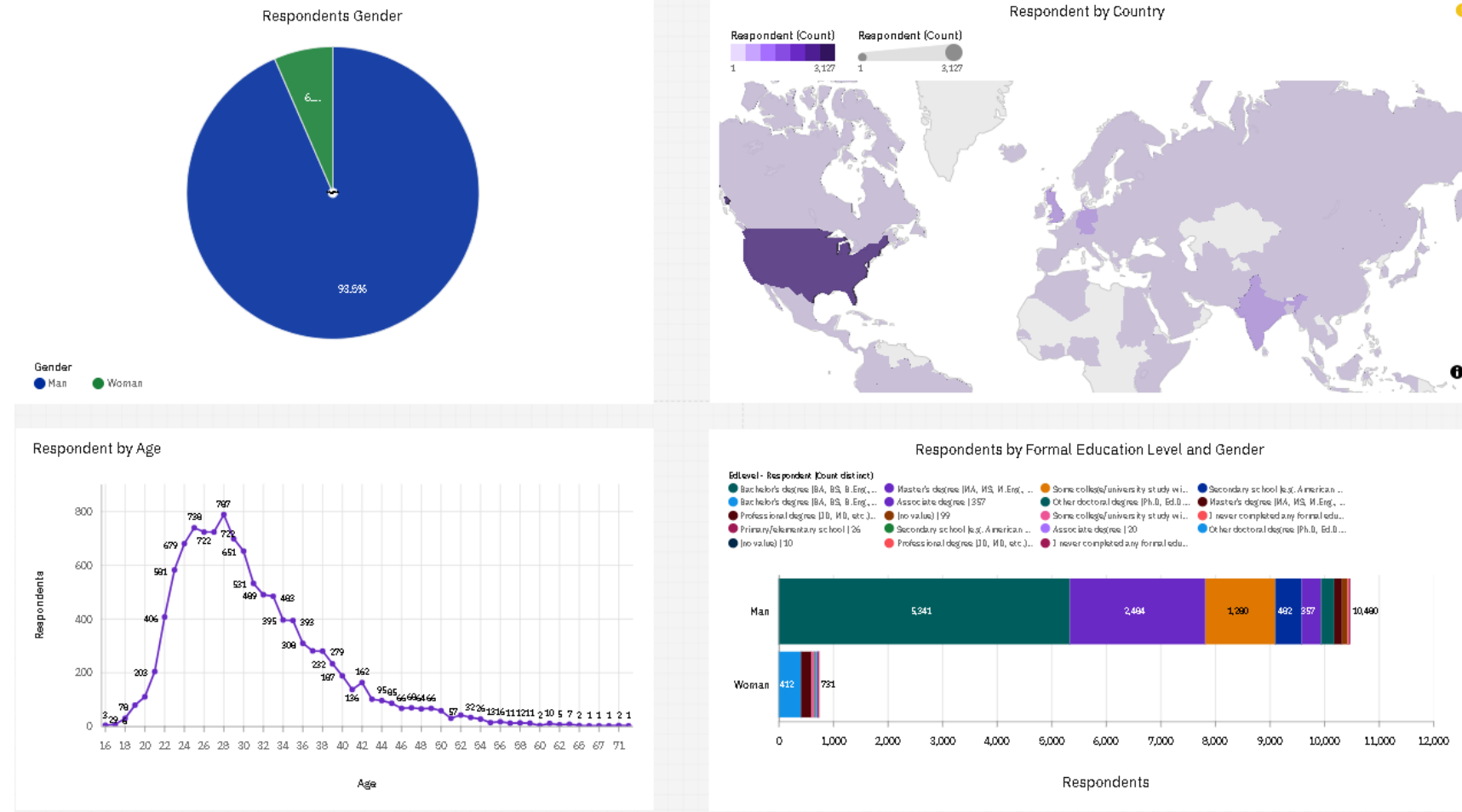
# DASHBOARD TAB 1



# DASHBOARD TAB 2



# DASHBOARD TAB 3



# DISCUSSION

---



- **Dynamic Technological Landscape:** The software development ecosystem is undergoing rapid evolution, with a shift towards cloud-based solutions, data-centric applications, and a growing emphasis on developer experience.
- **Skill Gap and Talent Acquisition:** The industry faces challenges in acquiring and retaining talent with expertise in emerging technologies like Python and cloud computing. Addressing the gender imbalance and expanding the talent pool to diverse geographic regions is crucial.
- **Strategic Technology Adoption:** Organizations must carefully evaluate and prioritize technology investments to align with business objectives and stay competitive in the evolving market.
- **Continuous Learning and Adaptation:** The fast-paced nature of the tech industry necessitates a culture of continuous learning and skill development to remain relevant.

# OVERALL FINDINGS & IMPLICATIONS

---

## Findings

- The software development landscape is dynamic, with JavaScript, HTML/CSS, SQL, and Python as core languages.
- Cloud platforms (AWS, Google Cloud, Azure) and frameworks like React.js are essential components of modern applications.
- Python is rapidly gaining prominence, especially in data science and machine learning.
- PostgreSQL is emerging as a strong competitor open-source to MySQL in the database market.
- Developers are predominantly male, concentrated in North America and Europe.

## Implications

- Organizations must invest in Python and cloud technologies to stay competitive.
- Address the growing emphasis on open-source, flexible, NoSQL, and high-performance database .
- Addressing the skill gap in Python and cloud computing is crucial for industry growth.
- Fostering diversity and inclusion is essential for a balanced and innovative workforce.
- A strategic approach to technology adoption is necessary to align with business objectives.
- Continuous learning and adaptation are vital for individuals and organizations to thrive in the evolving tech landscape.



# CONCLUSION

---

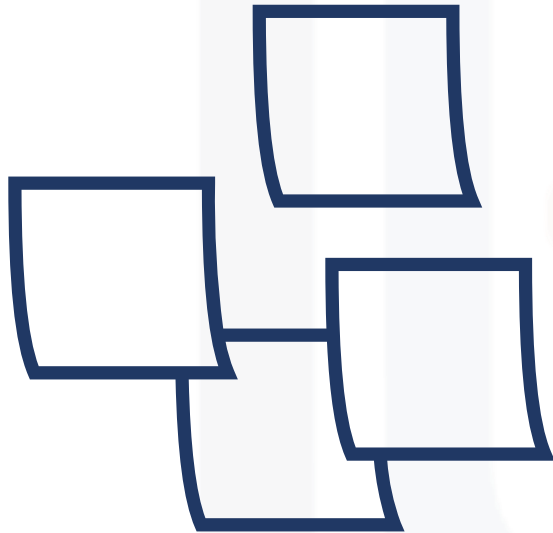


- The software development landscape is dynamic, with JavaScript, HTML/CSS, and SQL remaining foundational, while Python's influence is rapidly growing.
- The trend indicates a growing emphasis on open-source, flexible, and high-performance database solutions.
- Cloud computing and containerization technologies are reshaping application development, with AWS and Kubernetes leading the charge.
- The industry faces a talent shortage, particularly in Python and cloud expertise, emphasizing the need for skill development and acquisition.
- Addressing gender imbalance and fostering diversity is crucial for the industry's growth and innovation.
- Strategic technology adoption, coupled with continuous learning and adaptation, is essential for organizations to thrive in the evolving tech landscape.

# APPENDIX

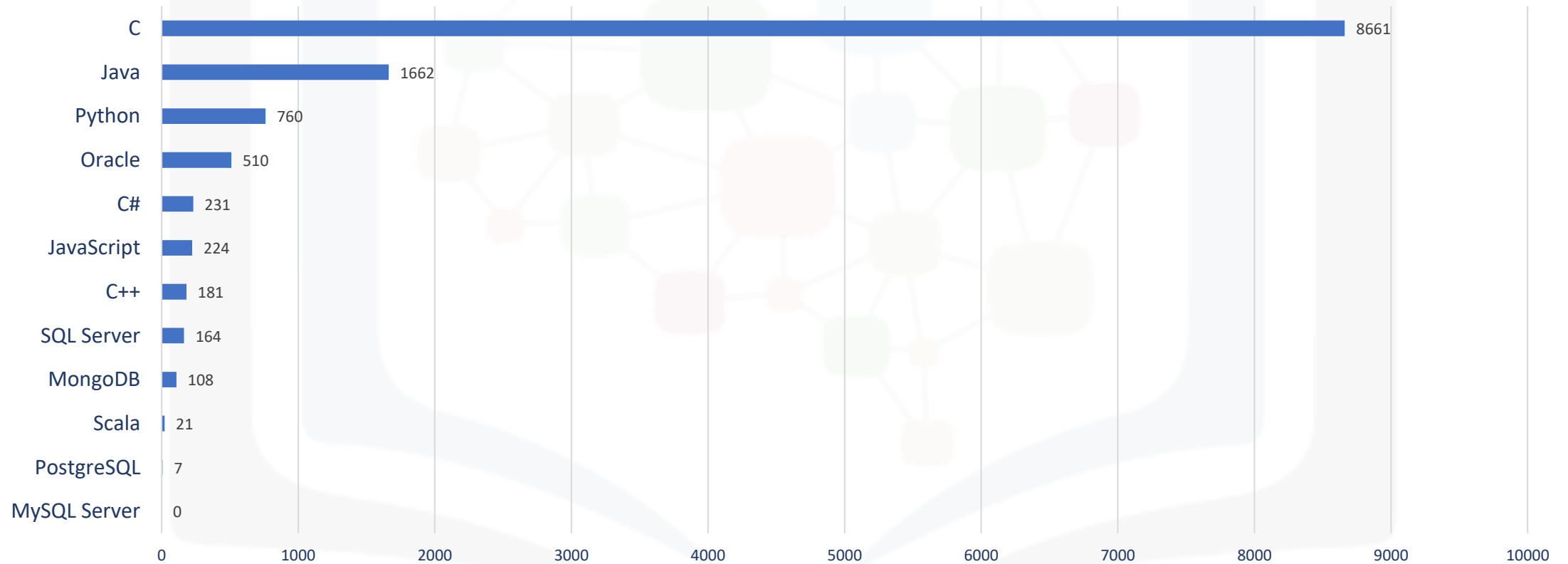
---

- Job Posting
- Popular Languages



# JOB POSTINGS

Total Job Posting by Language



# POPULAR LANGUAGES

