IBM Data Analysis Final Project

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EXECUTIVE SUMMARY

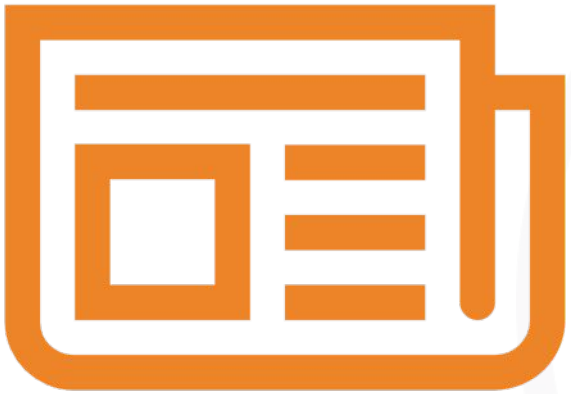
An Analytical Review of Programming Language and Database Trends in 2024

- **Current Technology Usage**
  - The Top 10 Programming Languages Used
  - The Top 10 Databases Used
  - The Top 10 Platforms Used
  - The Top 10 Web Frameworks Used
- **Future Technology Trends**
  - Top 10 Languages Desired Next Year
  - Top 10 Databases Desired Next Year
  - Top 10 Desired Platforms
  - Top 10 Desired Web Frameworks
- **Demographics**
  - Respondents by Age
  - Respondent Count by Country
  - Respondent Distribution by Education Level
  - Respondent Count by Age, Classified by Education Level

INTRODUCTION

- Analyzes developer preferences from the 2024 Stack Overflow Survey.
- Focuses on current and future technology usage trends.
- Includes insights into developer demographics worldwide.
- Aims to guide tech leaders, educators, and recruiters.
- Uses visual dashboards to present data clearly and comparably.

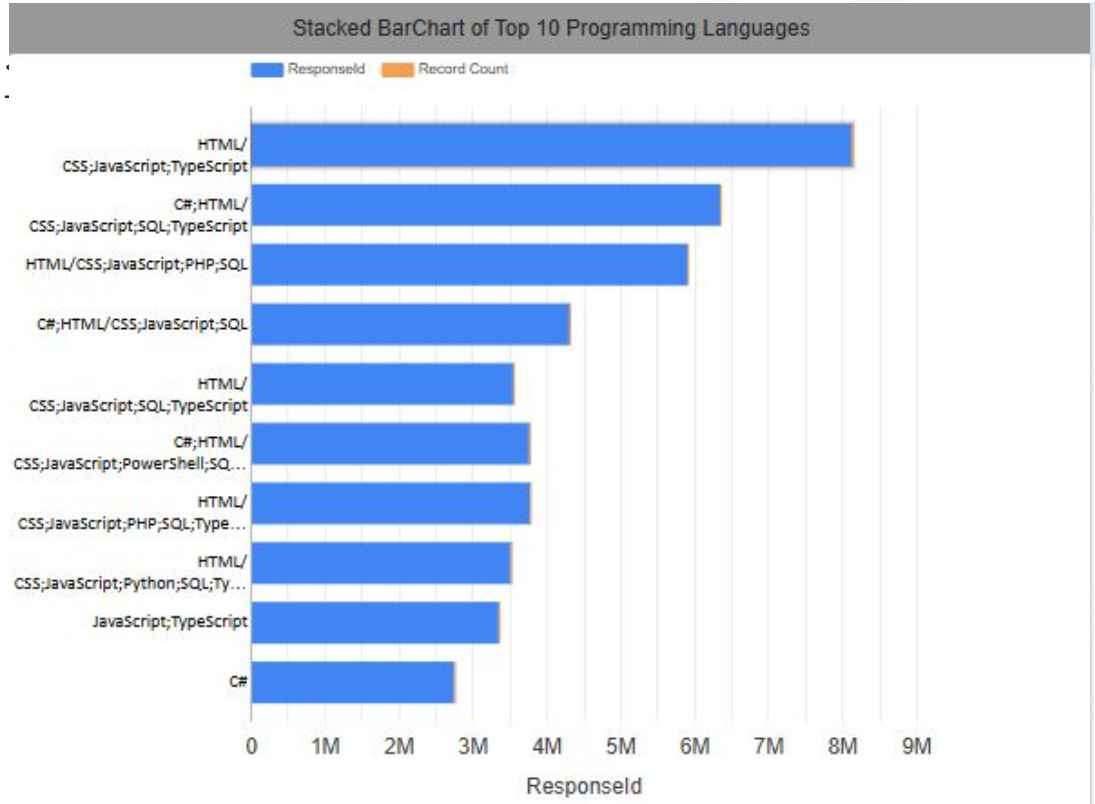
METHODOLOGY



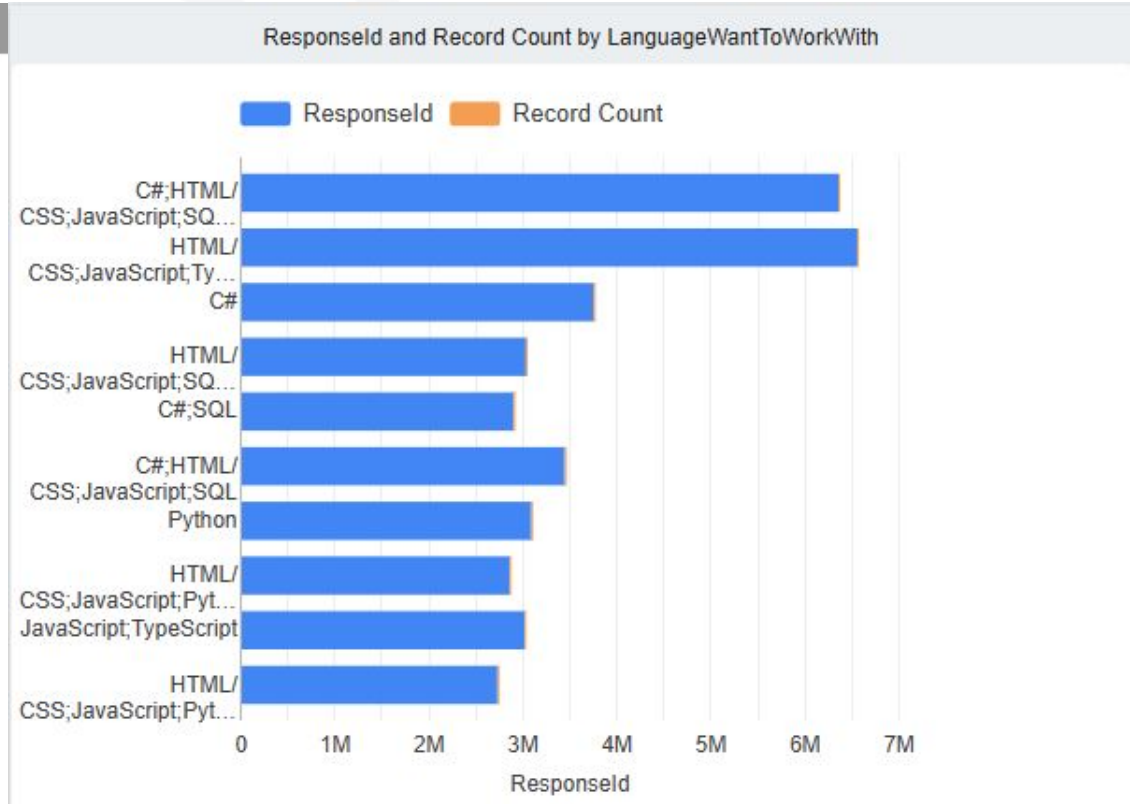
- **Data Collection**
  - Source: 2024 Stack Overflow Developer Survey dataset.
  - Data gathered from thousands of global respondents, including both professionals and students.
- **Data Cleaning & Preprocessing**
  - Removed incomplete, inconsistent, or duplicate responses.
  - Standardized categorical variables (e.g., language names, database types).
  - Converted raw text responses into structured formats for analysis.
- **Data Analysis**
  - Aggregated and ranked data to identify top 10 items in each category (e.g., languages, databases).
  - Calculated distributions and preference shifts using comparative metrics.
  - Used statistical summaries to highlight usage vs. aspiration gaps.

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

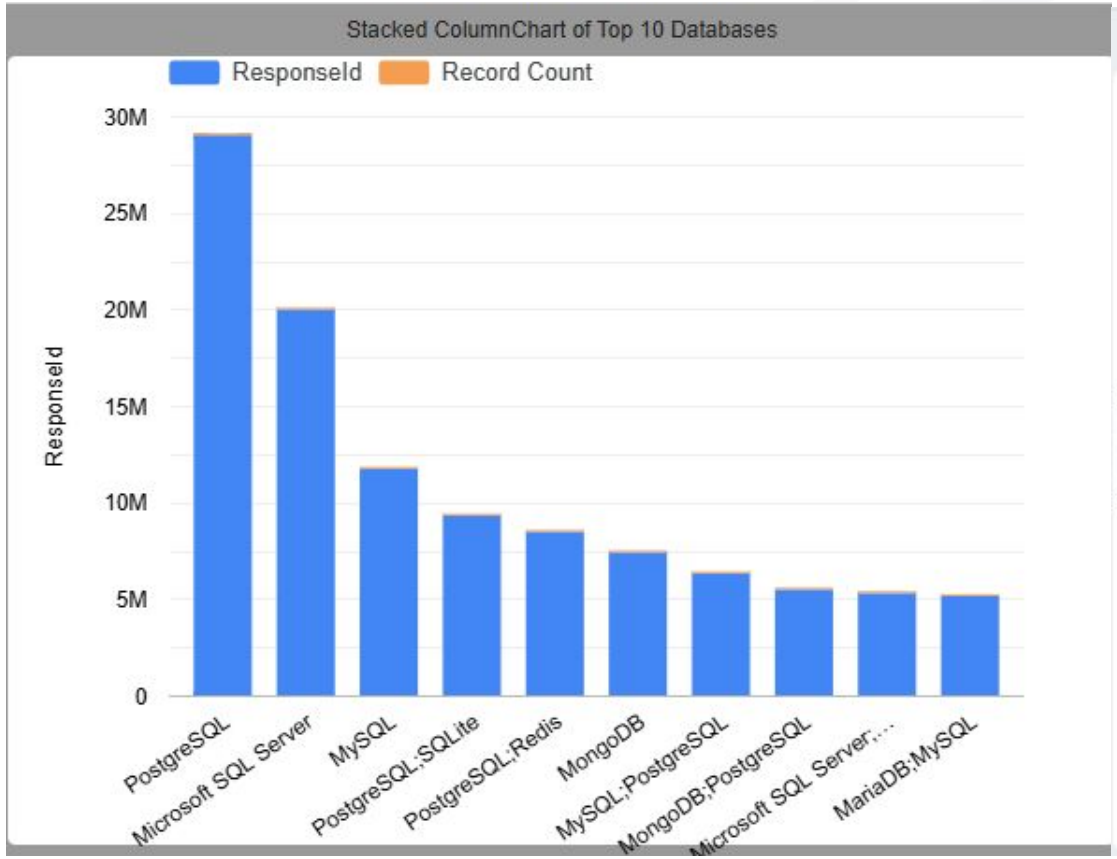
- JavaScript & Python dominate in usage, with Python growing due to its role in data science and AI.
- TypeScript and Rust are rapidly gaining popularity, with TypeScript favored for large-scale web apps and Rust for system-level and performance-critical applications.
- Go continues to rise, especially in cloud-native and microservices development.

Implications

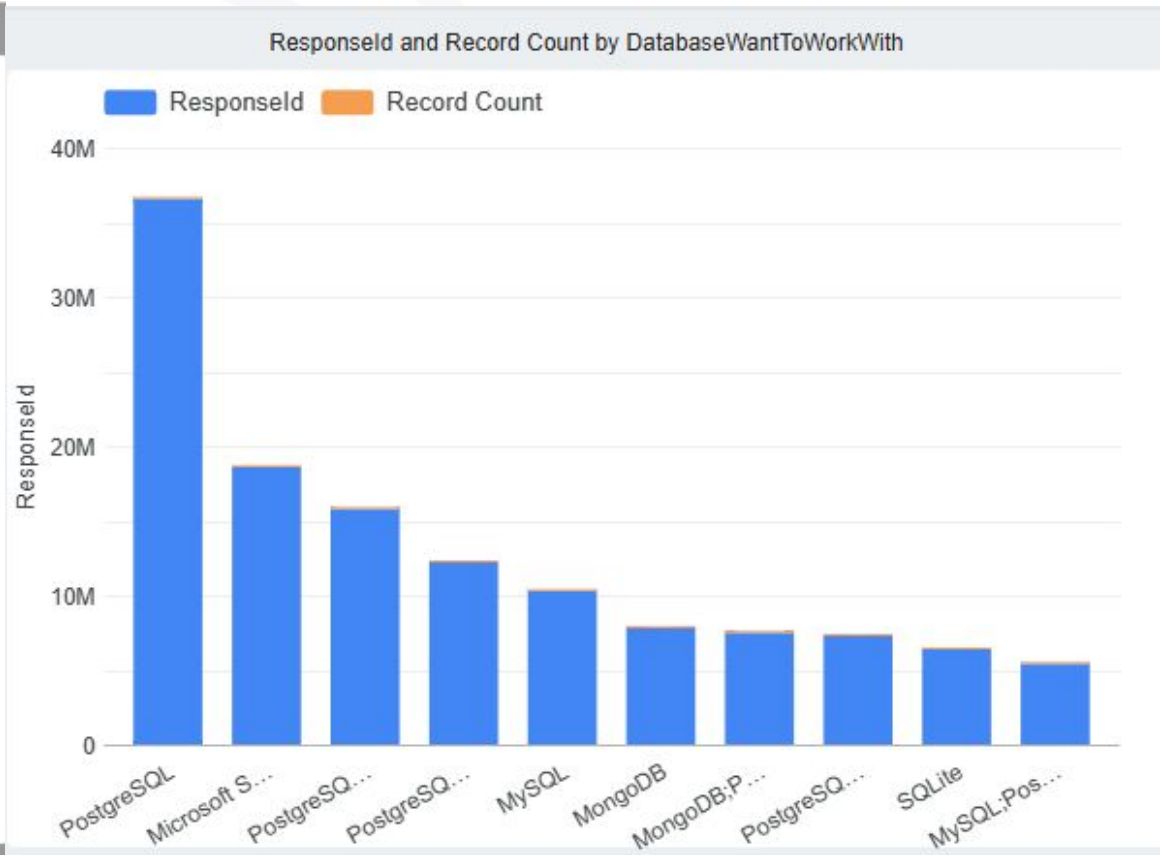
- Skill Demand: JavaScript, Python, TypeScript, and Rust will be key languages for developers, especially in web, cloud, and AI roles.
- Institutions should focus on TypeScript, Go, and Rust to equip students with skills for modern development
- Companies may shift from Java/C# to Kotlin and Go for modern, scalable solutions.

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- PostgreSQL is the most used and most admired database, signaling its dominance in both open-source and enterprise projects.
- MySQL, SQLite, and MongoDB remain popular, with MongoDB leading among NoSQL solutions for flexible, document-based data handling.
- Newer and cloud-native databases like Firebase, Supabase, and DynamoDB are rising quickly, especially in web, mobile, and serverless environments.

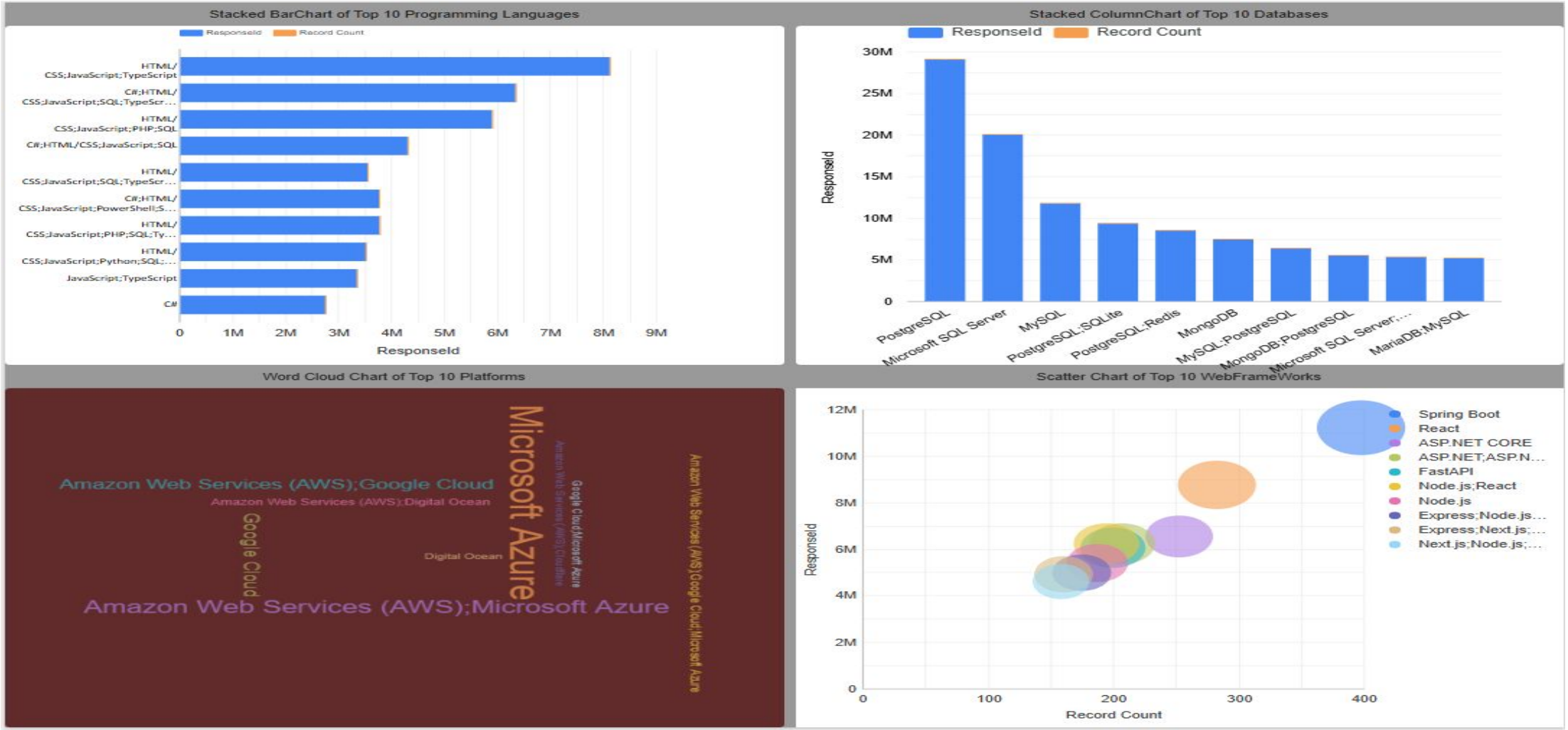
Implications

- Developers should focus on PostgreSQL and MongoDB to align with current market demands and project preferences.
- Companies are moving toward scalable, cloud-friendly databases, reducing reliance on legacy systems like Oracle and SQL Server.
- The growth of real-time and backend-as-a-service platforms indicates a shift toward faster, lightweight development workflows, especially for startups and mobile-first teams.

DASHBOARD

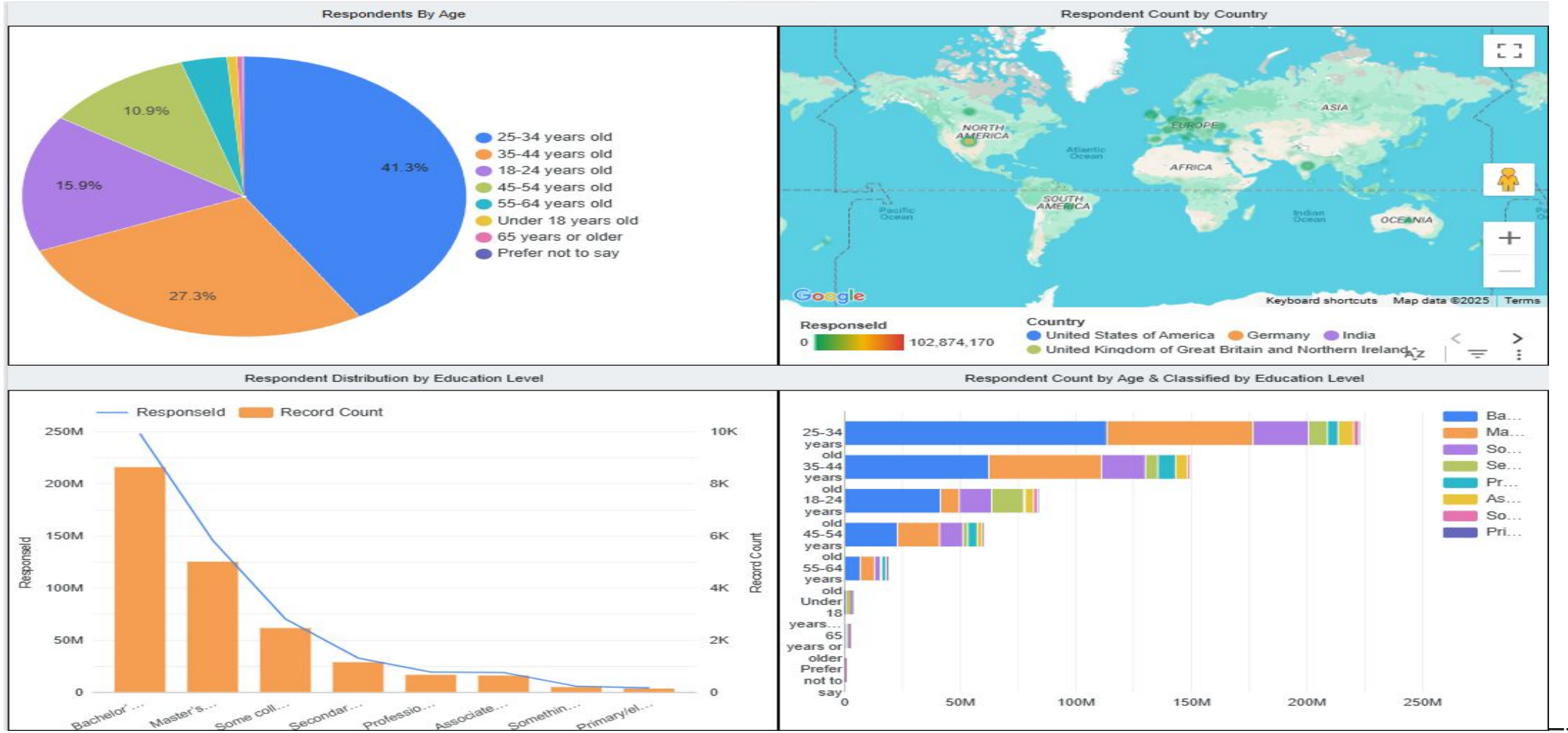
<Link to the Dashboard>

DASHBOARD TAB 1



DASHBOARD TAB 2

DASHBOARD TAB 3



DISCUSSION

OVERALL FINDINGS & IMPLICATIONS

Findings

- JavaScript, Python, and TypeScript dominate language usage, while newer languages like Rust and Go are gaining strong developer interest.
- PostgreSQL leads database adoption, with rising use of MongoDB, Firebase, and Supabase in modern, cloud-based applications.
- Linux, Docker, and cloud platforms (like AWS and Google Cloud) are the most used, reflecting the shift toward cloud-native and containerized development.

Implications

- Developers should focus on modern, versatile languages and tools like Python, TypeScript, Rust, and Go to stay competitive.
- There is a clear industry move toward open-source, scalable, and serverless databases, favoring PostgreSQL and cloud-integrated solutions.
- Platforms built around cloud infrastructure, containers, and DevOps tools are now essential, highlighting the need for platform fluency in development roles.

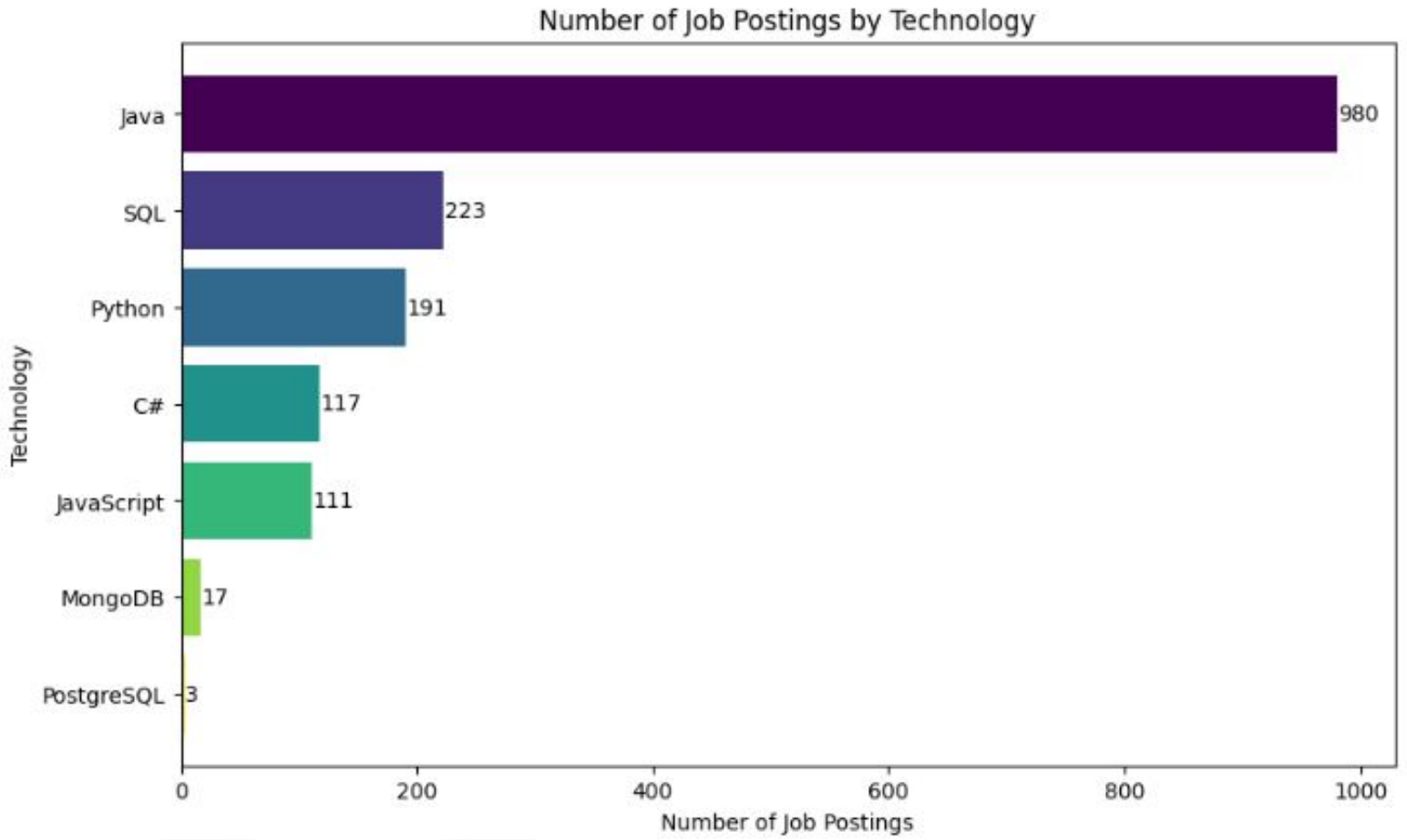
CONCLUSION

- Modern languages like TypeScript, Rust, and Go are reshaping development, while JavaScript and Python continue to dominate due to their versatility and wide adoption.
- PostgreSQL leads a growing preference for open-source, feature-rich databases, with MongoDB, Firebase, and Supabase rising in popularity for modern app architectures.
- Cloud-native platforms and tools such as Docker, Linux, and AWS have become essential, reflecting a strong shift toward containerization and scalable cloud solutions.
- Developers and organizations must adapt to these evolving technology trends to stay relevant, competitive, and prepared for the next wave of innovation in software development.

APPENDIX

JOB POSTINGS

	Technology	Number of Jobs
0	Python	191
1	Java	980
2	C#	117
3	JavaScript	111
4	SQL	223
5	MongoDB	17
6	PostgreSQL	3



POPULAR LANGUAGES

	Language	Average Salary
0	Python	$114,383
1	Java	$101,013
2	R	$92,037
3	Javascript	$110,981
4	Swift	$130,801
5	C++	$113,865
6	C#	$88,726
7	PHP	$84,727
8	SQL	$84,793
9	Go	$94,082