IBM
Data Analyst
Capstone Project

Created By:

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OUTLINE

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  - **Visualization – Charts**
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EXECUTIVE SUMMARY

- **PROJECT OVERVIEW**
  - Analyzes Current And Future Tech Trends Using Data From The Stack Overflow Developer Survey.
  - Leverages Insights From The Global Developer Community.

- **MOST USED TECHNOLOGIES**
  - **Languages:** JAVASCRIPT, HTML/CSS, SQL,C#, PYTHON
  - **Databases**: MYSQL, MICROSOFT SQL SERVER, POSTGRESQL
  - **Platforms**: WINDOWS, GOOGLE CLOUD PLATFORM, MICROSOFT AZURE
  - **Web Frameworks**: JQUERY, REACT.JS

- **MOST DESIRED FOR THE FUTURE**
  - **Languages**: JAVASCRIPT, TYPESCRIPT, SQL, PYTHON, GO, RUST
  - **Databases**: POSTGRESQL, REDIS, MONGODB, ELASTICSEARCH
  - **Platforms**: DOCKER, LINUX, AWS, KUBERNETES
  - **Frameworks**: REACT.JS, VUE.JS, ASP.NET

- **DEMOGRAPHICS**
  - Majority Aged **18-24**
  - Most Have A **Bachelor's Or Master's Degree**

- **IMPLICATIONS**
  - Supports Decision-making For Hiring, Training, And Future Technology Investments

INTRODUCTION

- With many technologies available in today's developer landscape, choosing the right tools and languages has become essential for career growth and innovation.

- This report presents insights on current technologies widely adopted by developers, as well as future tools that are gaining interest and are expected to grow in demand.

- It also explores how the choice of technologies can impact opportunities and compensation, as developers fluent in high-demand tools often access greater career prospects.

- Valuable for developers, educators, and HR professionals to align with in-demand skills.

- Helps developers focus on high-growth skills

- Supports strategic hiring and curriculum planning

METHODOLOGY

- Data collection involved web scraping and API integration, with the Stack Overflow Annual Developer Survey serving as the principal dataset. Additional information was retrieved through the Stack Overflow API to complement the analysis.

- Data collection methods included web scraping using BeautifulSoup4 for efficient HTML parsing, along with parsing and structuring JSON and CSV files to prepare the data for analysis.

- Duplicate entries were removed to maintain data integrity. Missing values were managed using mean imputation for numerical variables, mode imputation for categorical variables, and exclusion of records with substantial missing data.

- Age data was categorized into meaningful groups (e.g., 18–24, 25–34) to facilitate analysis. Salaries were normalized across various currencies to ensure consistency. Survey responses were parsed to extract programming languages, allowing for frequency analysis of their usage.

- Grouped ages improve demographic insights and trend identification.

- Language frequency analysis highlights the most popular programming tools among respondents.
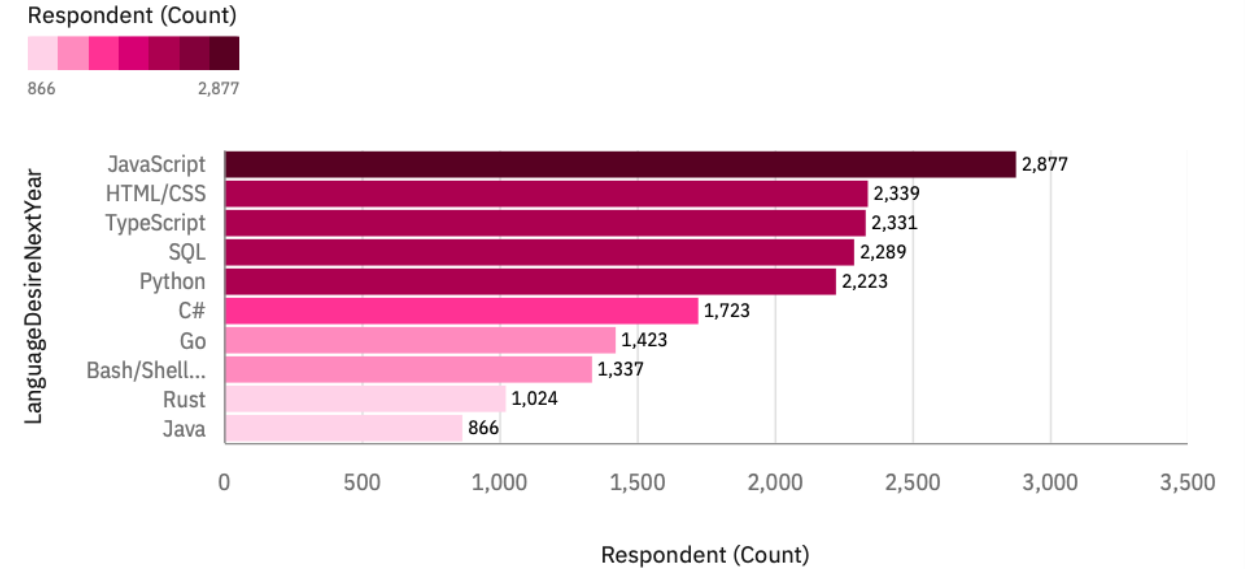
PROGRAMMING LANGUAGE TRENDS

Current Year

Top 10 Languages That Respondents Have Worked With
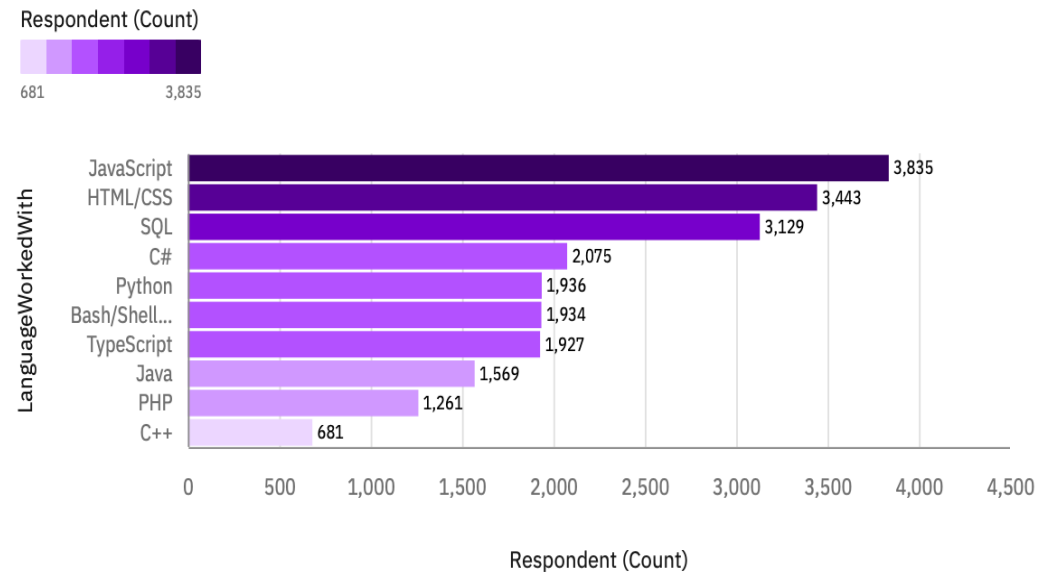
Next Year

Top 10 Languages Desired Next Year

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PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

- JavaScript is the most popular and most desired language.

- Interest in Go and Rust is rising, while Java, PHP, and C++ are less desired next year.

- TypeScript and Python maintain strong positions in both current use and future interest.

Implications

- Web development skills (JavaScript, TypeScript, HTML/CSS) will stay in demand.

- Developers may benefit from learning Go and Rust to meet future needs.

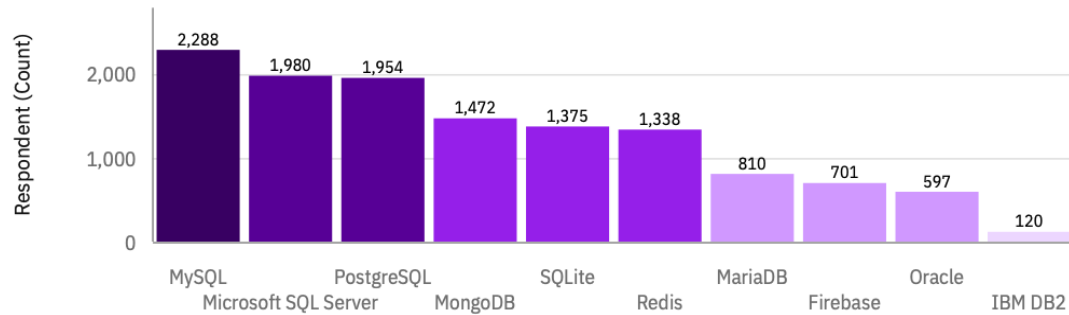- Demand for legacy languages like Java and PHP may decline.

DATABASE TRENDS

Current Year

Next Year

Top 10 Databases That Respondents Have Worked With
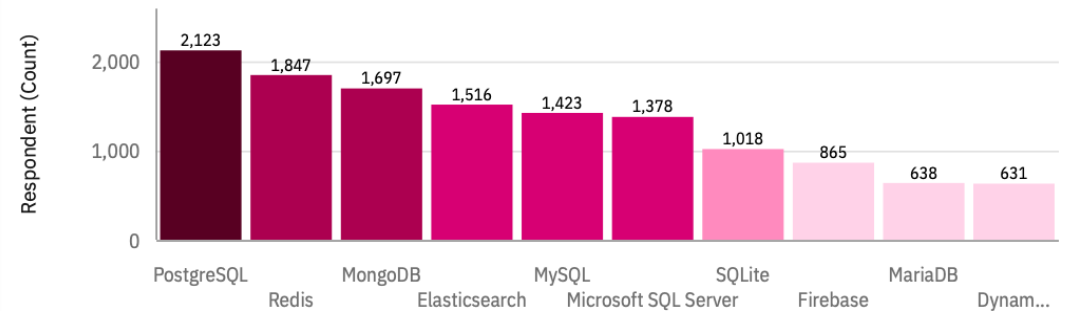
Respondent (Count)
120 — 2,288

Respondent (Count)

Database	Count
MySQL	2,288
Microsoft SQL Server	1,980
PostgreSQL	1,954
MongoDB	1,472
SQLite	1,375
Redis	1,338
MariaDB	810
Firebase	701
Oracle	597
IBM DB2	120

DatabaseWorkedWith

Top 10 Databases Desired Next Year

Respondent (Count)
631 — 2,123

Respondent (Count)

Database	Count
PostgreSQL	2,123
Redis	1,847
MongoDB	1,697
Elasticsearch	1,516
MySQL	1,423
Microsoft SQL Server	1,378
SQLite	1,018
Firebase	865
MariaDB	638
Dynam...	631

DatabaseDesireNextYear

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DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- MySQL is the most used database this year, but PostgreSQL is most desired for next year.

- Interest in MongoDB and Redis is growing for next year.

- Traditional databases like Oracle and IBM DB2 are less desired moving forward.

Implications

- Developers should focus on learning PostgreSQL and modern NoSQL databases.

- Demand for traditional databases may decrease, affecting legacy system maintenance.

- Skills in emerging databases like Redis and Elasticsearch could offer new job opportunities.
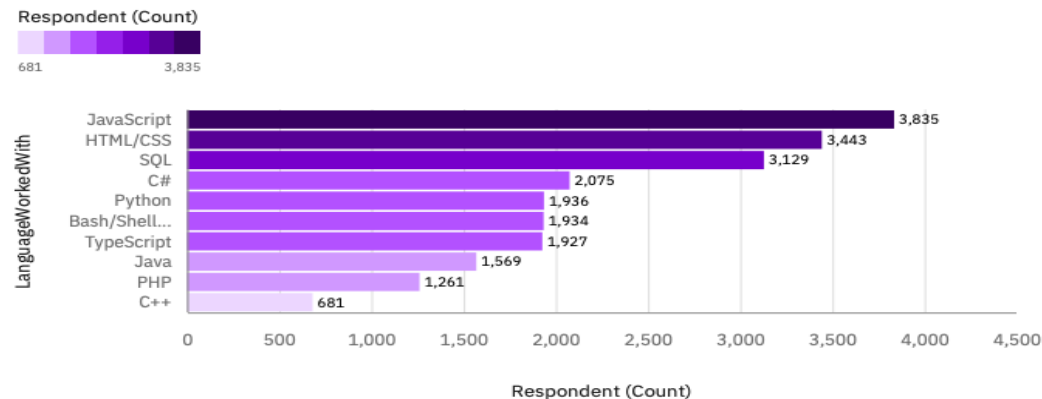
Skills Network
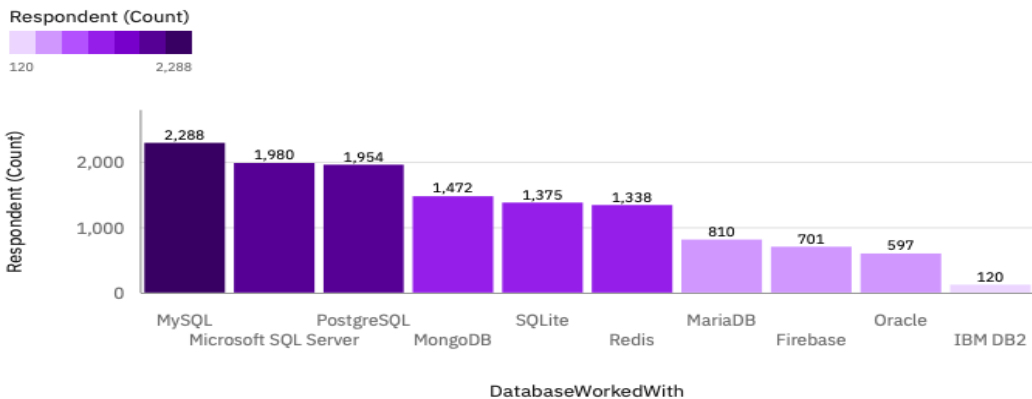
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DASHBOARD

IBM Data Analyst Capstone Project Dashboard

DASHBOARD TAB 1

Current Technology Usage
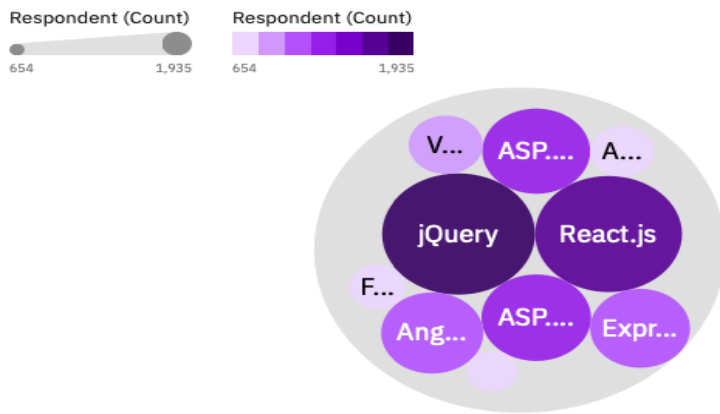
Top 10 Languages That Respondents Have Worked With

Respondent (Count)
681 — 3,835

Language	Count
JavaScript	3,835
HTML/CSS	3,443
SQL	3,129
C#	2,075
Python	1,936
Bash/Shell...	1,934
TypeScript	1,927
Java	1,569
PHP	1,261
C++	681

Respondent (Count)

Top 10 Databases That Respondents Have Worked With

Respondent (Count)
120 — 2,288

Database	Count
MySQL	2,288
Microsoft SQL Server	1,980
PostgreSQL	1,954
MongoDB	1,472
SQLite	1,375
Redis	1,338
MariaDB	810
Firebase	701
Oracle	597
IBM DB2	120

DatabaseWorkedWith

Top 10 Platforms That Respondents Have Worked With

Respondent (Count)
88 — 2,592

Respondent (Count)
88 — 2,592

Top 10 WebFrames That Respondents Have Worked With

Respondent (Count)
654 — 1,935

Respondent (Count)
654 — 1,935

DASHBOARD TAB 2

Future Technology Trend

Top 10 Languages Desired Next Year

Respondent (Count)

866   2,877

Language	Respondent (Count)
JavaScript	2,877
HTML/CSS	2,339
TypeScript	2,331
SQL	2,289
Python	2,223
C#	1,723
Go	1,423
Bash/Shell...	1,337
Rust	1,024
Java	866

LanguageDesireNextYear

Respondent (Count)

Top 10 Databases Desired Next Year

Respondent (Count)

631   2,123

Database	Respondent (Count)
PostgreSQL	2,123
Redis	1,847
MongoDB	1,697
Elasticsearch	1,516
MySQL	1,423
Microsoft SQL Server	1,378
SQLite	1,018
Firebase	865
MariaDB	638
Dynam...	631

DatabaseDesireNextYear

Top 10 Platforms Desired Next Year

Respondent (Count)
1,182   2,918

Respondent (Count)
1,182   2,918

Docker · AWS · Windows · Android · MacOS · Linux · Kubernetes · Microsoft Azure · Google Cloud Platform · Raspberry Pi
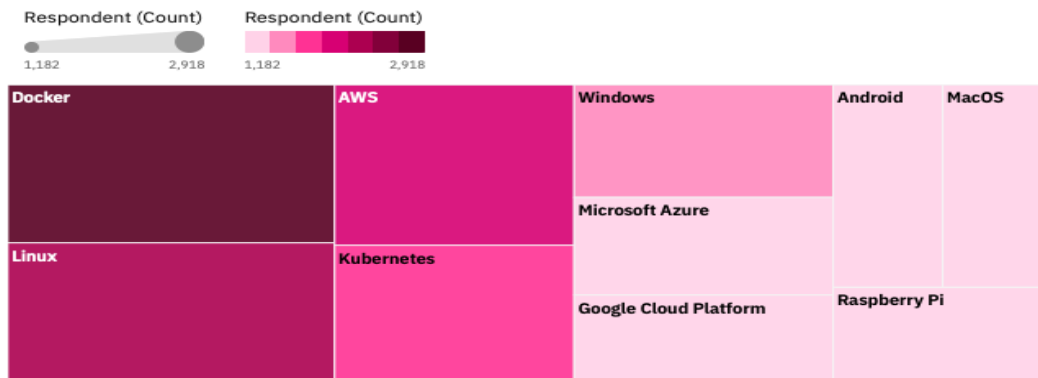
Top 10 Webframes Desired Next Year
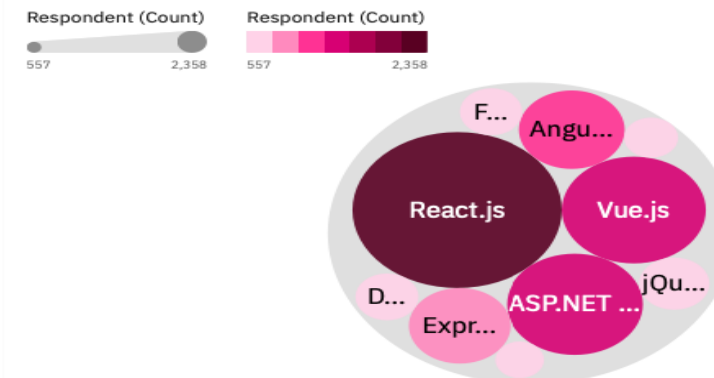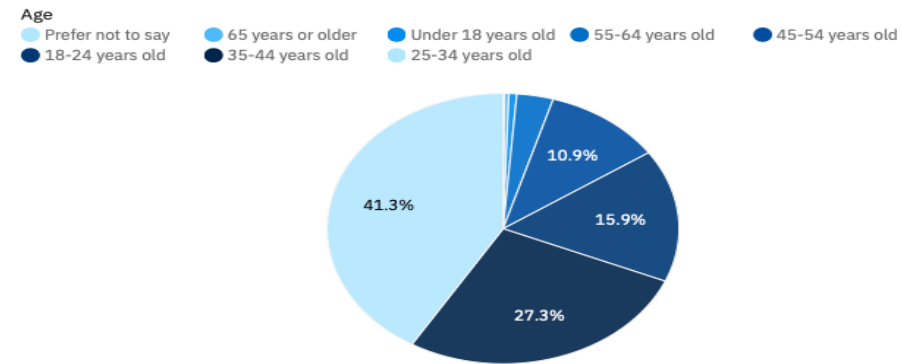
Respondent (Count)
557   2,358

Respondent (Count)
557   2,358

F... · Angu... · React.js · Vue.js · D... · Expr... · ASP.NET ... · jQu...
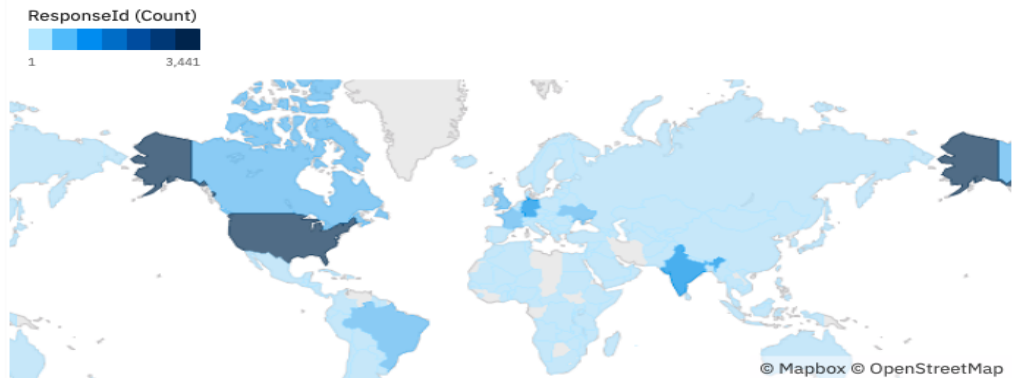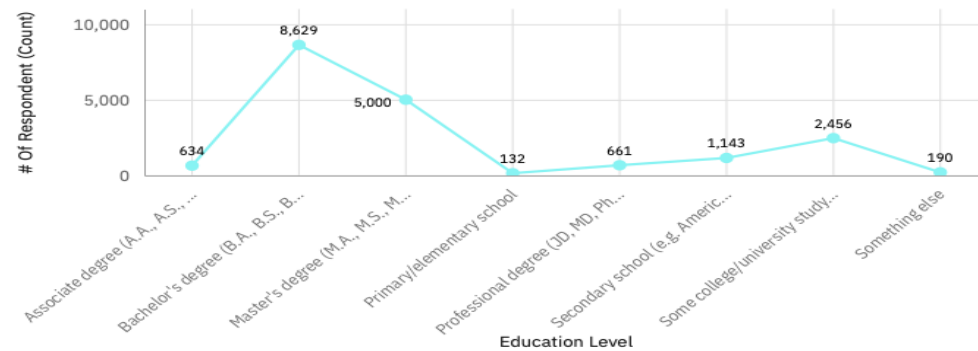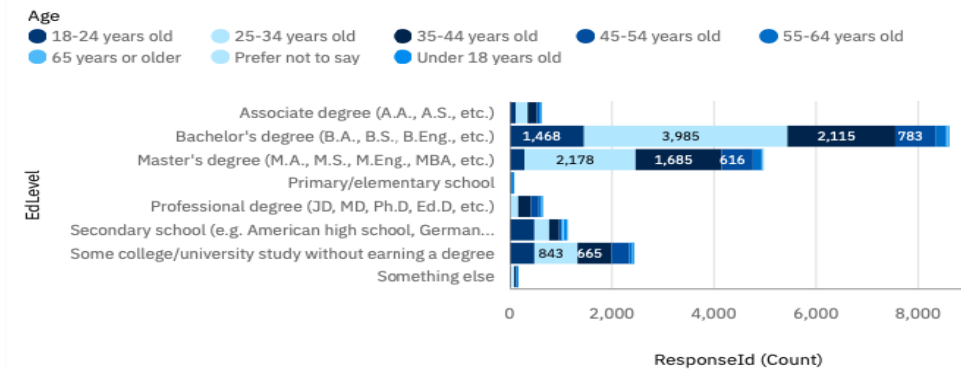
DASHBOARD TAB 3

Insights from Dashboard

- The dashboard shows that JavaScript, HTML/CSS, and SQL remain the most widely used and desired languages, while interest in TypeScript, Python, and modern databases like PostgreSQL, Redis, and MongoDB is growing. This highlights a shift toward open-source and NoSQL technologies.

- Current platform use is highest for Google Cloud Platform and Windows, but there's rising demand for Docker, Linux, AWS, and Kubernetes. Web development preferences are also moving from older tools like jQuery to newer frameworks such as React.js and Vue.js.

- Most respondents are young (18–34 years old) and highly educated, mainly with bachelor's or master's degrees. This youthful, skilled demographic is driving rapid adoption of new, cloud-based, and open-source technologies.

OVERALL FINDINGS & IMPLICATIONS

Findings

- JavaScript, HTML/CSS, and SQL are the most widely used languages, while TypeScript, Go, and Rust are gaining popularity.

- MySQL and SQL Server are currently the most used databases, but PostgreSQL, Redis, and MongoDB are seen as future-preferred technologies.

- There is a noticeable shift in platform preference from Windows and Google Cloud to Docker, Linux, and AWS.

- Younger developers (18–24) are more likely to adopt newer tools and technologies.

- Higher compensation is associated with experience, modern tech stacks, and cloud expertise.

- Remote work continues to rise, particularly among skilled and experienced professionals.

Implications

- Organizations should align tech stacks with developer preferences to attract and retain talent.

- Educational programs can be tailored by age group and experience level to maximize relevance and effectiveness.

- Businesses must adapt to remote-friendly policies to stay competitive in hiring.

- Upskilling in modern languages and cloud technologies is crucial for both individuals and organizations.

- Companies should plan to migrate from legacy systems to modern, open-source, and cloud-native platforms.

- Continuous learning is essential, especially as a young, educated workforce accelerates technology adoption.

CONCLUSION

- The Stack Overflow survey provides valuable insights into developer preferences, skills, and work environments.

- A clear trend is emerging toward cloud-native platforms and modern database technologies.

- Younger developers are driving adoption of new tools, highlighting the need for continuous learning.

- Swift, Python, and C++ are among the most financially rewarding languages for proficient developers.

- Remote work and cloud expertise are increasingly linked to higher compensation.

- Organizations and educators must adapt to these shifts to remain relevant and competitive in the evolving tech landscape.
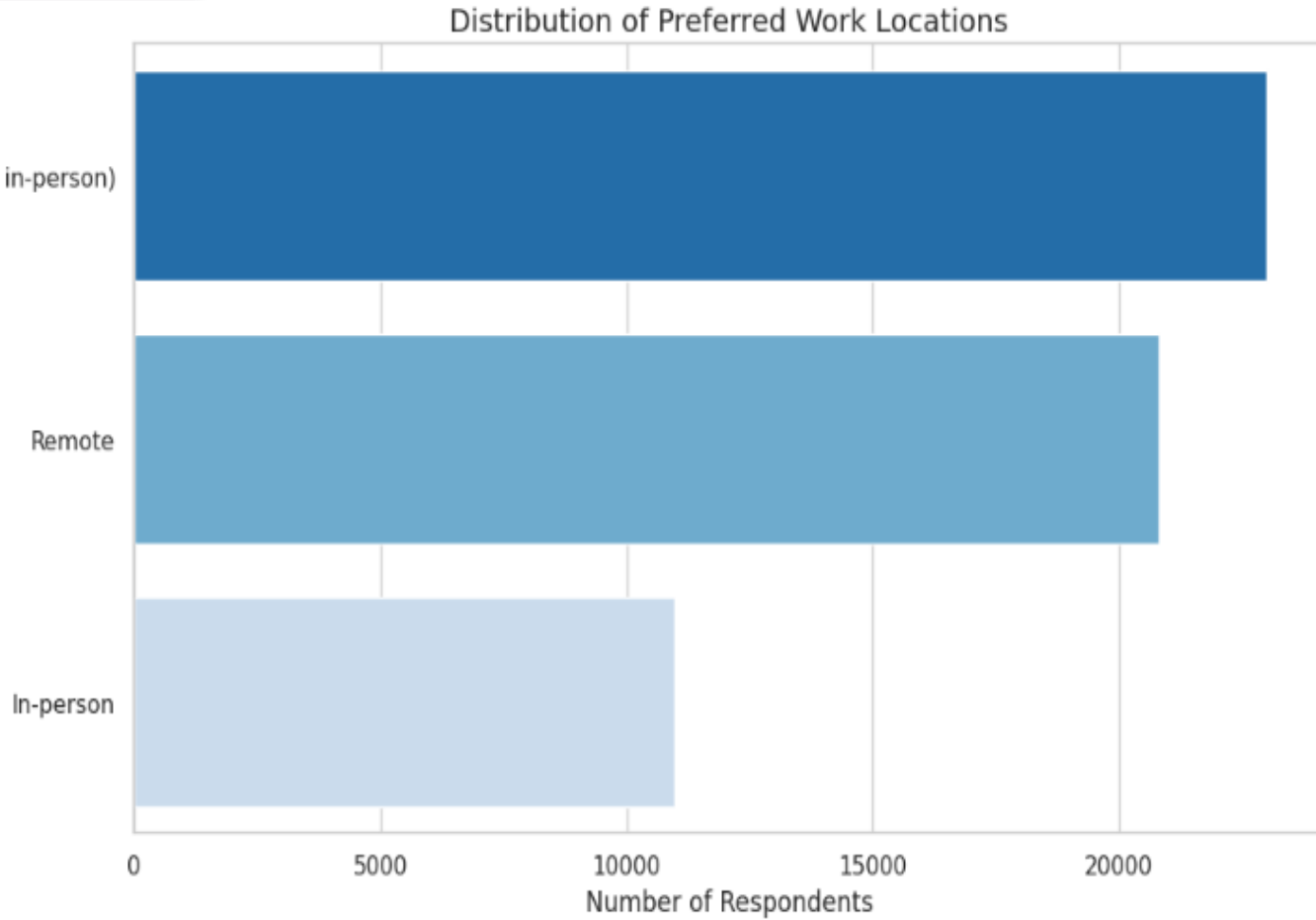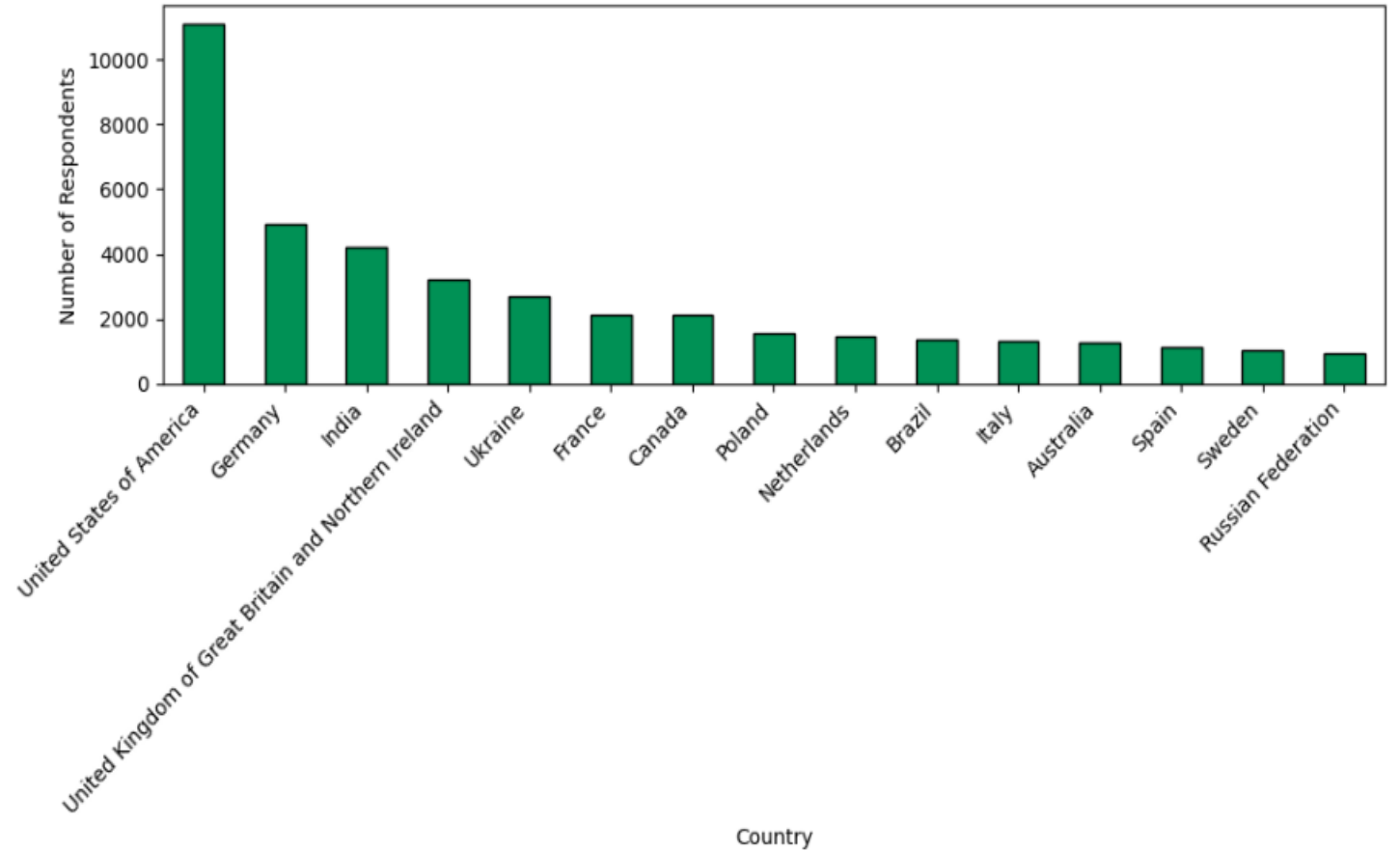
APPENDIX

APPENDIX

APPENDIX

Top Collaboration Tools That Respondents Use

Notepad++ 13.6%
IntelliJ IDEA 15.3%
Visual Studio 16.7%
Visual Studio Code 42.0%
Vim 12.3%

JOB POSTINGS

Of Job Posting

	# Of Job Posting
C	~13500
Java	~2600
Python	~1200
Oracle	~800
JavaScript	~350
C#	~330
C++	~300
SQL Server	~250
MongoDB	~130
Scala	
PostgreSQL	
MySQL Server	

■ Total

POPULAR LANGUAGES

Popular Languages by Annual Average Salary

Annual Average S...

$84,727.00 $130,801.00

Language Name	Annual Average Salary (Sum)
Swift	$130,801.00
Python	$114,383.00
C++	$113,865.00
Javascript	$110,981.00
Java	$101,013.00
Go	$94,082.00
R	$92,037.00
C#	$88,726.00
PHP	$84,727.00
SQL	$84,793.00

Annual Average Salary (Sum)

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