IBM Data Analytics Capstone Project Presentation

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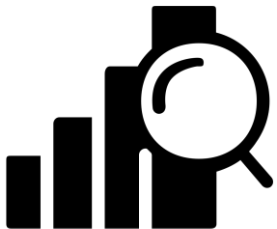
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Outline

Executive Summary

Introduction

Methodology

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Conclusion

Executive Summary

o A survey of developers was analyzed to summarize what tools they use today, which ones they want to use next, and key demographic patterns

1 Current Technology Usage

2 Future Technology Trends

3 Demographics

Commonly used languages, databases, platforms, frameworks.

Tools respondents plan to adopt next year.

Age, country, and education profile.

Introduction

o The report utilizes data visualization to summarize the findings from the survey:

1 Current Technology Usage

What tools dominate today?

2 Future Technology Trends

Which ones are most likely to be adopted next year?

3 Demographics

Who is represented (by age, country, and education) and how might that shape the results?

Methodology

Define Objective & Questions

What's used now, what's planned next year, and who responded; each view highlights the top 10 results for clarity

Collect Data

Data collected in survey_results_updated.csv which was gathered from the 2024 Stack Overflow Developer Survey dataset

Wrangle & Clean Data

Removed duplicate or incomplete records; handled nulls and converted response entries to analysis-ready data

Analyze Data

Aggregated data to identify the top 10 items in each category. Compared current usage with next-year intent using distributions and descriptive statistics

Visualize Data

Translated the analyzed data into clear visuals to highlight key findings, trends, and comparisons across categories
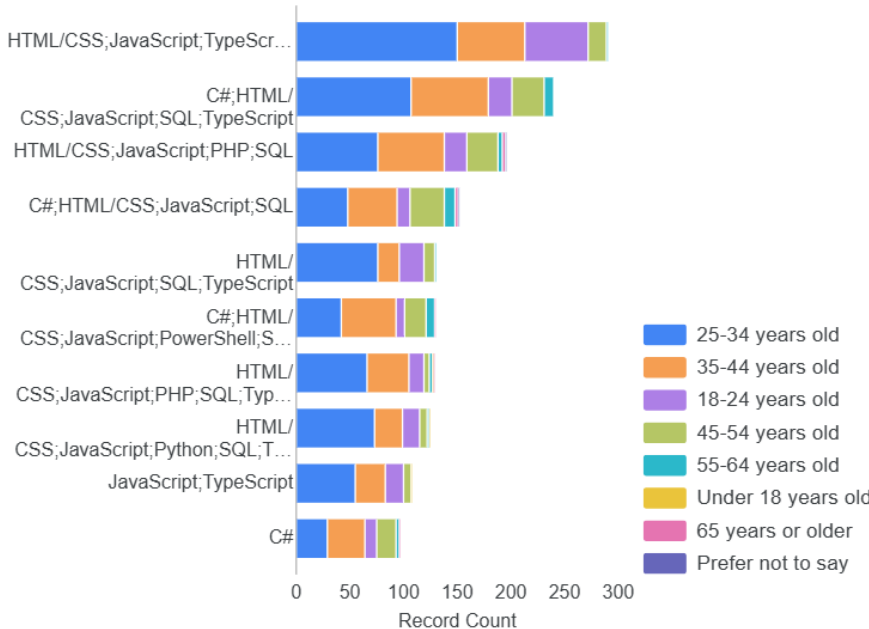
Results

Programming Languages Trends

Current Year

Next year

Programming Languages Trends

Findings

o Current usage: JavaScript and Python are the most used languages

    o Python is rising due to data/AI work

o Next-year intent: TypeScript and Rust is the most desired languages next year

    o TypeScript is rising for web work

    o Rust is rising for system work

   o Go is rising due to cloud-centric/ microservices-based work

Implications

o JavaScript/TypeScript for web work and Python & SQL for data/AI

o Java/C# remain common in enterprise stacks; Go/Rust are nice-to-haves for performance critical back ends

o TypeScript is a frequent default for front ends and many Node services

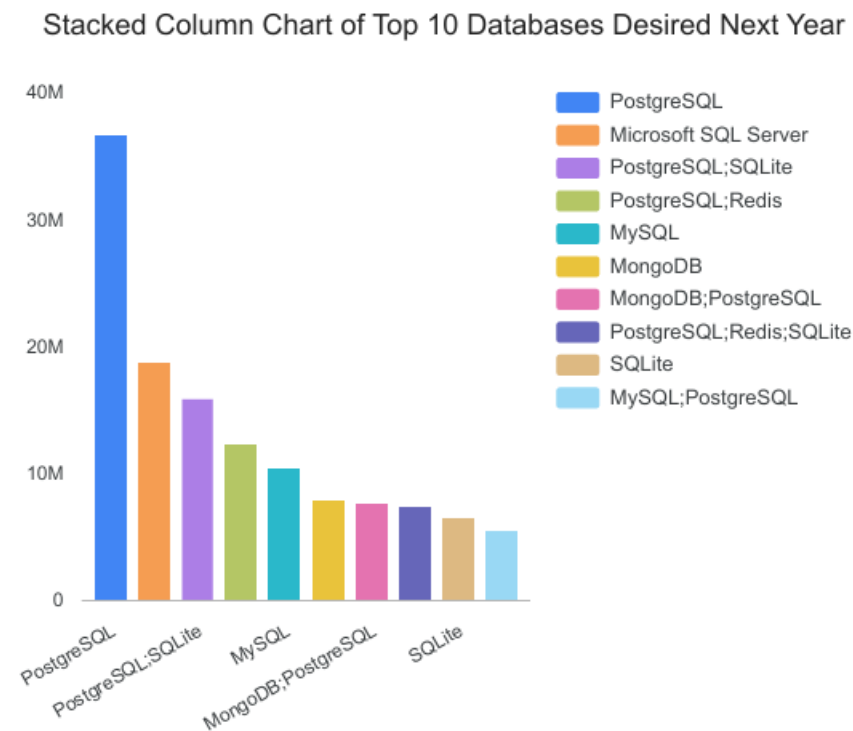o Add Go/Rust when performance and reliability matter most

Database Trends

Current Year
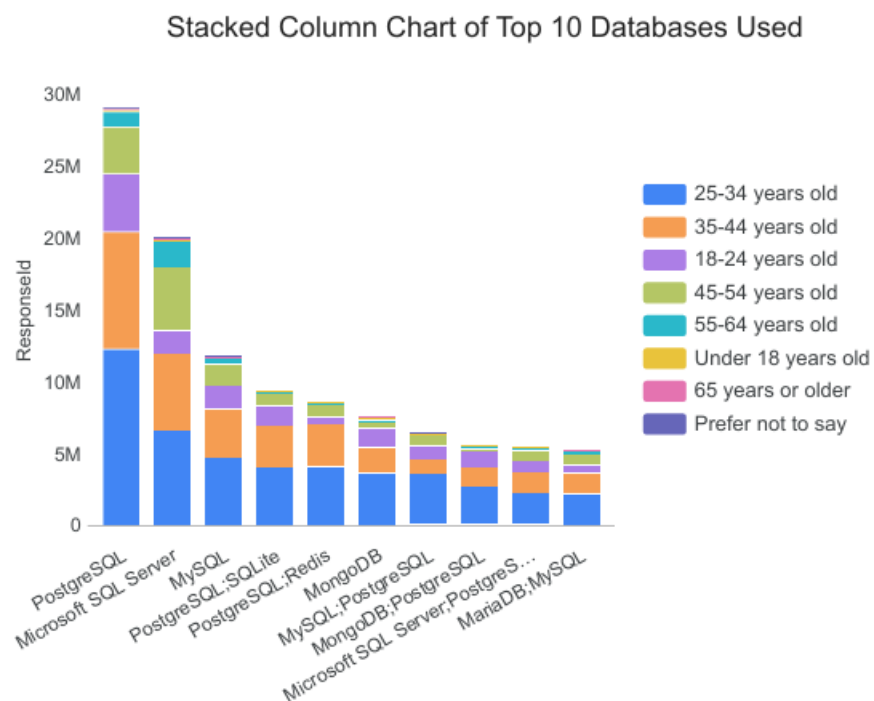
Next year

Database Trends

Findings

- Current usage:
    - PostgreSQL is the most used database
    - MariaDB is the least used database

- Next-year intent:
    - PostgreSQL will be the most desired database next year
    - SQLite will be the least desired database next year

Implications

- Developers need to prioritize PostgreSQL as it aligns well with current demand and common project needs

- Teams are moving to scalable-cloud-ready databases and relying less on legacy platforms like Oracle and SQL Server

- The shift to real-time features and managed back ends shortens release cycles and enable faster, leaner development, ideal for startups and mobile apps
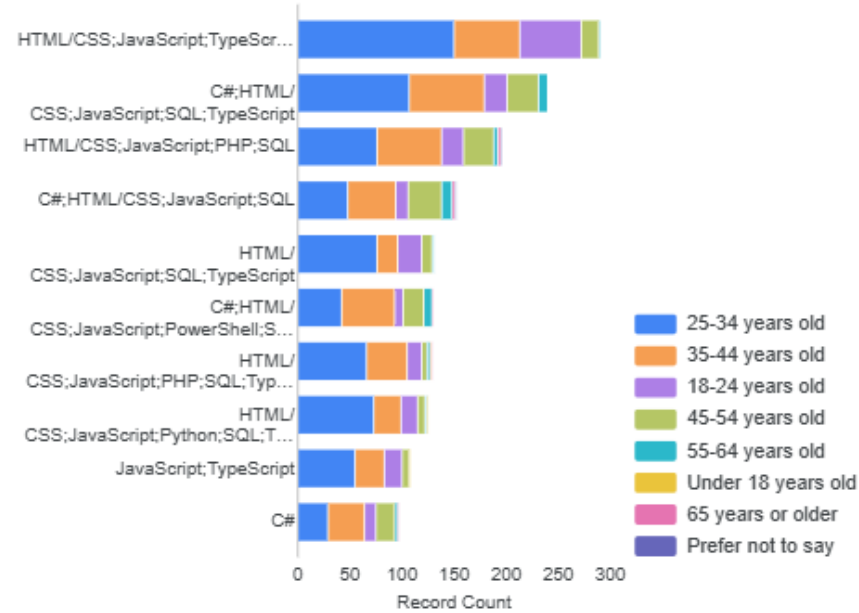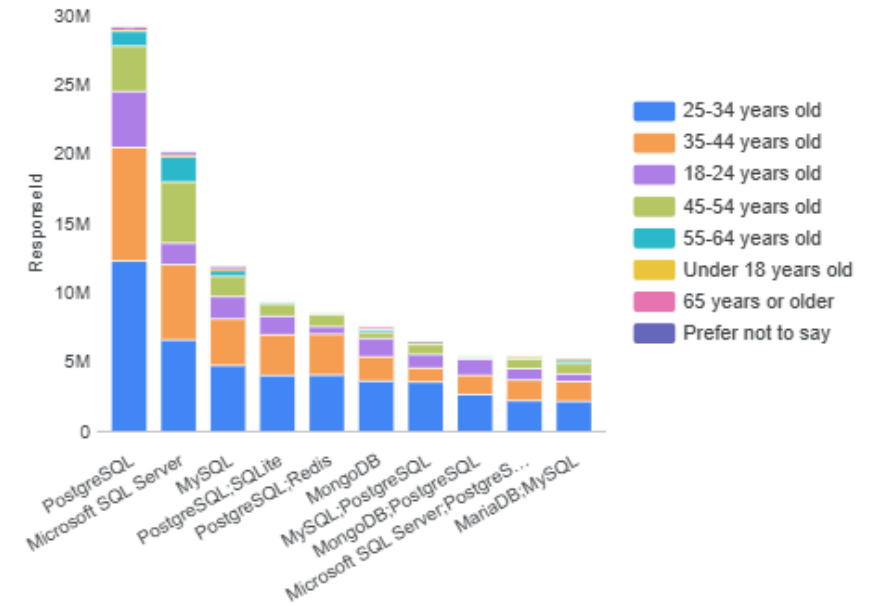
Dashboards

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Current Technology Usage

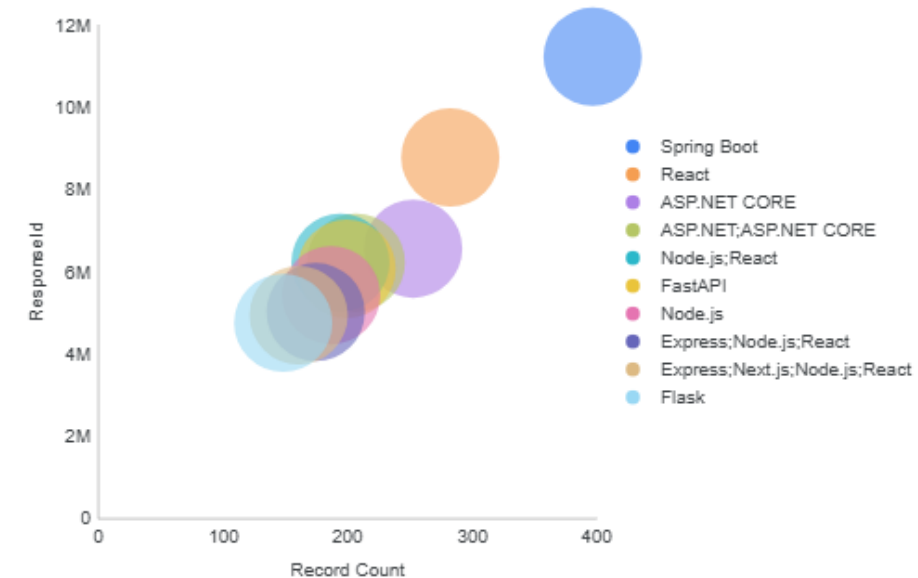## Stacked Bar Chart of Top 10 Programming Languages Used

Legend:
- 25-34 years old
- 35-44 years old
- 18-24 years old
- 45-54 years old
- 55-64 years old
- Under 18 years old
- 65 years or older
- Prefer not to say

Categories: HTML/CSS;JavaScript;TypeScr…; C#;HTML/CSS;JavaScript;SQL;TypeScript; HTML/CSS;JavaScript;PHP;SQL; C#;HTML/CSS;JavaScript;SQL; HTML/CSS;JavaScript;SQL;TypeScript; C#;HTML/CSS;JavaScript;PowerShell;S…; HTML/CSS;JavaScript;PHP;SQL;Typ…; HTML/CSS;JavaScript;Python;SQL;T…; JavaScript;TypeScript; C#

X-axis: Record Count (0, 50, 100, 150, 200, 250, 300)

Stacked Column Chart of Top 10 Databases Used

Y-axis: ResponseId (0, 5M, 10M, 15M, 20M, 25M, 30M)

Legend:
- 25-34 years old
- 35-44 years old
- 18-24 years old
- 45-54 years old
- 55-64 years old
- Under 18 years old
- 65 years or older
- Prefer not to say

Categories: PostgreSQL; Microsoft SQL Server; MySQL; PostgreSQL;SQLite; PostgreSQL;Redis; MongoDB; MySQL;PostgreSQL; MongoDB;PostgreSQL; Microsoft SQL Server;PostgreS…; MariaDB;MySQL

Word Cloud of Top 10 Platforms Used

Microsoft Azure; Amazon Web Services (AWS);Google Cloud; Amazon Web Services (AWS);Microsoft Azure; Google Cloud; Amazon Web Services (AWS);Digital Ocean; Digital Ocean; Amazon Web Services (AWS);Google Cloud;Microsoft Azure

Scatter Bubble Chart for Top 10 Web Frameworks Used

Y-axis: ResponseId (0, 2M, 4M, 6M, 8M, 10M, 12M)
X-axis: Record Count (0, 100, 200, 300, 400)

Legend:
- Spring Boot
- React
- ASP.NET CORE
- ASP.NET;ASP.NET CORE
- Node.js;React
- FastAPI
- Node.js
- Express;Node.js;React
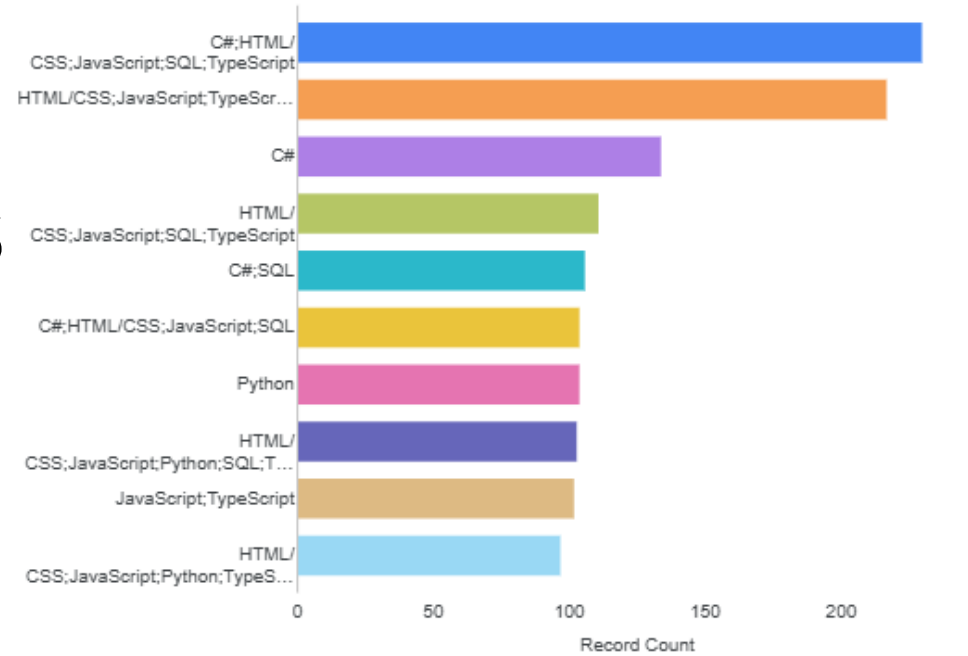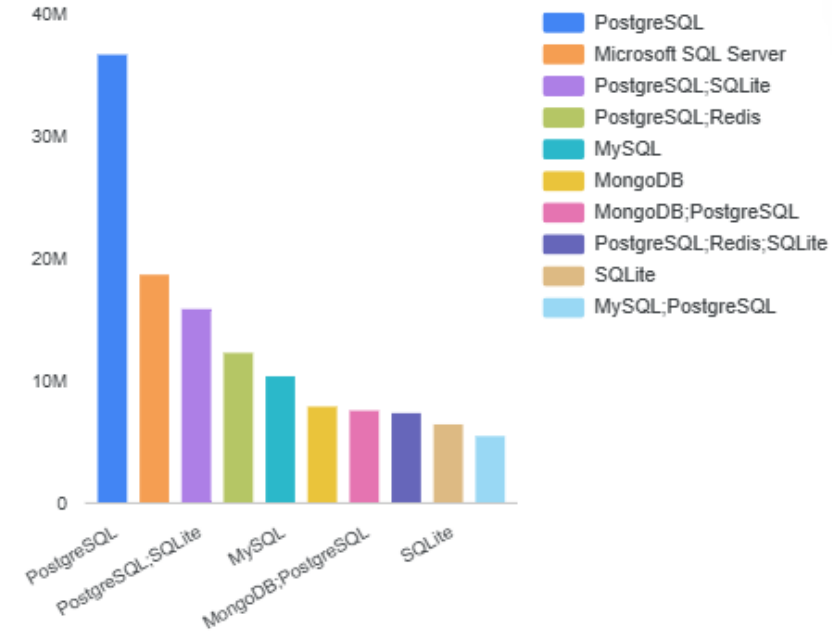- Express;Next.js;Node.js;React
- Flask
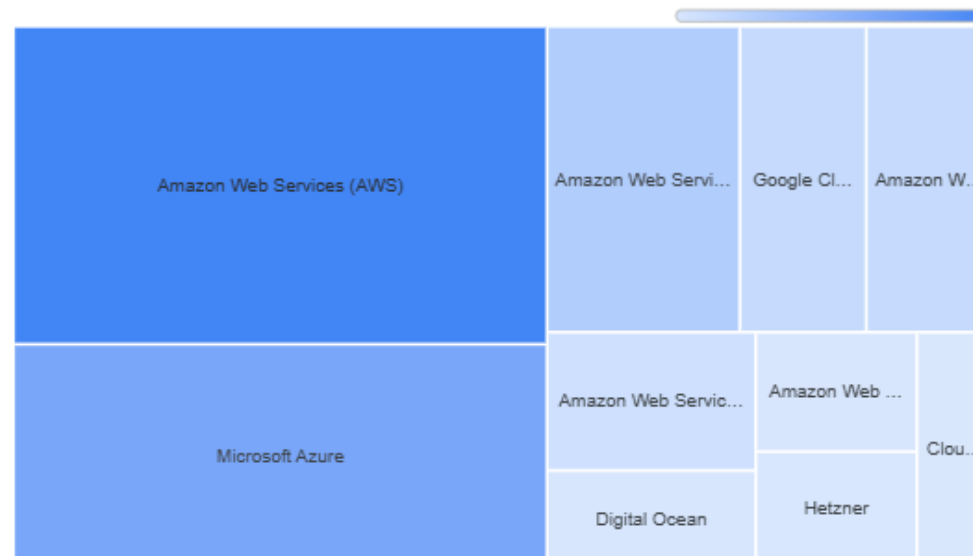
Dashboards

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Future Technology Trends

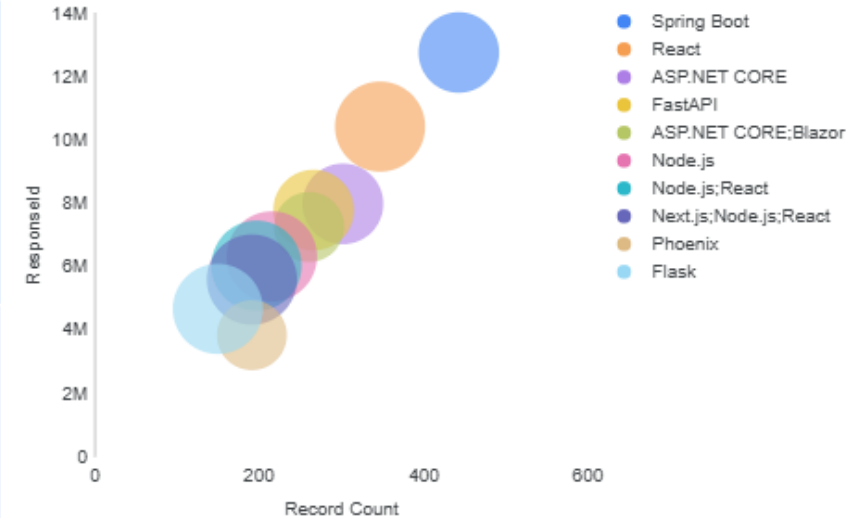Stacked Bar Chart of Top 10 Languages Desired

Stacked Column Chart of Top 10 Databases Desired Next Year

Tree Map of Top 10 Desired Platforms

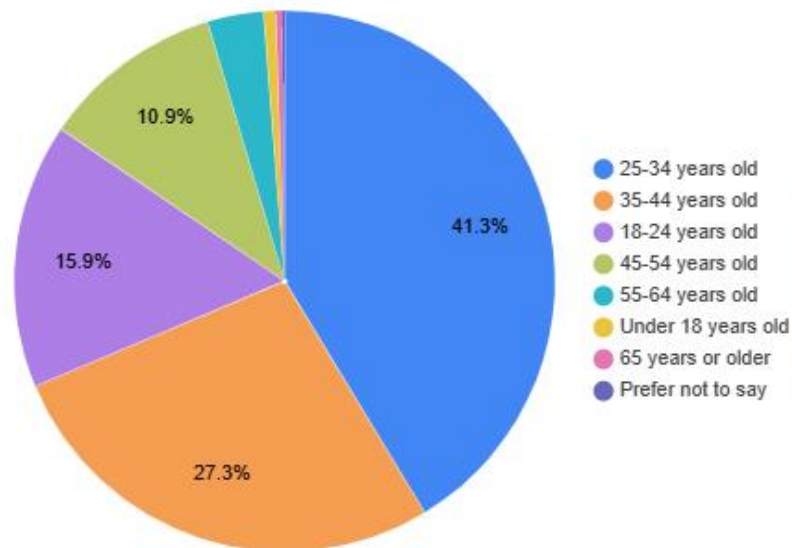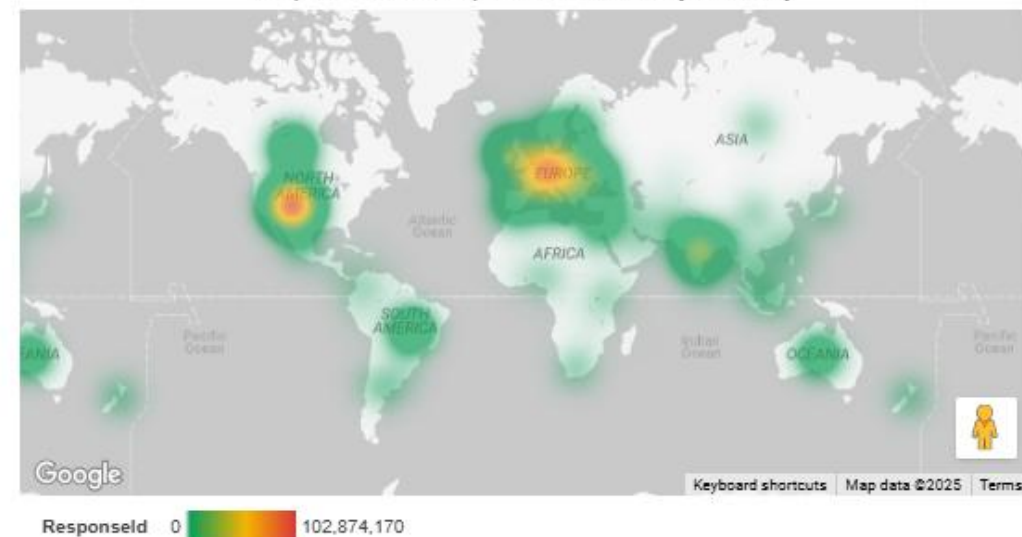Scattered Bubble Chart of Top 10 Desired Web Frameworks
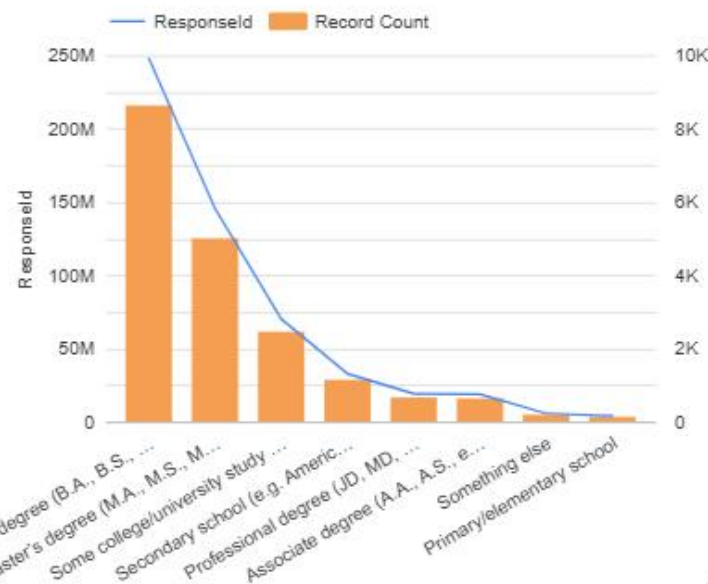
Dashboards

3

Demographics

Pie Chart of Respondents by Age

- 25-34 years old
- 35-44 years old
- 18-24 years old
- 45-54 years old
- 55-64 years old
- Under 18 years old
- 65 years or older
- Prefer not to say

41.3%

27.3%

15.9%

10.9%

Map Chart of Respondent Count by Country

ResponseId 0 — 102,874,170

Line Bar Chart of Respondent Distribution by Education Level

Stacked Bar Chart of Respondent Count by Age, Classified by Education Level

- 25-34 years old
- 35-44 years old
- 18-24 years old
- 45-54 years old
- 55-64 years old
- Under 18 years old
- 65 years or older
- Prefer not to say
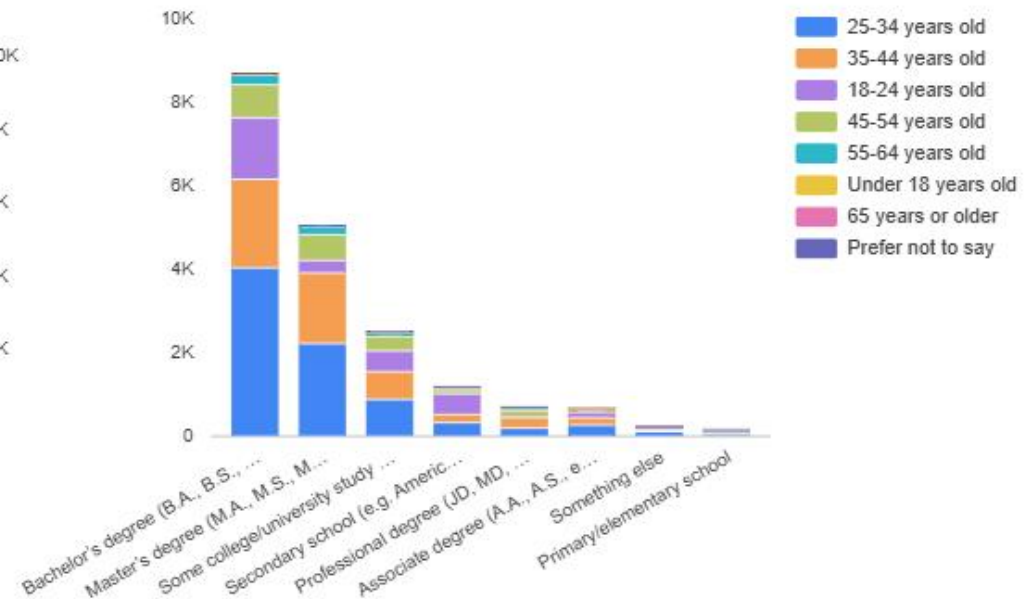
Discussion

Insights from Dashboard

o Current Technology Usage

    o AWS and Azure are lead platforms; Spring Boot and React are strongest web frameworks; PostgreSQL is the leading database

o Future Technology Trends

    o Next-year intent is highest for AWS (then Azure), with Spring Boot, React, ASP.NET Core, FastAPI, and Node.js rising, and PostgreSQL leading database interest

o Demographics

    o Respondents are mostly 25–34 then 35–44, concentrated in North America and Europe, with bachelor's degrees most common

Overall Findings and Implications

Findings

o   Platform use is led by AWS and Azure; web frameworks are led by Spring Boot and React; databases center on PostgreSQL

o   Next-year interest remains highest for AWS, with Spring Boot, React, AP.NET Core, FastAPI, and Node.js showing the most traction and PostgreSQL leading database intent

o   The respondents skew 25-34 then 35-44, is concentrated in North America and Europe, and most commonly reports a bachelor's degree

Implications

o   Emphasize JavaScript/TypeScript + React for web work and Python + SQL for data, while maintaining depth in Spring Boot and ASP.NET Core

o   Standardize on PostgreSQL where practical and build practical proficiency with the major cloud providers (AWS/Azure)

o   Run small pilots to evaluate FastAPI for new services and promote tools that show rising interest into limited rollouts before wider use

Conclusion

o Current Technology Usage

    o AWS and Azure are the main platforms; PostgreSQL is the leading database; React and Spring Boot are the main web frameworks

o Future Technology Trends

    o Interest is rising for AWS/Azure; React, Spring Boot, ASP.NET Core, FastAPI, and Node.js are the most popular web frameworks; PostgreSQL is the leading database

o Demographic

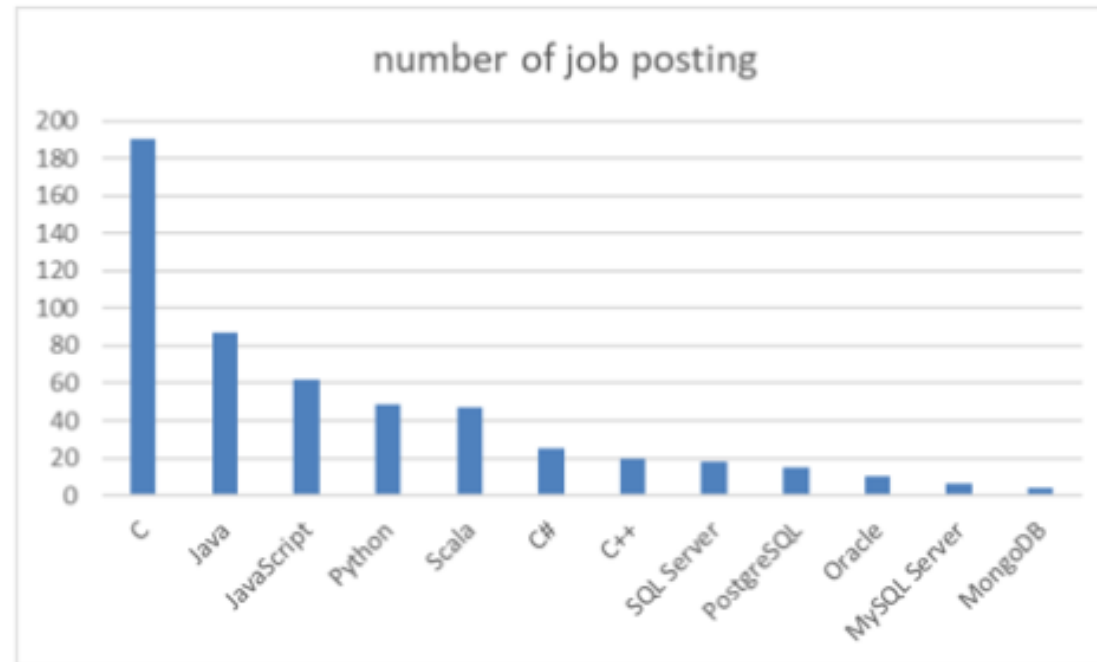   o Most respondents are 25-44, mainly from North America and Europe, with bachelor's degrees most common

Appendix

Job Postings

Job posting data collected via Job API

Popular Languages

Data of popular languages and their average annual salary collected via web scraping jobs API in csv

Popular languages and their average annual salary

Language	Salary
Swift	130,801
Python	114,383
C++	113,865
Javascript	110,981
Java	101,013
Go	94,082
R	92,037
C#	88,726
SQL	84,793
PHP	84,727