Current and Future Technology Trends

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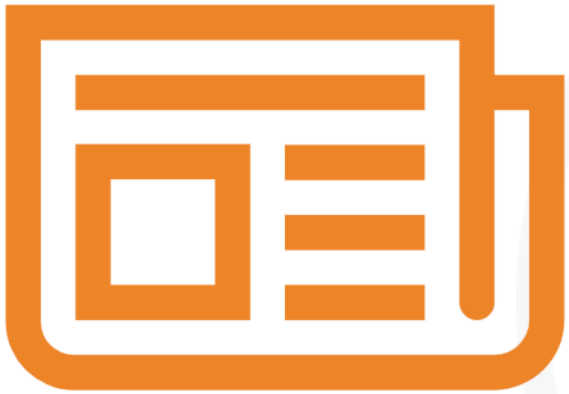
EXECUTIVE SUMMARY

- This report analyzes developer trends using data from the 2024 Stack Overflow Developer Survey
- Main focuses are the current and future technology trends and an exploration of job satisfaction and compensation metrics
- Most survey respondents are full-time, full stack developers from the US between the ages of 25-34 years old
- The top 3-5 languages (**JavaScript, SQL, Typescript**), databases (**PostgreSQL**), platforms (**AWS**, **Azure**) and frameworks (**React**, **Node.js**) have stayed consistent YOY, however, new technology preferences (**Rust, Go, Supabase**) are emerging
- There is no correlation between job satisfaction and developer role
- There is a slightly negative correlation between income level and job satisfaction
- Job satisfaction scores stay consistent across employment type and years of coding experience

INTRODUCTION

- The purpose of this report is to analyze the findings of the 2024 Stack Overflow survey and determine how the technological landscape is changing
- Key areas of interest include tool preference, developer type, participant demographics, job satisfaction and compensation metrics.
- This is an annual report which provides valuable insight into technology trends on an ongoing basis.

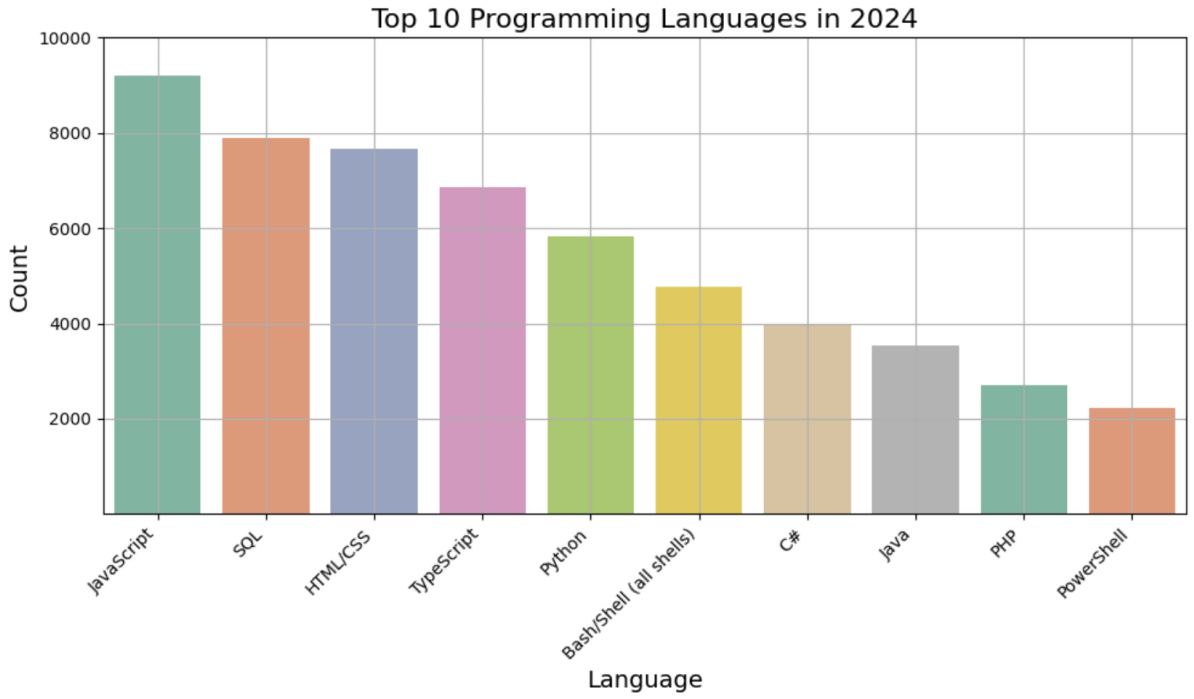
METHODOLOGY



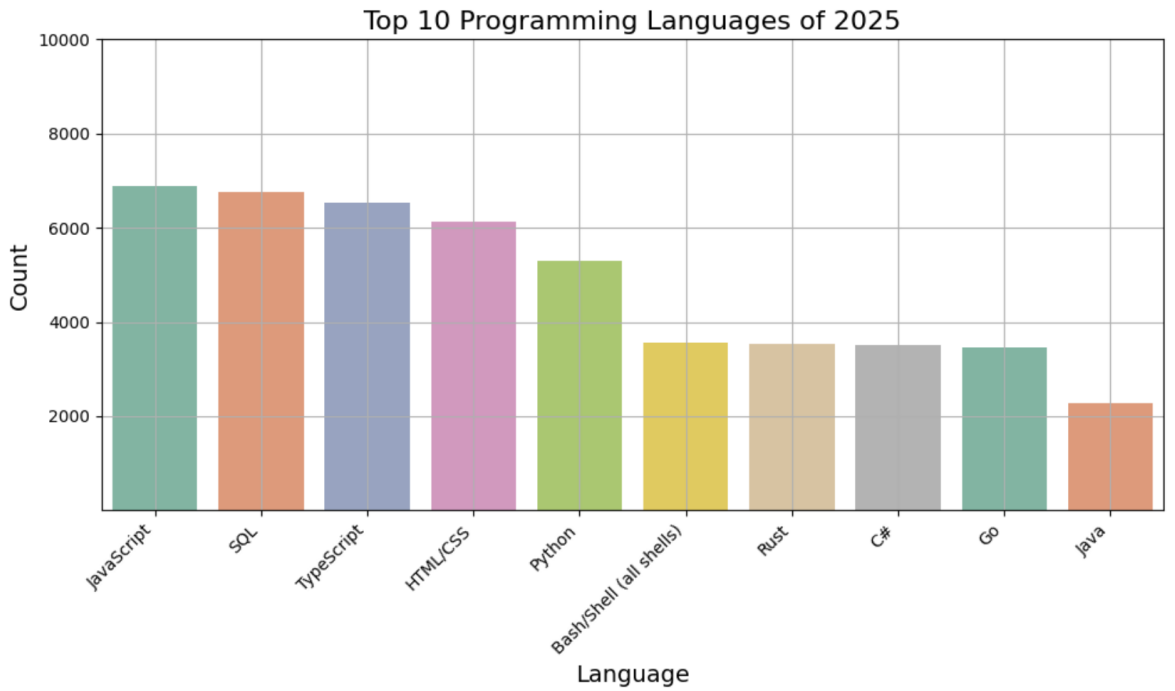
- Data Sources
  - 2024 Stack Overflow Developer Survey, provided by IBM as survey_data_updated.csv
- Data was analyzed using Python via Jupyter Notebooks and dashboard produced via Google Looker Studio
  - SQLite Database was created to house and access data
- Data Wrangling
  - Compensation info was highly skewed, requiring IQR (interquartile range) calculation and dropping of null values
  - Categorical values (eg Age) were mapped to numerical counterparts for statistical analysis
  - Columns with multiple values housed in each cell (eg LanguageHaveWorkedWith, Employment, DatabaseWantToWorkWith, etc) were exploded (split) to allow for accurate record counts
  - Experience Level (eg 'WorkExp') was binned to create relevant categories

PROGRAMMING LANGUAGE TRENDS

Last Year



This Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

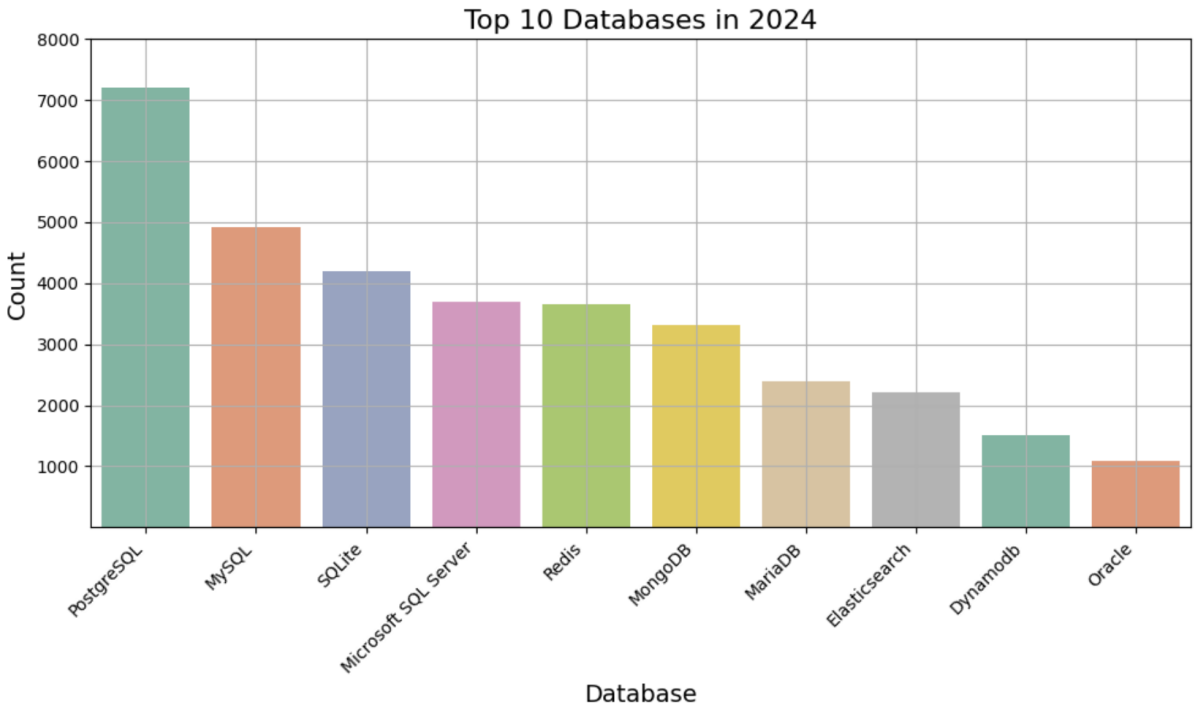
- Rust and Go are in the top 10 for 2025, replacing PHP and PowerShell
- TypeScript has overtaken HTML/CSS as the number 3 language
- Javascript, SQL and HTML/CSS have seen a slight decrease in demand

Implications

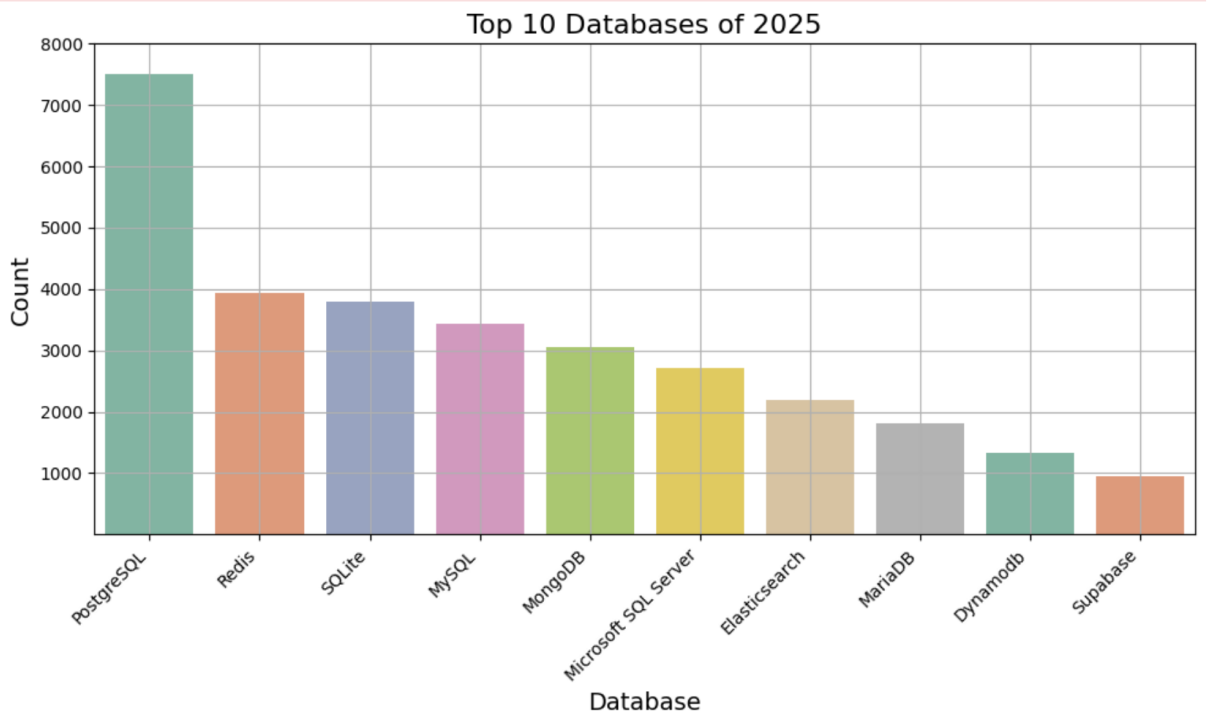
- The demand for TypeScript has stayed the same, while demand for HTML/CSS, PHP and PowerShell has decreased
- The demand for the top 4 languages is flattening out
- Companies should continue investing in JavaScript, SQL, and TypeScript expertise, as they are core technologies in development.

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

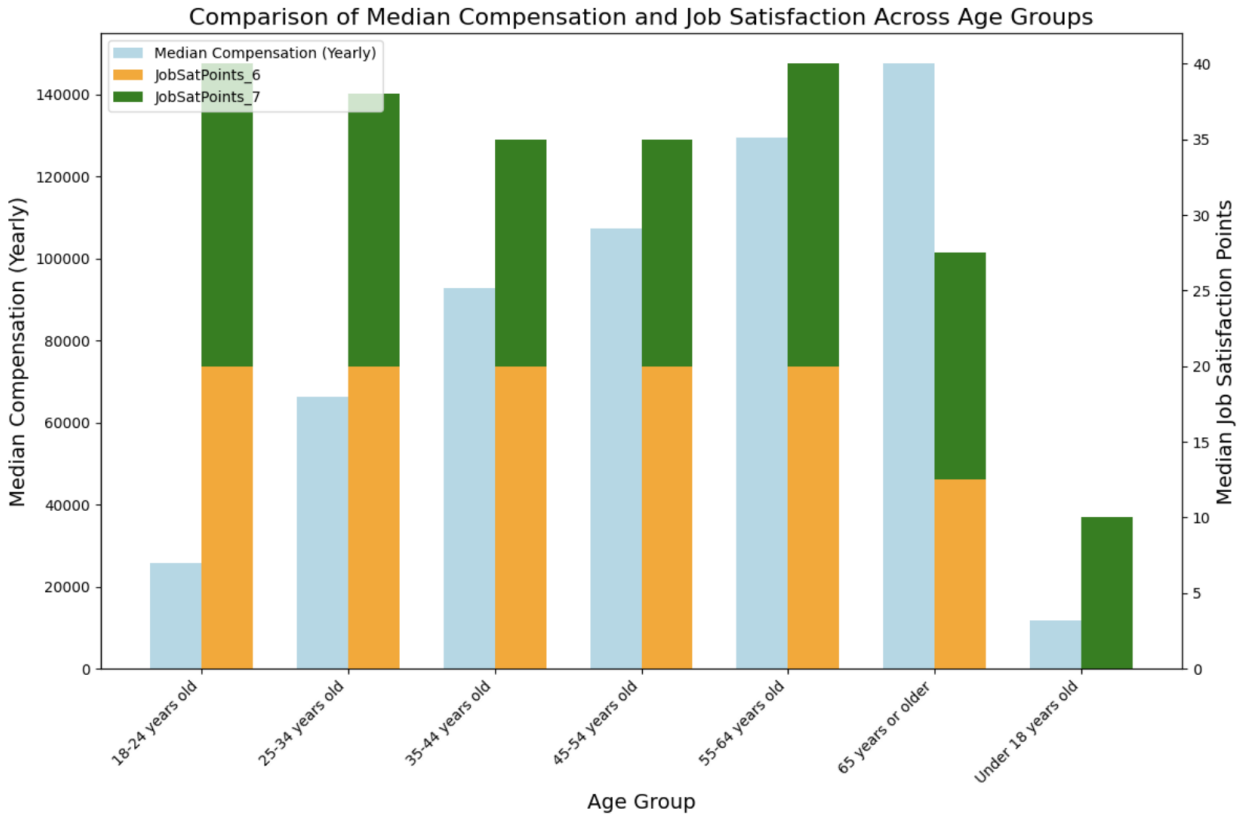
Findings

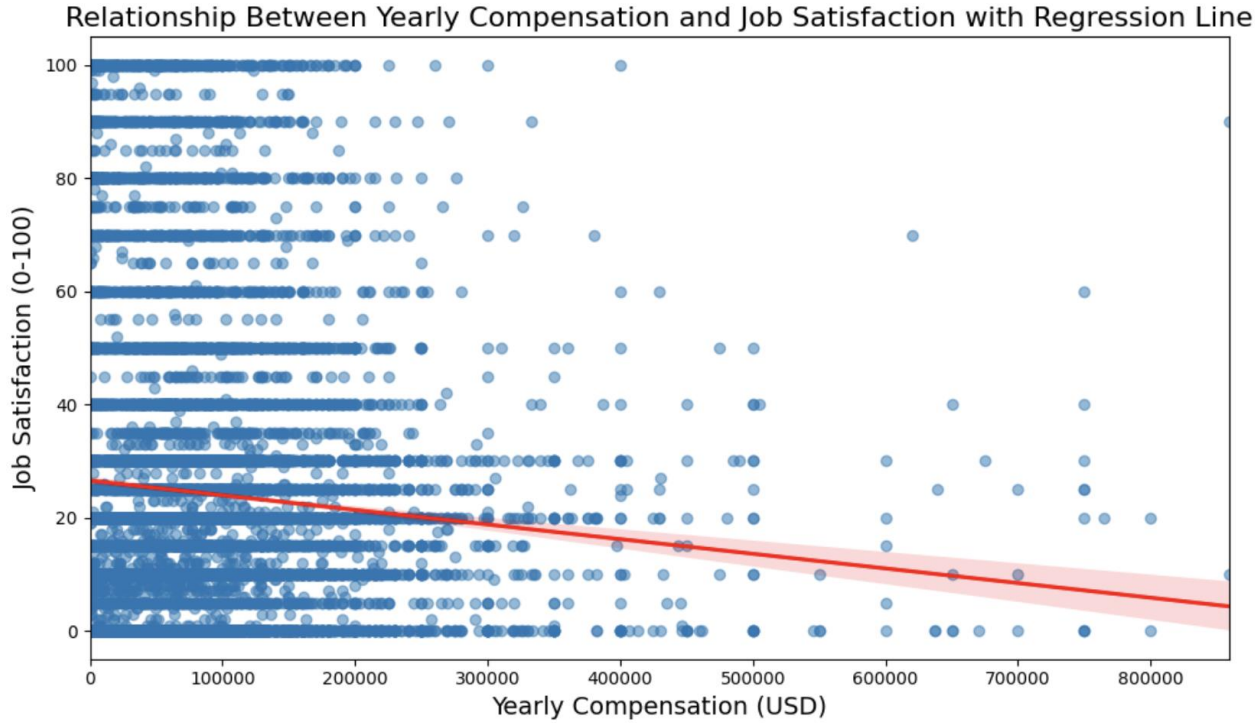
- PostgreSQL continues to be the preferred database
- MySQL has moved to the number 2 spot
- Supabase has replaced Oracle in the number 10 spot

Implications

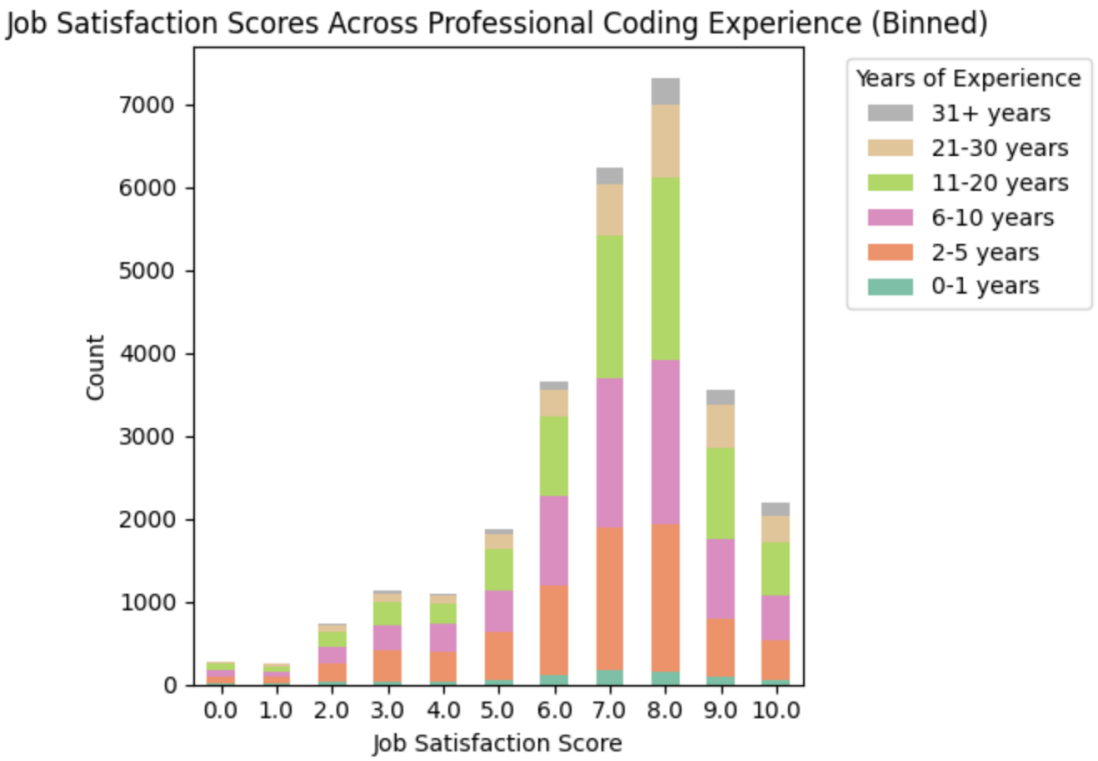
- PostgreSQL has extended it's lead as the top database
- MySQL has increased in popularity, while Oracle database has decreased
- Businesses should focus on PostgreSQL and MySQL as key database technologies due to their widespread adoption.

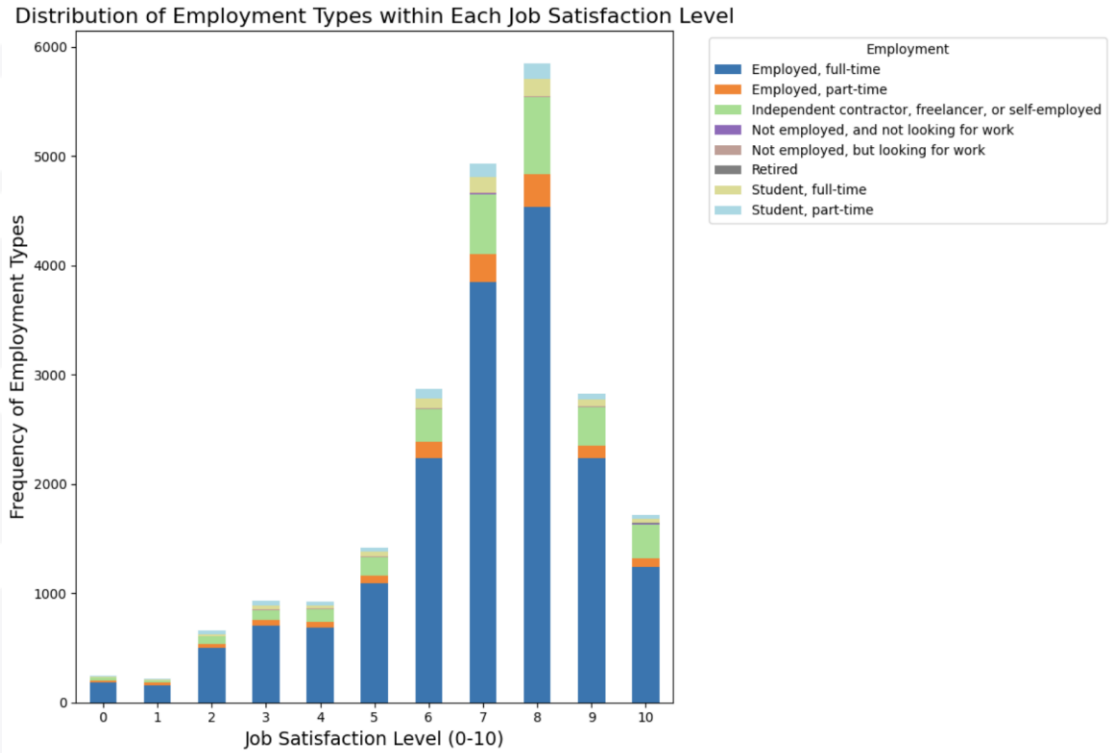
JOB SATISFACTION





JOB SATISFACTION (cont.)





JOB SATISFACTION - FINDINGS & IMPLICATIONS

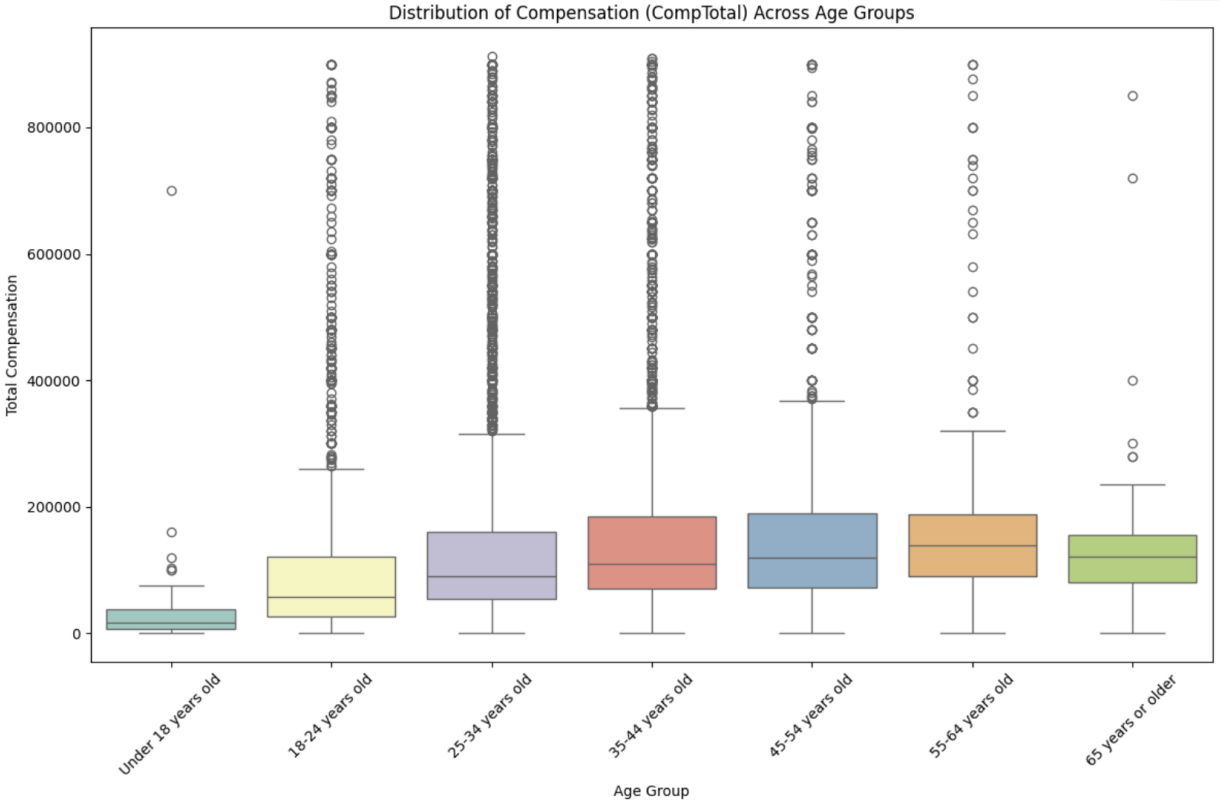
Findings

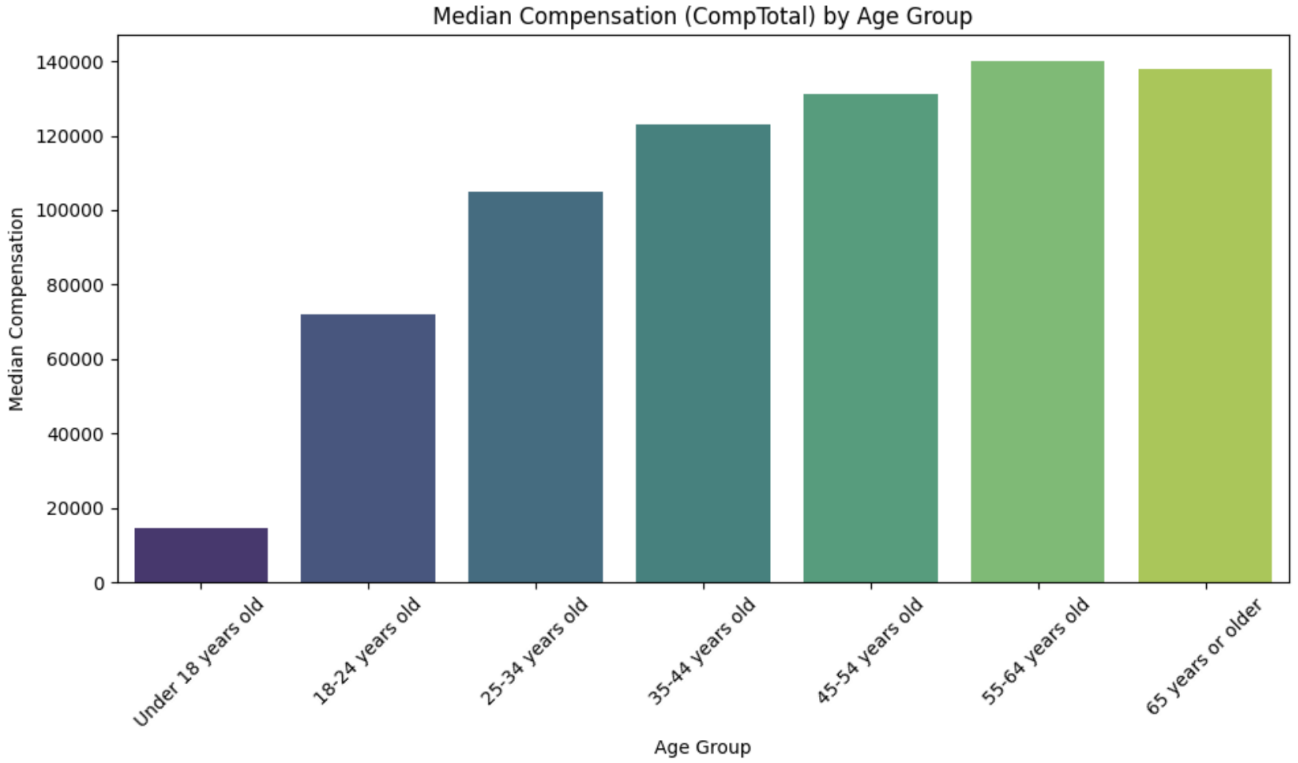
- As compensation increases, job satisfaction decreases
- Job satisfaction scores follow the same pattern across all experience levels
- Job satisfaction scores follow the same pattern across all employment types

Implications

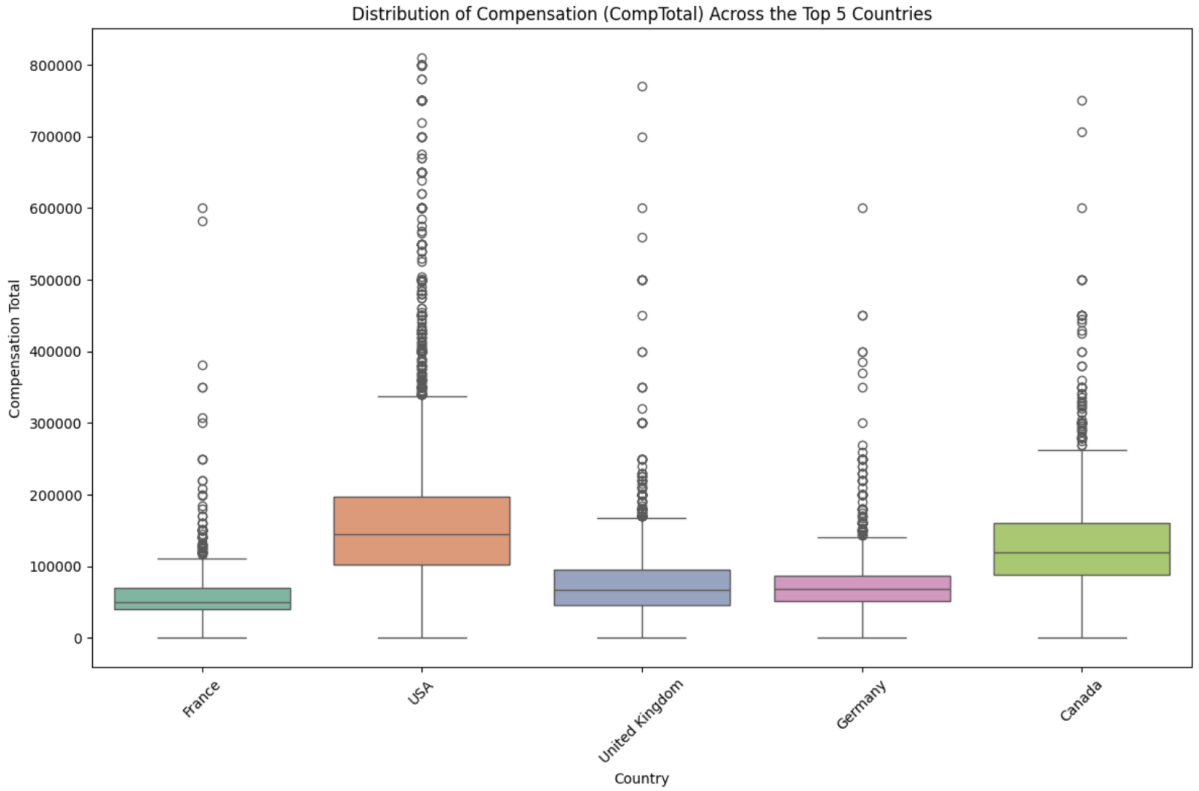
- This finding suggests the increase in responsibilities that comes with a higher salary leads to less job satisfaction
- Job satisfaction does not seem to be correlated with experience level or employment type

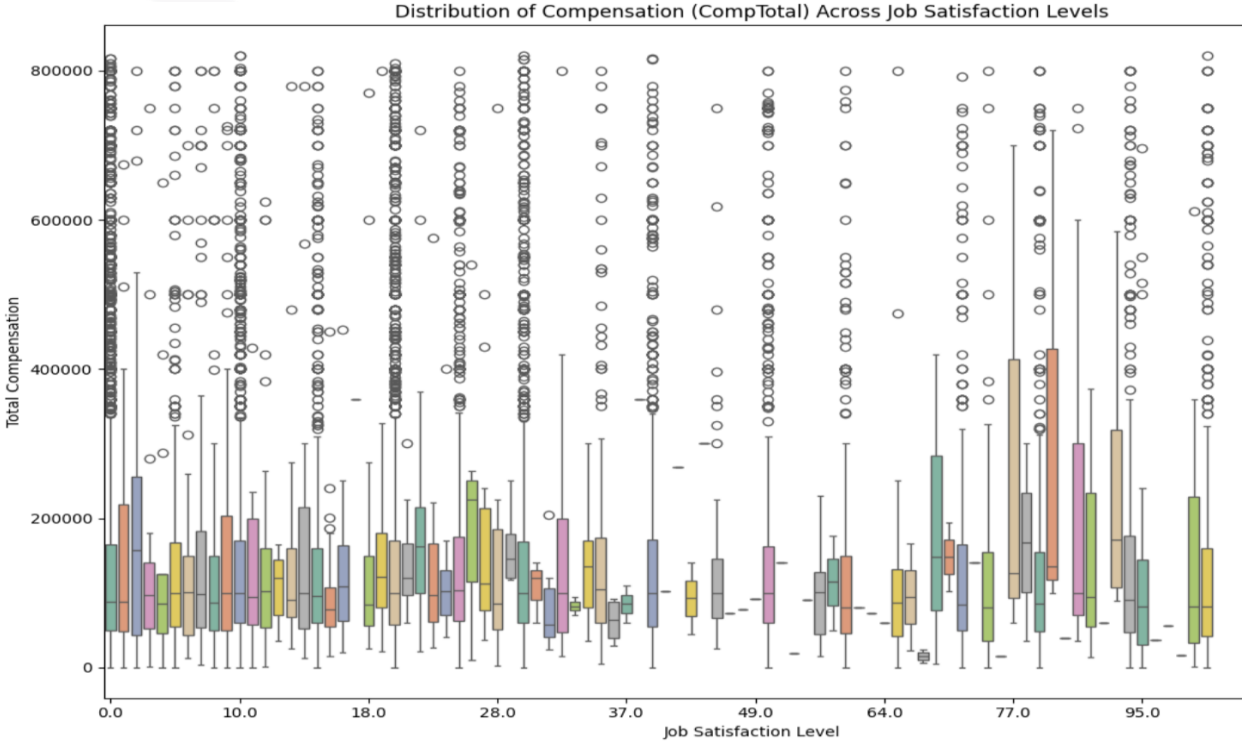
COMPENSATION





COMPENSATION (cont.)





COMPENSATION - FINDINGS & IMPLICATIONS

Findings

- Median compensation positively correlates with age
- Compensation is positively skewed across all age groups
- US respondents had the highest IQR range for compensation and the most positive outliers

Implications

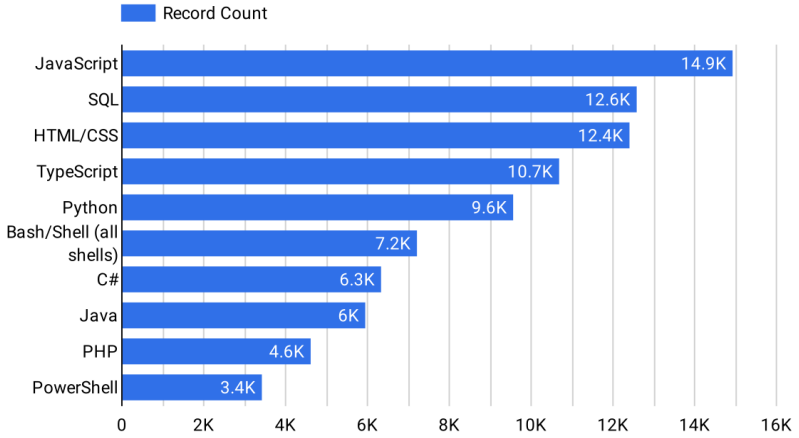
- Salary increases keep pace with age / job experience
- Salary outliers exist at all ages
- US respondents have the most competitive wages out of all respondents

DASHBOARD

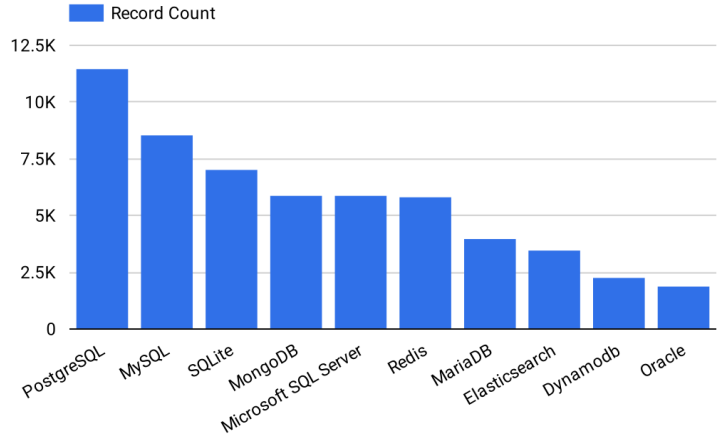
https://lookerstudio.google.com/s/nkCVkyaSTn4

DASHBOARD TAB 1 – Current Tech Usage

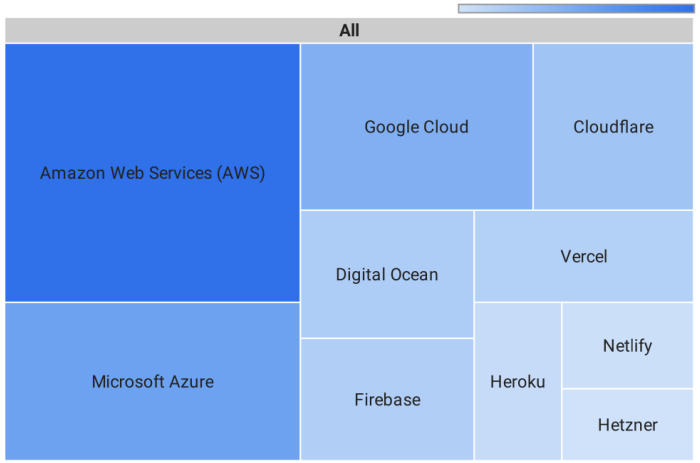
Top 10 Languages Used



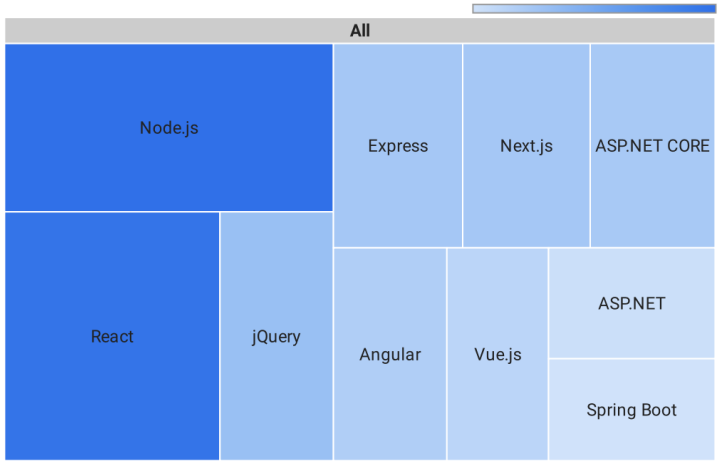
Top 10 Databases Used



Top 10 Platforms Used

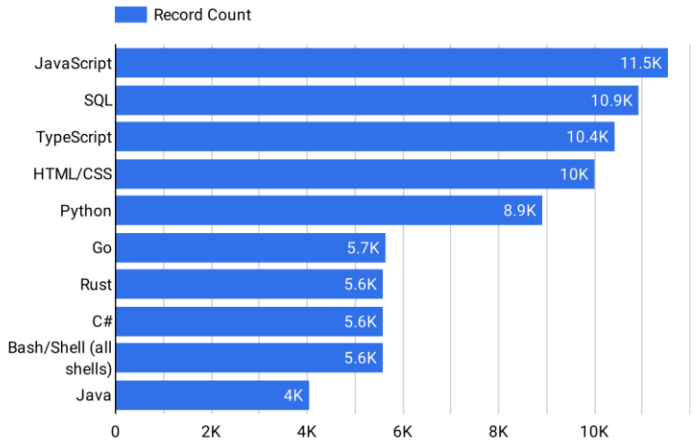


Top 10 Web Frameworks Used

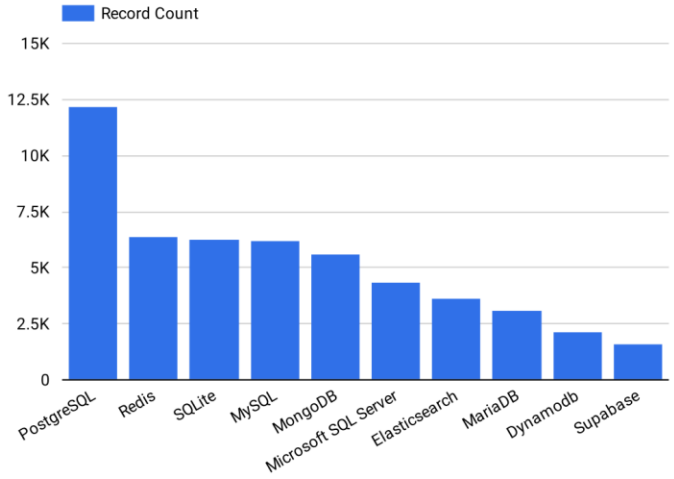


DASHBOARD TAB 2 – Future Tech Usage

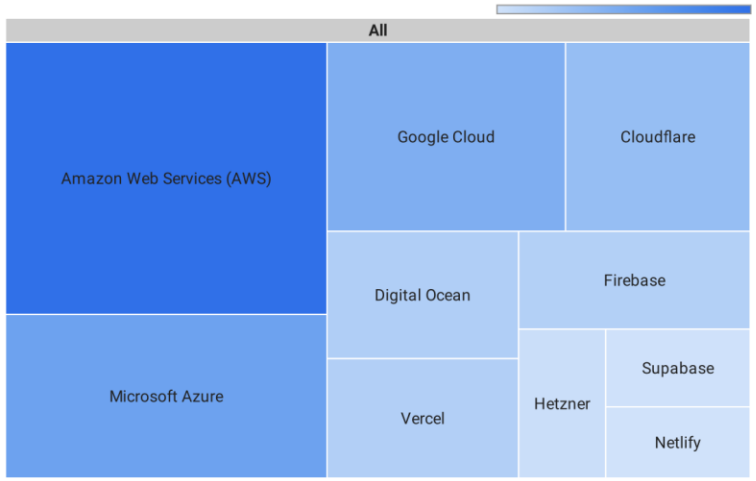
Top 10 Languages Desired Next Year



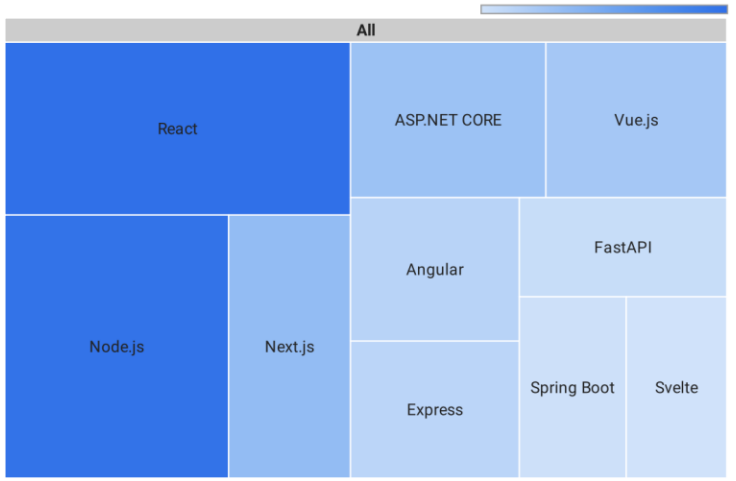
Top 10 Databases Desired Next Year



Top 10 Platforms Desired Next Year

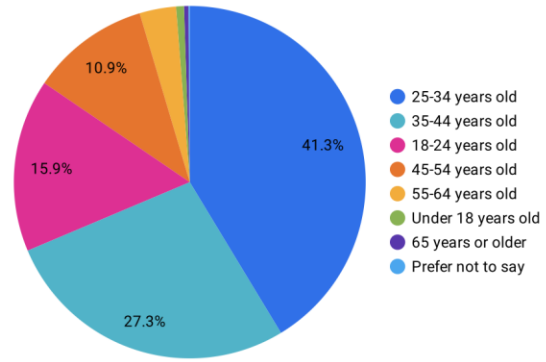


Top 10 Web Frameworks Desired Next Year

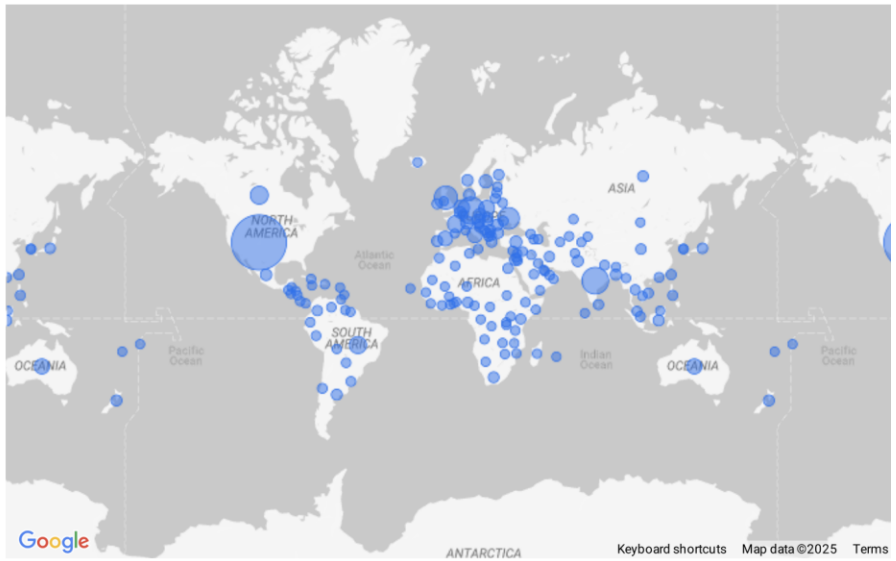


DASHBOARD TAB 3 - Demographics

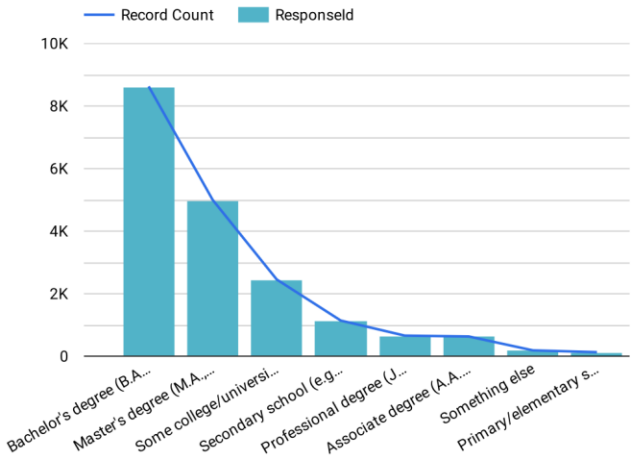
Respondents by Age



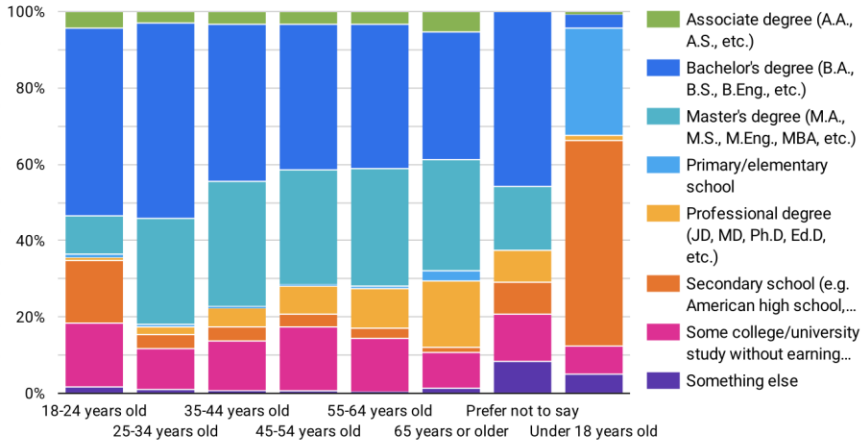
Respondents by Country



Respondents by Education Level



Respondents by Age, Classified by Education Level



DISCUSSION

1. Current Technology Usage

- **Top Programming Languages**: JavaScript, SQL, and HTML/CSS are the most widely used languages by developers.
- **Top Databases**: PostgreSQL and MySQL lead, followed by SQLite and MongoDB.
- **Top Platforms**: AWS, Microsoft Azure, and Google Cloud are the most used cloud platforms.
- **Top Web Frameworks**: Node.js and React are the most commonly used frameworks.

2. Future Technology Trends

- **Languages Developers Want to Work With**: JavaScript, SQL, and TypeScript remain popular, with growing interest in Go and Rust.
- **Databases Developers Want to Work With**: PostgreSQL is the most desirable, followed by Redis and SQLite.
- **Preferred Platforms**: AWS, Microsoft Azure, and Google Cloud remain dominant.
- **Web Frameworks in Demand**: React and Node.js continue to be top choices, with Next.js and FastAPI gaining traction.

3. Demographics

- **Age Distribution**: The majority of respondents are aged **25-34 years (41.3%)**, followed by **35-44 years (27.3%)**.
- **Global Participation**: The survey includes respondents from multiple countries, with most participants from the United States
- **Education Levels**: Most respondents hold a **Bachelor's degree**, followed by those with a **Master's degree**.

OVERALL FINDINGS & IMPLICATIONS

Findings

- The top 3-5 languages, databases, platforms and frameworks have stayed consistent YOY
- Most survey respondents are full-time, full stack developers from the US between the ages of 25-34 years old
- There was no clear factor in determining job satisfaction levels
- Compensation is positively skewed with no clear correlative factor

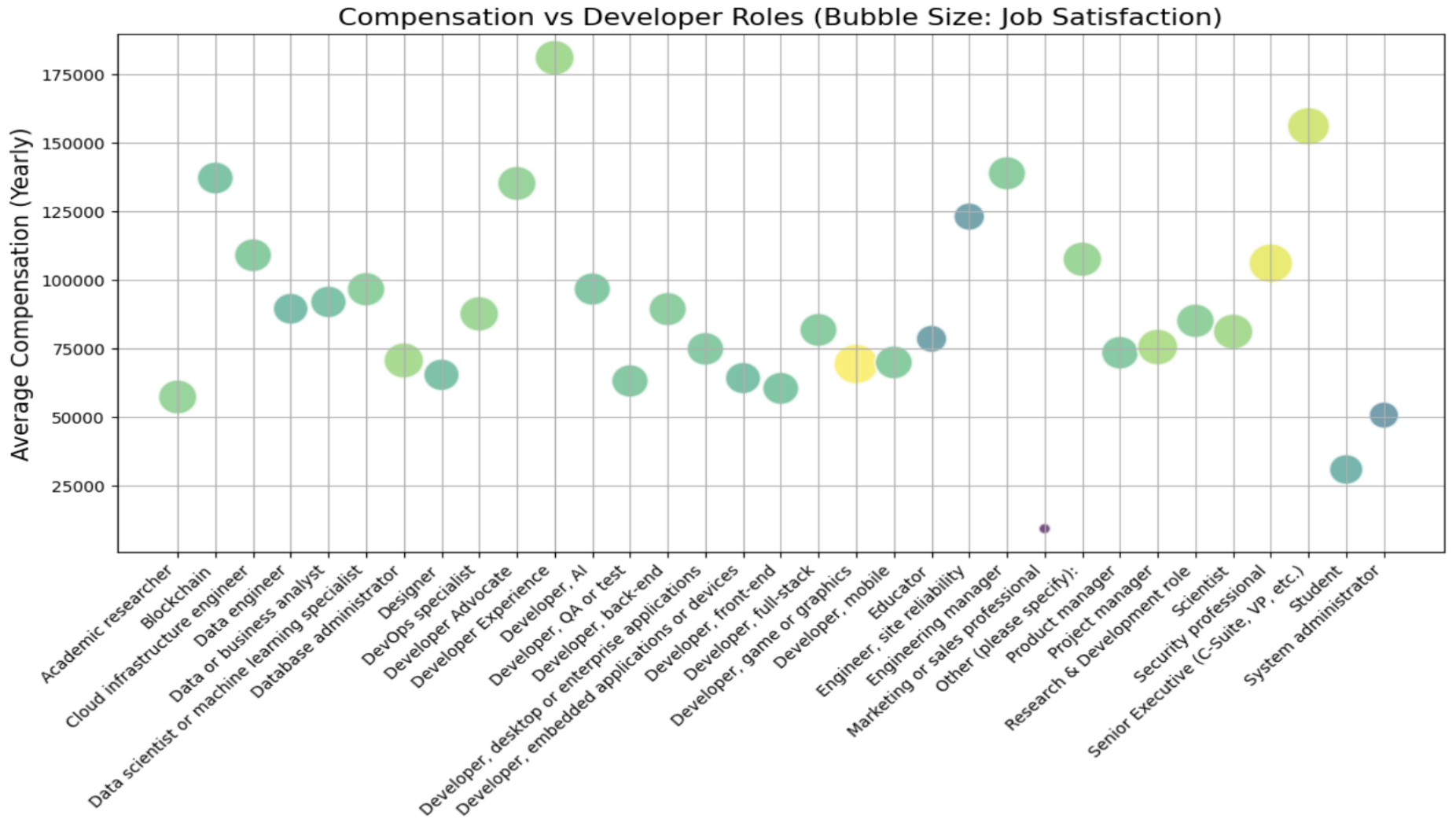
Implications

- While there was ample movement among the top 10 tools, most users continue to flock to the most popular tools
- Developers and organizations should prioritize the top 3-5 tech tools in projects and skill development to align with industry trends.
- Stack Overflow must be aware of the overall demographic of respondents to account for any biases and/or limits to implications of the survey results
- There is no clear predictor for job satisfaction or compensation based on survey results

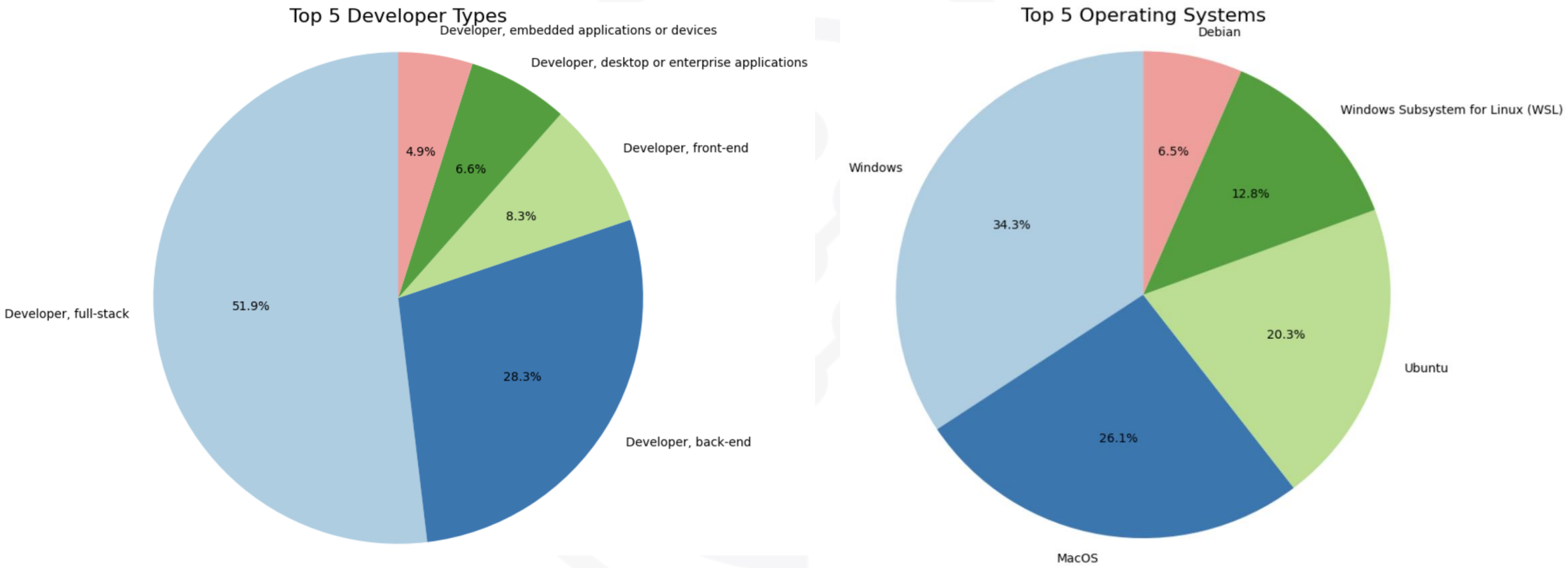
CONCLUSION

- The top 5 tools (ie languages, databases, frameworks, platforms) continue to dominate their respective arenas, but there is significant movement from year to year outside of the top 5.
- While the 2024 Stack Overflow survey collects information from a worldwide pool of respondents, the majority of surveys came from the same demographic.
  - Stack Overflow must be diligent in accounting for any biases and/or limits to implications of the survey results.
- There are no clear metrics to predict Job Satisfaction and Compensation scores

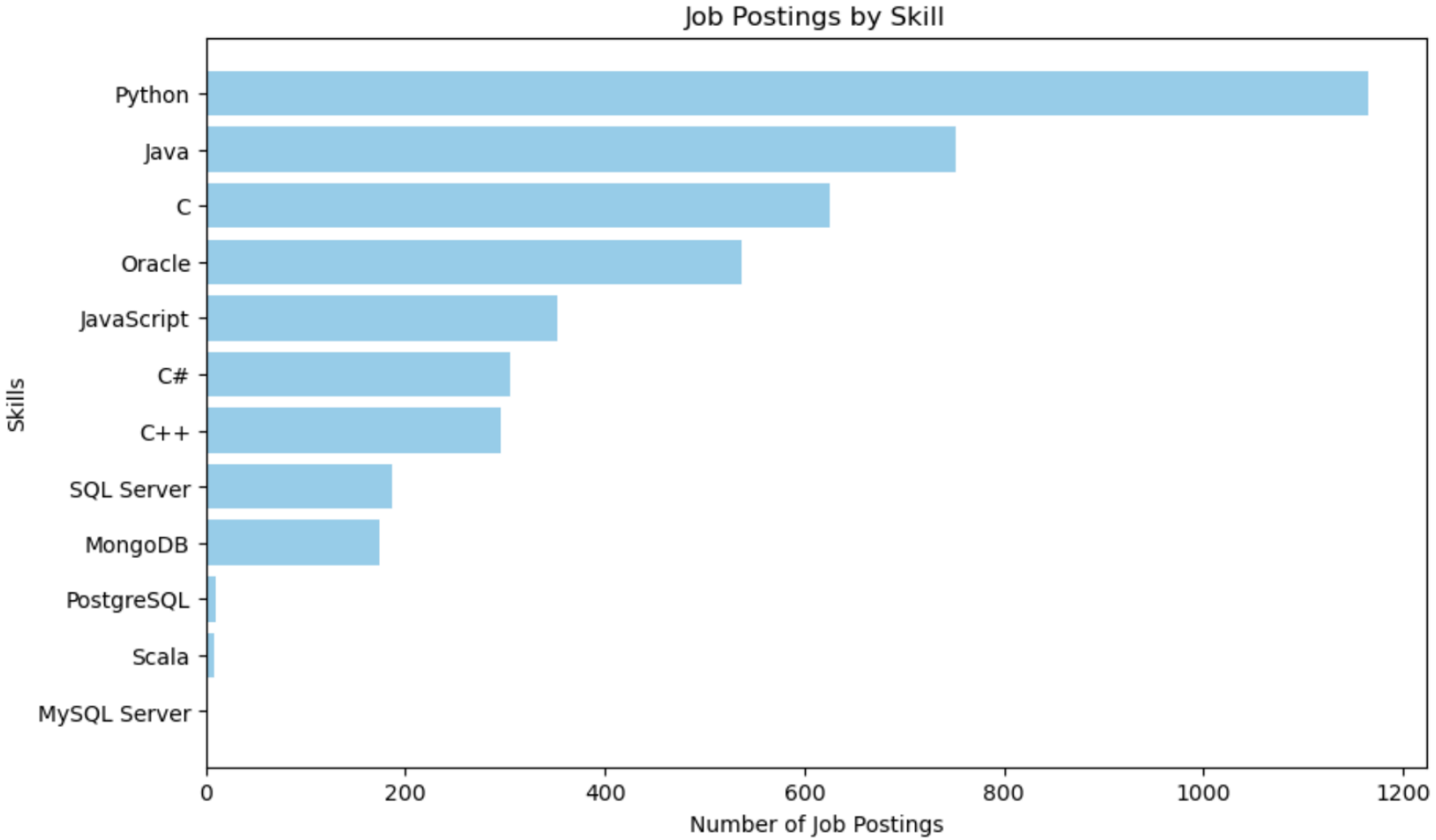
APPENDIX – JOB SATISFACTION



APPENDIX – TOP 5 Developers / OS



JOB POSTINGS



POPULAR LANGUAGES