

Key Findings of Stack Overflow Developer Survey 2019

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OUTLINE



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

EXECUTIVE SUMMARY



- The aim of this presentation is to summarize future skills requirements and trends in the IT sector to help the company to keep pace with changing technologies and make more informed hiring and developing decisions, remain competitive in the fast-evolving industry.
- This analysis is based on data from various sources including: job postings, blog posts and surveys. Collected data were prepared for analysis by using data wrangling methods, then statistical techniques were applied to identify insights and trends:
 - ❖ Top programming languages, database skills, platforms in demand
 - ❖ Trends for languages, databases, platforms for the next year
 - ❖ Demographic data like gender and age distribution of developers, education, level of compensation, their median values, distribution and comparison.

INTRODUCTION



- This presentation is a result of collecting and analyzing data from various sources, such as job postings on Naukri, IBM training's dataset, survey about popular languages and salaries in the industry. The most significant amount of data came from the Stack Overflow's annual Developer Survey 2019.
- Stack Overflow is a popular website for developers. Their annual Developer Survey – the largest and most comprehensive survey of people who code around the world. The surveys are conducted since 2011.
- The actual data set of the survey has around 90,000 responses. In this analysis a subset, that contains around 1/10th of the original data set ($N = 11\,398$), was examined.
- This report is relevant for educators, students, developers, recruiters, HR specialists to understand the trends and skills requirement in the IT industry.

METHODOLOGY



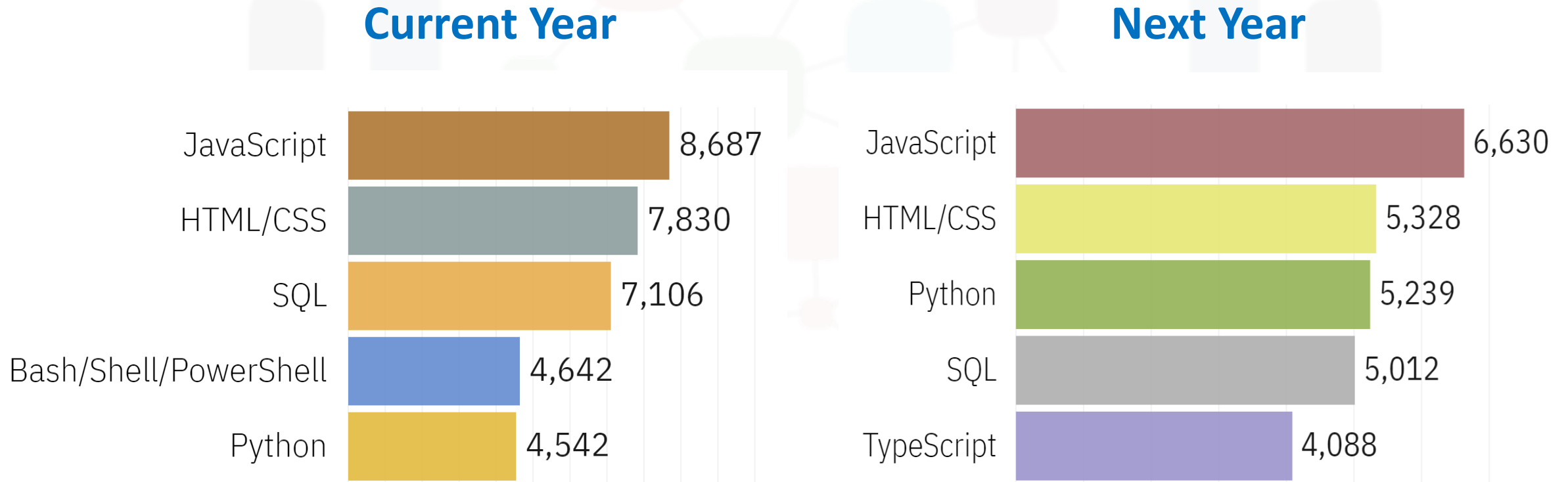
- **Data Sources** (all with links, so to follow links press Ctrl+Click):
 - [Job postings](#) (using API)
 - [Popular languages by salary](#) (using webscraping)
 - [Stack Overflow's annual Developer Survey, 2019](#)
 - [Modified subset](#) of the Stack Overflow dataset
- **Data Wrangling:** identified and removed duplicate rows, found missing values, and normalized the data.
- **Exploratory Data Analysis:** analyzed the dataset to find the distribution of data, presence of outliers and the correlation between different columns using Python libraries and SQL.
- **Data Visualization:** highlighted the distribution of data, relationships between data, the composition and comparison of data. Python libraries, Cognos Analytics, Cognos Dashboard were used.

RESULTS

- Dataset before cleaning rows - 11552, columns – 85, duplicate rows – 154, after removing N= 11398.
- Median age of the respondents – 29 years and 75 % of them are under 35. Min and max ages are 16 and 99 years. The age group of 24-32 years has the highest number of survey respondents.
- Majority of respondents are male 93.5 % vs 6.5% - female.
- Educational level – Bachelor's degree - 51.8%, Master's degree-23.9%.
- Of professional developers who studied at the university level, over 60% majored in computer science, computer engineering, or software engineering.
- 96 % are employed full-time and 4% - are part-time.
- 90 % of the respondents are developers by profession and 10% are not primarily developers, but write code from time to time (database administrators, data or business analysts, data scientists or machine learning specialists, designers, system administrators, engineers, researchers).
- About 50% of the respondents identify themselves as full-stack developers, and about 17% consider themselves mobile developers; the most common pairs are combinations of back-end, front-end, and full-stack developers.
- Median compensation before removing outliers – 57,745 USD, median compensation of woman – \$57,708.
- Median salary in the industry after removing outliers: \$52,704 per year. mean compensation – \$34,567.
- Distribution of salaries depending on the coding language (last slide): maximum - Swift (for IOS development), then Python, C++, JavaScript.
- Job postings demonstrate the demand for specialists, regarding their skills - most wanted are with a qualification in languages C, Java, Python.
- Converted compensation has the biggest correlation with age – which means older (often more qualified, with higher job positions) developers have higher compensations.

PROGRAMMING LANGUAGE TRENDS:

Top 5 programming languages



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

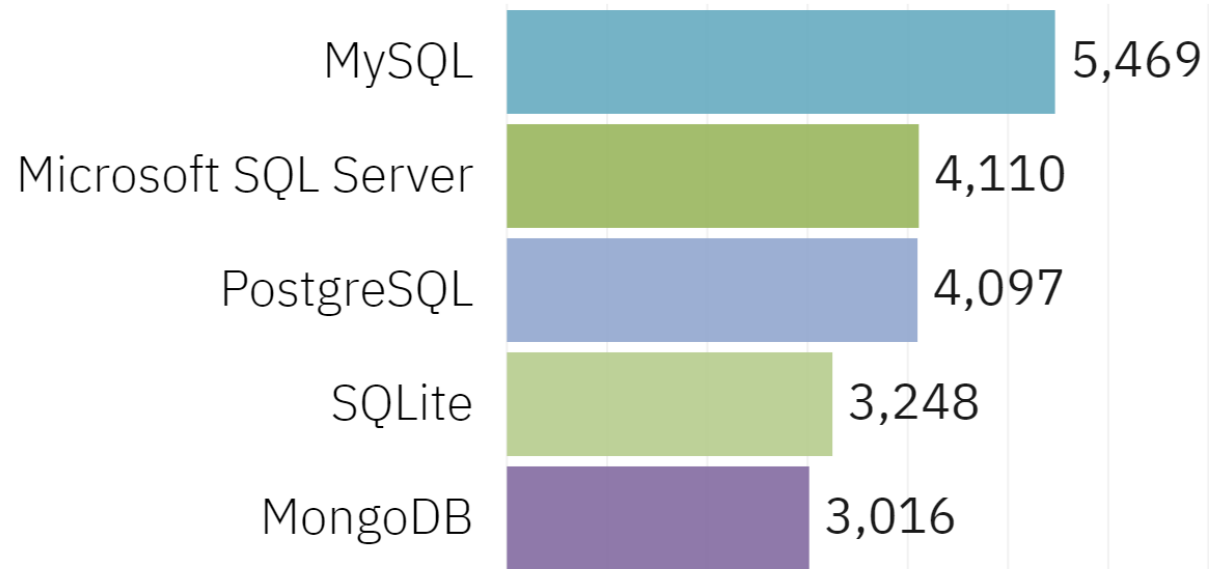
- Javascript and HTML/CSS were the most popular languages in 2019.
- SQL was in demand in 2019 and will likely remain so.
- Interest in Python and TypeScript is rising.
- PowerShell/Bash is losing its popularity.

Implications

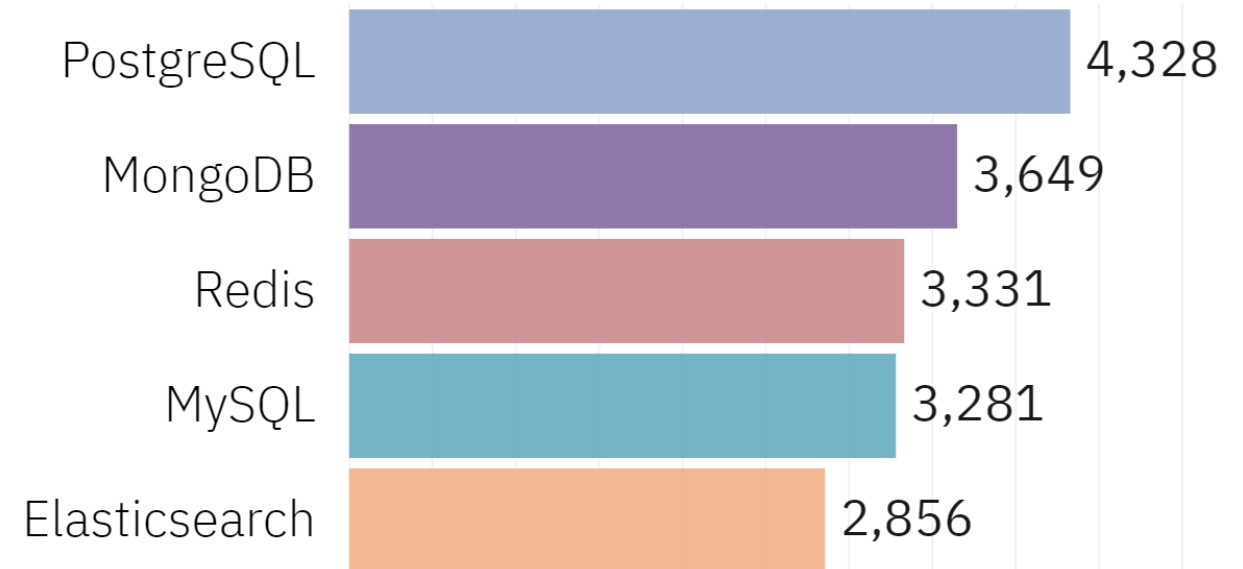
- Javascript and HTML/CSS are two of the most desirable languages. Both are used in web development and given that web development is in high demand, both are likely to remain popular.
- TypeScript is used in web development as an additional language to JavaScript, and with huge demand in web development, its popularity is going to raise.
- Python is the fastest-growing major programming language. It's widely used in analytics, data science, ML, AI. That means a high need for skilled professionals in this language.
- SQL is still the most preferred language for big data querying and storage, and with great amounts of data generated each year, it's likely that language will remain desirable for a long.

DATABASE TRENDS: Top 5 databases

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- SQL databases were the most popular in 2019, with MySQL on top of the list.
- Increasing interest in NoSQL databases.
- Increasing interest in PostgreSQL and MongoDB databases, Redis and Elasticsearch.

Implications

- Knowledge and skills in SQL databases are still in high demand with SQL db on the top of the list of the most popular and most desirable databases.
- Emergence of the big data, cloud computing, and high-volume web and mobile applications led to the need in more flexible databases. This fact explains rising popularity of NoSQL databases.

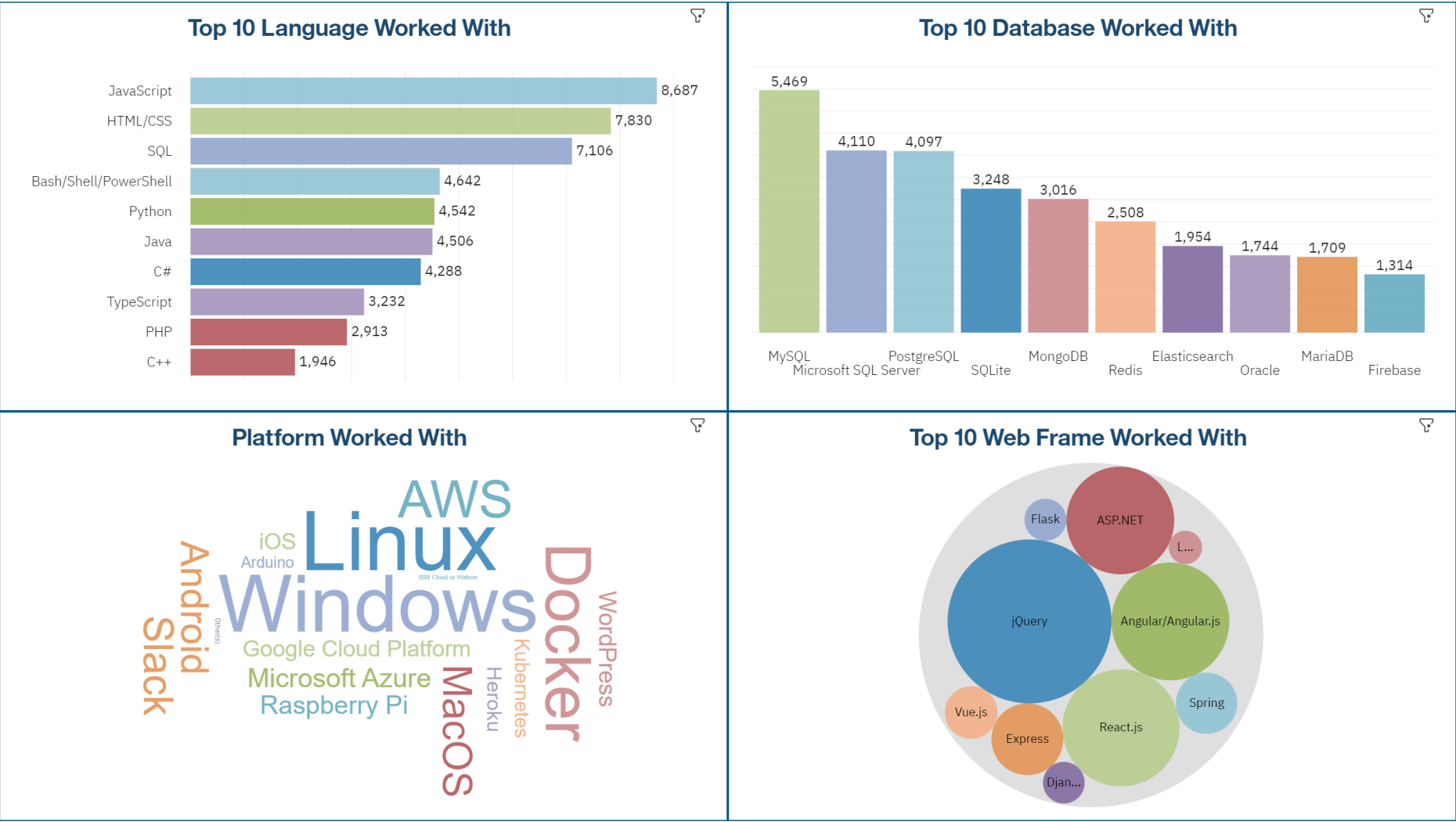
DASHBOARD



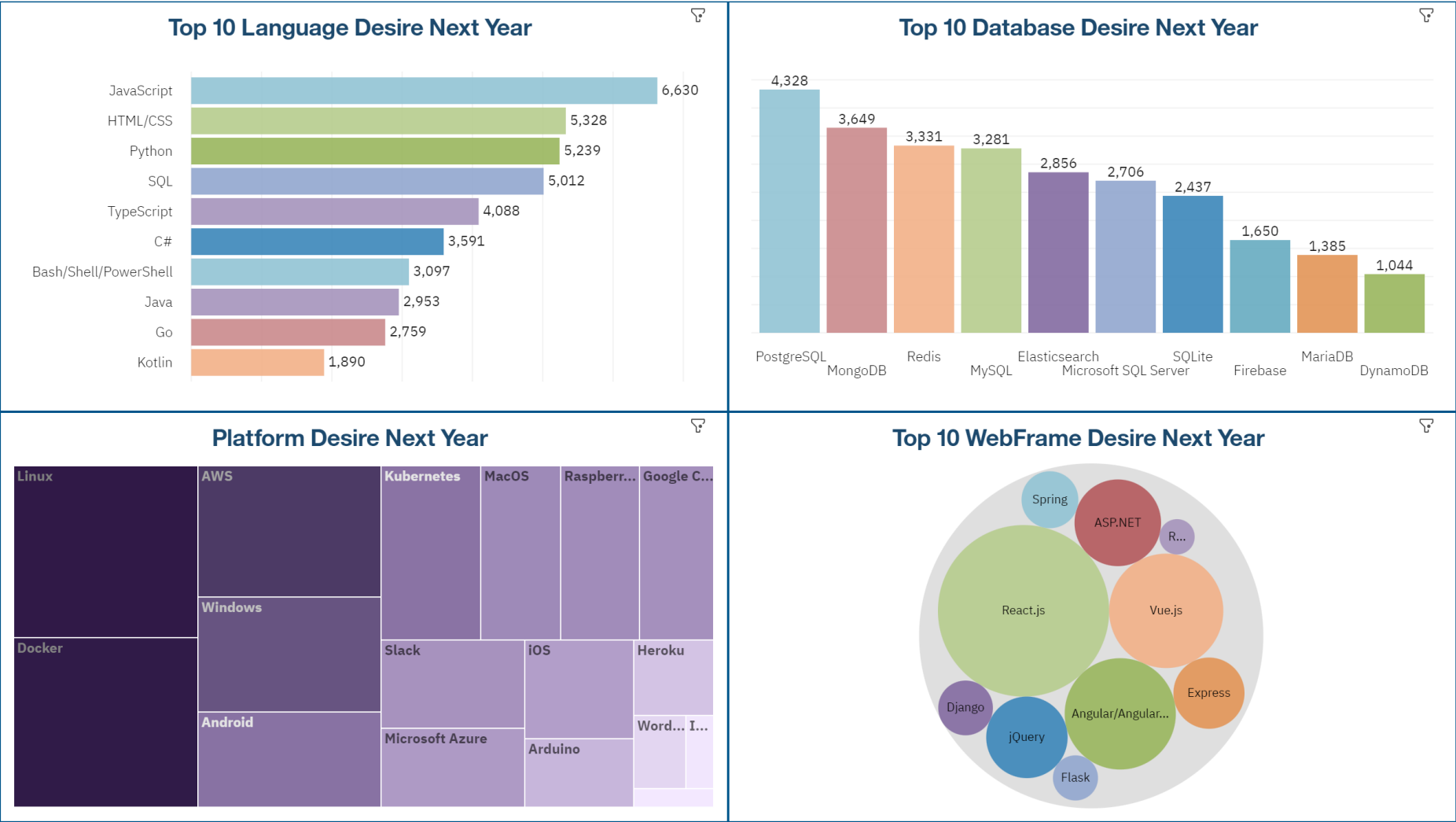
Click [here](#) to open the Cognos dashboard.

Screenshots of the dashboard are on the following slides.

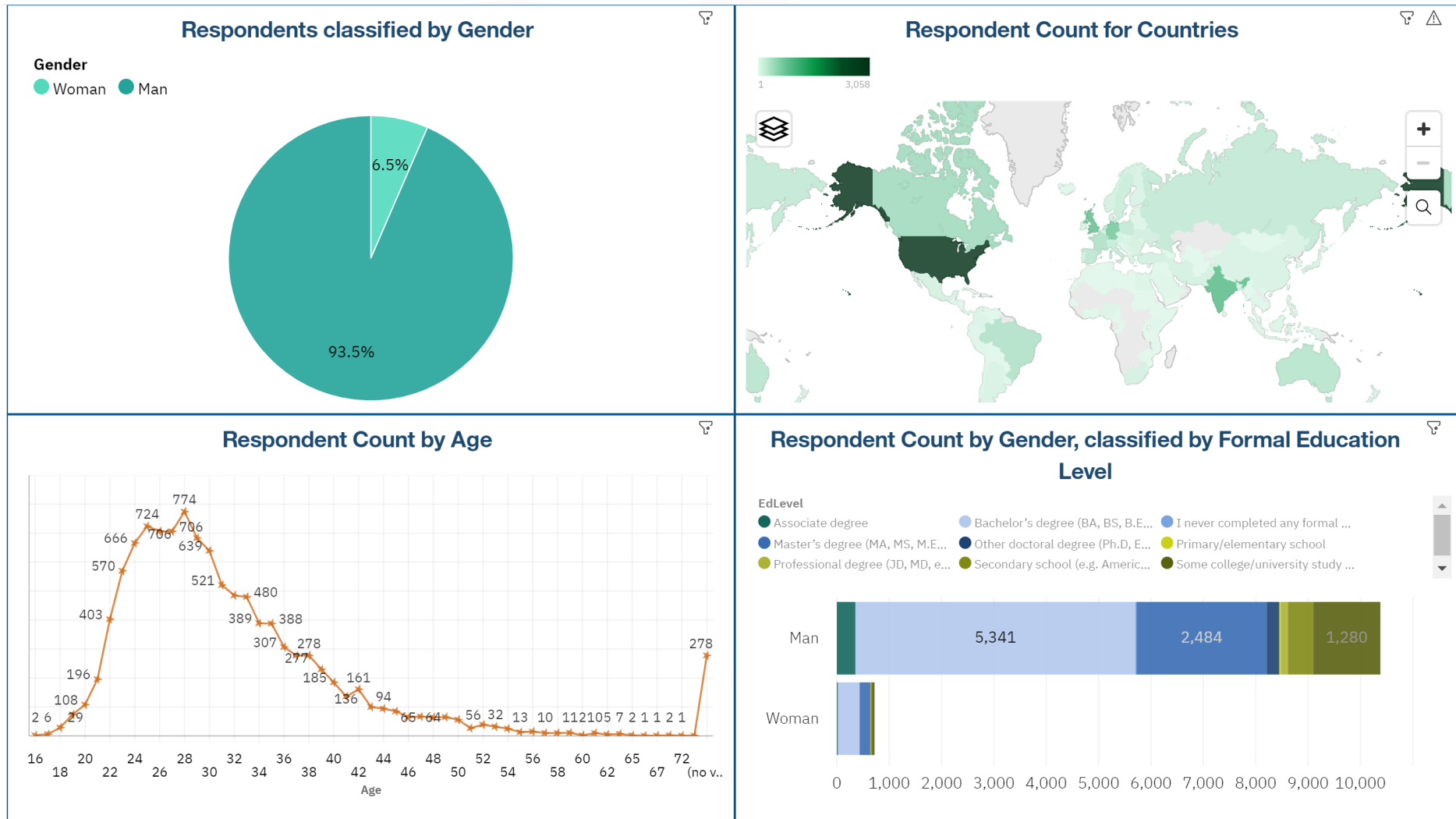
Dashboard Tab1. Current Technology Usage



Dashboard Tab2. Future Technology Trend



Dashboard Tab3. Demographics



Discussion

The insights and trends include the following questions:

- What are the top programming languages in demand?
- What are the top databases in demand?
- What are the most popular developers technologies, web frames, platforms?

OVERALL FINDINGS & IMPLICATIONS

- The respondents have a median age of 29, 75% of them are younger than 35 years.
- Most respondents are male – 93.5 %, female – 6.5% (varies in different countries).
- About 3/4 of developer respondents have the equivalent of a bachelor's degree or higher (51.8% - bachelor's, 23.9 – master's). Interestingly, both rates are higher for women than for men – 56.3% against 50.9% for bachelor's degrees, 26.1 % and 23.7% for master's.
- Over 50 % of respondents, who took the survey are from the following countries – the USA (27.4 %), India, Germany, Great Britain, Canada.
- Median compensation in the industry: 52,704 USD per year. Distribution of salaries depending on the coding language (last slide)– Swift (for IOS development), then Python, C++, JavaScript.
- Programming Languages- High usage and interest in JavaScript and HTML/CSS remain. TypeScript is gaining significant rise, Python as well.
- Databases- the popularity of such databases as Redis, Elasticsearch, PostgreSQL and MongoDB is growing. High interest in SQL. MySQL is the most commonly used database in 2019. NoSQL database programs gaining interest.
- Platforms: Linux and Windows are the most common platforms for development. Most desirable platforms – Linux, Docker and AWS.
- WebFrames: jQuery is the most broadly used web framework. React.js and Vue.js are gaining interest, both are the most wanted web frameworks by developers.
- Popularity of Python is explained by its general-purpose nature, simplicity of language, its usage with BigData. Python also is the major code language for AI and Machine Learning.
- High interest in web development explains broad usage of coding languages JavaScript and HTML/CSS, rising interest in TypeScript, and utilizing web frameworks jQuery, React.js, Vue.js. These languages and web frames all are used in web development.
- Growing amounts of nonrelational data, unstructured data, and web data led to the need of utilizing NoSQL databases in addition to SQL ones. This adds skills in handling NoSQL databases to potential job requirements.

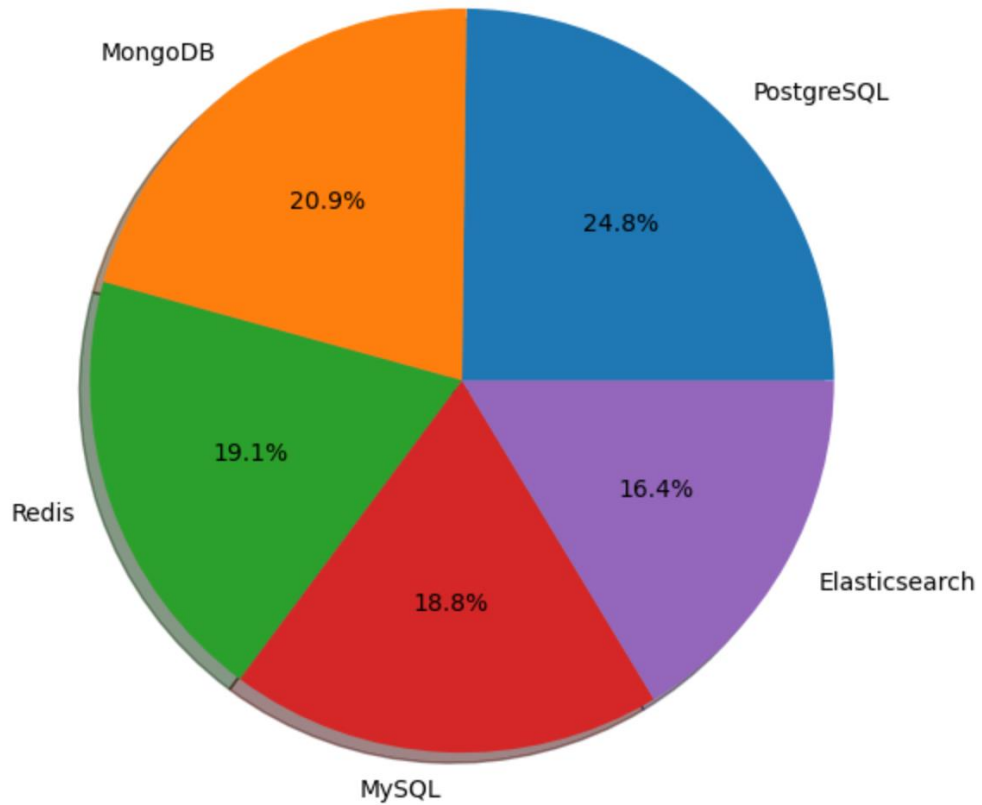
CONCLUSION



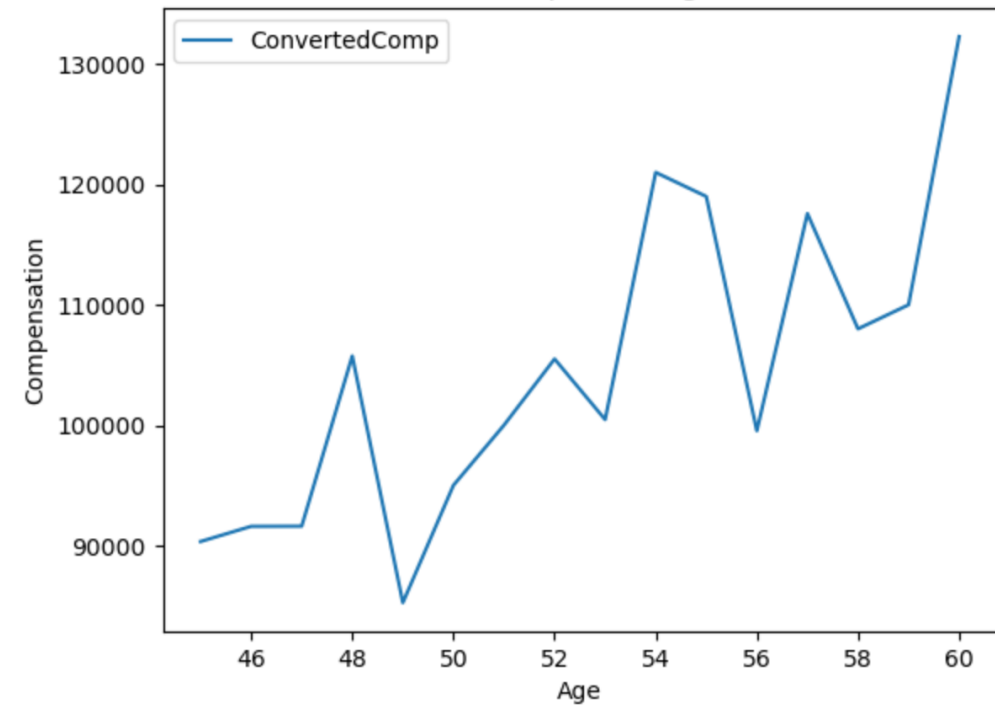
- **Web development** is the most popular area of programming. That's why JavaScript, HTML/CSS, and TypeScript are in-demand languages.
- **Python** is a major and easy programming language, commonly used in different areas. This explains why it's very popular and is the fastest-growing one. Also, Python is broadly used in Machine Learning and AI development.
- **Big Data and NoSQL.** Although SQL databases are utilized for querying and storing data, there is a need to handle Big Data, a lot of unstructured data, and SQL db are not the best answer for that. That's why NoSQL(not only SQL) databases are gaining a lot of weight. Various NoSQL db handle Big Data, non-structured, semi-structured data, cloud computing, and high-volume web and mobile applications.
- **AI/MachineLearning** – rapidly emerging area of IT. AI is used for automation, data analytics, optimized advertising, cybersecurity, fraud detection, customer forecasting and so much more.
- Understanding the required skills and the above-presented trends should help companies to make more informed decisions. Such as hiring additional staff with needed skills, setting programs to upskill already employed personnel, and retaining their level of competence.

APPENDIX

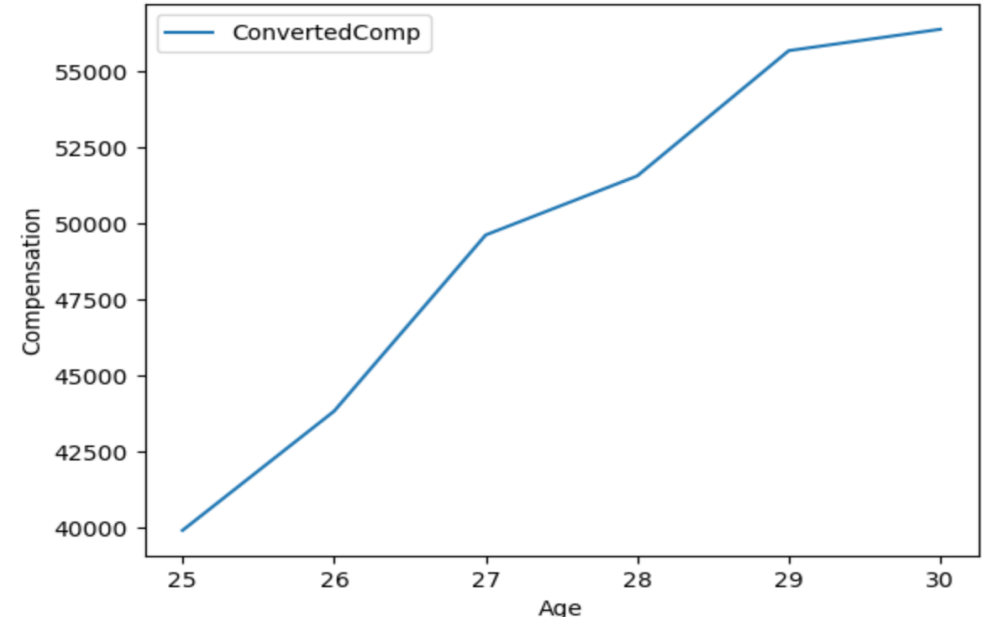
Top 5 databases respondents wish to learn next year



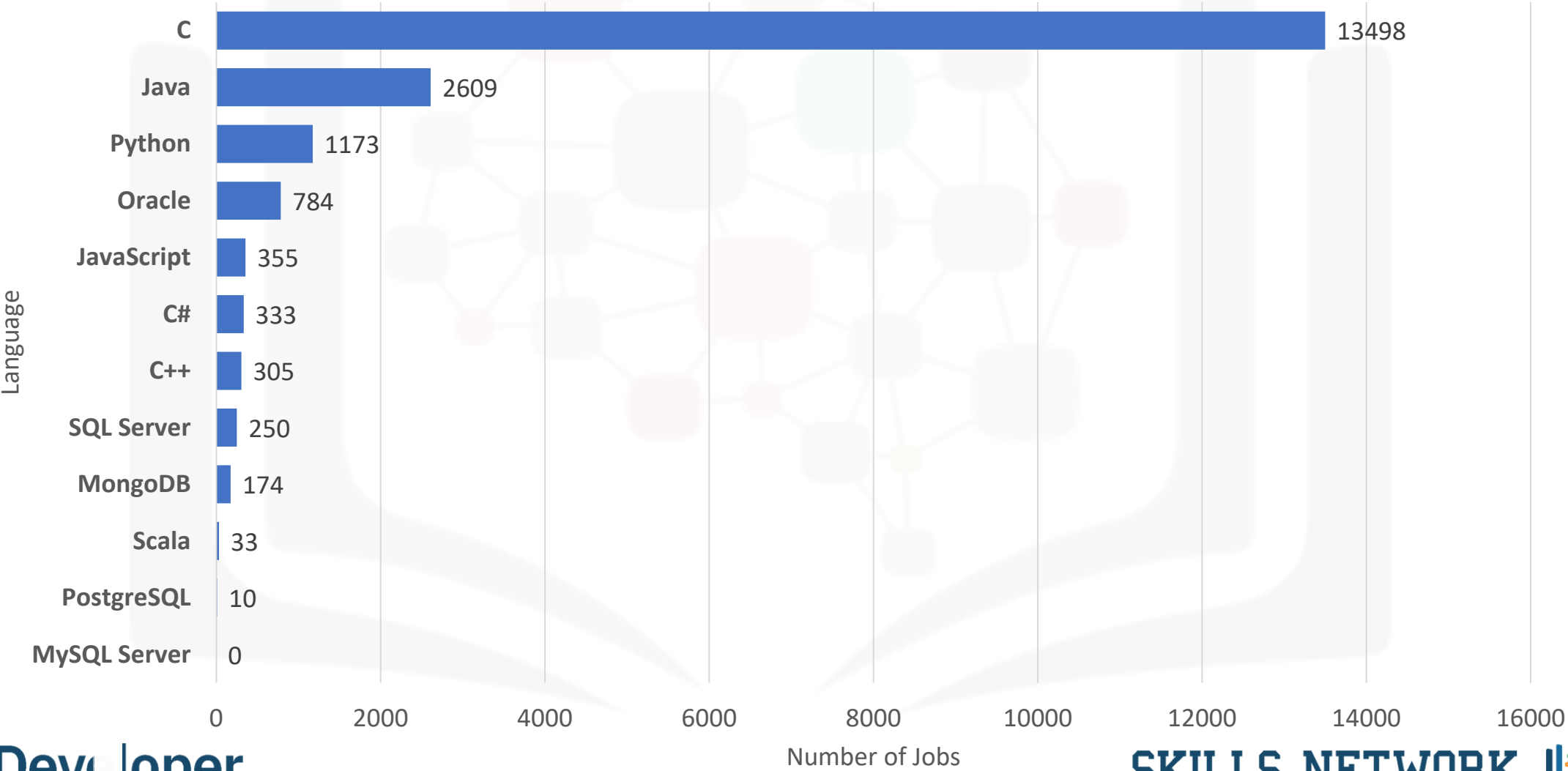
Median ConvertedComp for all ages from 45 to 60



Median ConvertedComp for all ages from 25 to 30



JOB POSTINGS



POPULAR LANGUAGES by salary

