

IBM DA capstone project

By Kon Mez



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OUTLINE



- Introduction
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EXECUTIVE SUMMARY



- **Current vs. Future Technology Preferences**
- **Programming Language Evolution**
- **Database Technology Preferences**
- **Platform and Framework Adoption**
- **Demographics Analysis**

EXECUTIVE SUMMARY

Key Insights from Developer Technology Preferences and Demographics

- **Current vs. Future Technology Preferences** reveal significant shifts in developer priorities, with emerging technologies gaining momentum while traditional tools maintain strong adoption rates
- **Programming Language Evolution** shows clear trends toward modern, versatile languages with strong community support and industry demand
- **Database Technology Preferences** indicate a move toward cloud-native and NoSQL solutions, reflecting changing application architectures
- **Platform and Framework Adoption** demonstrates the continued dominance of web technologies while highlighting growing interest in cross-platform development solutions
- **Demographics Analysis** reveals a globally diverse developer community with varying educational backgrounds, providing insights into the accessibility and reach of software development careers



INTRODUCTION

Understanding the Developer Landscape Through Data



- **Survey Significance**
- **Strategic Importance**
- **Current Market Context**
- **Research Objectives**



INTRODUCTION

Understanding the Developer Landscape Through Data



- **Survey Significance:** Stack Overflow's annual developer survey represents one of the largest and most comprehensive datasets on global developer preferences, technologies, and demographics
- **Strategic Importance:** Technology adoption trends directly impact hiring decisions, project planning, and strategic technology investments across organizations
- **Current Market Context:** The software development landscape continues to evolve rapidly, with new frameworks, languages, and platforms emerging while established technologies adapt and maintain relevance
- **Research Objectives:**
 - Identify current technology usage patterns among developers
 - Understand future technology preferences and emerging trends
 - Analyze demographic distribution and educational backgrounds
 - Provide actionable insights for technology strategy and workforce planning



METHODOLOGY

Data Analysis Approach and Visualization Strategy



- **Data Source**
- **Analysis Framework**
- **Visualization Strategy**
 - Bar and Column Charts
 - Hierarchy Bubble Charts
- **Dashboard Design**
 - Current Technology Usage
 - Future Technology Trends
 - Demographics Analysis



METHODOLOGY

Data Analysis Approach and Visualization Strategy



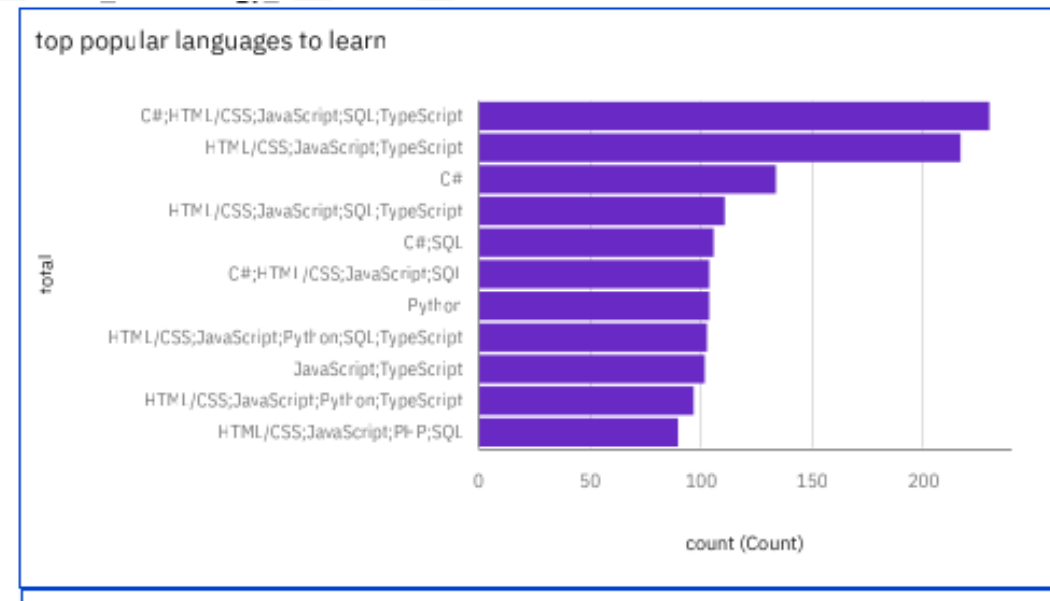
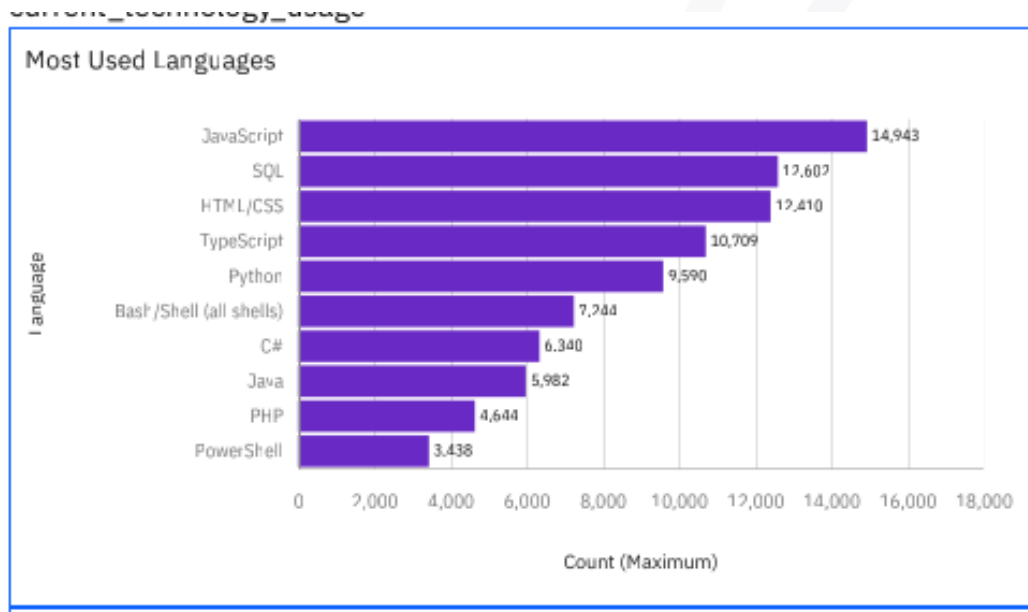
- **Data Source:** Stack Overflow Annual Developer Survey dataset (survey_data_updated.csv)
- **Analysis Framework:** Multi-dimensional analysis covering current usage, future preferences, and demographic characteristics
- **Visualization Strategy:** Strategic use of different chart types to optimize data comprehension:
 - Bar and Column Charts:** For ranking and comparison of technology adoption
 - Word Clouds:** For highlighting prominence and relative importance
 - Hierarchy Bubble Charts:** For showing relationships and proportional representation
- **Dashboard Design:** Three-tier analytical approach:
 - Current Technology Usage:** Understanding present-day adoption patterns
 - Future Technology Trends:** Identifying emerging preferences and growth areas
 - Demographics Analysis:** Contextualizing findings within developer population characteristics



PROGRAMMING LANGUAGE TRENDS

Current
Year

Next
Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Finding 1: Established Languages Maintain Strong Position

Traditional programming languages like JavaScript, Python, and Java continue to dominate current usage statistics
These languages benefit from extensive ecosystems, mature tooling, and widespread industry adoption

Finding 2: Emerging Languages Show Growing Interest

Future preference data indicates rising interest in modern languages designed for specific use cases
Languages with strong performance characteristics and developer experience improvements gain traction

Finding 3: Gap Analysis Reveals Transition Opportunities

Comparison between current usage and future preferences highlights technologies developers want to adopt
This gap represents both learning opportunities for developers and strategic considerations for organizations

Implication 1: Skill Development Priorities

Developers should maintain proficiency in established languages while building expertise in emerging technologies
Organizations should provide training paths that bridge current capabilities with future technology needs

Implication 2: Technology Strategy Planning

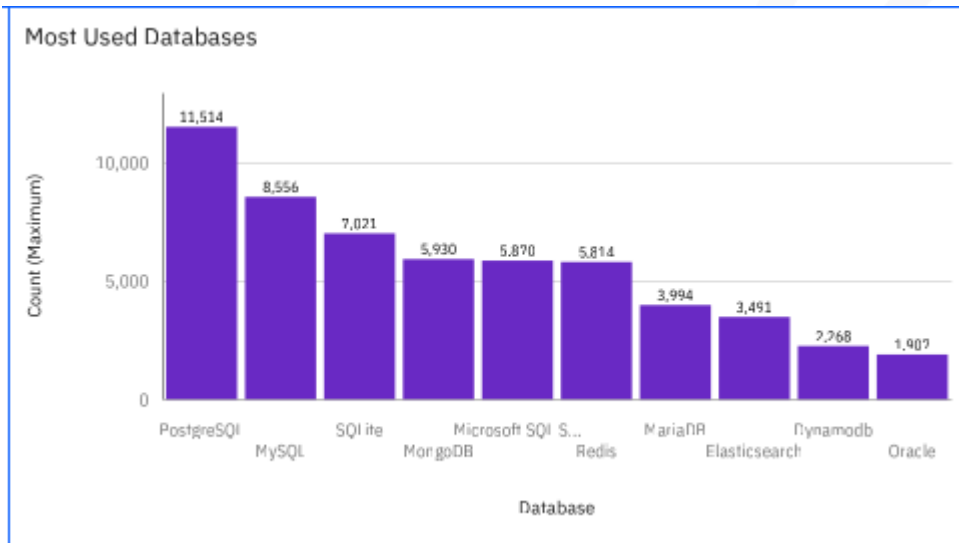
Companies should consider long-term adoption trends when making technology stack decisions
Early adoption of growing languages can provide competitive advantages in talent acquisition and system performance

Implication 3: Market Positioning

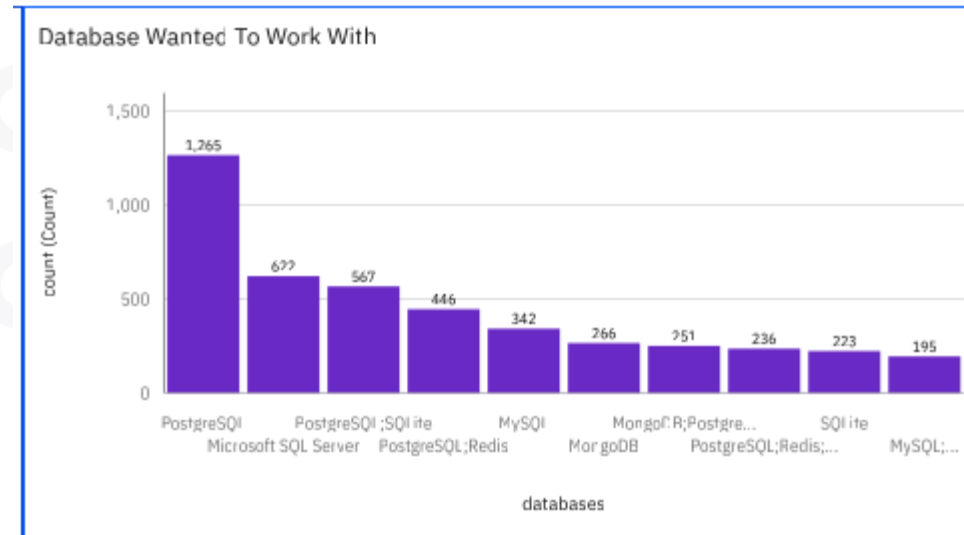
Understanding language trends helps predict future talent availability and demand
Organizations can better position themselves by aligning technology choices with developer preferences

DATABASE TRENDS

Current
Year



Next
Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

Current Database Landscape

- Relational databases maintain strong presence in current usage patterns
- Cloud-native and NoSQL solutions show increasing adoption rates
- Traditional databases demonstrate resilience through continuous innovation

Future Database Preferences

- Growing interest in specialized databases for specific use cases
- Increased preference for managed database services and cloud solutions
- Performance and scalability considerations drive technology choices

Implications

Strategic Database Planning

- Organizations should evaluate current database strategies against emerging trends
- Investment in cloud-native and specialized database solutions may provide competitive advantages
- Data architecture decisions should consider both current needs and future scalability requirements



DASHBOARD



Here come Dashboards

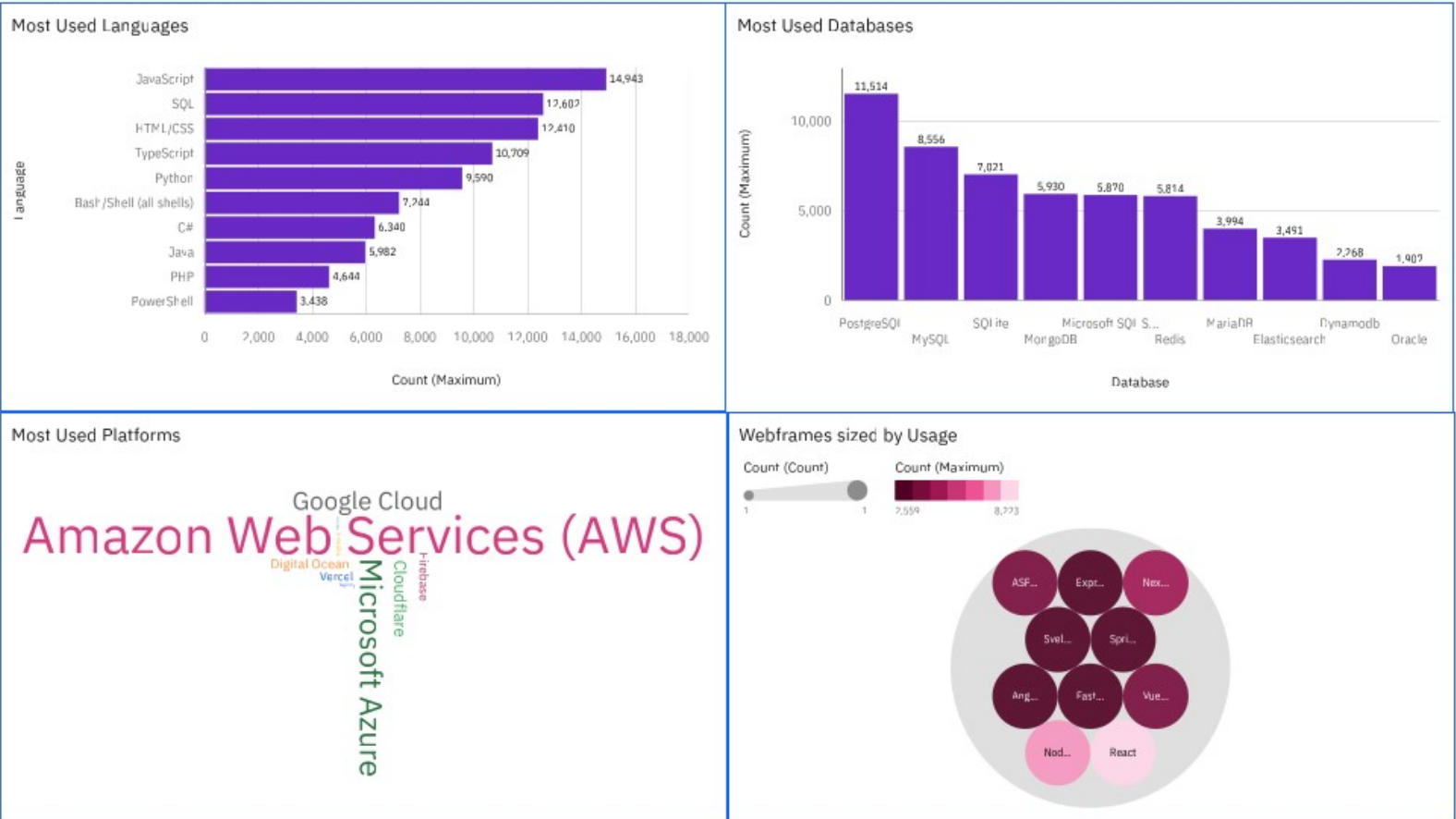


DASHBOARD TAB 1

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current_technology_usage

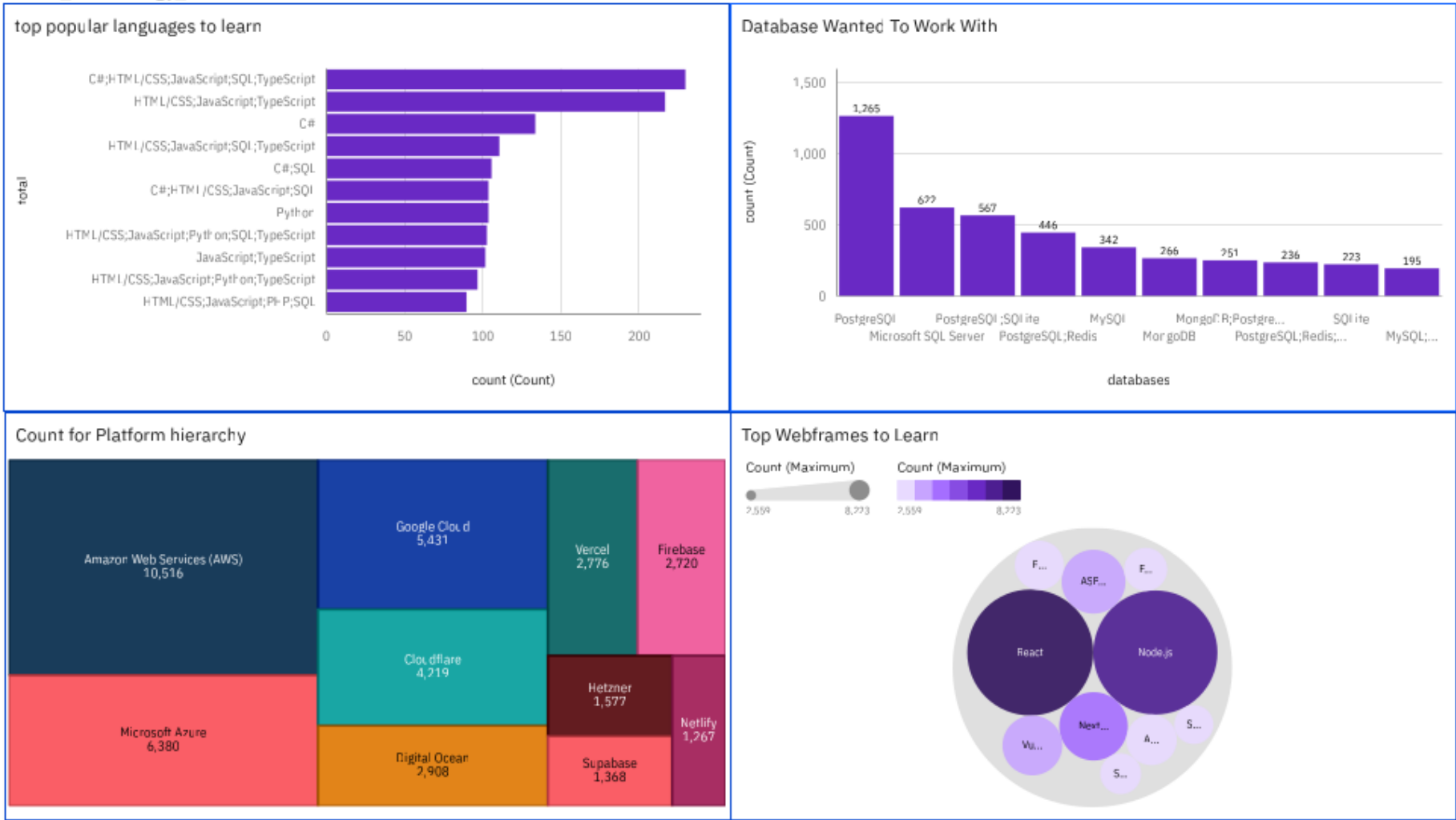


DASHBOARD TAB 2

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future_technology_trend

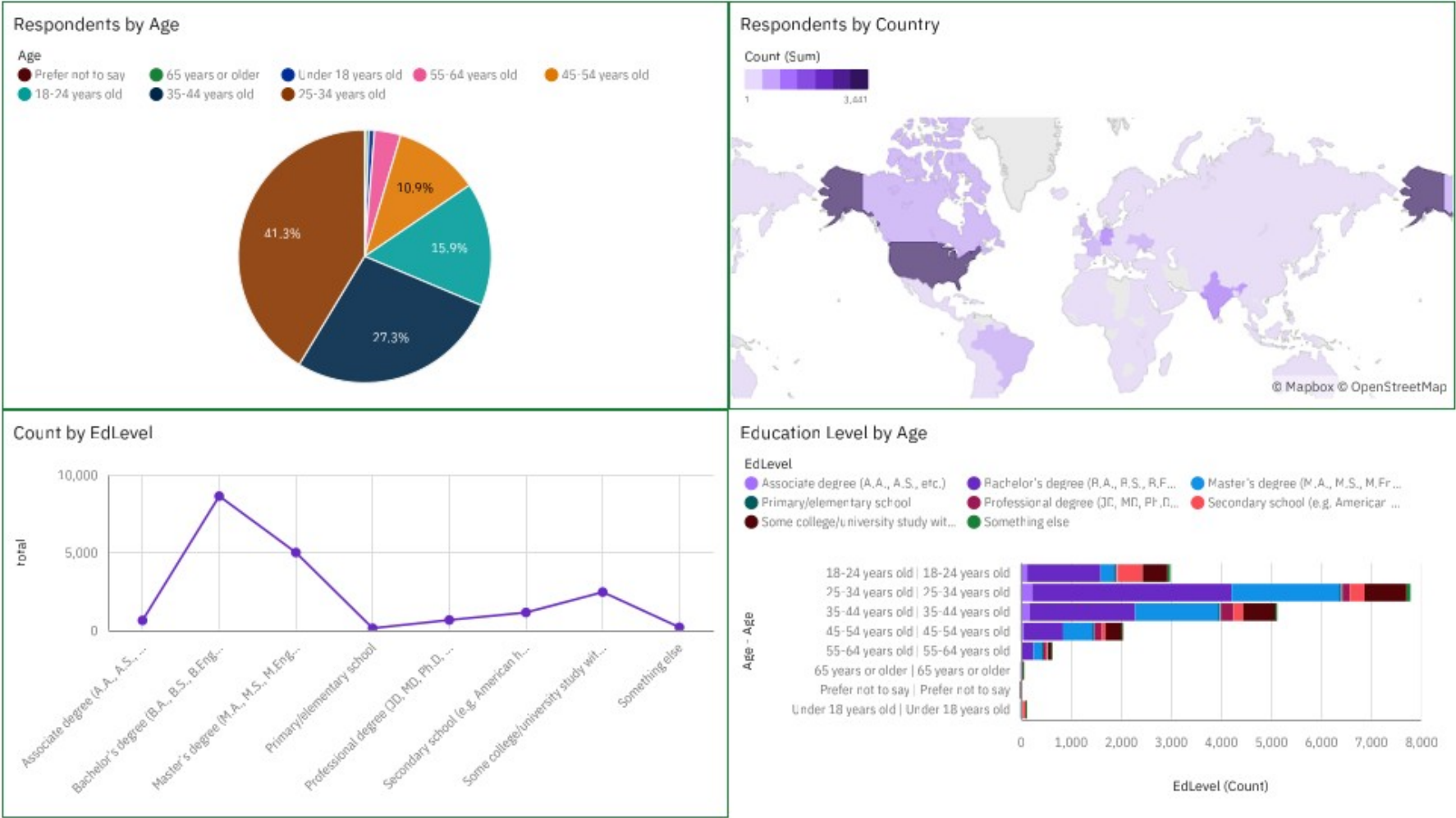


DASHBOARD TAB 3

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demographics



DISCUSSION



- **Synthesizing Technology Trends with Developer Demographics**
- **Technology Adoption Patterns**
- **Community Insights**
- **Platform and Framework Evolution**



DISCUSSION

Synthesizing Technology Trends with Developer Demographics

The intersection of technology preferences and demographic data reveals important insights about the global developer community. The geographic distribution of survey respondents provides context for understanding regional technology adoption patterns, while education level analysis helps explain the accessibility and learning pathways into software development.

Technology Adoption Patterns

Current usage data reflects practical, production-ready technology choices
Future preferences indicate aspirational technologies and emerging trends
The gap between current and desired technologies represents market opportunities

Community Insights

Age distribution suggests a healthy mix of experienced and emerging developers
Educational background diversity indicates multiple pathways into technology careers
Geographic distribution reflects the global nature of software development

Platform and Framework Evolution

Web technologies continue to dominate platform preferences
Cross-platform development frameworks gain popularity for efficiency and reach
Cloud platforms show strong adoption aligned with industry digital transformation trends



OVERALL FINDINGS & IMPLICATIONS

Strategic Technology Insights

Key Patterns Identified:

Continuity with Innovation: Established technologies evolve and maintain relevance while new solutions address emerging needs

Performance and Developer Experience: Technology choices increasingly balance performance requirements with developer productivity

Cloud-Native Adoption: Strong trend toward cloud-based solutions across all technology categories

Global Developer Community: Diverse, worldwide participation in technology trends with regional variations

Business Implications:

Talent Strategy: Understanding technology preferences helps predict talent availability and inform hiring strategies

Technology Investment: Balancing investment in current productive technologies with emerging future solutions

Training and Development: Structured approach to skill development addressing both current and future technology needs

Market Positioning: Aligning technology choices with industry trends and developer preferences for competitive advantage

Future Considerations:

Monitor emerging technologies that show strong preference growth

Consider regional variations in technology adoption for global operations

Evaluate the sustainability and community support of technology choices

Plan migration strategies for evolving from current to preferred technologies



CONCLUSION

Transforming Data into Strategic Action

The Stack Overflow survey data analysis reveals a dynamic technology landscape where established solutions maintain strong positions while innovative technologies gain momentum. The developer community demonstrates both practical decision-making in current technology use and forward-thinking preferences for future adoption.

Key Takeaways:

- Technology decisions should balance current production needs with future strategic positioning
- Developer preferences provide valuable indicators for technology investment and career development planning
- The global and diverse nature of the developer community creates opportunities for inclusive technology adoption
- Understanding the gap between current usage and future preferences identifies areas for strategic focus

Recommended Actions:

- Develop technology roadmaps that incorporate both current usage patterns and future preference trends
- Invest in training and development programs that prepare teams for emerging technologies
- Consider community strength and developer satisfaction when evaluating technology choices
- Monitor demographic trends to understand the evolving developer landscape
- This analysis provides a foundation for data-driven technology strategy decisions that align with developer community trends and market evolution.



APPENDIX



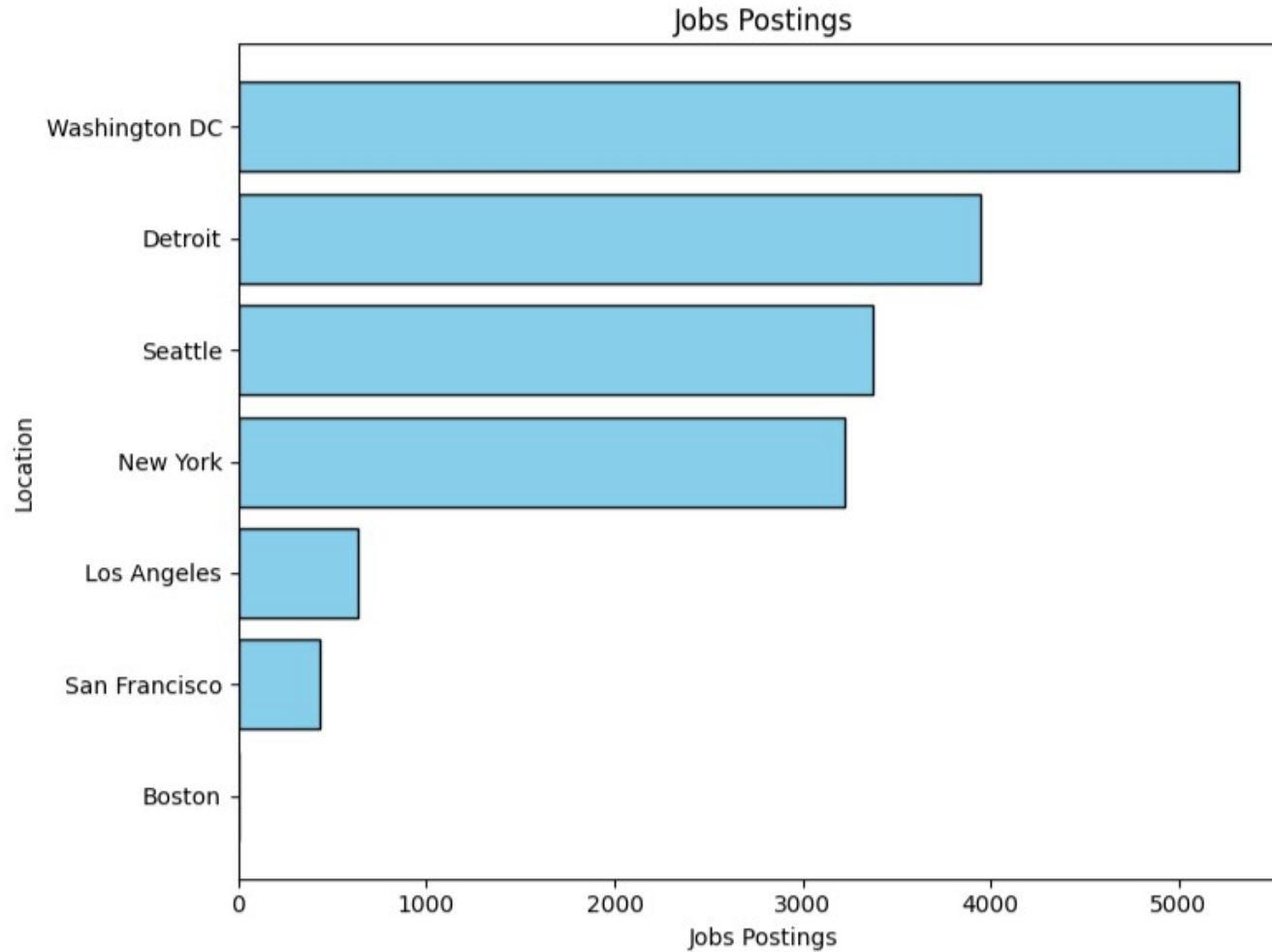
Link to dashboard:

- <https://lookerstudio.google.com/reporting/aa255d66-f2d3-431a-a0bc-a30480b18bc0>
- https://eu1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FFAcapstone%2B%25281%2529%2FFA_attempt2_dashb-v1&action=view&mode=dashboard&subView=model000001974b4ce3b0_00000002



JOB POSTINGS

In Module 1 you have collected the job posting data using Job API in a file named "job-postings.xlsx". Present that data using a bar chart here. Order the bar chart in the descending order of the num



POPULAR LANGUAGES

In Module 1 you have collected the job postings data using web scraping in a file named “popular-languages.csv”. Present that data using a bar chart here. Order the bar chart in the descending or

