Top and Emerging Development Languages


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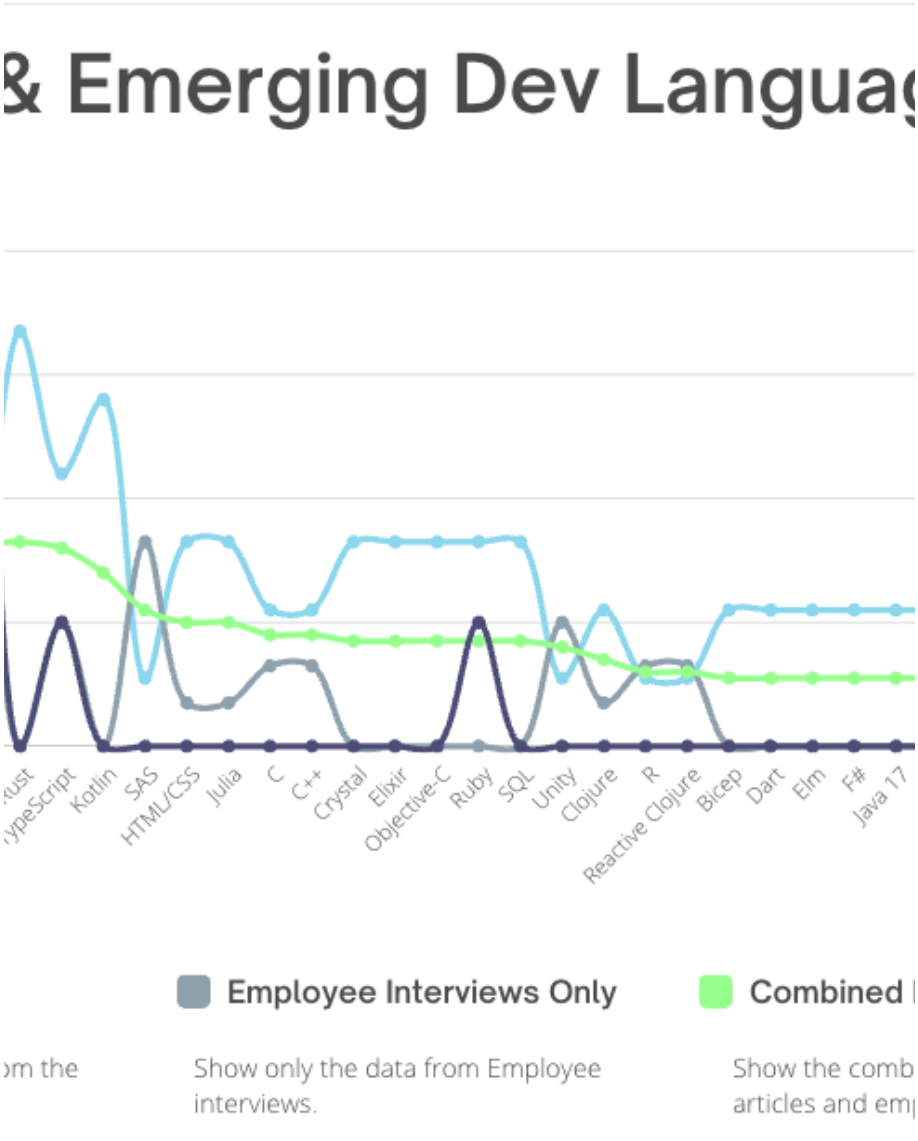

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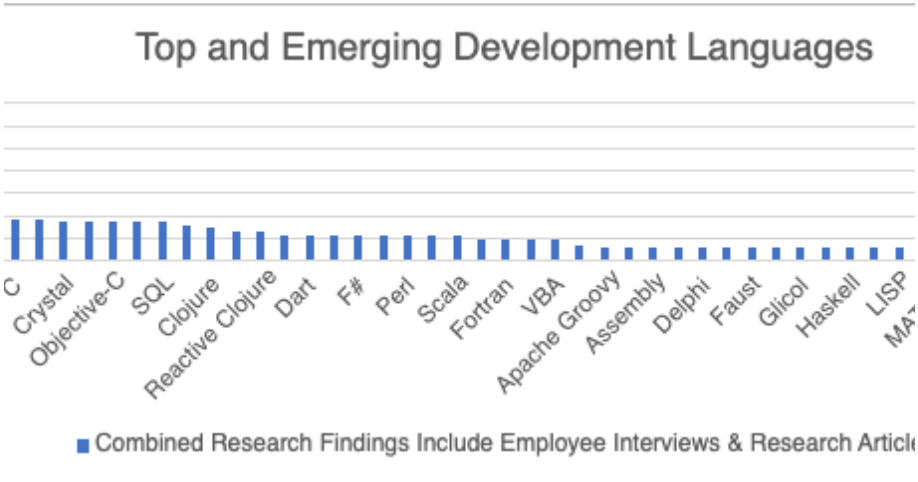
What are the Top and Emerging Development Languages for Vertex

Vertex wants to stay current with the best of what is currently out there and what is newly emerging. Through this article, we researched the top and emerging development languages to determine which are best for our business, employees, and projects. The research breaks down the top current and emerging languages based on various studies and interviews with current Vertex employees. It is important to note that different developing languages apply to multiple means of development, and not all currently apply to Vertex. For example, we don't have projects presently focused on gaming development.

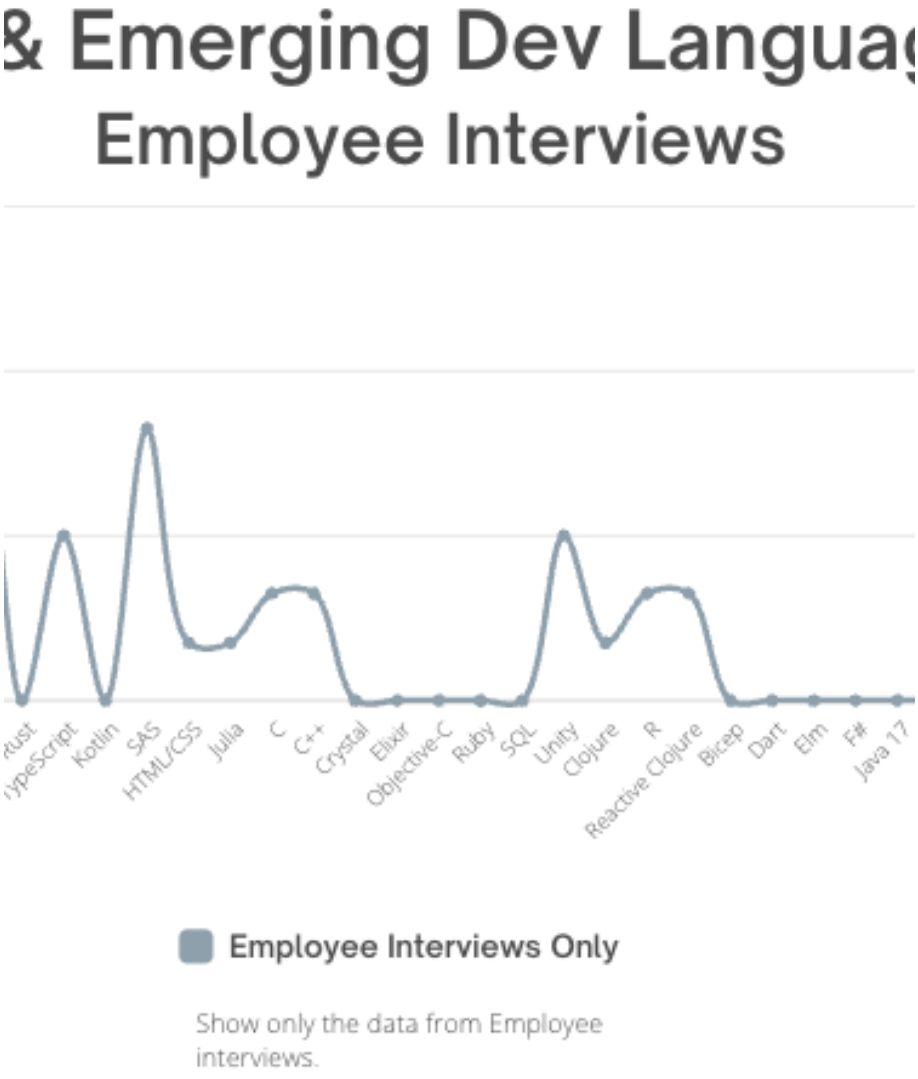
It is important to note that each language was entered separately. The statistics below reflect the percentage of persons or articles that mentioned the language.



We have combined the data in the above chart to

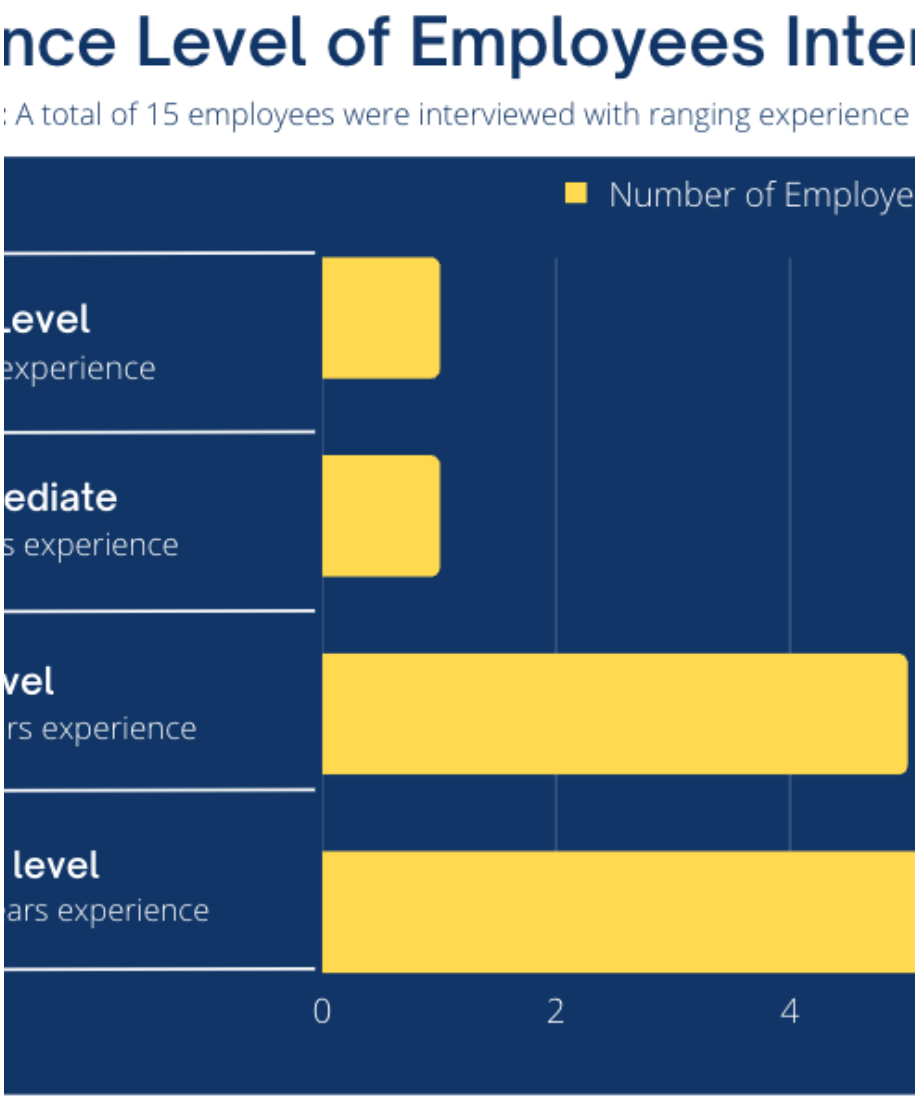
show the percentage of research articles and Vertex employee interviews that offer support for various languages.

Top and Emerging Development Languages from Employee interviews



We interviewed 15 Vertex Employees on what they felt was the best of developer languages, both current and emerging. The employees ranged from Entry level (0 years of Experience) to senior level (with over 38 years of experience). Their titles included Architect, Enterprise Architect, Director, Software Engineer, Data Scientist, Technical Lead, and Innovation Operations Analyst.

The chart below shows the differences between the research's top findings (green) and the employee interviews (blue) based on the percentage of agreement.



The chart above shows the top 12 development languages based on employee interviews. Blue shows the percentage of employees in favor of, while green shows the percentage of employees in opposition to.

The research and employee interviews show that Rust, Swift, Go, Java, JavaScript, and TypeScript as the top and emerging developer languages that Vertex should be paying attention to.

What are the Top/Emerging Development Languages that Vertex should be focusing on to get the best developers?

Vertex should look for diverse and knowledgeable developers with in-depth knowledge of the current languages and an understanding of the trends while anticipating beneficial changes. My research found that the Top and Emerging 10 Developer Languages are Python, JavaScript, Swift, Java, Go, C#, Rust, TypeScript, Kotlin, and SAS.

20 Top and Emerging Developer Languages

1. Python
2. JavaScript
3. Swift
4. Java
5. Go
6. C#
7. Rust
8. TypeScript
9. Kotlin
10. SAS
11. HTML/CSS
12. Julia

13. C
14. C++
15. Crystal
16. Elixir
17. Objective-C
18. Ruby
19. SQL
20. Unity

When comparing the information gathered in interviews with employees at Vertex, the opinions were comparable to those of the trending market. According to the articles, Swift, Rust, Python, Go, and Kotlin lead the pack for top and emerging developer languages.

Overview of all Research Article Rankings and Findings

Stack Overflow Ranking	11 new programming languages to make a coder's heart sing	The Most In-Demand Programming Languages for 2022	O'Reil Emerg Progr Langu
JavaScript	Apache Groovy	Go	Rust
HTML/CSS	Clojure	Python	Crysta
SQL	Crystal	Rust	Elixir
Python	Dart	C# (C Sharp)	Julia

TypeScript	Elixir	HTML/CSS	Kotlin
Java	F#	Java	Elm
Bash/Shell	Go	JavaScript	
C# (C Sharp)	Java 17	NoSQL	
C++	Julia	Perl	
PHP	Kotlin	SQL	
C	Pony		
PowerShell	PureScript		
Go	Python		
Rust	Reason		
Kotlin	Red		
Dart	Rust		
Ruby	Swift		
Assembly	TypeScript		
Swift			
R			
VBA			

MATLAB			
Lua			
Groovy			
Delphi			
Scala			
Objective-C			
Perl			
Haskell			
Elixir			
Julia			
Clojure			
Solidity			
LISP			
F#			
Fortran			
Erlang			
APL			
COBOL			
SAS			

OCaml			
Solidity			
VBA			

Stack Overflow Summary

When looking strictly at the articles, I found the most significant study was Stackoverflow's Survey. The findings are broken down individually below.

Programming, Scripting, and Markup Languages included in the Survey

APL	Clojure	Erlang	HTML/CSS	Lua
Assembly	COBOL	F#	Java	MATLA
Bash/Shell	Crystal	Fortran	JavaScript	Objecti C
C	Dart	Go	Julia	OCaml
C#	Delphi	Groovy	Kotlin	Perl
C++	Elixir	Haskell	LISP	PHP

Top Ranking:

Similar to our findings JavaScript took the lead in

Stack Overflow's survey. What was surprising was that HTML/CSS came in second, beating out Python by 7%.

Language	Percentage
JavaScript	65.36
HTML/CSS	55.08%
SQL	49.43%
Python	48.07%

Differences in Data depending on Coding Experience:

It's important to note that developers with varying experience levels voted differently. Stack Overflow found that 58% of new coders chose Python, while only 44% of professionals chose it. Other samples of the differences can be seen below.

Language	People Learning to Code	Professional Developers
Python	58%	44%
C# (C Sharp)	35%	20%
C	32%	17%
SQL	53%	38%
TypeScript	40%	15%
Bahs/Shell	29%	19%

What are the benefits of Top/Emerging Development Languages for Vertex?

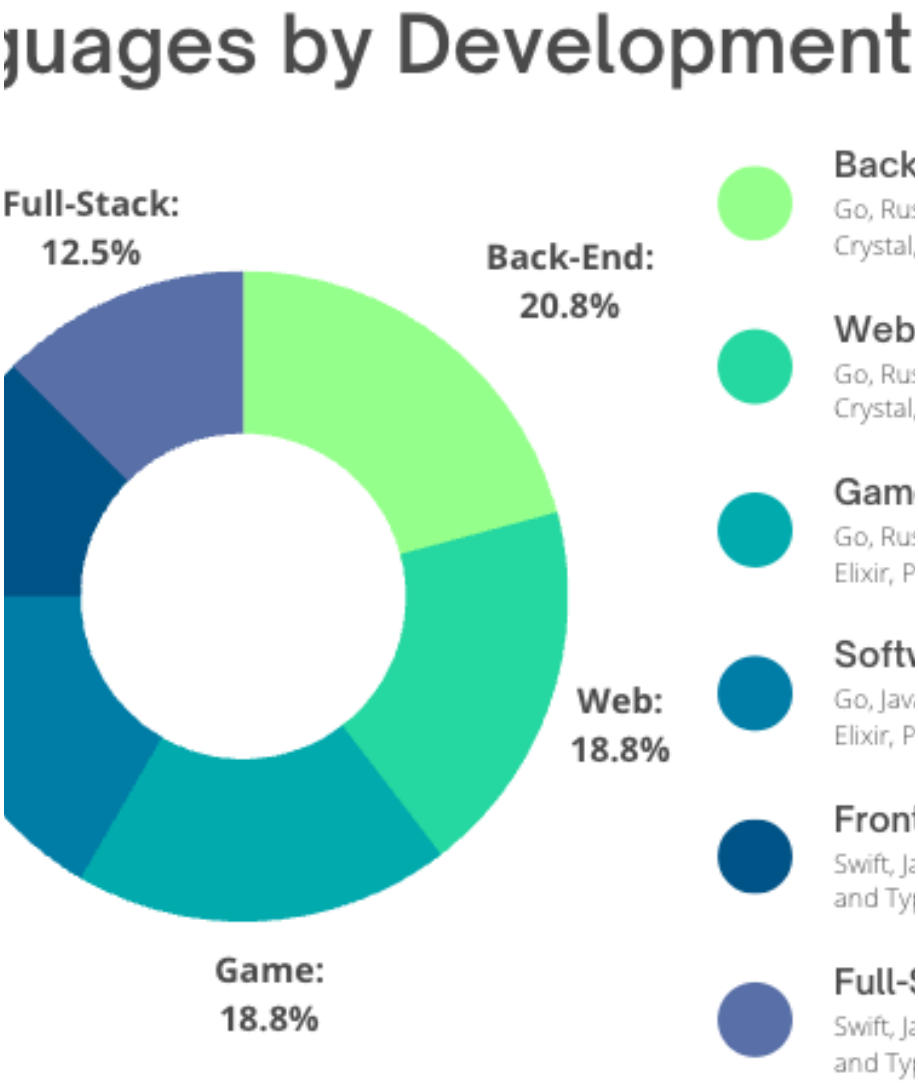
Development languages are beneficial for various use cases ranging from Software, Web, Back-end, Front-End, Full-stack, or Game development. Depending on the company's needs, different languages would prove beneficial. Below is the breakdown of the top languages and which uses apply to Vertex.

The top and Emerging 10 Developer Languages are:

- **Rust** – is used for systems programming, web development, and virtual reality.
- **Swift**- is used for mobile development and is specific to iOS.
- **Go**- is used for backend web development, system and network programming, and audio/video editing.
- **Java**- is used for mobile development, E-commerce, Finance, and application development.
- **JavaScript** –is used for front-end and back-end web and mobile development.
- **TypeScript** – is used for front-end web development.
- **Python** – is used for back-end web, desktop

application development, and data science.

- **Kotlin**- is used for backend, mobile, and web development. This language is used by over 60% of professional Android developers.
- **C#** - is used for virtual reality, desktop application, web, game, and mobile application development.
- **Julia**- is used for backend and web development.



Type of Development with their applicable Development Languages

Software	Web	Front-End
• Go	• Go • Rust • Swift	

• Java, • JavaScript • C# • Crystal • Elixir • Python • TypeScript	• Java • JavaScript • Crystal • Elixir • Python • TypeScript	• Swift • Java • JavaSc • Elixir • Pythor • TypeSc
Back-End	**Full-Stack**	**Game**
• Go • Rust • Swift • Java • JavaScript • C# • Crystal • Elixir • Python • TypeScript	• Swift • Java • JavaScript • Elixir • Python • TypeScript	• Go • Rust • Swift • Java • JavaSc • C# • Elixir • Pythor • TypeSc

How do the Top/Emerging Development Languages for Vertex benefit businesses?

Each of the benefits and drawbacks are broken down by language in the table below.

Development Language	Benefits	Drawbacks
	• Great	

Rust	memory efficiency • Fast and high performance • Secure • Portable	• It takes a time to b larger ecosyste • Single impleme
Swift	• Memory is automatically managed • Code errors are easily seen • Simplified syntax and grammar	• Limited library/in because newness • Lower nu experien professi
Go	• Good for large-scale projects • Impressive performance • Easy to learn and use	• Limited library/in because newness • Poor err handling
Java	• Easy to learn and use • Object Oriented • Platform independent • Secure • High-level programming language	• Poor me efficienc • Slow spe • Raising hardwar
	• Fast • Interoperable • Short	• Always v everyon can view

JavaScript	compilation time • Accelerated program execution	JavaScri • Substan amounts • Steep le curve
TypeScript	• Fast • Scalable • Fast refactoring • Early spotted bugs	• It is an o complica typing sy • Unsuppo abstract • Browser interpret users mu transpile
Python	• Easy to learn and use • Highly compatible with other languages • Widely applicable	• Poor me efficienc • Slow spe • Runtime
Kotlin	• Requires 40% fewer lines of code than Java • Bugs and errors are easier to find	• Slower compilat speed • Lower nu experien Kotlin professi
	• Easy to learn and understand • Scalable as engineers can adjust	• Needs to compile time a ch made

C#	and build on top of any C# program • Most widely used languages around the world	• Conside high-lev languag because syntax re human la
Julia	• Write easily understood code fast • Math friendly as users can utilize their scientific formulae as code	• Lack of s compilat means tl incompa other lar • Does no generate executab

Competitor activity

Based on our competitors, the top 5 languages are C#, JavaScript, Python, C, and Java. Two developer languages, JavaScript and C#, took the lead, with four out of the five competitors using them. Next came Python, with three out of five competitors using it. Two of the five competitors use C, Java, or PHP developer languages. Further breakdown of which competitors use which languages can be seen below with links to their GitHub.

COMPETITORS COMPARISON CHART

GES	AVALARA	SOVOS	THOMSON REUTERS	STRIP (TAXJA
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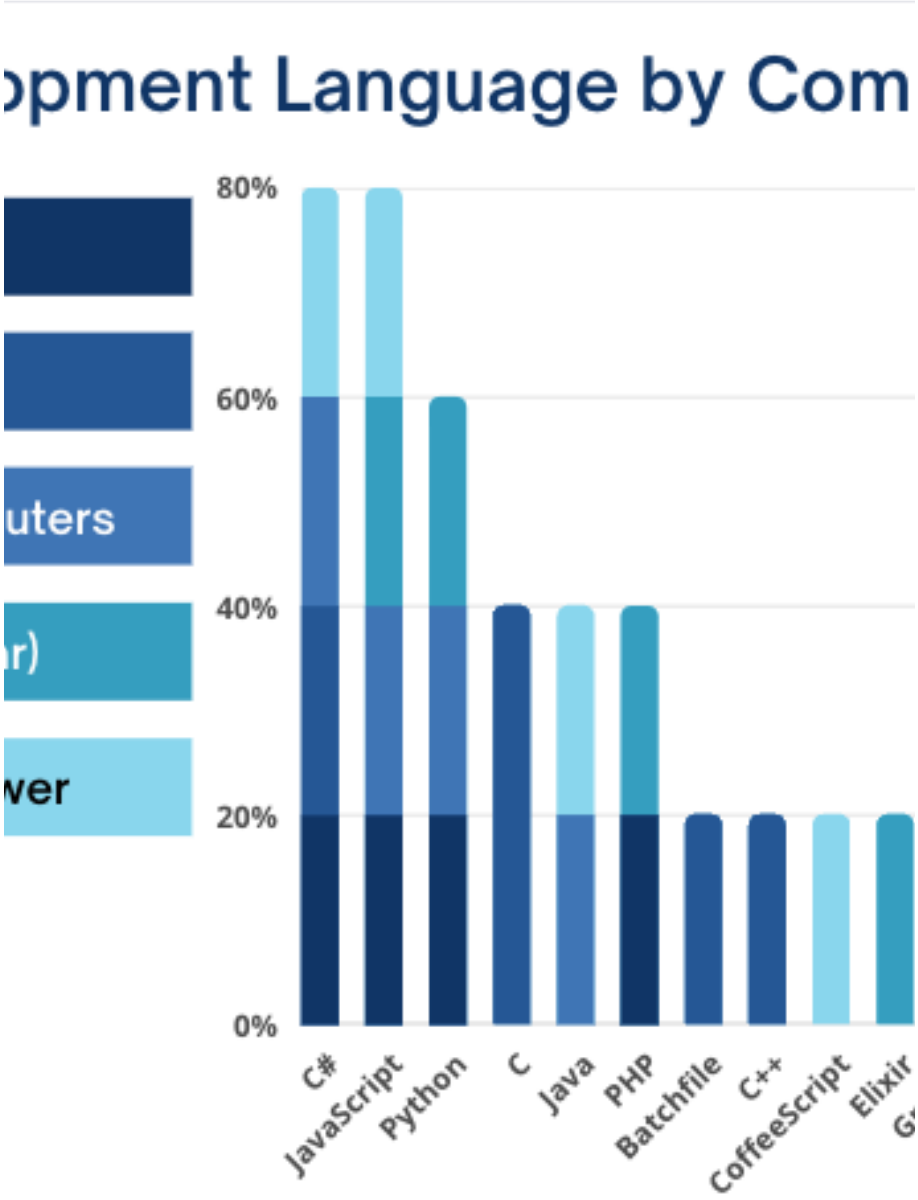


Top 15 languages that our competitors use in their ranking order. Further breakdown of our competitors can be seen below.

1. C#
2. JavaScript
3. Python
4. C
5. Java
6. PHP

7. Batchfile
8. C++
9. CoffeeScript
10. Elixir
11. Groovy
12. Pascal
13. PowerShell
14. Ruby
15. TypeScript

Avalara

Top Developer languages for Avalara include C#, Java, Javascript, Python, PHP, and Ruby. This is based on their GitHub. Job descriptions for developers at Avalara focus on experience with "ES'15 vanilla Javascript" and specifically request experience with "Javascript frameworks - React and Node."

Avalara Links:	Avalara Dev Language-Specific GitI Links
• https://developer.avalara.com/sdk/ • https://github.com/Avalara	• Java • PHP • C# • Type • Pyth

Sovos

Sovos job descriptions focused on developers that

had experience with "SQL Scripting, JavaScript, and Python." top Developer languages for Sovos are C, Pascal, C#, C++, and Batchfile. Aside from these, Sovos wrote most of the language samples in JSON programming language. They were explicitly related to Global VAT and APIs.

Sovos Links:
• https://developer.sovos.com/ • https://github.com/Sovos-Compliance • https://developer-guide.sovos.com/simple-connect-api/getting-started/quickstart-guide-for-sandbox-environment/ • https://developer.sovos.com/apis/configuration

Thomson Reuters

The top Developer languages for Thomson Reuters are JavaScript, Java, Python, Groovy, and C#. While their GitHub showed these, other languages were specified within their job descriptions, including "Java" and "RESTful web services and web stack such as HTML, CSS, and Javascript."

Thomson Reuters Links:	T D L S L

• https://github.com/thomsonreuters?language=javascript • https://developerportal.thomsonreuters.com/	

Stripe (TaxJar)

Based on Stripe's GitHub, the top developer languages include Elixir, Ruby, PHP, JavaScript, and Python. While their GitHub highlighted these, their job description focuses on "Ruby, with some Scala and Go."

Stripe (TaxJar)Stripe Links:	Stripe (TaxJar) Developer Language-Specific GitHub Links:
• https://github.com/taxjar	• Elixir • Ruby • PHP • JavaScript • Python

Wolters Kluwer

The top developer languages for Wolters Kluwer include C#, JavaScript, PowerShell, CoffeeScript,

and Java. These top languages were confirmed by their GitHub and job description postings which focused on experience with ".NET Framework, REST, and C#."

Wolters Kluwer links:
• https://github.com/Twinfield • https://github.com/WoltersKluwerSoftwareUndSer

Potential/in-progress Vertex projects

Some research has already been completed on preferred microservices frameworks and preferred languages. This research is a work in progress by Ed Burnette, Kent Kingery, Brian Slocum, Andrew Glatts, Brent MacLeod, and Dan Greene.

Preferred frameworks for microservices findings:

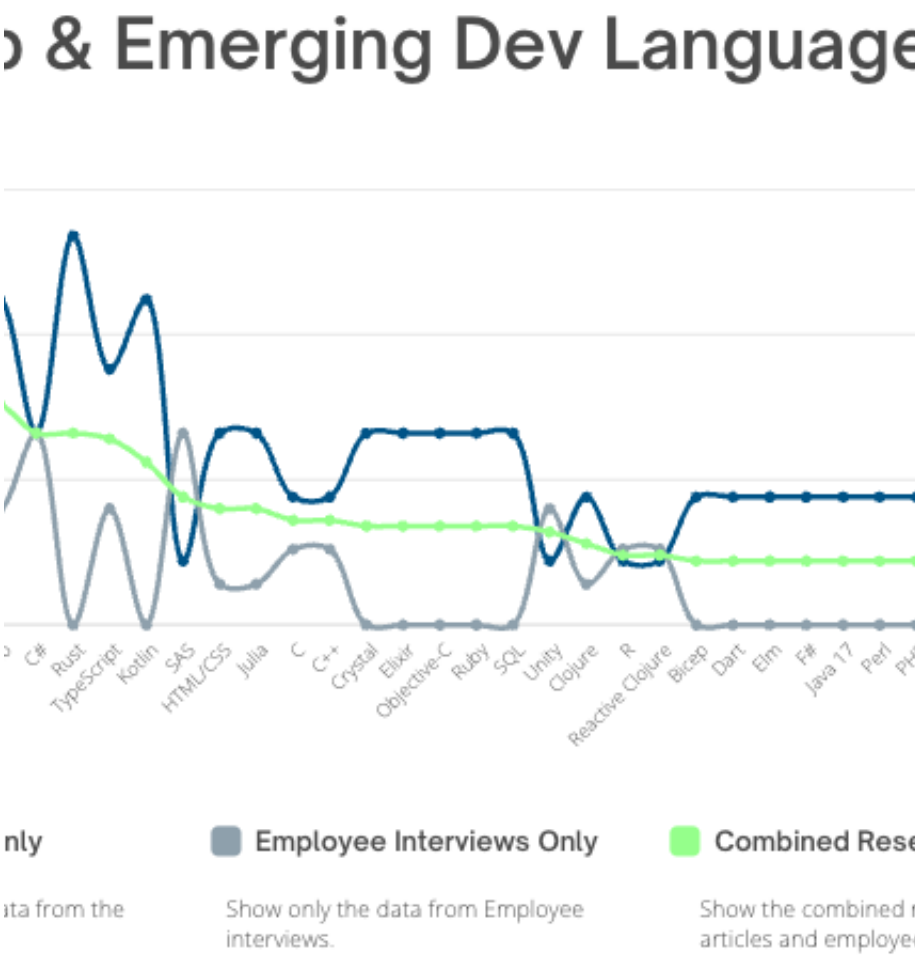
If a microservice must be written in Java, use

Quarkus. Otherwise, use Gofiber. Compared to Java, Go provides a 2x increase in speed, a 2x reduction in size (i.e., half the size), and a 50x reduction in memory. Java programmers can pick up Go programming skills in a couple of weeks.

Preferred languages for microservices findings:

Adopt	**We should use these in our projects**	**Proposed: JDK11, C# .NET 6**
Trial	Build expertise and use where the risk is low	Proposed: Go, GraalVM, JDK17
Assess	Worth exploring to see how it can be used	Proposed: Node.JS, Python 3
Hold	Not recommended for new projects, but ok for existing ones	Proposed: JDK8, Clojure, C# .NET older than 6

Conclusion



Viewing all the aspects that can impact our decision when choosing the best developer languages is essential. My research found that the Top and Emerging 10 Developer Languages are Rust, Swift, Go, Java, JavaScript, TypeScript, Python, Kotlin, C#, and Julia. Each has its benefits and drawbacks. We need to look at the research, Vertex employee opinion, and our analysis of our competitors to make the best decision.

Research: When looking strictly at the research, we find that the top five developing languages are Rust,

Swift, Go, Python, and Kotlin.

Vertex Employee- When looking strictly at the Vertex Employee opinions, we find that the top five developing languages are Rust, Swift, Go, Java, and JavaScript. We know that some plans have been put in place to adopt Go, but it would also be essential to add Rust as well.

Competitor Analysis: Our competitors focus their efforts on C#, JavaScript, Python, C, and Java . Our competitor's language shows us what typical customers are looking for. It is crucial to remain up to date but not be limited by the choices of our competitors.

When looking at all the data, it is easy to see that we are set up in an optimal position. We are comfortable with languages our research supports as being the top and emerging languages and are efficient in the languages used by our competitors.

References

The articles that I used for this research include:

- Stackoverflow Ranking
- 11 new programming languages to make a coder's heart sing
- 18 New Programming Languages to Learn
- The Most In-Demand Programming Languages for 2022
- O'Reilly Emerging Programming Languages

- Top programming languages that will rule in 2022
- Programming Languages May Finally Be Reaching a Status Quo
- Redmonk Language Rankings 2022
- Tech Radar

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