TECHNOLOGY USAGE: CURRENT, FUTURE & DEMOGRAPHICS

Developer Survey Dashboard Summary (Cognos)

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Date: 13-Sep-2025

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EXECUTIVE SUMMARY

- **Stacks: JS/TS** and **C#/.NET** lead current and future language interest; **Python** remains highly attractive.
- **Databases: PostgreSQL** dominates future demand; **SQL Server/MySQL** remain significant today; polyglot pairs (Postgres+Redis/SQLite) appear.
- **Platforms: AWS** is most used and most desired; **Azure** and **GCP** follow.
- **Frameworks:** Strong signals for **React**, **Spring Boot**, **ASP.NET Core**, **Node.js**, **FastAPI**.
- **Demographics:** Largest cohorts **25–34** and **35–44**; education led by **Bachelor's**, then **Master's**.
- **Implication:** Invest training and hiring in **AWS + PostgreSQL + JS/TS + C# + Python**; maintain SQL as a baseline skill

INTRODUCTION

- **Purpose:** Summarize current usage and future interest in languages, databases, platforms, and frameworks; profile respondent demographics.
- **Audience:** Hiring managers, practice leads, and L&D teams planning skills, staffing, and training.
- **Value:** Aligns talent strategy with market interest; informs stack choices for upcoming projects and upskilling.

METHODOLOGY

Data Sources:

- Developer survey (survey_data_updated.csv) analyzed in **IBM Cognos Analytics**.
- **Job postings** (job-postings.xlsx) via API/web queries; **popular languages** salaries (popular-languages.csv/HTML).

Collection/Wrangling:

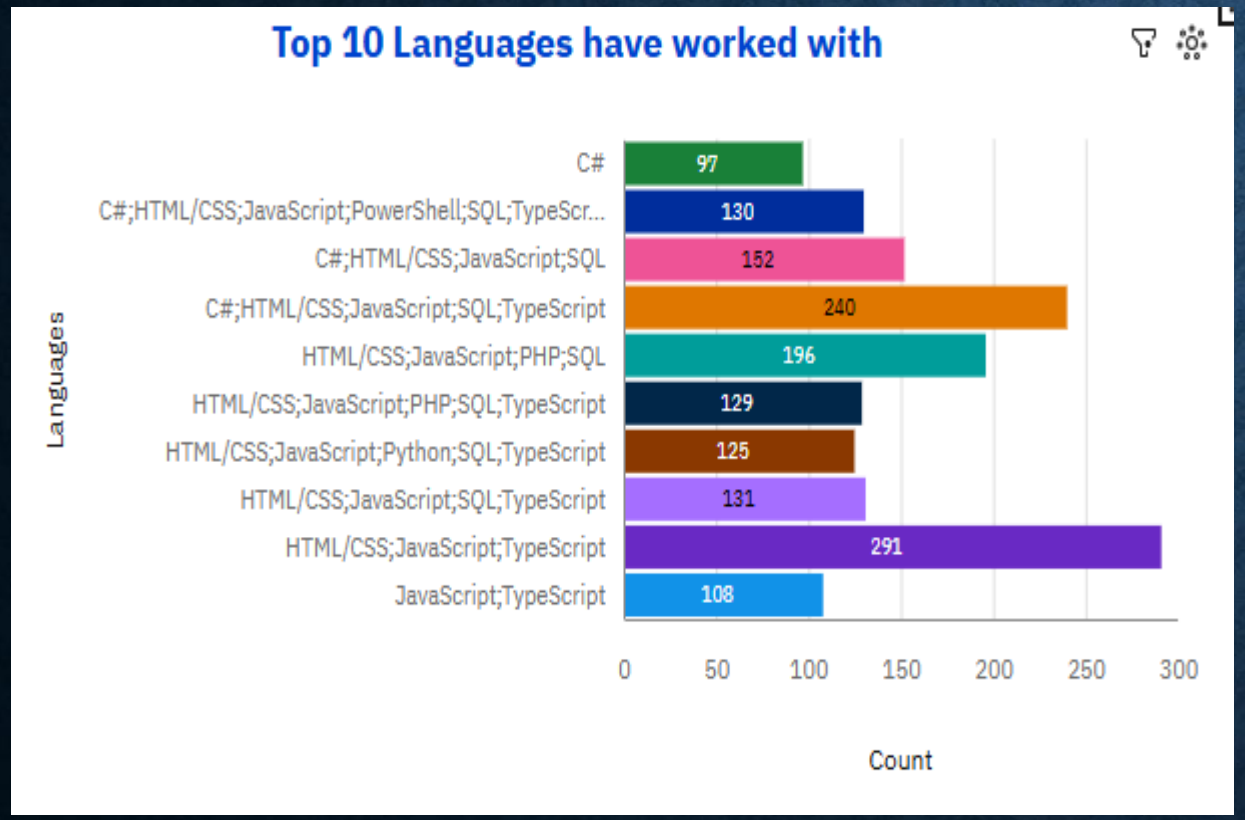
- Split multi-select tech fields on **';'**, **trim**, drop blanks; compute **Top-10** counts.
- Parsed salary strings ($, commas, *k*, ranges) to numeric; validated outliers (e.g., "R" false positives) with strict matching.
- Built 3 dashboards (2×2 panels) with value labels and clear titles.

Tools:

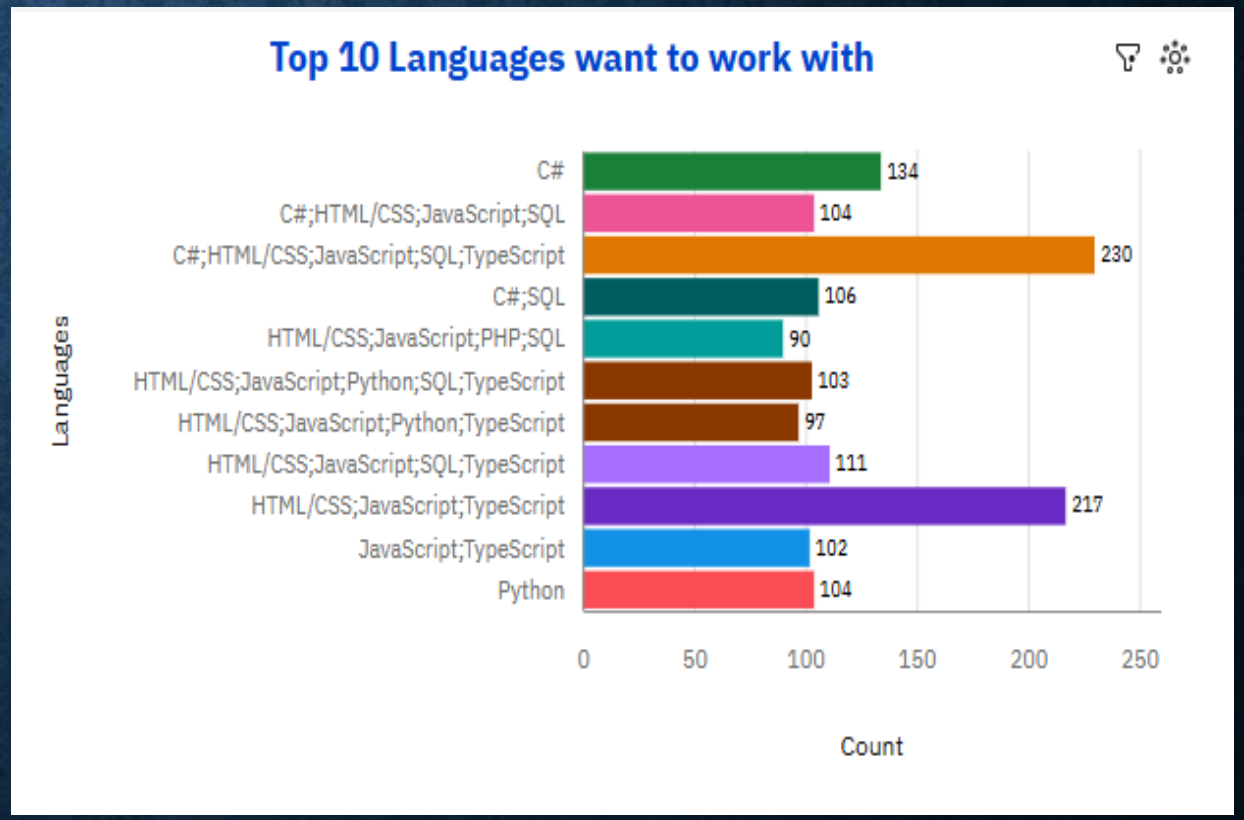
- Cognos (dashboards), Python/pandas & Matplotlib (cleaning + plots).

PROGRAMMING LANGUAGE TRENDS

Current Year (worked with)



Next Year (want to work with)



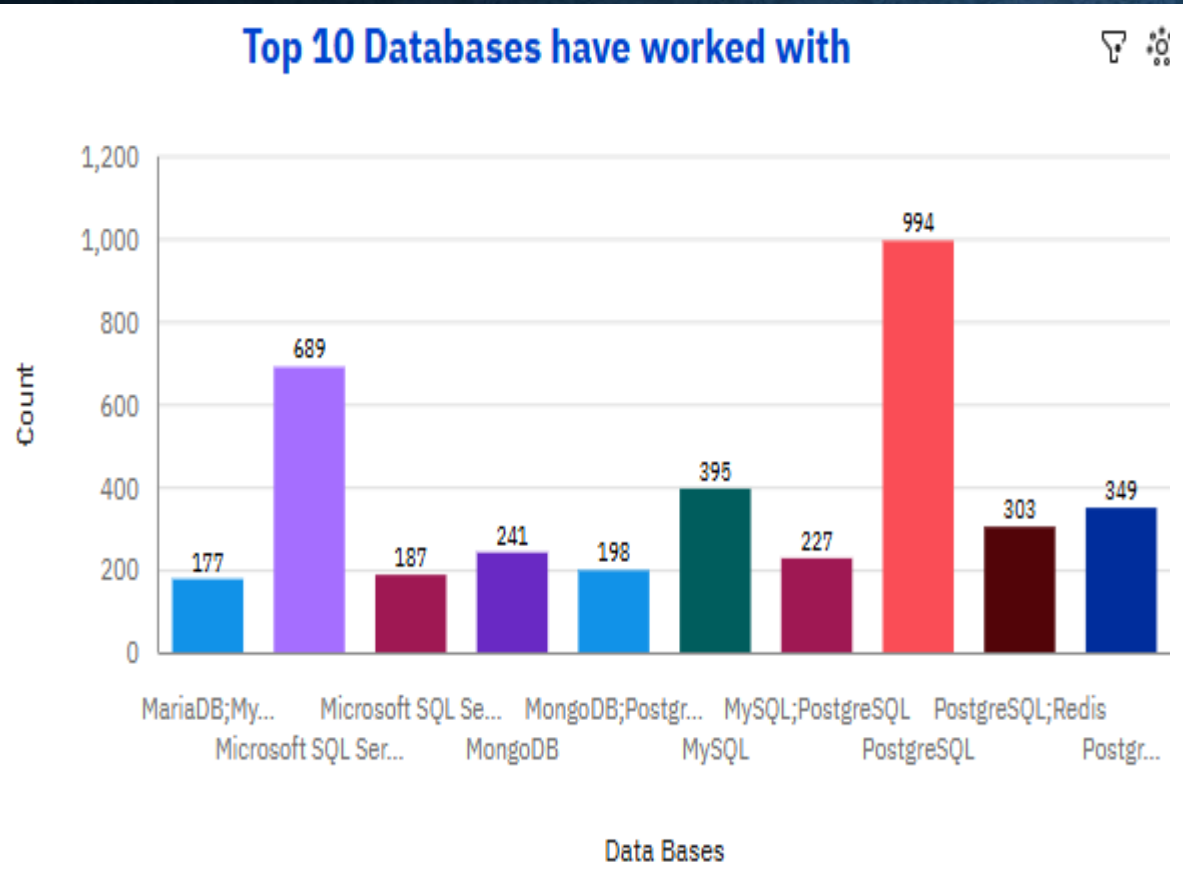
TOP 10 PROGRAMMING LANGUAGES WORKED WITH TRENDS - FINDINGS & IMPLICATIONS

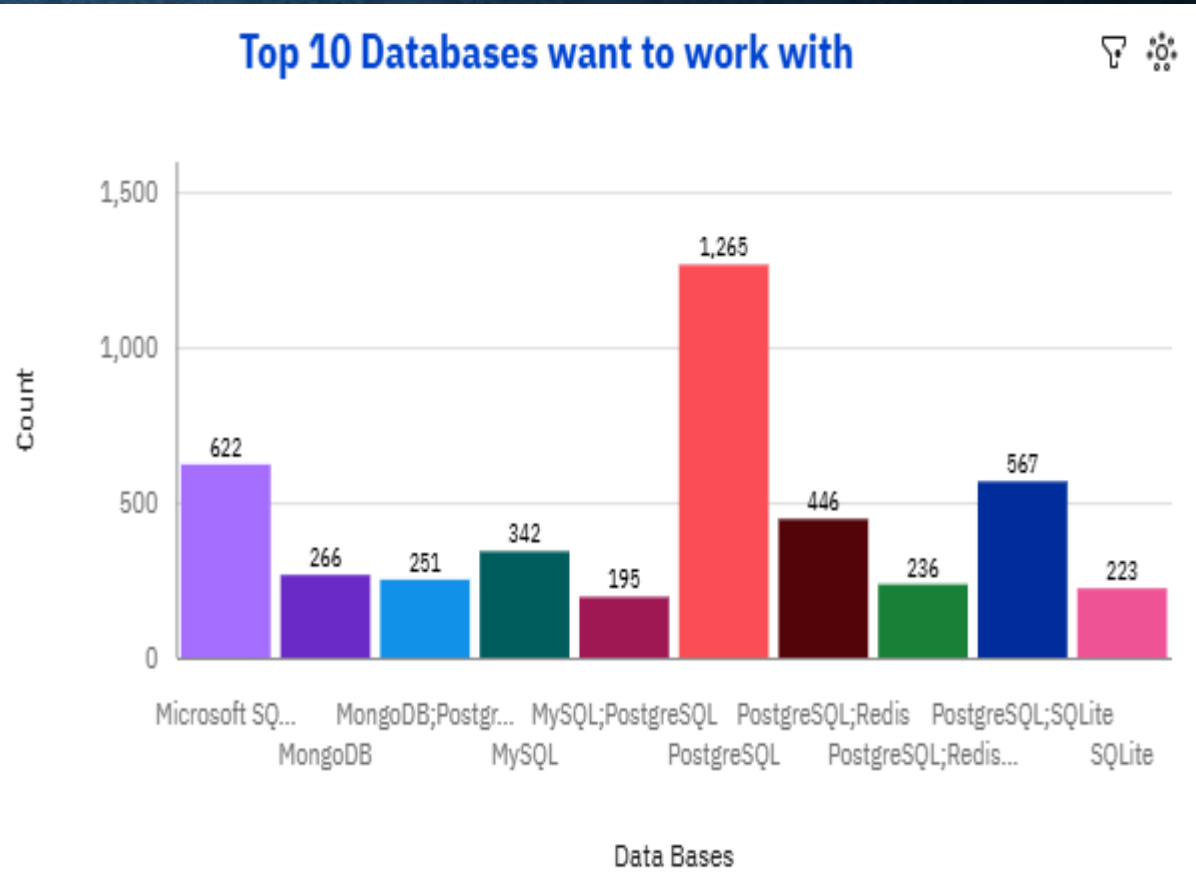
Finding	Implication
JS/TS web stack dominates (e.g., HTML/CSS; JavaScript; TypeScript).	Keep JS/TS as core; prioritize hiring/training and standards around TS-based front-ends.
Enterprise .NET full-stack combos are very strong (C#; HTML/CSS; JavaScript; SQL; TypeScript).	Continue investing in C#/.NET APIs paired with TS front-ends; staff cross-functional squads.
PHP appears in popular current combos (…JavaScript; PHP; SQL).	Plan maintenance for PHP apps; begin modernization/migration paths.
Python shows in mixed stacks (…JavaScript; Python; SQL; TypeScript) rather than standalone.	Support Python for data/automation/back-end services, but expect it mainly alongside JS/TS.
SQL present across many combos.	Keep SQL/data-modeling as a baseline competency for all devs.
PowerShell appears in a long current combo only.	Likely legacy/ops usage; shift automation to more portable tools where possible.
Multi-tech combos > single languages.	Hire and train for T-shaped, polyglot developers comfortable across front-end, back-end, and DB.

TOP 10 PROGRAMMING LANGUAGES WANT TO WORK WITH TRENDS - FINDINGS & IMPLICATIONS

Finding	Implication
JS/TS web stack remains a top desire (HTML/CSS; JavaScript; TypeScript).	Continue deepening TS/JS capability (frameworks, testing, performance).
.NET remains highly desired (C#; HTML/CSS; JavaScript; SQL; TypeScript) and **standalone C#** interest rises.	Expand .NET hiring/training; create back-end C# growth paths.
Python appears as a clear standalone interest.	Add/scale Python learning tracks (APIs, data, automation); seed Python projects.
PHP combos drop in desirability compared to current.	De-emphasize new PHP builds; offer reskilling from PHP to JS/TS, C#, or Python.
SQL still pervasive in desired combos.	Reinforce SQL fundamentals and query optimization training.
Desire continues to favor **polyglot stacks** (combos common).	Structure roadmaps and curricula for cross-stack fluency; encourage full-stack rotations.

DATABASE TRENDS





TOP 10 DATABASES HAVE WORKED WITH - FINDINGS & IMPLICATIONS

Finding	Implication
PostgreSQL is the top current DB (~994).	Keep Postgres as a primary platform; invest in tuning, extensions, and managed Postgres.
Microsoft SQL Server is widely used (~689).	Maintain strong MS SQL support; plan integration/migration paths where desired.
MySQL has broad current usage (~395).	Continue MySQL ops/readiness; not the main growth engine but still core.
MongoDB appears but behind the top RDBMS.	Use MongoDB selectively for document use-cases; avoid defaulting to it.
PostgreSQL+Redis / PostgreSQL+SQLite combos are present (303 / 349).	Encourage polyglot patterns (Postgres core + Redis cache/queues; SQLite for edge/offline).
MariaDB shows up mainly in combos, not leading.	Limit new MariaDB starts; standardize on Postgres/MySQL for relational.

TOP 10 DATABASES WANT TO WORK WITH - FINDINGS & IMPLICATIONS

Finding	Implication
PostgreSQL dominates future interest (~1,265).	Prioritize Postgres training, migrations, and new builds on Postgres.
PostgreSQL+SQLite (~567) and PostgreSQL+Redis (~446) are popular future combos.	Plan architectures with Postgres core plus SQLite (edge) and Redis (cache/streaming).
Microsoft SQL Server still has strong interest (~622).	Continue MS SQL capability for enterprise workloads; support hybrid landscapes.
MySQL interest remains (solo ~342; combo ~195).	Keep MySQL competency; use where it fits legacy or specific ecosystems.
MongoDB interest is moderate (~251).	Apply for document-heavy schemas; avoid one-size-fits-all adoption.
SQLite also appears standalone (~223).	Enable local/embedded/offline apps; add tooling/pipelines for sync patterns.

DASHBOARD TAB 1

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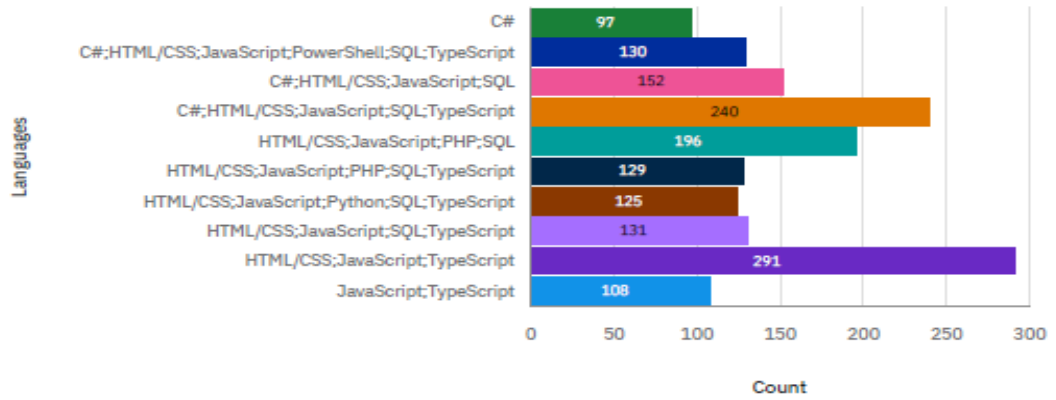
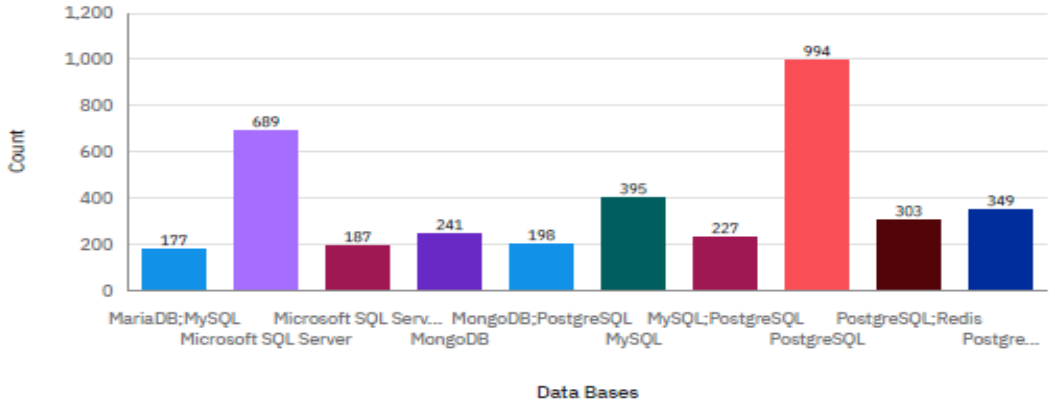
Technology Usage

Current Technology Usage

Top 10 Languages have worked with



Top 10 Databases have worked with



Top 10 Platforms have worked with

Top 10 Webframes have worked with

DASHBOARD TAB 2

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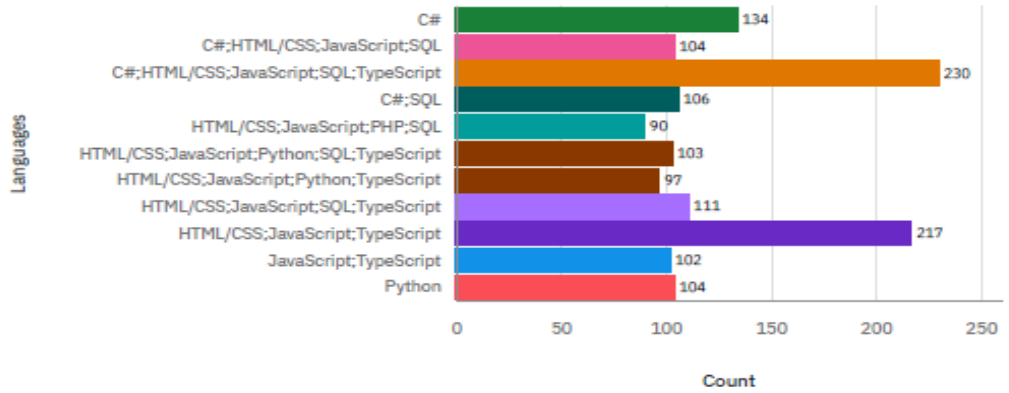
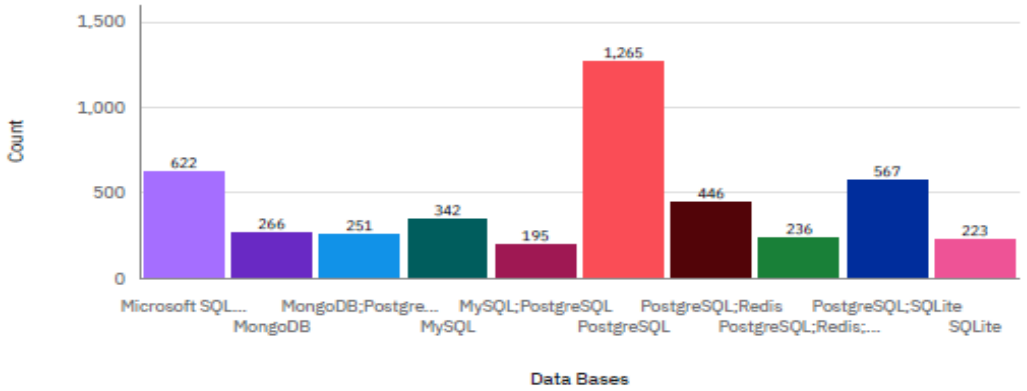
Technology Usage

Future Technology Trend

Top 10 Languages want to work with

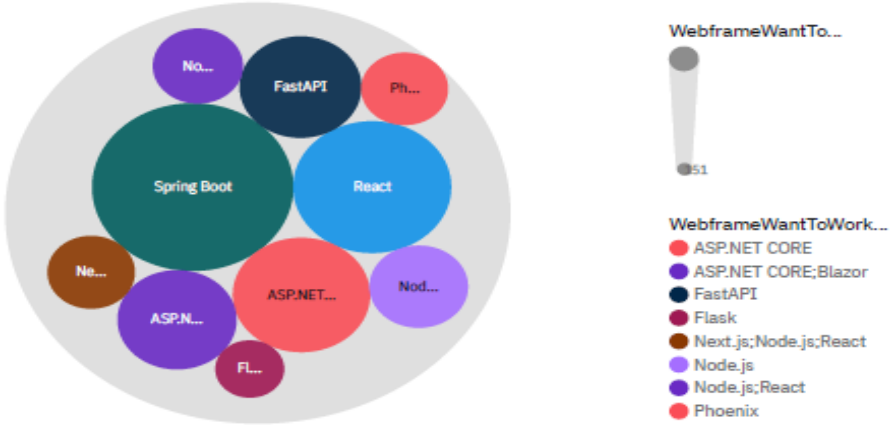


Top 10 Databases want to work with



Top 10 Platforms want to work with

Top 10 web frameworks want to work with



DASHBOARD TAB 3

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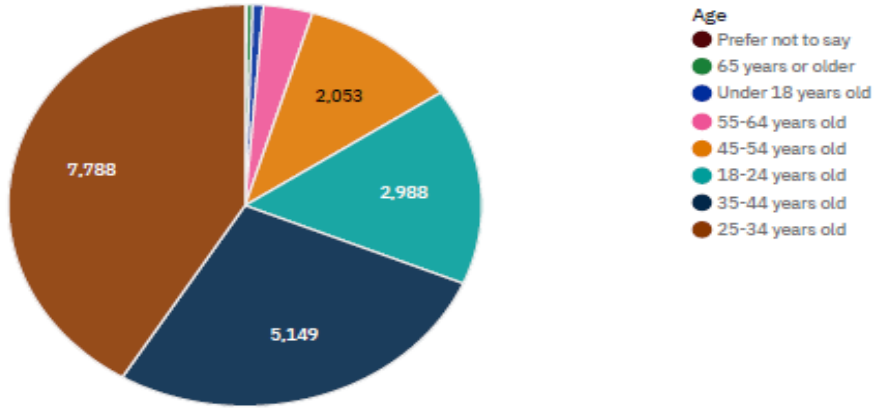
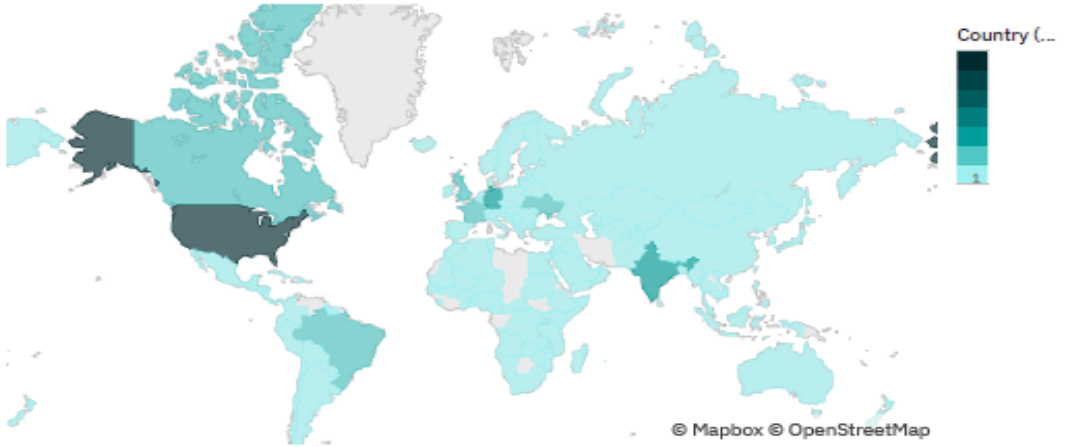
Technology Usage

Demographics

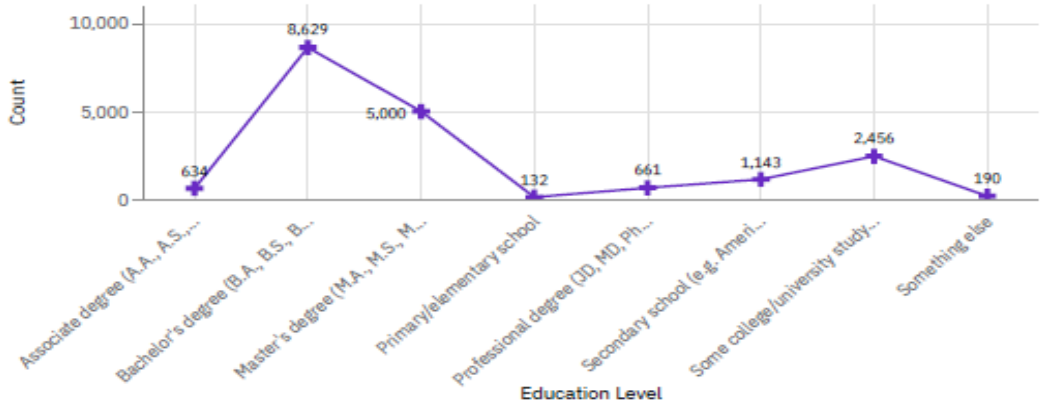
Respondent distribution by Age



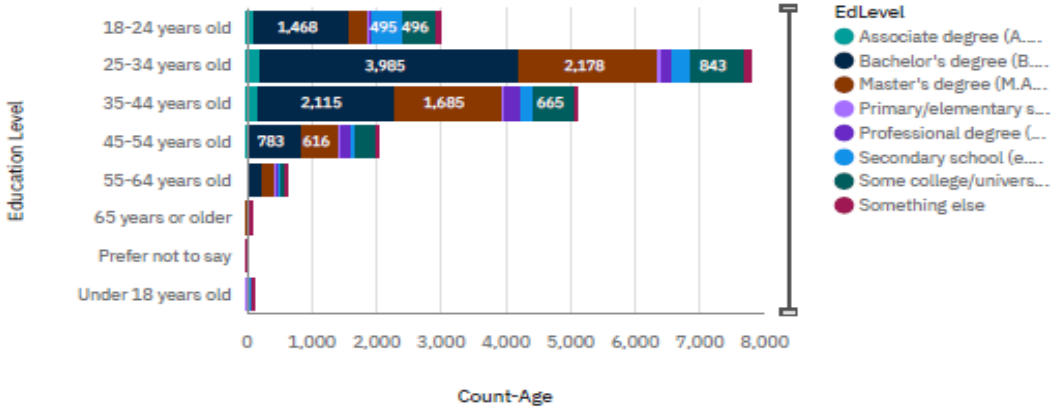
Respondent Count by Country



Respondent distribution by Formal Education Level



Respondent Count by Age, classified by Education Level



DISCUSSION

Current Technology Usage

- **Languages:** JS/TS web stack leads (e.g., *HTML/CSS; JavaScript; TypeScript*). Strong **.NET full-stack** combos (*C#; TypeScript*) also rank high; **PHP** appears but behind leaders.
- **Databases: PostgreSQL** is the top RDBMS; **SQL Server** and **MySQL** remain widely used; polyglot mixes (Postgres+Redis/SQLite) are present.
- **Platforms: AWS** is most prominent, followed by **Microsoft Azure** (and **Google Cloud**).
- **Web frameworks:** Big bubbles for **Spring Boot** and **React**, with **ASP.NET Core**, **Node.js**, **FastAPI**, and **Express** in the pack.

Future Technology Trend

- **Languages (desire):** Momentum continues for **JS/TS** and **C#**; **Python** interest rises.
- **Databases (desire):** Clear tilt to **PostgreSQL** (dominant), with **Postgres+SQLite** and **Postgres+Redis** popular combos.
- **Platforms (desire): AWS** still the #1 target; **Azure** and **Google Cloud** follow.
- **Web frameworks (desire):** Interest clusters around **React**, **Spring Boot**, **ASP.NET Core**, **FastAPI**.

Demographics

- **Age:** Largest cohorts are **25–34** and **35–44**, then **18–24**; seniors and minors are small shares.
- **Country:** Broad global distribution with strong concentrations in North America, Europe, and South Asia.
- **Education: Bachelor's** is the largest group, followed by **Master's**; other levels are smaller.
- **Age × Education:** Bachelor's-level respondents dominate the **25–34** and **35–44** groups.

CURRENT TECHNOLOGY USAGE - FINDINGS & IMPLICATIONS

Area	Key Finding	Implication
Languages	**JS/TS web stack** leads; **C#/.NET full-stack** very strong; **PHP** appears but lower.	Keep **JS/TS** and **C#/.NET** as primary stacks; put PHP in maintenance & plan modernization.
Databases	**PostgreSQL** tops usage; **SQL Server** and **MySQL** widely used; polyglot mixes (Postgres+Redis/SQLite) present.	Invest in **PostgreSQL** excellence; maintain SQL Server/MySQL; use **Redis/SQLite** tactically.
Platforms	**AWS** dominates with **Azure** next; **GCP** visible.	Keep **AWS-first** standards; ensure Azure/GCP depth for partner/customer needs.
Web Frameworks	Big bubbles for **Spring Boot** and **React**; **ASP.NET Core**, **Node.js**, **FastAPI**, **Express** active.	Resource squads across **Java/Spring**, **React/Node**, **ASP.NET Core**; enable **FastAPI/Express** for services.
Skills Pattern	**SQL** appears across stacks; multi-tech **combos > single languages**.	Make **SQL** baseline; hire/train **T-shaped** polyglot developers.

FUTURE TECHNOLOGY TREND - FINDINGS & IMPLICATIONS

Area	Key Finding	Implication
Languages (Desire)	**JS/TS** and **C#** remain top; **Python** interest rises; standalone **C#** demand increases.	Expand learning paths & roles in **TS/React/Node**, **C#/.NET**, and **Python** (APIs/data/automation).
Databases (Desire)	**PostgreSQL** is the clear target; combos **Postgres+SQLite** and **Postgres+Redis** popular; MS SQL still strong; MySQL/Mongo moderate.	Default **new builds to Postgres**; architect **SQLite (edge/offline)** and **Redis (cache/streams)**; keep MS SQL/MySQL competency.
Platforms (Desire)	**AWS** remains #1; **Azure** and **GCP** follow.	Prioritize **AWS certifications/patterns**; curate Azure/GCP upskilling as secondary.
Web Frameworks (Desire)	Interest clusters around **React**, **Spring Boot**, **ASP.NET Core**, **FastAPI**.	Focus enablement/hiring on these frameworks; standardize toolchains.
Overall Direction	Continuity from current → future with a decisive **tilt to PostgreSQL** and steady **AWS / JS/TS / C#**.	Concentrate investments on **PostgreSQL**, **AWS**, **JS/TS + C#**; grow **Python**; support polyglot stacks.

DEMOGRAPHICS - FINDINGS & IMPLICATIONS

Metric	Key Finding	Implication
Age	Largest cohorts: **25–34**, then **35–44**, then **18–24**.	Aim upskilling and career paths at **early–mid career** talent.
Country	Broad global spread with strong NA, Europe, South Asia presence.	Schedule programs across **time zones**; localize examples where useful.
Education	**Bachelor's** is the largest group, followed by **Master's**.	Tailor curriculum depth and prerequisites to **Bachelor's/Master's** audiences.
Age × Education	Bachelor's dominates within **25–34** and **35–44** groups.	Target certifications/advanced tracks to these cohorts for maximum impact.
Workforce Planning	Demographic base supports scalable training and cross-stack growth.	Build **pipeline programs**, mentorship, and rotations to develop **full-stack** capability.

CONCLUSION

- **Where we are now (Current Usage):**
  JS/TS web stack and **C#/.NET** dominate; **PostgreSQL** is the leading DB with **SQL Server/MySQL** still significant; **AWS** is the most-used platform; frameworks cluster around **Spring Boot**, **React**, **ASP.NET Core**, **Node.js**, **FastAPI**
- **Where we're heading (Future Trend):**
  Continued preference for **JS/TS** and **C#**, with rising **Python** interest. **PostgreSQL** is the clear target DB (often paired with **Redis** or **SQLite**). **AWS** remains the top aspiration; **Azure/GCP** follow. Framework interest centers on **React**, **Spring Boot**, **ASP.NET Core**, **FastAPI**
- **Who we're building for (Demographics):**
  Largest cohorts are **25–34** and **35–44** with **Bachelor's** then **Master's** degrees; respondents span North America, Europe, and South Asia

- **Implications:**
- Standardize new builds on **PostgreSQL**; keep **SQL Server/MySQL** well supported.
- Keep **AWS-first** patterns; maintain depth in **Azure/GCP**.
- Prioritize skills and hiring in **TypeScript/React/Node**, **C#/.NET**, and **Python**; make **SQL** a baseline skill.
- Encourage **polyglot** designs (Postgres core + **Redis** cache/streams; **SQLite** for edge/offline)

- **Next 60–90 days (actions):**
  - Launch focused upskilling: **AWS + Postgres + TS/React + C# + SQL**.
  - Identify 2–3 services to migrate/pilot on **Postgres** (with Redis/SQLite where useful).
  - Align hiring reqs to target stacks; add a Python track for data/APIs.
  - Define success metrics: time-to-first-commit on new stack, defect rate, perf gains, migration milestones

APPENDIX

Data & Prep

- Source: survey_data_updated.csv (**18,845 rows**, **114 columns**).
- Multi-select tech fields are **semicolon-delimited (;)**; split to rows, **trim**, then **count** values.
- Removed null/blank tokens before ranking **Top 10**

Columns used

- Current usage: LanguageHaveWorkedWith, DatabaseHaveWorkedWith, PlatformHaveWorkedWith, WebframeHaveWorkedWith.
- Future trend: LanguageWantToWorkWith, DatabaseWantToWorkWith, PlatformWantToWorkWith, WebframeWantToWorkWith.
- Demographics: Age, Country, EdLevel

Dashboard structure (Cognos, 3 tabs, 2×2 each)

- *Current Technology Usage:* Bar (Languages), Column (Databases), Word Cloud (Platforms), Hierarchy Bubble (Webframes).
- *Future Technology Trend:* Bar (Languages Want), Column (Databases Want), Treemap (Platforms Want), Hierarchy Bubble (Webframes Want).
- *Demographics:* Pie (Age), Map (Country), Line (Education distribution), Stacked Bar (Age × Education).

APPENDIX

Export (for grading/linking)

- Dashboard → **Share** → **Export** (Landscape) → **Save as PDF** → (Next steps optional) upload to GitHub → share **read-only link**

Limitations / Notes

- Self-reported survey; **frequency ≠ proficiency**.
- “Combos” (e.g., HTML/CSS; JavaScript; TypeScript) reflect multi-select responses, not strict stacks.
- Top-10 truncation hides long-tail technologies.
- Country names must match Cognos map expectations

Glossary

- *HaveWorkedWith* = current usage; *WantToWorkWith* = future intent.
- *Hierarchy Bubble* = bubble size by count; *Treemap* = area by count with hierarchical grouping.

JOB POSTINGS

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 descending order of salary

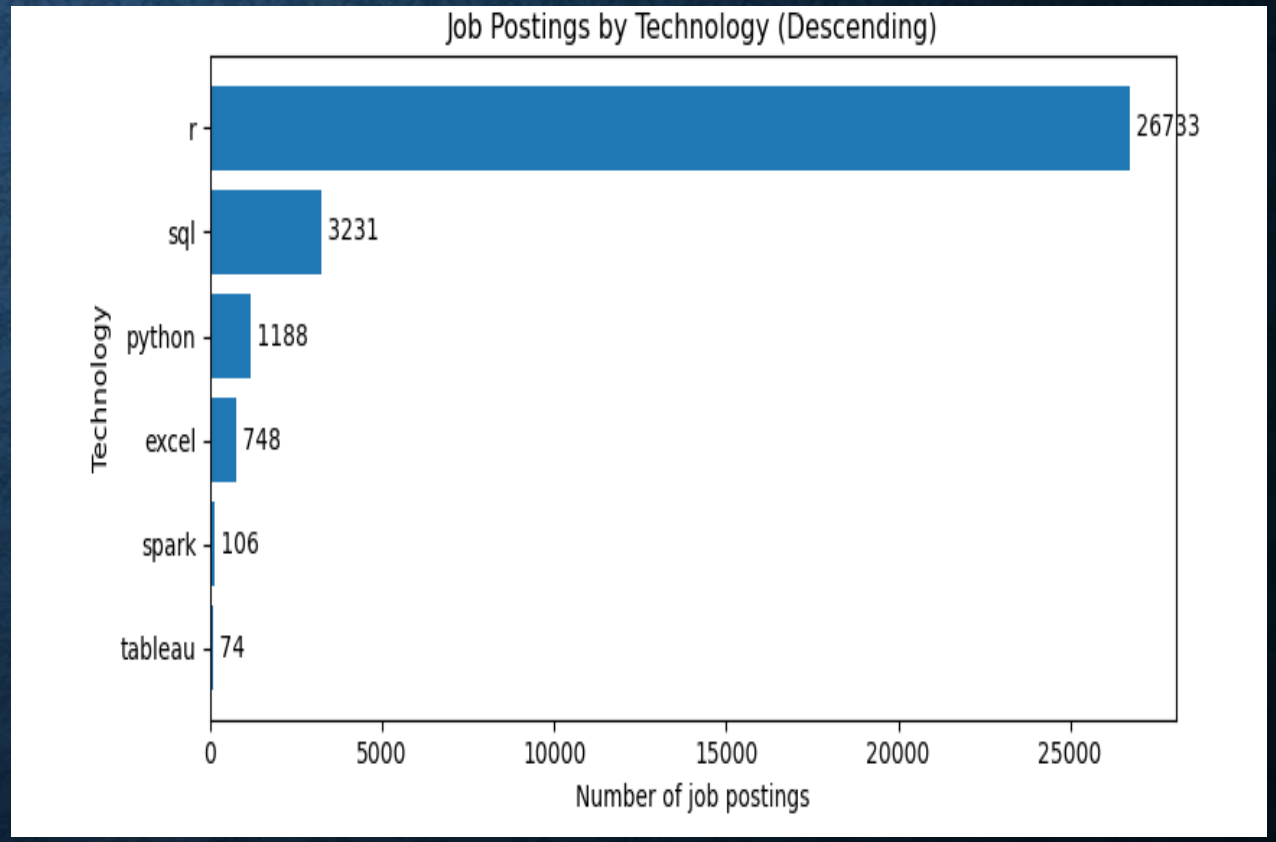
Total postings analyzed: 32,080

Share by tech:

- **R:** 26,733 (**83.3%**) → *suspiciously high*
- **SQL:** 3,231 (**10.1%**)
- **Python:** 1,188 (**3.7%**)
- **Excel:** 748 (**2.3%**)
- **Spark:** 106 (**0.3%**)
- **Tableau:** 74 (**0.2%**)

Key findings

- The bar for **R** dwarfs everything else; this is **very likely a query artifact** (single-letter term “r” matching unrelated text).
- Ignoring the R anomaly, the demand picture is: **SQL > Python > Excel > Spark > Tableau**.
- Even without R, **SQL** clearly leads—consistent with data roles where SQL is foundational.
- **Python** shows solid demand; **Excel** remains relevant; **Spark** and **Tableau** are comparatively niche in this snapshot.



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 descending order of salary.

- **Top pay: Swift ($130.8k)** leads—Apple/iOS specialization commands a premium.
- **High tier (~$111–114k): Python, C++**, and **JavaScript** cluster just below Swift → strong demand across data/ML (Python), systems/fintech (C++), and web (JS).
- **Mid tier (~$94–101k): Java ($101k)** then **Go ($94k)** → solid enterprise/server-side roles; Go is strong but below Python/JS in this sample.
- **Data science niche: R ($92k)** trails Python, reflecting broader industry use of Python for DS/ML.
- **Enterprise stack: C# ($88.7k)** sits mid-low versus Java in this set.
- **Entry/commodity web & core skill: PHP ($84.7k)** and **SQL ($84.8k)** are lowest—valuable, but typically not the main driver of comp when listed alone.
- **Spread:** gap between top and bottom ≈ **$46k** (~**54%** over the lowest), so language choice can materially affect salary bands