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"Smarter Data, Faster Insights: Rethinking Industrial Analytics Architecture"

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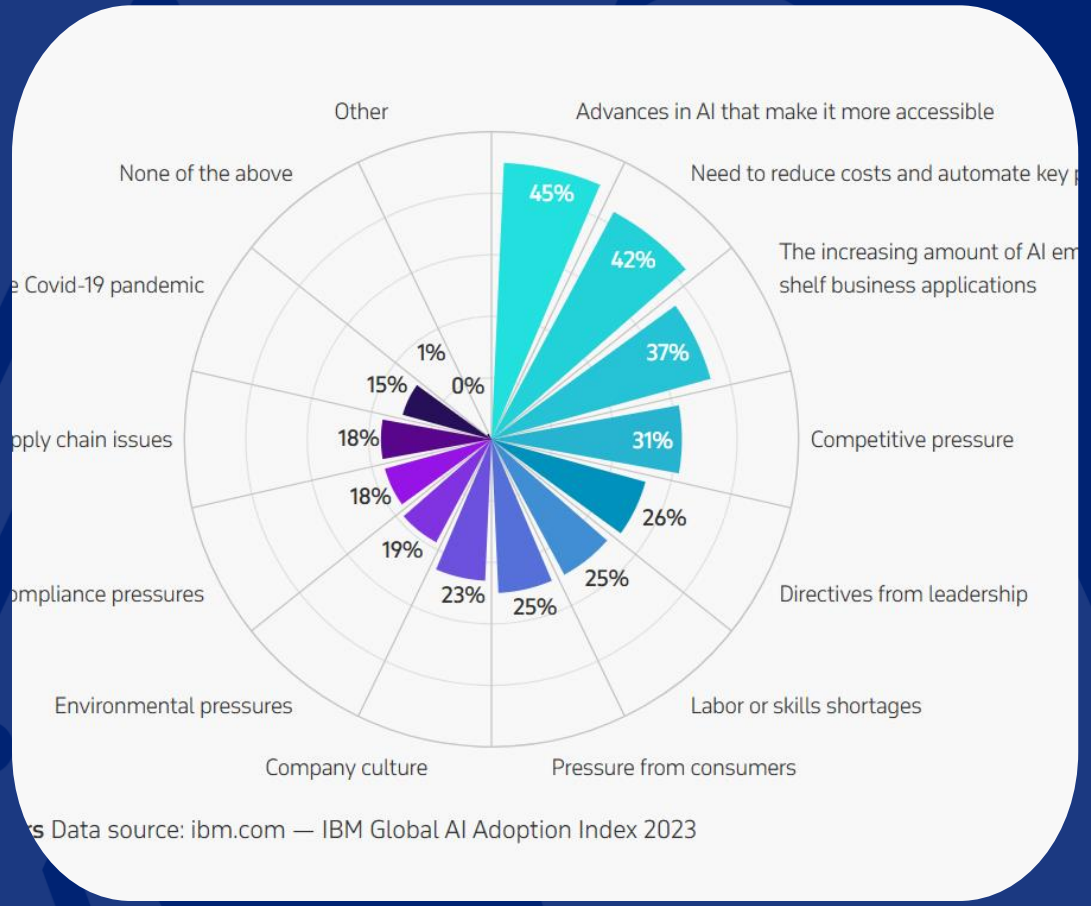
Industry Shift and Trends

Across the globe, industries are transforming how they operate. According to the 2023 IBM Global AI Adoption Index, companies are embracing AI and analytics to:

- Reduce operational costs (42%)
- Improve automation (37%)
- Address competitive pressure (31%)



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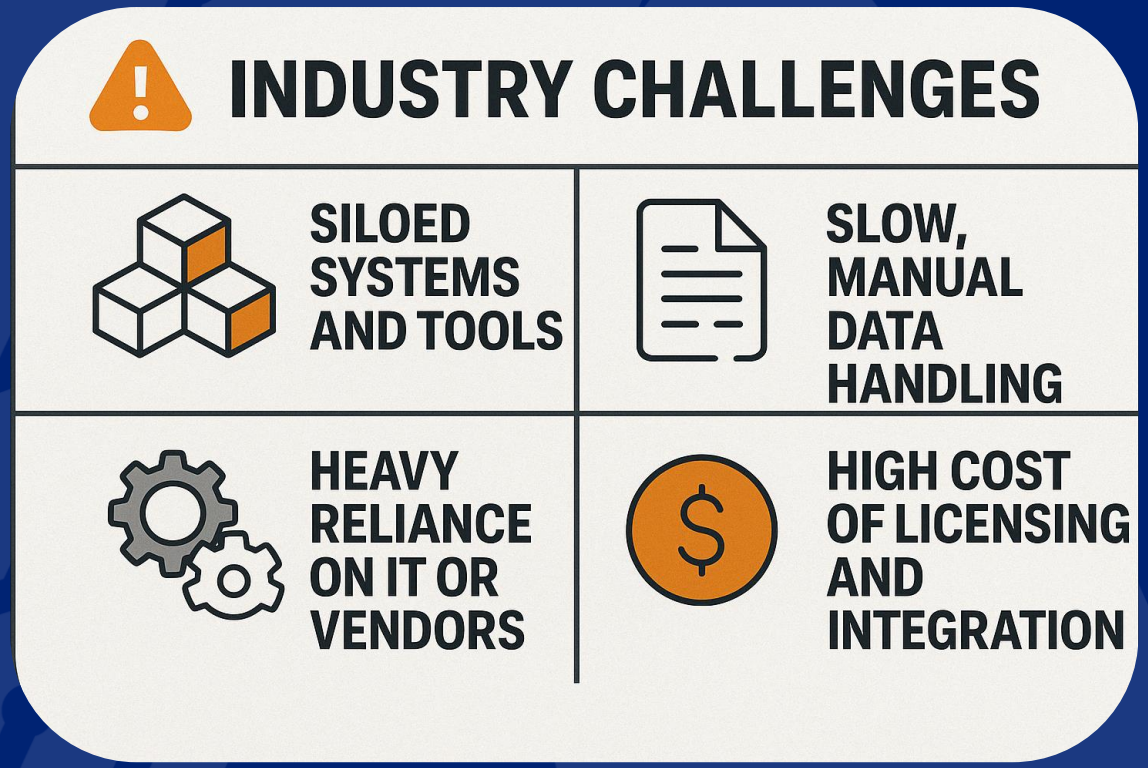
Industry Challenges

In many factories today, this is how ML workflows look:

- Data is logged in a historian and exported for cleaning and offline model development.
- Engineers use separate tools for cleaning, training, and validating models.
- Once validated, scripts must be manually moved to production environments.
- Visualization is handled in yet another system, often disconnected.



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Traditional Analytics Workflow: Why It No Longer Scales

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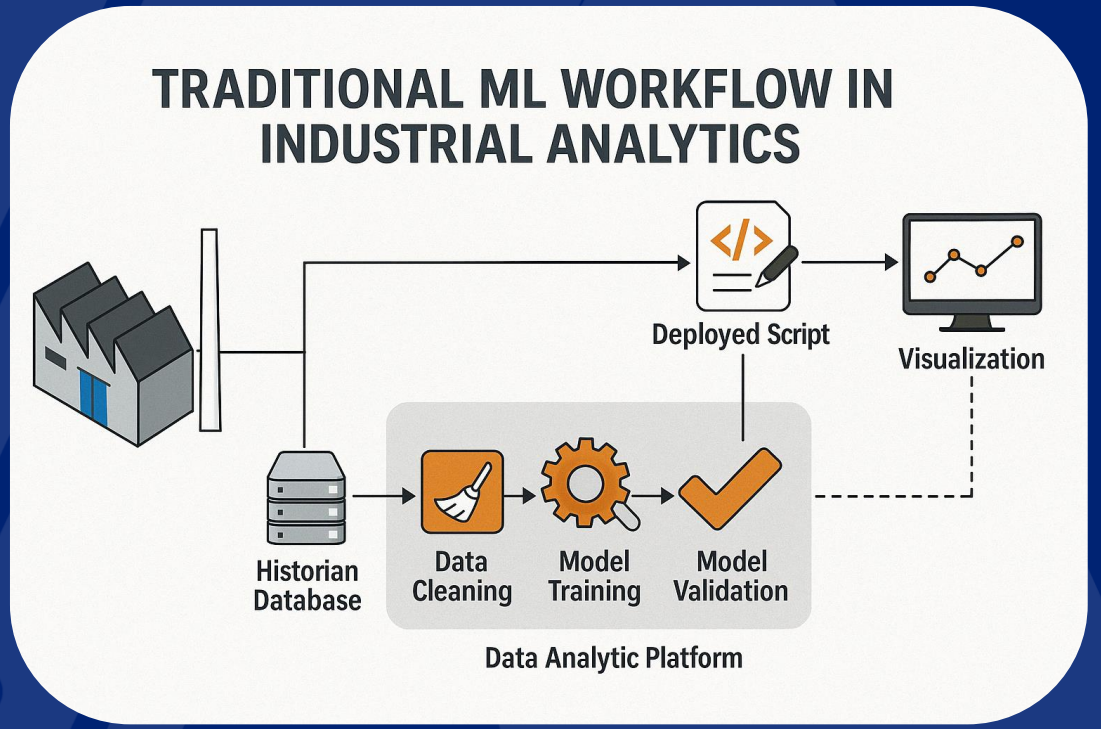

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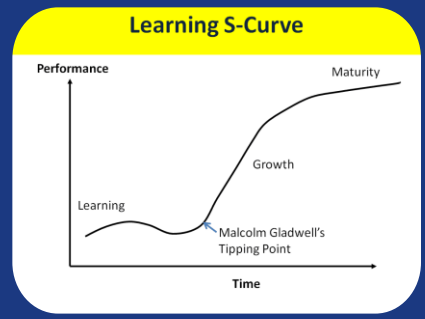
What Industrial Teams Need

Let's reframe the ideal workflow:

- Fast, unified access to time-series and contextual data
- Native scripting and automation with open-source ML
- Built-in visualization to cut reliance on external BI tools
- Low learning curve, high scalability



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Modern Design Principles

How do we architect that?

- One platform for data, visualization, and logic
- Built-in integration, not loosely connected tools
- Security and access control by design
- Open standards, so you avoid vendor lock-in

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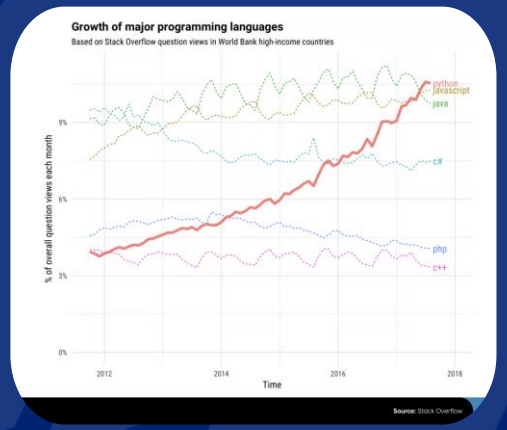
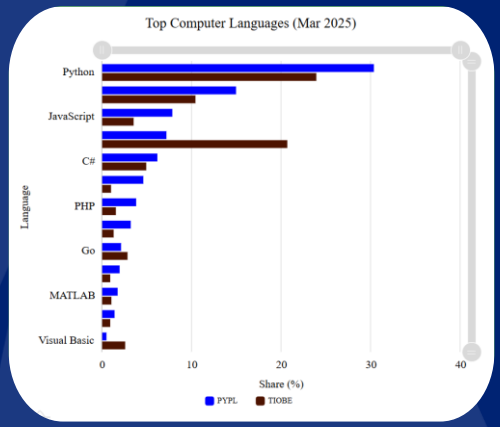
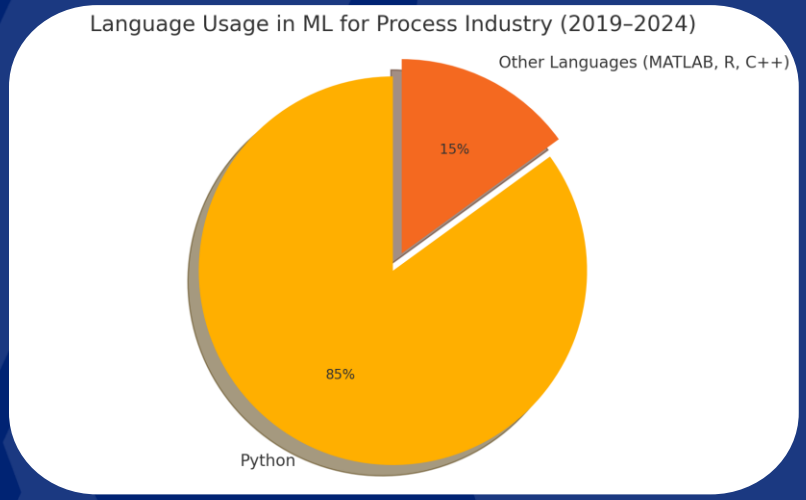
Why Open-Source ML Matters

"It's not just about coding — it's about enabling rapid innovation using tools engineers already understand."

- Free and open-source
- Easy for engineers and scientists to learn
- Massive ecosystem for ML, data wrangling, and visualization
- Already common in simulation, APC, and academic R&D







Source: IEEE Xplore, Applied Energy, Energy Reports (2019–2024); TIOBE and PYPL Index 2024.

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ML in Action: Real Benefits for Operations Teams

Use Case	Industry	ML Objective	Outcome / Impact
Quality prediction in sulphonation	Chemical	Predict product quality in real-time	MAE: 0.089, correlation: 0.978 — faster, more accurate QC
Demand forecasting	Chemical	Forecast inventory and production demand	20% improvement in forecast accuracy (Vandeput)
Process fault detection & soft sensors	Petrochemical	Detect deviations, simulate hard-to-measure values	Increased uptime, improved operator confidence
Utility usage optimization	Chemical	Predict energy consumption per production load	Reduced utility costs through real-time adjustment

“These results were achieved using open-source ML tools — no proprietary software required.”

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From Possibility to Action

- You don’t need to replace everything. Start small.
- Use your existing data to train your first model — today.
- Empower your process engineers — not just data scientists.
- Choose platforms that are open, unified, and scalable.
- Deliver value in weeks, not years.

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Thank you!

“ML libraries and unified platforms are enablers — but it’s your process knowledge that drives the value.

With the right tools, your team doesn’t just adopt analytics — they lead it.”

“Let’s rethink industrial analytics together.”