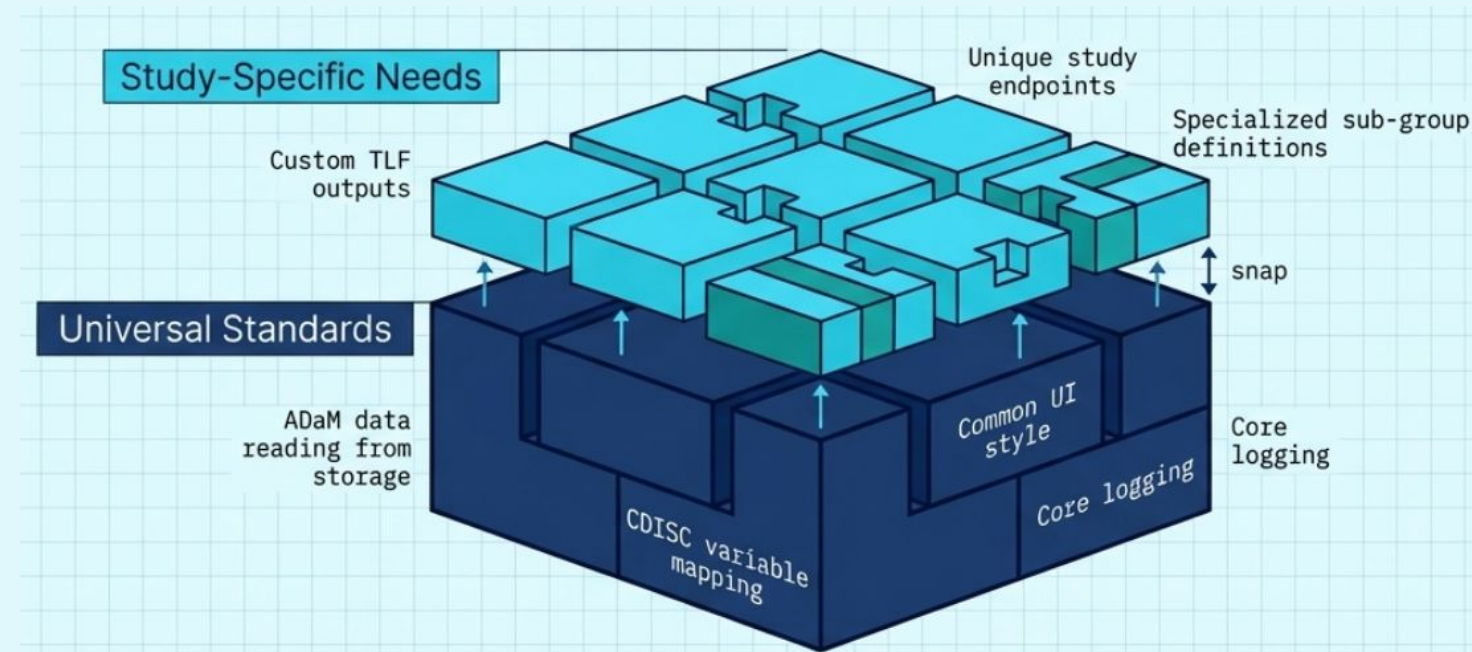
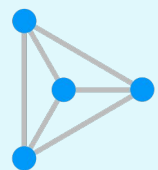




Standardizing Clinical Dashboards for Rapid Study Analysis

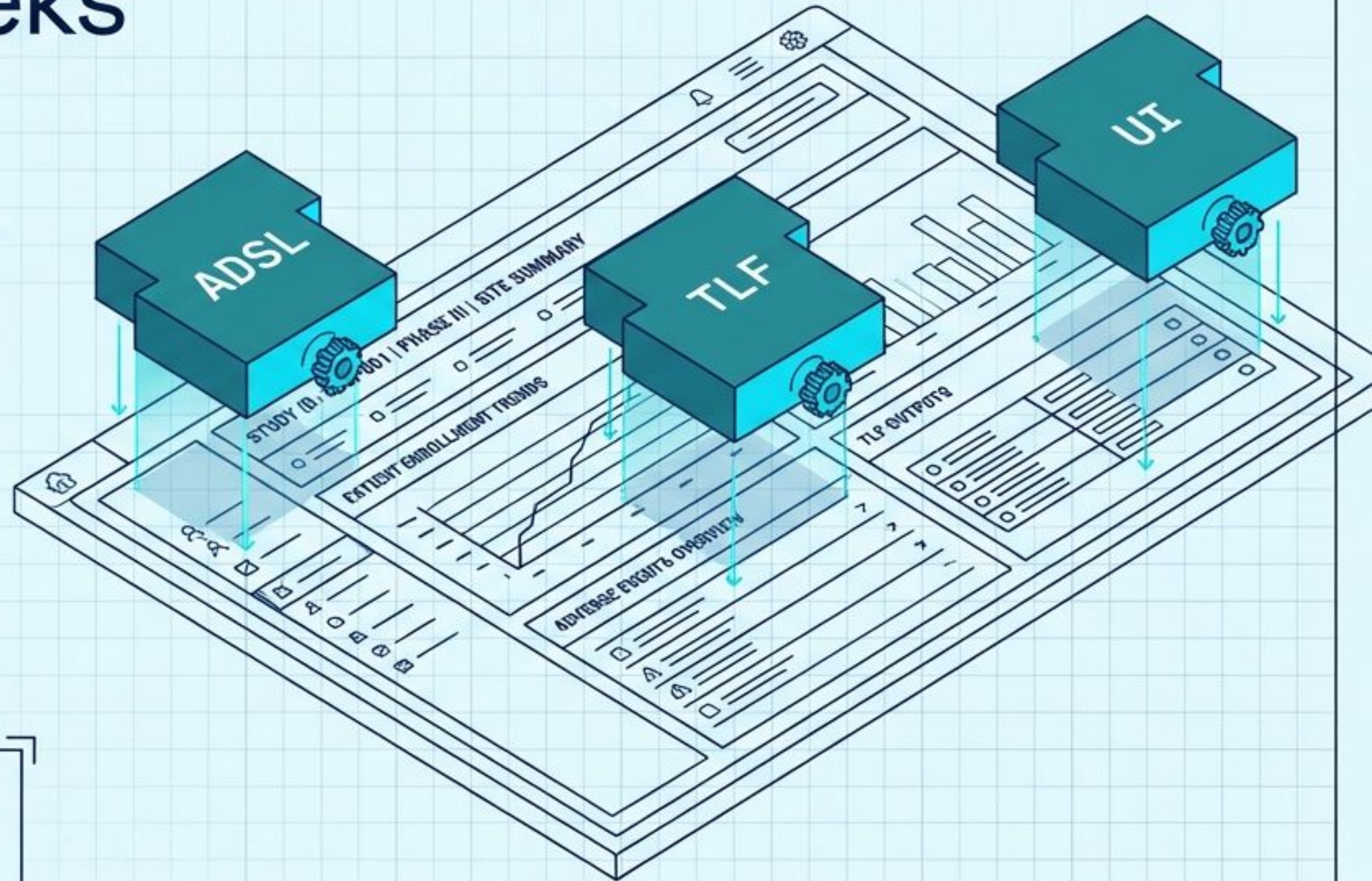
André Veríssimo, Ph.D.



Appsilon

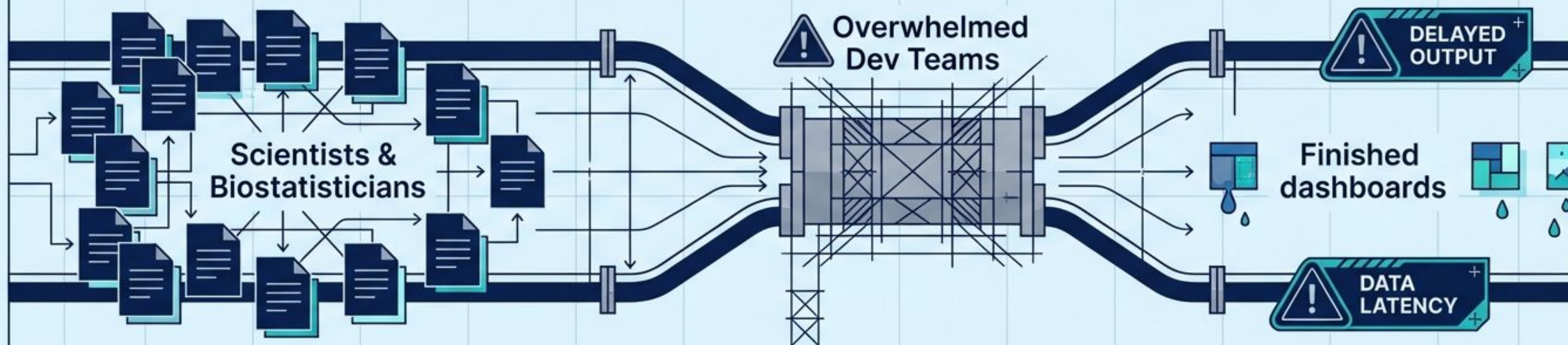
Building Clinical Trial Apps in Hours, Not Weeks

Standardizing the
foundation
and automating the build
with **{teal}** and Agentic AI.



An Appsilon Strategic Blueprint
for Clinical Data Organizations.

Clinical research teams are bottlenecked by bespoke development cycles



15+ Week Delays



Routine TFLs and reports take months, meaning critical insights arrive too late for agile decision-making.

Deep Complexity

Transitioning to R requires specialized coding skills that not every domain scientist possesses.

```
code {  
  public {  
    sentence = 3;  
    syntax {  
      return = 2;  
    }  
  }  
}
```

Lost Value

Every delay in the pipeline slows regulatory filings and puts millions at risk.



Moving from study-by-study rebuilding to a reusable baseline.

	Legacy Bespoke	Standardized Foundation
Development Time	15+ weeks. 	Hours (POC in minutes). 
Resource Reliance	Overwhelmed Developers.	Empowered Scientists (Self-serve).
Architecture	Built from scratch for every study.	Reusable baseline across all studies.
AI Readiness	Incompatible (High hallucination risk).	Native (AI acts on predictable modules).

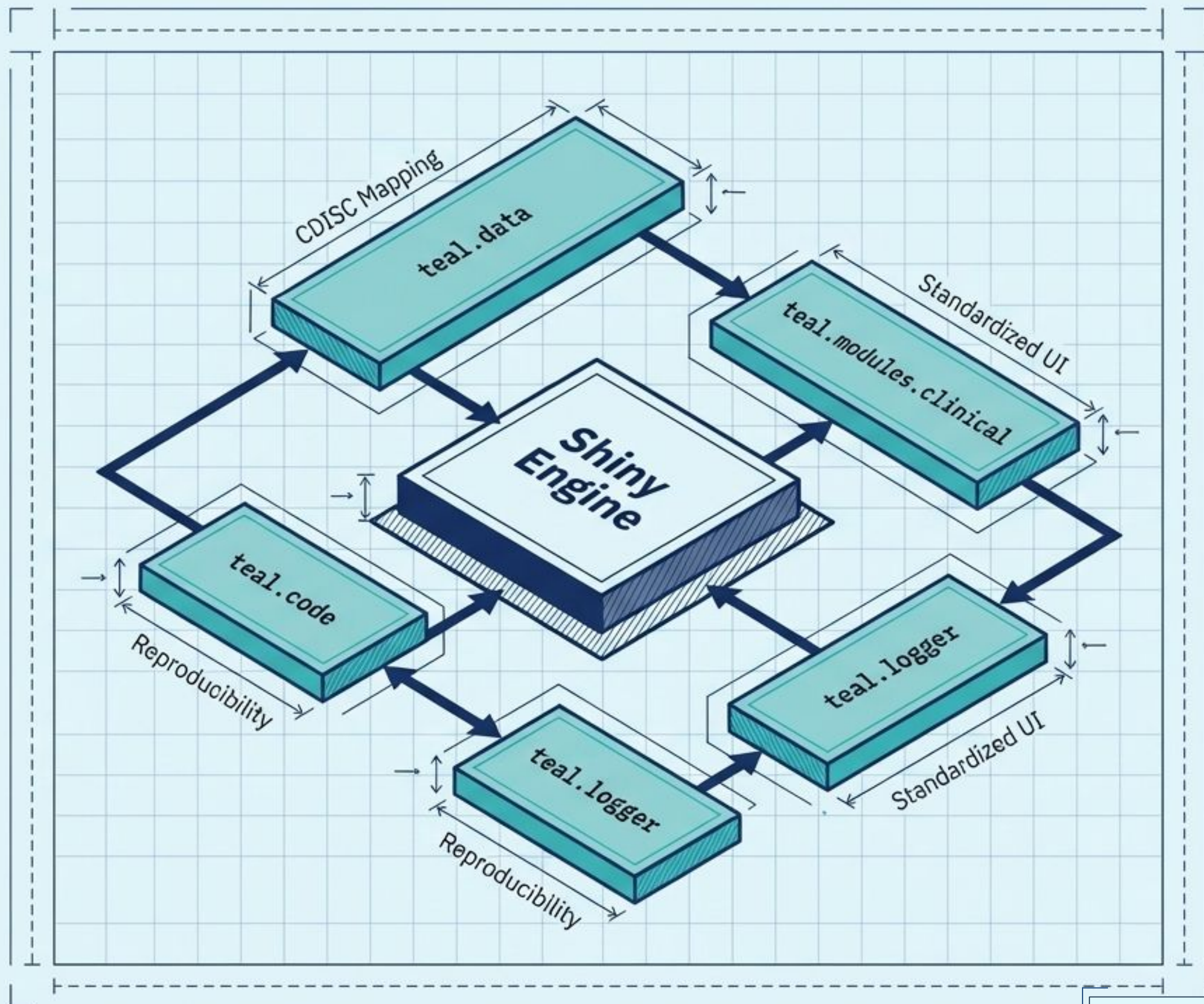
The {tea1} framework provides a validated, modular foundation for clinical exploration.

What is it?

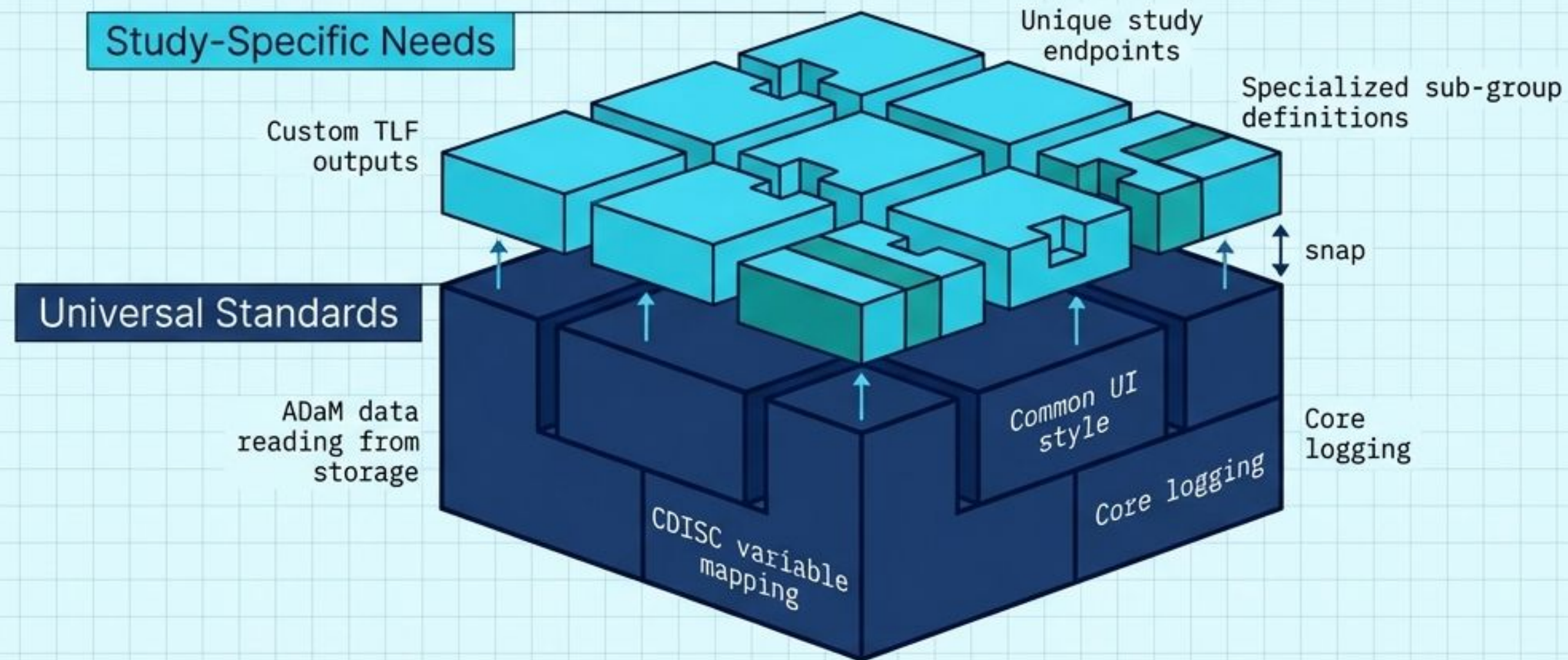
An open-source R/Shiny interactive exploration framework specifically designed for clinical trial data.

Why it matters:

It standardizes data loading (CDISC/MultiAssayExperiment) and UI encapsulation, ensuring that the underlying codebase is reliable, reproducible, and ready for GxP environments.



Smart governance separates universal standards from study-specific needs.



By standardizing the base data preparation and UI structures across all studies, multiple clinical teams can reuse the exact same foundation without slowing delivery or losing the flexibility to build custom endpoints.



Interactive R Shiny© Applications: Transforming Pivotal Clinical Trial Readouts

Carolyn Fisher & Elisabeth Deutschmann
Roche Products Ltd
PHUSE 2025 Hamburg



Available at the PHUSE Archive Search for: Carolyn Fisher

https://phuse.global/Communications/PHUSE_Archive?Author=Carolyn+Fisher



The Solution Architecture: TEAL/R Shiny©

Platform: R Shiny© app built using TEAL framework.

Foundation: Utilized the TEAL efficacy template.

Efficiency Gain: Instantly accessible, validated Time-to-Event and MMRM methods.

The Shift: Programmers went with a dual output delivery approach. Topline static outputs plus dedicating resources to dynamic, program-critical visualizations.



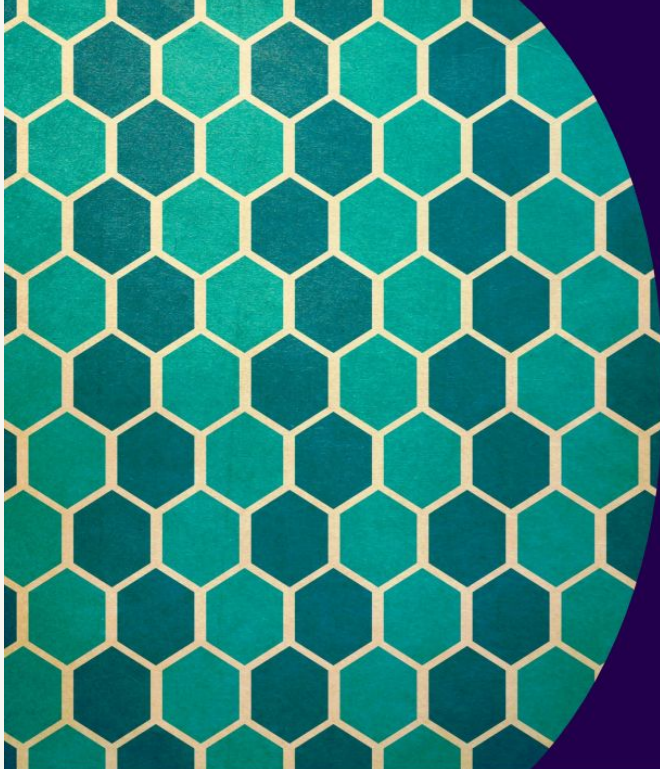
The Critical Context: The Phase II Go/No-Go

Program-Defining Decision: Go/No-Go determined by this pivotal Phase II data.

Timeline Pressure: A tight window between Data Lock and the Senior Leadership review.

Static Limitations: TFLs are necessary for regulatory documents but too rigid for urgent exploratory analysis.

Primary Objective: Expedite cross-functional collaboration and build data-driven confidence immediately.





{teal.builder}: A Multifaceted Teal App Builder for Clinical Data Exploration and Reporting

Phuse US Connect, Bethesda MD

Freeman Wang, R/Shiny Dev Lead (ART)
Andre Couturier, Global Head (ART)
Analytics and Reporting Tools

02/28/24



US 2024

25-28 February

Bethesda North Marriott Hotel & Conference Center



Walter Reed National Military Medical Center

Available at the PHUSE Archive

Search for: Freeman Wang

https://phuse.global/Communications/PHUSE_Archive?Author=Freeman

Challenges

May sounds familiar to your organization ☺

Internal Challenges

- Limited server access to clinical data repository
- Unmet need of adopting Shiny-powered clinical data exploration and reporting
 - Integrate internal statistical methods
- Limited R/Shiny resource in study team
 - Steep learning curve for new {teal} programmer
 - Even fewer who can develop customized modules
- Limitation in internal R infrastructure
 - Installing R packages is not always easy
 - Deployment (CI/CD, GitHub) tends to be overwhelming to new users
- Data standardization across studies

Why we need a builder tool?

- Scale modules to any study (w/o coding). An attractive idea
- Don't reinvent the wheel. Stand on the shoulders of giants
- May benefit the other community companies with similar journey

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5

Custom App Builder

User Journey:

1. Clinical Data Access/Authentication
2. ADaM data loader
3. Module selection page
4. Launch {teal} app
5. Deploy to Posit Connect

Select your other ADaM datasets and add modules to your app.

ART_SANDBOX > ADS > DATA
> adae.sas7bdat

adae.sas7bdat

Select domain

ADAE

Select keys

STUDYID USUBJID AESEQ AETERM

We've selected a valid domain and keys for you. You may change them if needed or click 'Add Dataset' below if they are correct.

+ Add Dataset

Datasets Added: ADL

Sanofi Teal Builder

Select your other ADaM datasets and add modules to your app.

ART_SANDBOX > ADS > DATA

Select file/directory

Datasets Added: ADL ADAE

Autofill Datasets

Launch App

Added Modules (4)

Data Table
TA: General

Regression
TA: General

Count Barchart
TA: General

Bivariate Plot
TA: General

Available Modules (13)

Missing Data
TA: General

Outliers
TA: General

Scatter Plot
TA: General

Variable Browser
TA: General

Cross Table
TA: General

Distribution Plot
TA: General

Response Plot
TA: General

Scatterplot Matrix
TA: General

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13

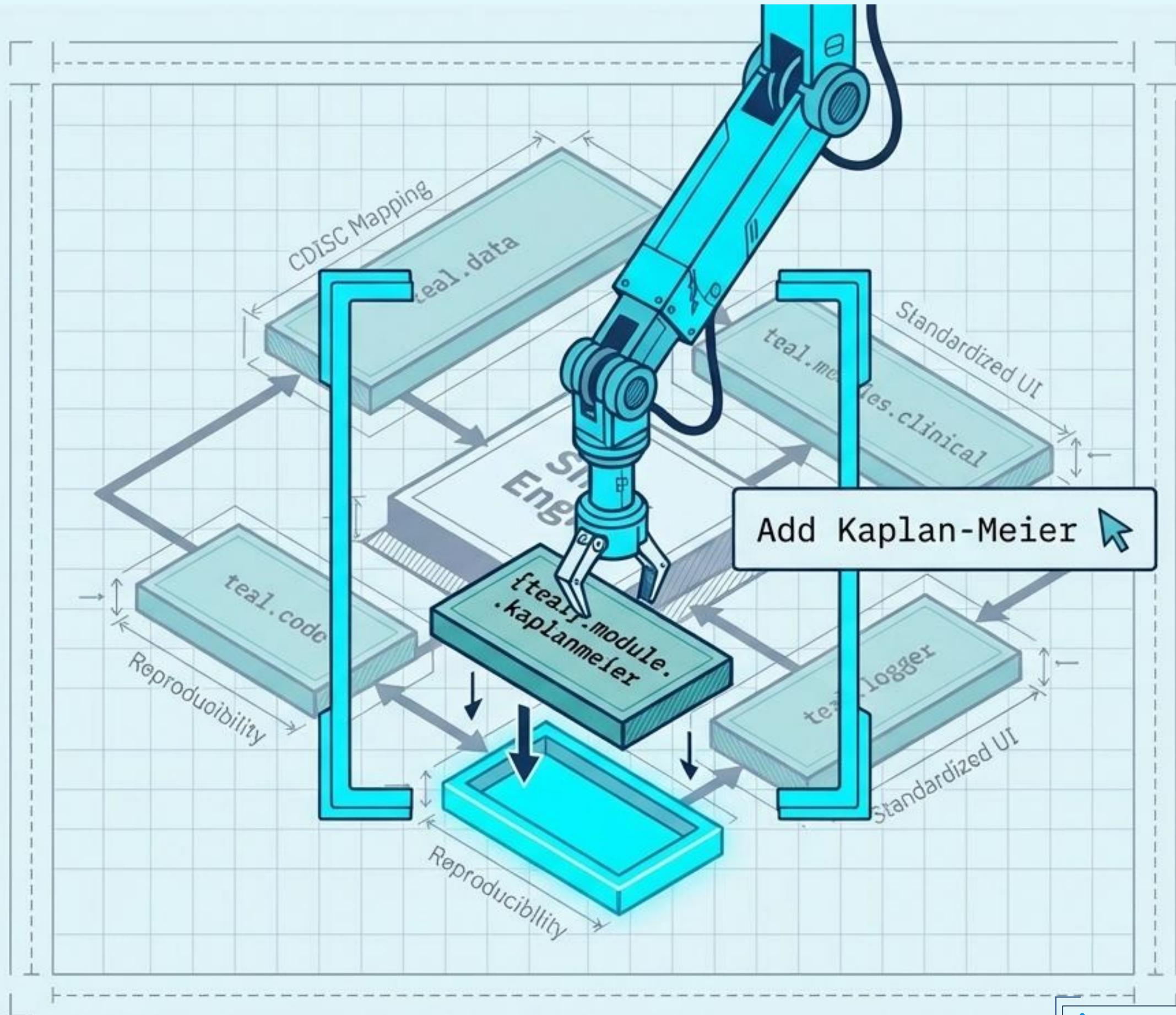
TealFlow uses agentic AI to assemble {teal} modules via natural language.

TealFlow bridges legacy environments with the R-based future.

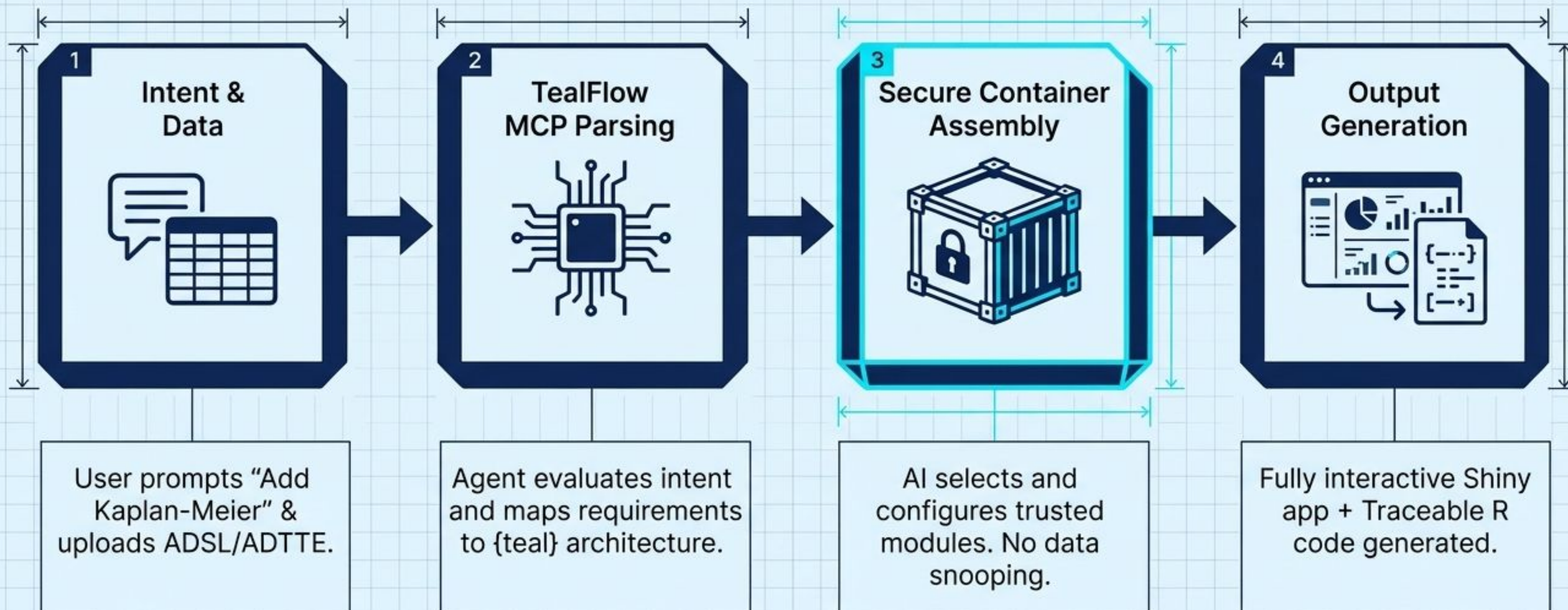
Users chat with the platform to prototype interactive, validated clinical trial analysis apps without writing code.

The Result:

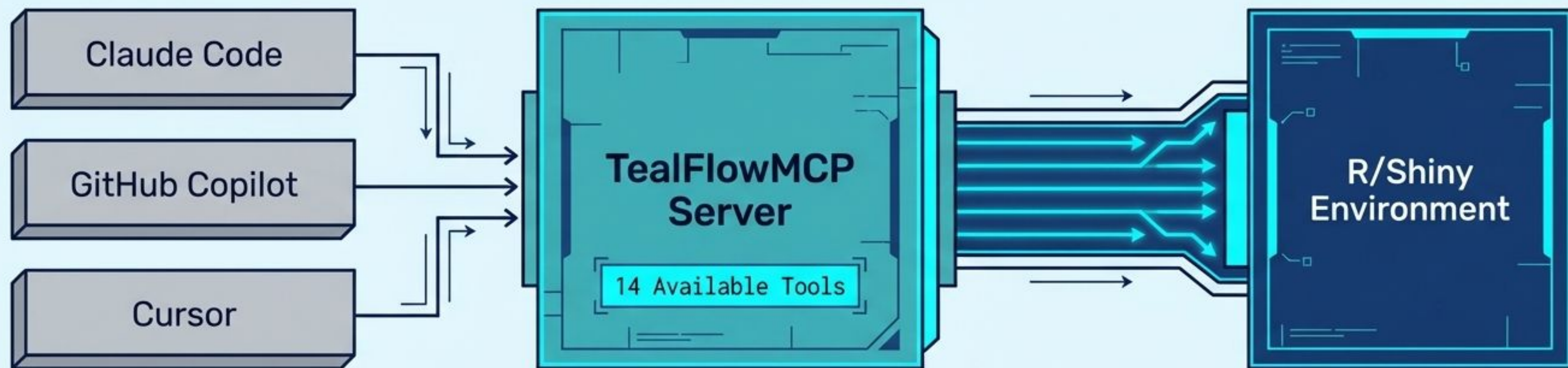
A working Proof-of-Concept in minutes, generating clean, review-ready R code that developers can instantly deploy.



From prompt to production-ready app in four standardized steps.



TealFlowMCP provides the standard protocol for LLMs to understand clinical R code.



The open-source TealFlowMCP allows any compatible LLM to discover, understand, and generate **{teal}** apps.

Module Discovery

Searching `teal.modules.clinical` by analysis type

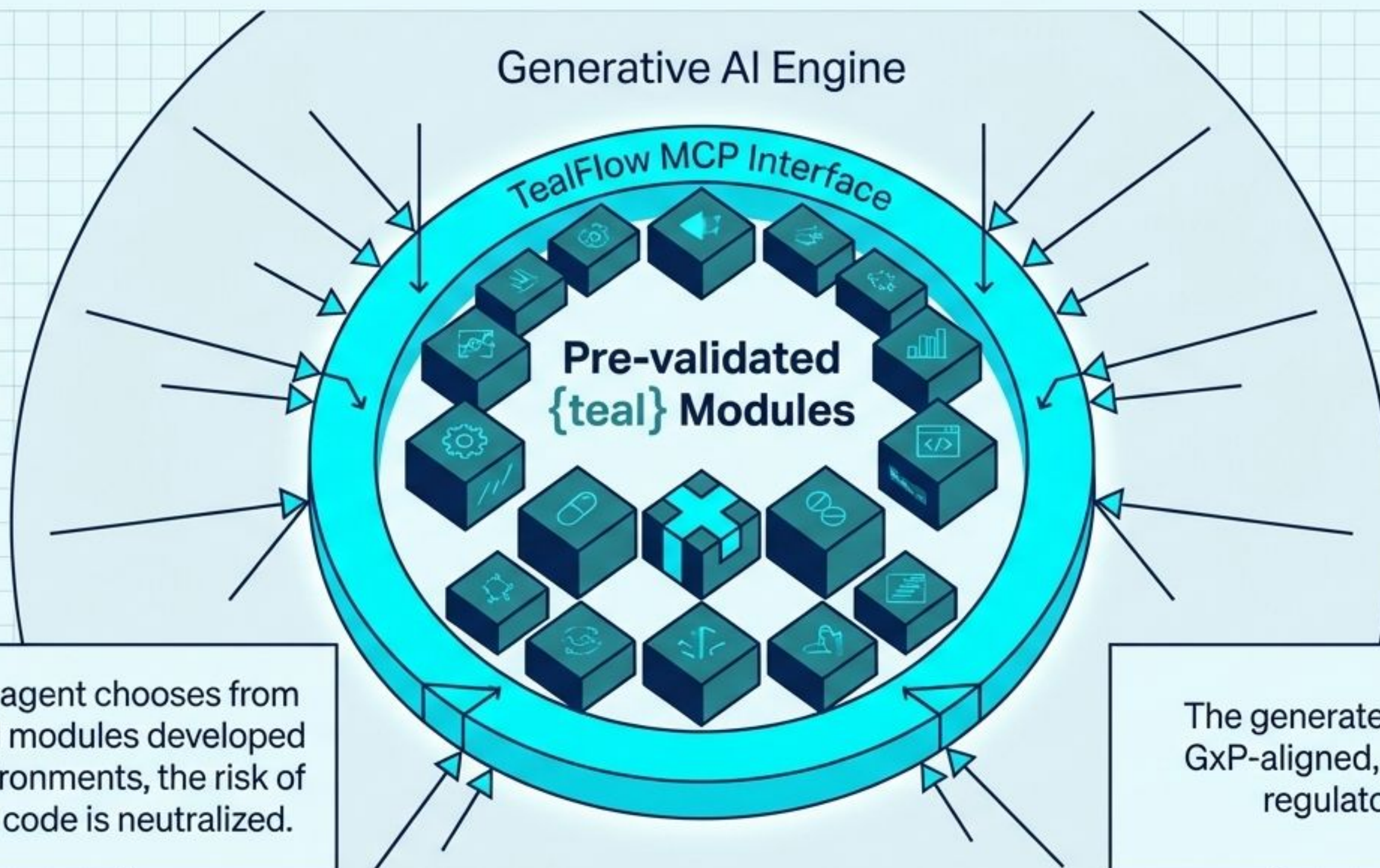
Dataset Management

Extracting ADaM metadata and checking requirements

Code Generation

Environment validation with `renv` snapshots

Eliminating AI hallucinations by constraining the model to validated modules.



Because the AI agent chooses from pre-built, vetted modules developed for pharma environments, the risk of non-compliant code is neutralized.

The generated apps remain GxP-aligned, auditable, and regulatory-ready.

Record-level patient data remains entirely private and secure.

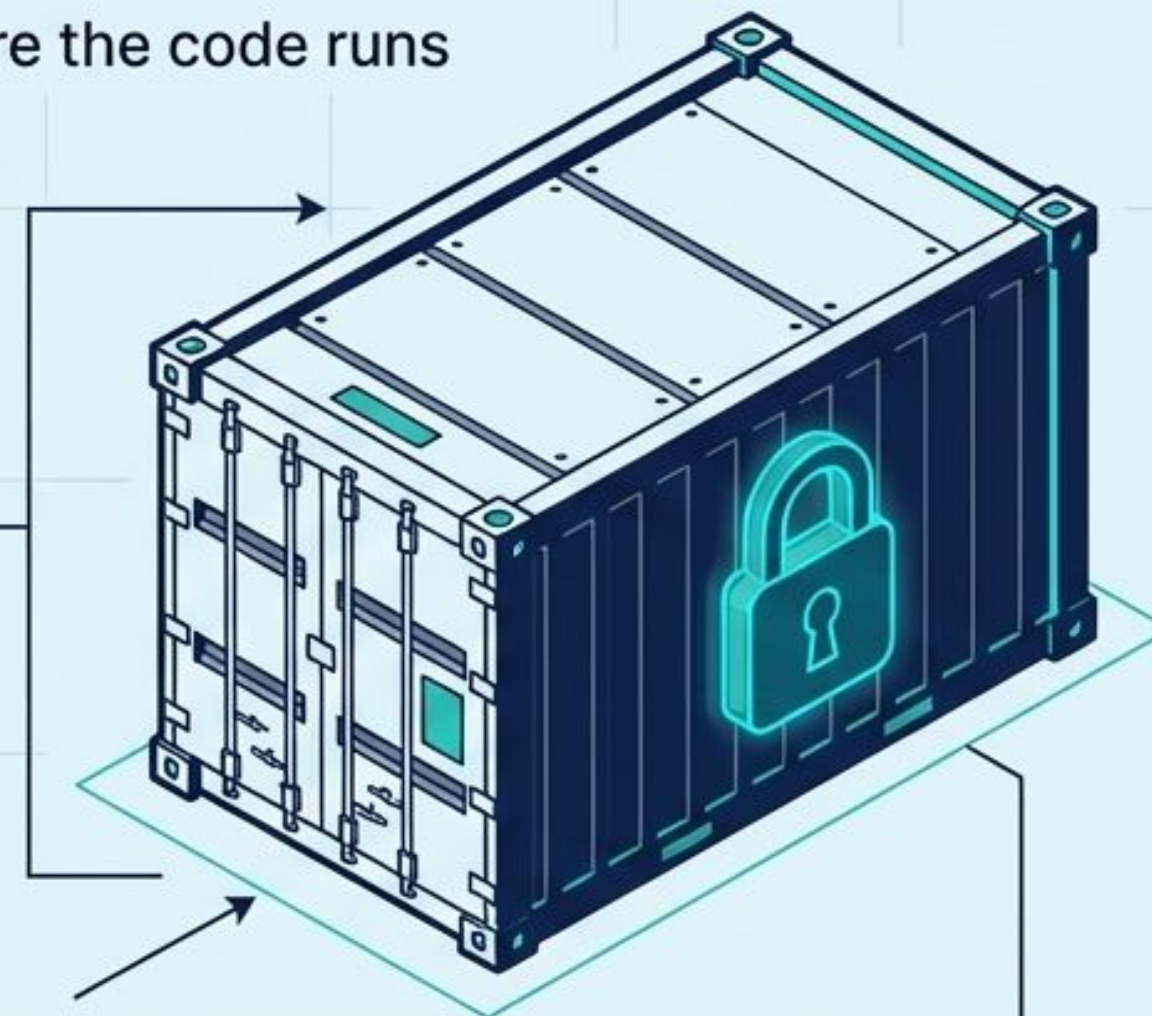
What the AI sees

ADSL	AGE	SEX	TRT01P
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]



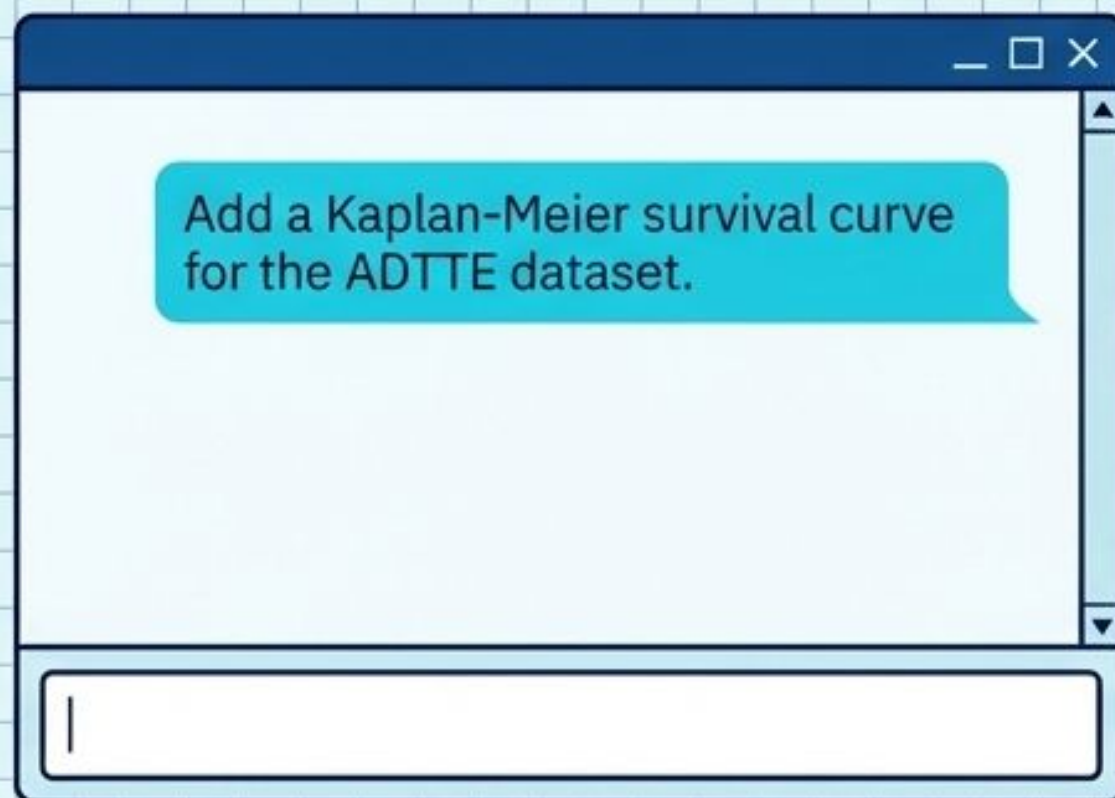
No Data Snooping: The AI only recognizes dataset names and expected CDISC formats. It never inspects or processes record-level clinical data.

Where the code runs



Isolated Execution: Agentic modifications occur strictly inside an isolated container. The AI cannot access anything outside this secure perimeter, ensuring complete compliance with pharma data governance.

Bridging the SAS-to-R divide with review-ready, transparent code

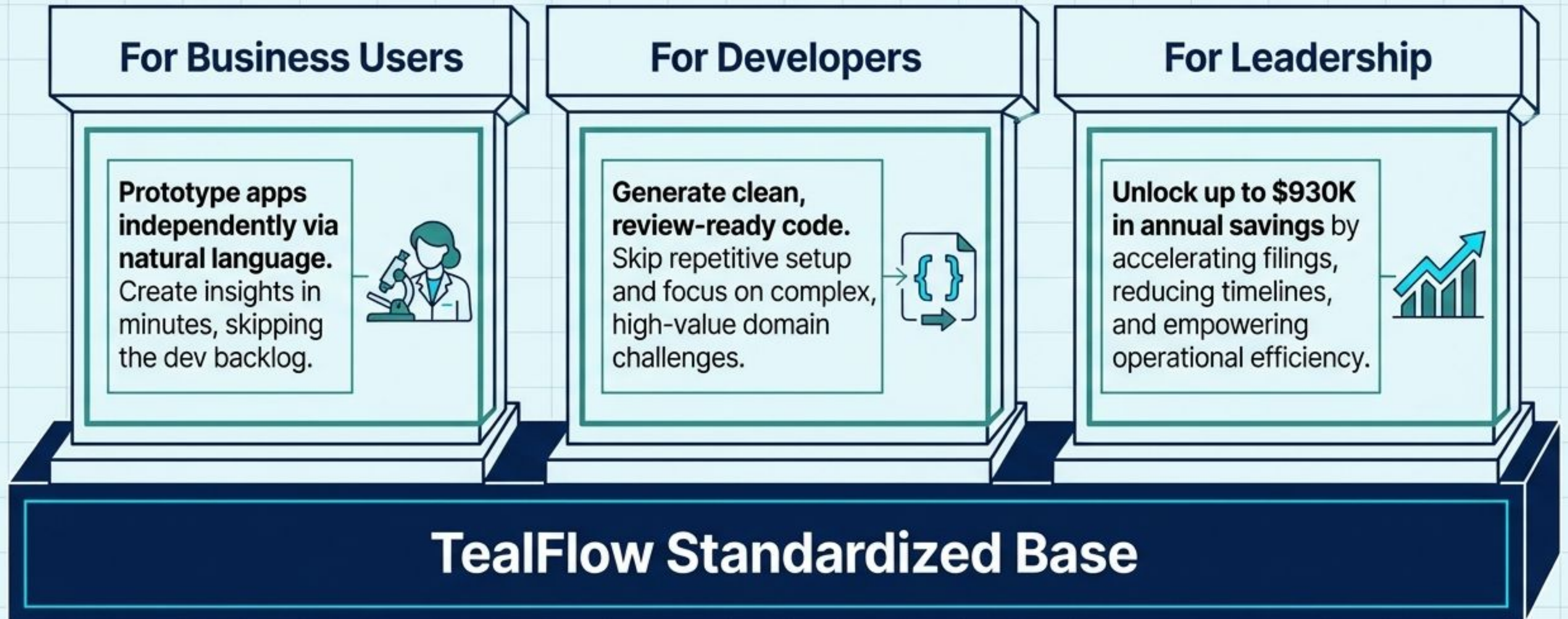


TealFlow doesn't just build black-box dashboards; it generates full, readable Shiny code.

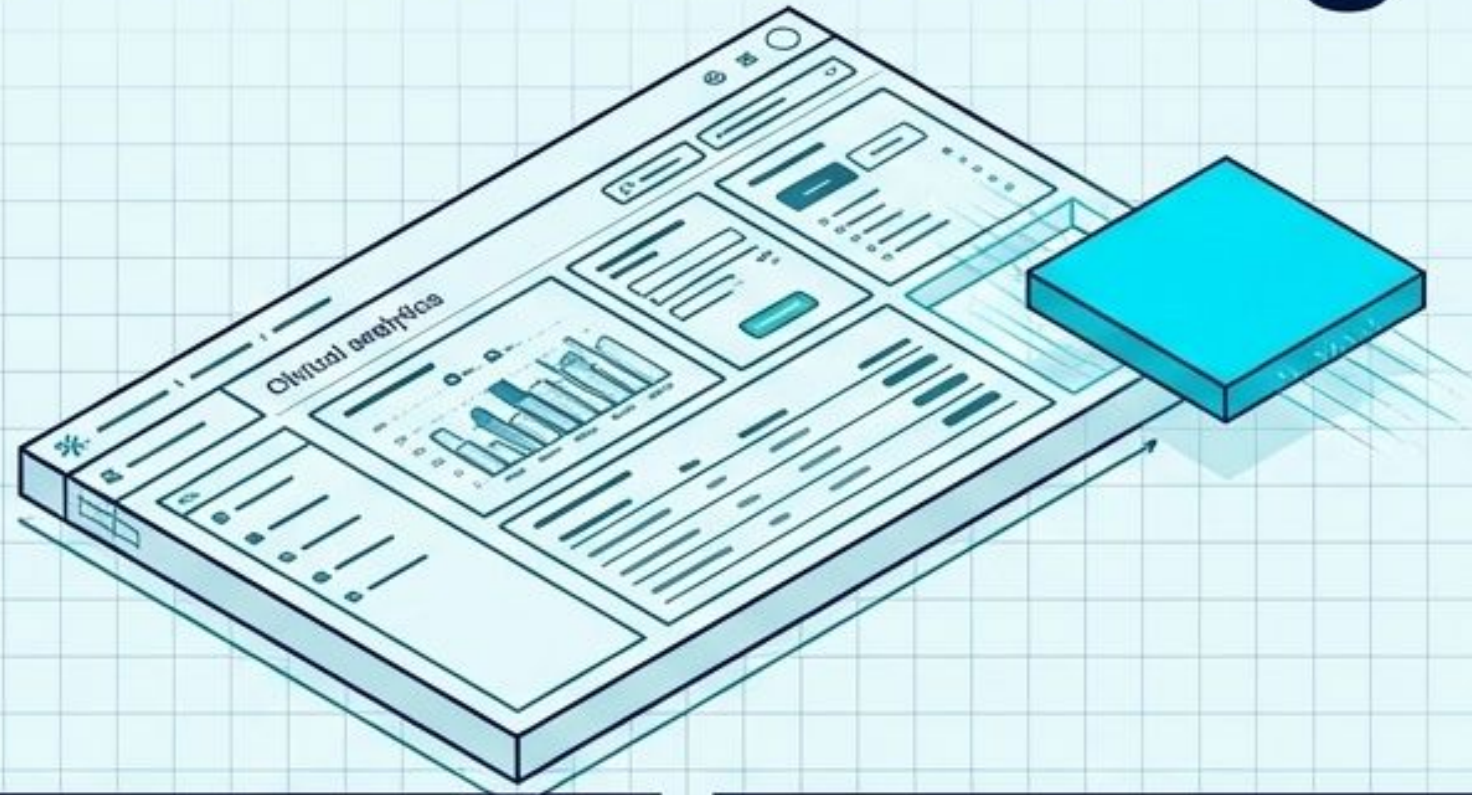
This acts as an accelerator for teams transitioning from SAS, providing them with production-ready R templates that they can review, learn from, and publish.

Maintains the critical "Human-in-the-loop" requirement for clinical analytics.

Generating value across every level of the clinical data organization.



From weeks of waiting to minutes of insight.

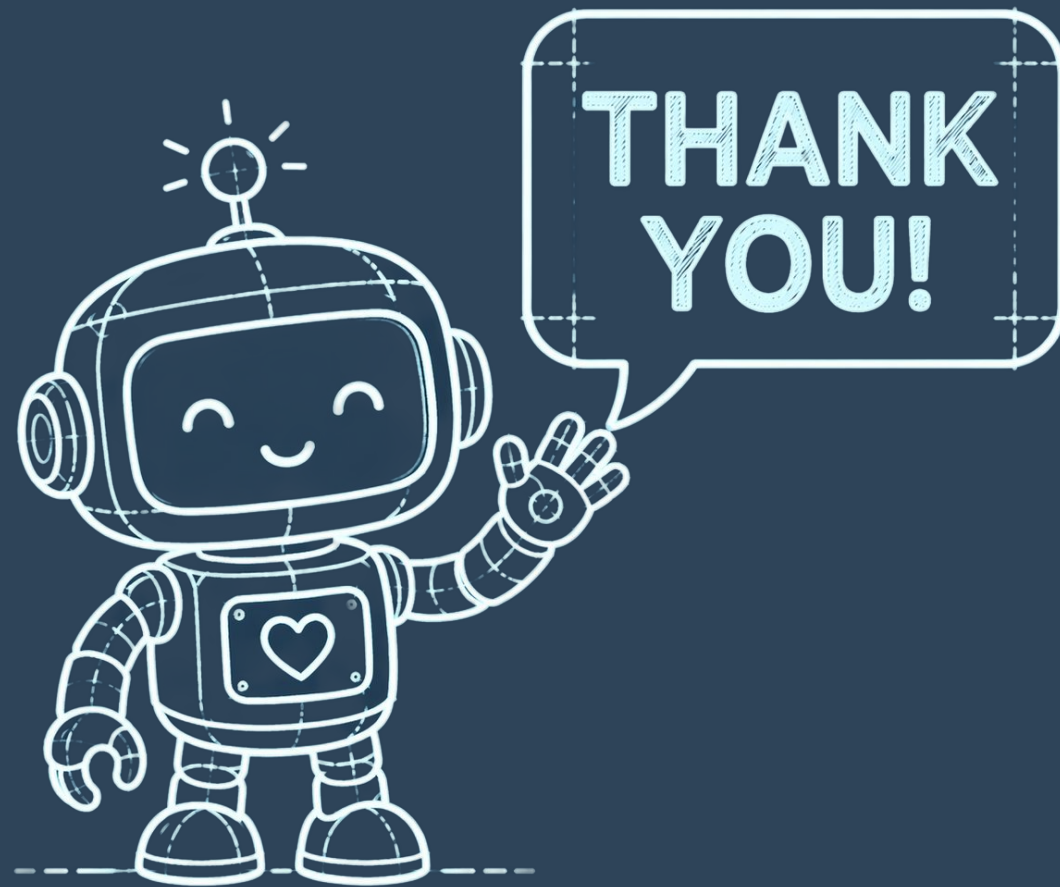


By standardizing on the {tea1} **framework** and automating with **TealFlow MCP**, clinical teams move from a **build-from-scratch** bottleneck to a **standardize-and-automate** paradigm.

The Blueprint is Ready: Deploy the open-source foundation, empower your researchers, and reclaim your competitive edge.

“Control, understanding and continuous improvement... leaves us free to focus on domain.”

– Technology Manager at Top Pharma Company



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