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## {teal.builder}: Our Journey After One Year

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The views and opinions expressed in this presentation are those of the author(s) and do not necessarily reflect the official policy or position of Sanofi.

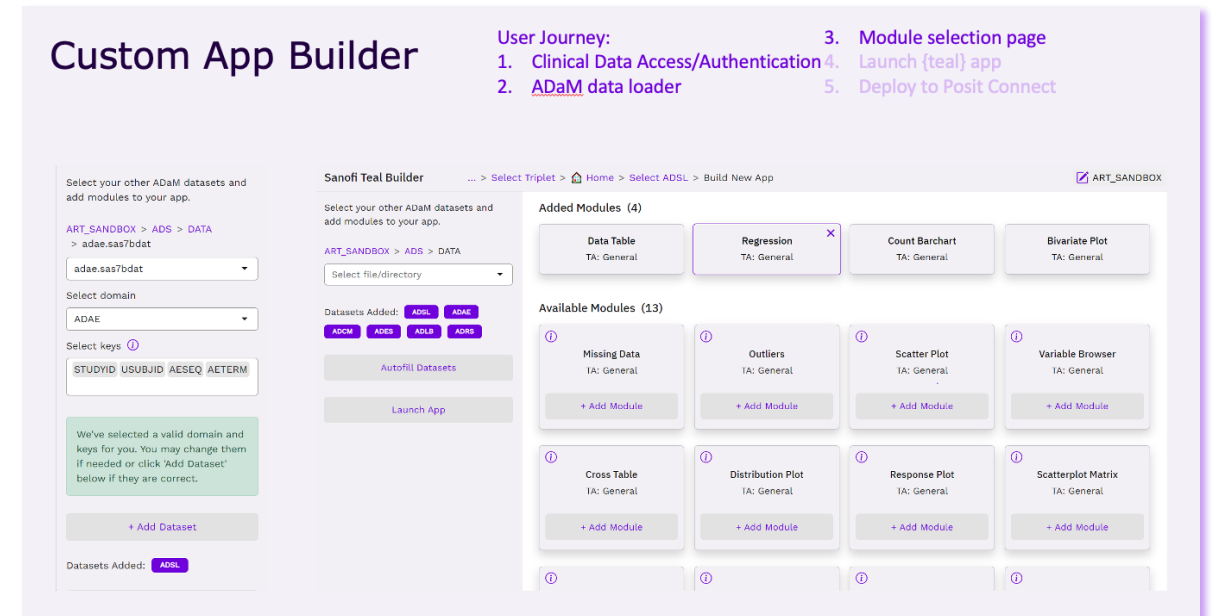
# Agenda

- Introduction
- Our Achievement
- New Feature Demo
- Conclusion

# Introduction

{teal.builder}, an advanced self-service platform built on the {teal} ecosystem, empowers both business users and programmers to create and deploy R/Shiny-based {teal} apps. By bridging low-code functionality with expert customization, it enhances scalability for interactive data exploration and reporting automation. This innovative tool has gained great traction at Sanofi for its ability to address the unmet need of efficient clinical data exploration and review.

Our PhUSE US Connect 2024 [presentation](#):





**Business**

**Advancements**

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## STUDY-LEVEL APP

- Customized {teal} apps with study-level specifications, for internal statistical surveillance activities.

## SELF-SERVICE

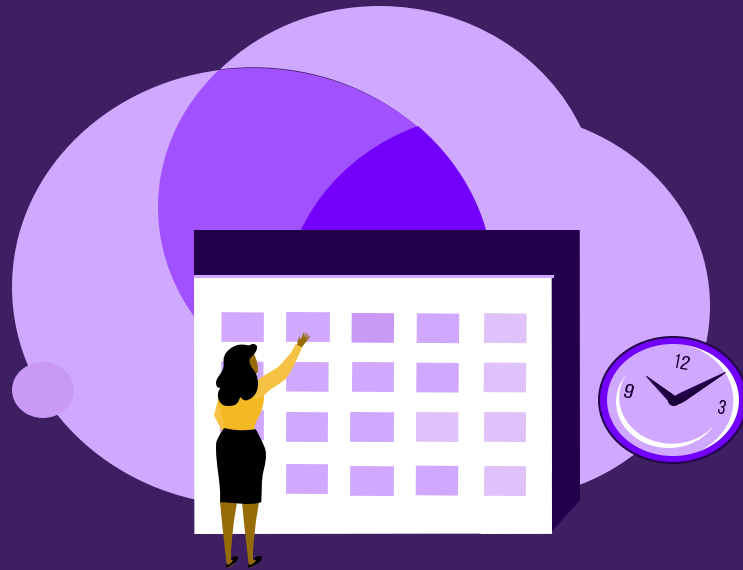
- Non-coder business users can explore clinical data with various exploration modules
- Standardized {teal} code templates

## EFFICIENCY

- Swift transformation of ADaM data into {teal} dashboards
- Instant scalability across all studies
- Reusable configuration
- Rapid prototyping and deployment

## CENTRALIZATION & STANDARDIZATION

- Standard module centralization
- Possible platform for future module governance
- Facilitate statistical innovation



Technical

Progress

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## CLINICAL DATA ACCESS

- Authenticated API access to clinical data repositories
- Option to connect with local ADaM files

## MODULE CONFIGURATION

- Reuse configuration
- Iterative app re-editing

## DATA VALIDATION

- Programmatic checks to verify compatibility between loaded data and selected modules

## EXTENSIBLE DEPLOYMENT

- GitHub's CI/CD pipelines for production-ready deployment
- Featured app review
- Automatic module-vs-data compatibility test report

# Demo

## SCREENSHOTS

**Disclaimer: All data presented in this presentation are simulated.  
No real patient information is used or disclosed.**



# Modules with Configuration Feature

The screenshot displays the Sanofi Teal Builder interface. On the left, a sidebar contains navigation and configuration options. The main area is divided into 'Added Modules (3)' and 'Compatible Modules (34)'. A purple box highlights the 'Added Modules' section, with a purple arrow pointing to the 'Demographics - bySubgroup' module, which has a gear icon indicating configuration options. The 'Module Configuration' section in the sidebar is also highlighted with a purple box and contains instructions on how to manage configurations.

**Sanofi Teal Builder** Home > App Builder Support

Select datasets and modules  
... > Select ADSL > Select ADaM  
Select your other ADaM datasets  
ART\_SANDBOX > ADS > DATA  
Select file/directory  
Datasets Added: ADSL ADAE  
Autofill Datasets

**Module Configuration**  
Manage module configurations by importing or exporting files—imported settings are applied instantly, and new modules are added automatically.  
Download Upload  
Launch App

**Added Modules (3)**

- Demographics - byARM TA: General
- Demographics - bySubgroup TA: General
- Adverse Events Summary Table TA: General

**Compatible Modules (34)**

- Principal Component Analysis TA: General
- Regression TA: General
- Data Table TA: General
- Stack Plots Association TA: General
- Count Barchart TA: General
- Bivariate Plot TA: General
- Count Forest Plot TA: General
- Distribution Plot TA: General
- Exposure Plot TA: General
- Grouped Scatterplot TA: General
- Response Plot TA: General
- Relative Risk Reduction TA: General

# Configuration Panel for One Module

The screenshot shows the Sanofi Teal Builder interface with a configuration panel for a module. The panel is titled "Configuration Panel for One Module" and is overlaid on a blurred background of the main application. The configuration panel includes the following sections and fields:

- Dataname:** ADSL
- Select arm var:** ARM
- Select summarize vars:** AGE SEX RACE ETHNIC COUNTRY BMRKR1
- Advanced Options:**
  - Add total**
  - NA Level Label:** <Missing>
  - Drop Unused Arm Levels**
  - Total label:** All Patients
  - Numeric Statistics:** n mean\_sd median quantiles range
  - Pre-output Text:** (empty text area)
  - Use NA Level:** ifany no
  - Denominator for Percentages:** N
  - Post-output Text:** (empty text area)

At the bottom of the panel, there are three buttons: "Load Configuration", "Restore Previous", "Reset to Default", and "Submit".

# Teal App After Configuration

Sanofi Teal Builder [Home](#) > [App Builder](#) > [Teal App](#)

Download Deploy Edit App Support

Demographics - byARM Demographics - bySubgroup Adverse Events Summary Table Report previewer

Reporter

Encodings Dataset: ADSL

Select Column Variable(s)

Select

ARM Description of Planned

Add All Patients column

Summarize Variables

Select

AGE Age, SEX Sex, R Race

> Additional table settings

Show Warnings

Show R code

|                 | A: Drug X<br>(N=134) | C: Combination<br>(N=132) | B: Placebo<br>(N=134) | All Patients<br>(N=400) |
|-----------------|----------------------|---------------------------|-----------------------|-------------------------|
| Age             |                      |                           |                       |                         |
| n               | 134                  | 132                       | 134                   | 400                     |
| Mean (SD)       | 33.8 (6.6)           | 35.4 (7.7)                | 35.4 (7.9)            | 34.9 (7.4)              |
| Median          | 33.0                 | 35.0                      | 35.0                  | 34.0                    |
| 25% and 75%-ile | 28.0 - 39.0          | 30.0 - 40.0               | 30.0 - 40.0           | 29.0 - 39.0             |
| Min - Max       | 21.0 - 50.0          | 20.0 - 69.0               | 21.0 - 62.0           | 20.0 - 69.0             |
| Sex             |                      |                           |                       |                         |
| n               | 134                  | 132                       | 134                   | 400                     |
| M               | 55 (41%)             | 62 (47%)                  | 52 (38.8%)            | 169 (42.2%)             |
| F               | 79 (59%)             | 70 (53%)                  | 82 (61.2%)            | 231 (57.8%)             |
| Race            |                      |                           |                       |                         |
| n               | 134                  | 132                       | 134                   | 400                     |
| ASIAN           | 68 (50.7%)           | 73 (55.3%)                | 67 (50%)              | 208 (52%)               |

Active Filter Summary

| Data Name | Obs     | Subjects |
|-----------|---------|----------|
| ADSL      | 400/400 | 400/400  |

Active Filter Variables

ADSL

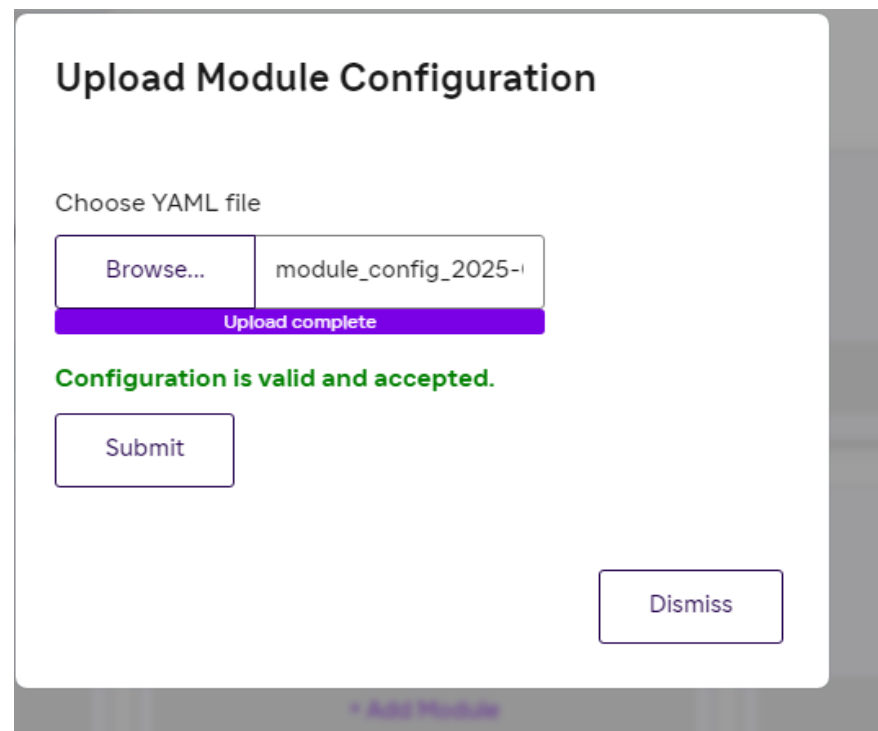
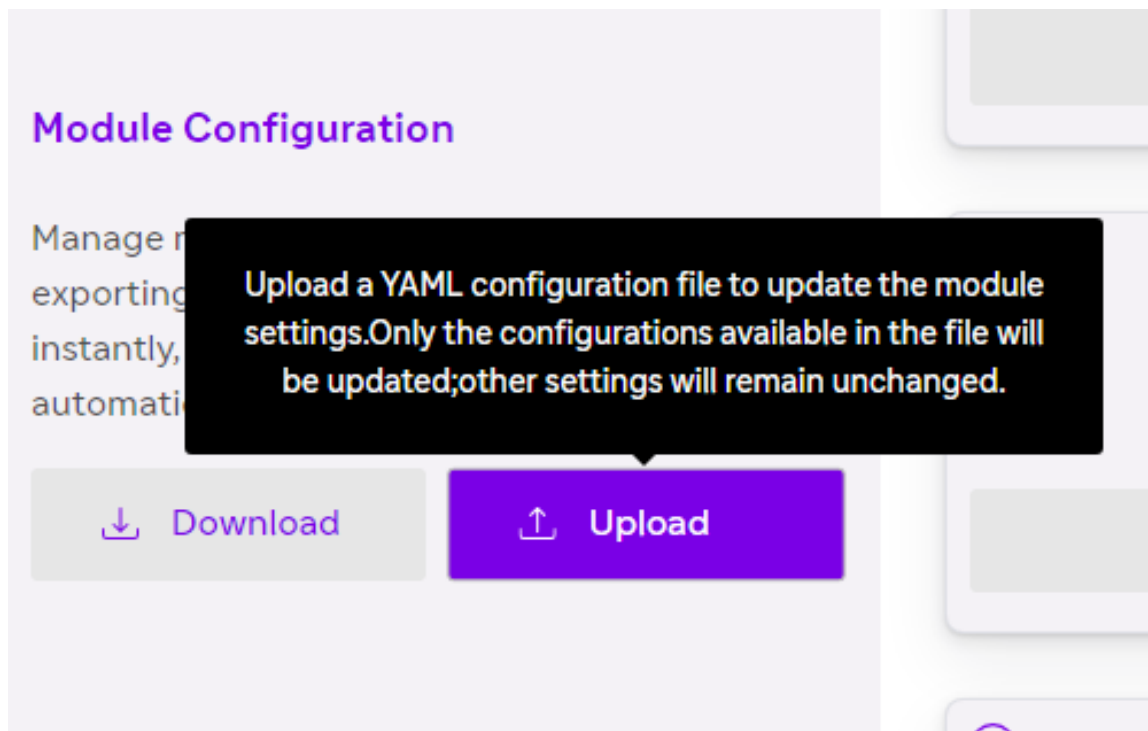
Add Filter Variables

Add ADSL filter

Select variable to filter

# Exporting and Importing

- Download:** Module-level configuration can be downloaded as YAML file, on the module selection page.
- Upload:** Previously downloaded configurations can be uploaded using the "Upload" button.



# Conclusion

Add **Business Value**: Built in close collaboration with business on live study-level pilots.

Focus on **efficiency & scalability** in clinical data workflows.

- Quick interactive data exploration via self-service
- Grow internal expert team: R and Shiny/Teal knowledge is needed for study-level customization

Continued engagement in the **open-source** community

- Path to regulatory adoption via cross-industry collaboration
- Longer lifespan than closed-source alternatives
- Fosters community-driven innovation
- Promotes transferable skills and talent



# Acknowledgement

- We thank {teal} development team for their open-source innovation and for providing such exceptional tools.
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# Thank You

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