

Visualizing Trends and Bottlenecks: A Python Web App for QC Progress Monitoring

Spencer Renyard

spencer.renyard@phastar.com



Introduction

- Challenges with traditional QC tracking

Static Excel files only show current status: no history, no trends

- Need for evolution

A more dynamic system is needed to capture change over time

- Opportunity for automation

Automating data extraction and visualization reduces manual effort

- Benefits of visualization

Enables better oversight, trend analysis, and faster decision-making

- Preview of the solution

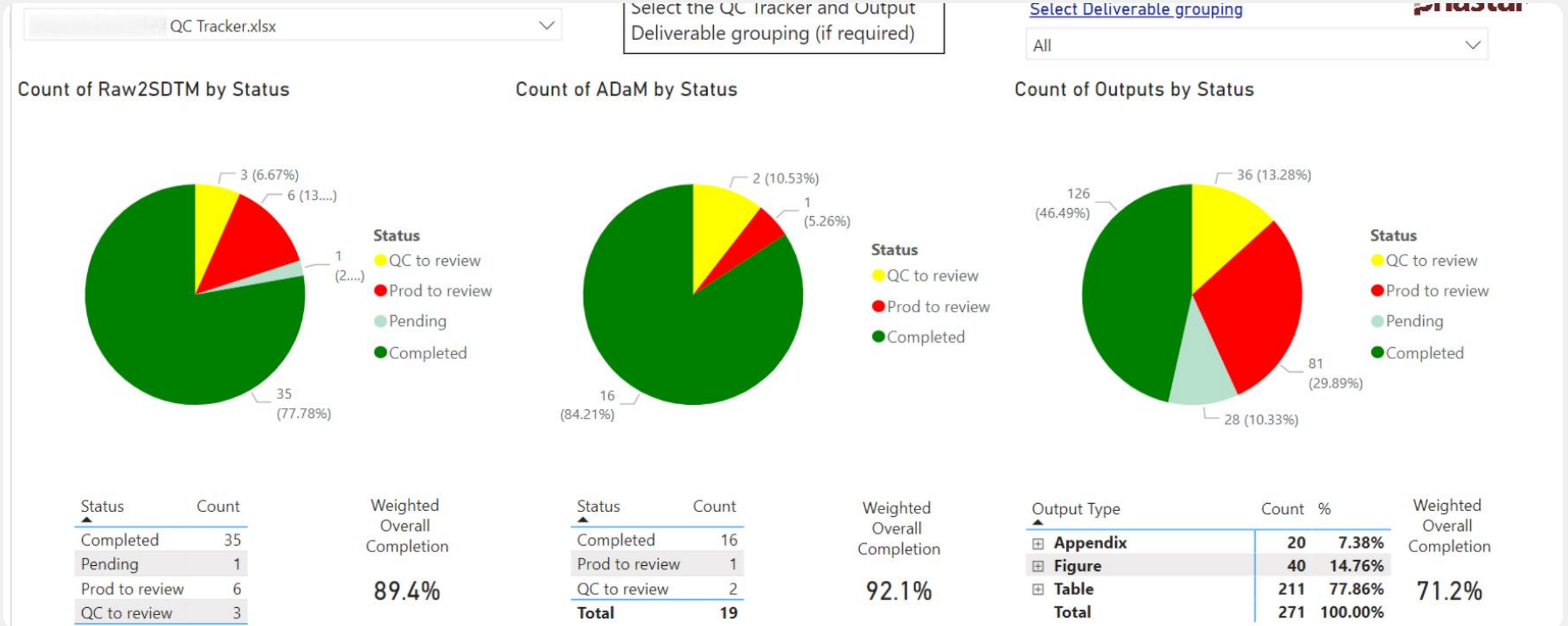
A Python® web app that visualizes QC progress using live and historical data.

What is a QC tracker (historically)?

- Shows the QC status of programs at the current point in time
- Where were we?

[illegible]

Traditional snapshot of Program Status

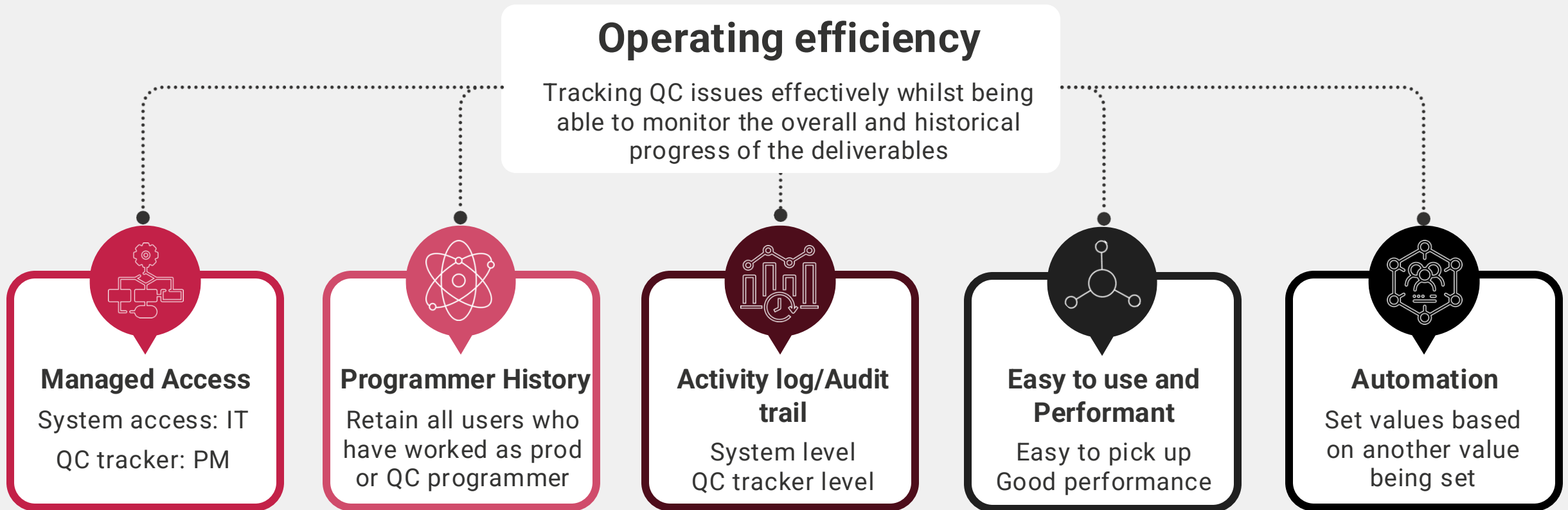


Limitations with the QC tracker in Excel

- Only shows the status now
- No history
- Cannot see any trends or oddities
- Excel functionality can be limiting, e.g., searching, filtering
- When hosted on SharePoint® for multi-user access VBA and macro functionality is limited
- Manual entry of key fields: dates, initials
- What if we have more than the snapshot of now?
- What if the system knows who/what/when?
- Can we analyse and visualise the QC tracker data?

New QC Tracker Requirements

The QC tracker requirements were a mixture of existing requirements and new requirements



Why not continue with Excel?

- Did investigate continuing to use Excel
- Conditional formatting can be complex
- Limitations on locations allowing collaborative working and macros
 - SharePoint and Excel VBA and macros don't play nicely

Monday.com

- Already being used within the company
- Covers many of the requirements and features
 - Customisable
 - Automations
- Whilst there will be further mentions of Monday.com during this presentation, it is not the focus
- Treating it like if presenting something using SAS® or R – it's just the platform and no advocacy is being made

QC Tracker example

QC Tracker (SDTM) ▾

Discover AI Integrate Automate / 6

Main View ▾Main tableKanbanChartOpen CommentsMeBy Status +

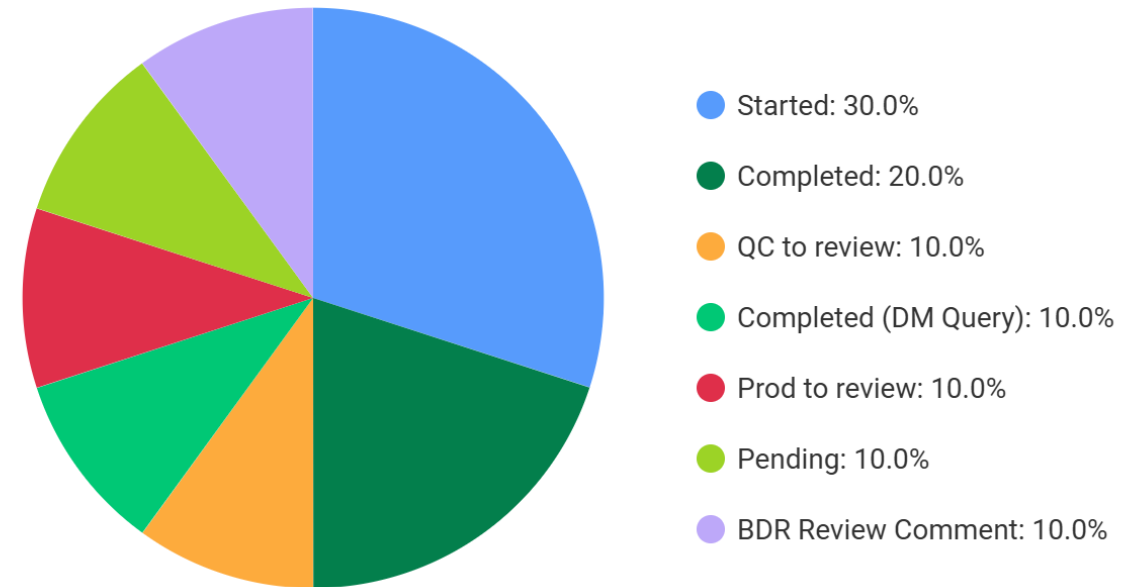
New item ▾SearchPersonFilter ▾SortHide / 5Group by ▾

▼ SDTM

☐	Item		Priority	Prod Programmer	Prod Programmer History	Prod/QC Check	QC Programmer	QC Programmer History	Comment Status	Status	Status Date
☐	TA					OK				Completed	Jul 17, 2025
☐	TE					OK				Not Started	
☐	TI					OK				Not Started	
☐	TV					OK				Not Started	
☐	TS					OK				Not Started	
☐	DM					OK				Not Started	
☐	SE					OK				Not Started	

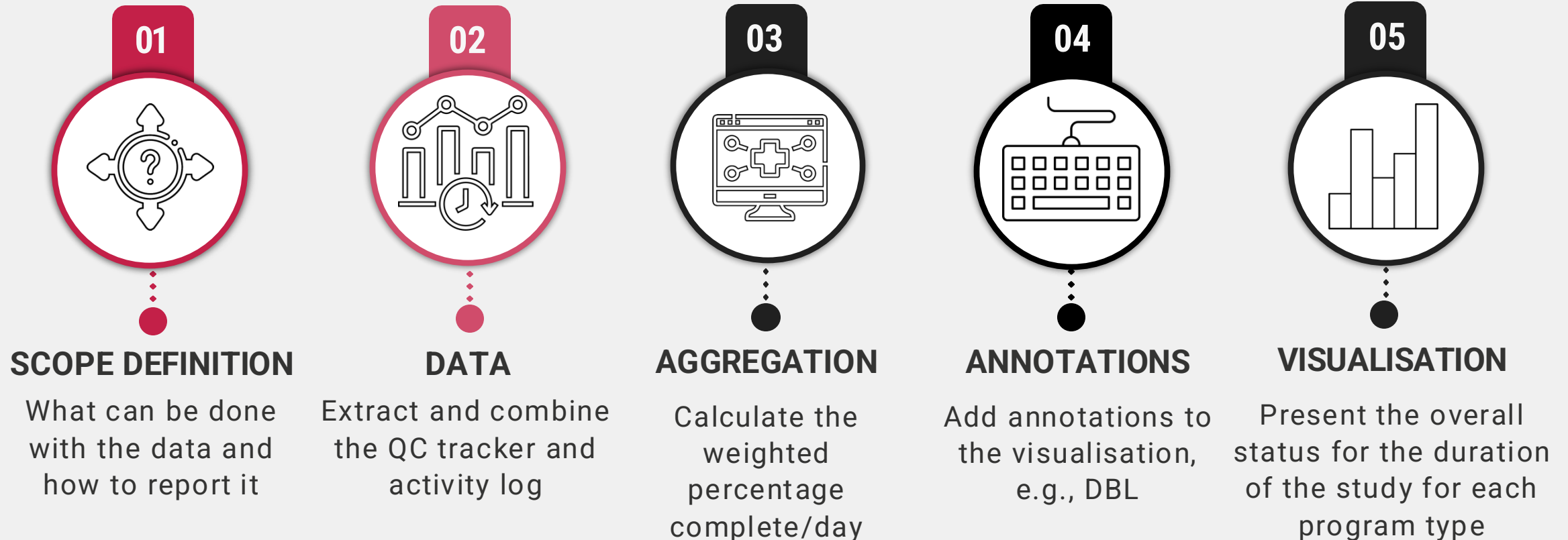
Visualisations

- Point-and-click interface
- Useful features
 - Drilldown
 - Hover-over
- Still only presents the current status



Project Objectives

Visual representation of overall status for the duration of the study – tracking progress over time



Status Plot Generator

- Web app
- Access data via Monday.com API and GraphQL queries
 - Board data
 - Activity log data
 - Combine to get every status value for a program and the date it was set
- Interactive line plot
 - Date slicer
 - Hover-over showing values
 - Select one program type
- Validated

Development Tools



Visual Studio Code



python™



docker®



GitLab



Flask



plotly



monday dev

GraphQL queries

<untitled>

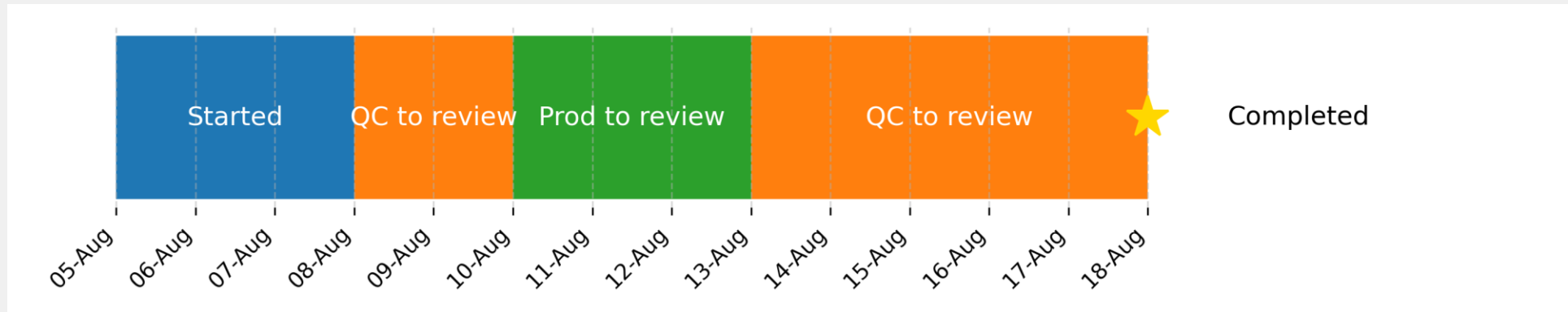
GetBoardItems x +

```
1 # Example: Get board items
2 # The example will return the first 5 items of a specific
3 # board and include all column values.
4
5 query GetBoardItems{
6   boards(ids: {{target_board_id}}) {
7     items_page(limit: 5) {
8       items {
9         id
10        name
11        column_values {
12          id
13          value
14        }
15      }
16    }
17  }
18 }
```



Data Aggregation and Processing

The data from the QC tracker board and the activity log can be combined to determine the program status on any given day



Allowing the progress of each program to be determined by carrying the program status forward until it changes

Weighted Status

Each Status value is assigned a weight

- Not Started
- Started
- Pending
- QC to review
- Prod to review
- Completed
- Completed (DM Query)
- BDR Review Comment

```
# Define status weights for all other program types
```

```
default_status_weights = {  
    'Completed': 1.0,  
    'Completed (DM Query)': 1.0,  
    'Pending': 0.75,  
    'QC to review': 0.5,  
    'Prod to review': 0.5,  
    'BDR Review Comment': 0.5,  
    'Started': 0.25,  
    'Not started': 0.0  
}
```

Status Plot application

Status Plot Generator

API Unknown Spencer RenyardManage API KeyAccount



Monday DEV QC Tracker Status Plot Generator

Generate interactive status timeline plots from your Monday.com QC Tracker boards

 **Authentication Required**

What you'll be able to do:

- ✓ Connect to your Monday.com workspaces
- ✓ Generate interactive timeline plots
- ✓ Add milestone annotations
- ✓ Download publication-ready plots

Monday.com API Key

Enter your Monday.com API key

[How to get your Monday.com API key](#)

☐ Remember me for 30 days
If unchecked, you'll need to re-enter your API key after 8 hours

Continue to Plot Generator

[Check if I'm already logged in](#)

**Interactive Timelines**

Generate dynamic status progression plots with zoom, pan, and export capabilities.

**Multi-Board Analysis**

Combine data from multiple QC Tracker boards for comprehensive project views.

**Milestone Tracking**

Add important project milestones and deadlines to your timeline visualizations.

Add API Key



Monday DEV QC Tracker Status Plot Generator

Generate interactive status timeline plots from your Monday.com QC Tracker boards

Authentication Required

What you'll be able to do:

- ✓ Connect to your Monday.com workspaces
- ✓ Generate interactive timeline plots
- ✓ Add milestone annotations
- ✓ Download publication-ready plots

Monday.com API Key

.....

[How to get your Monday.com API key](#)

☒ Remember me for 30 days

If unchecked, you'll need to re-enter your API key after 8 hours

 Validating...

 [Check if I'm already logged in](#)

QC Tracker selection



Monday DEV QC Tracker Status Plot Generator

Select Workspace

QC Tracker test (SR)



Milestone Annotations (Optional)

DBL

12/03/2025



Add Another Milestone

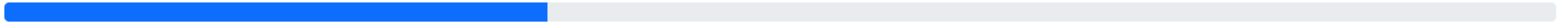
Generate Plot

Progress



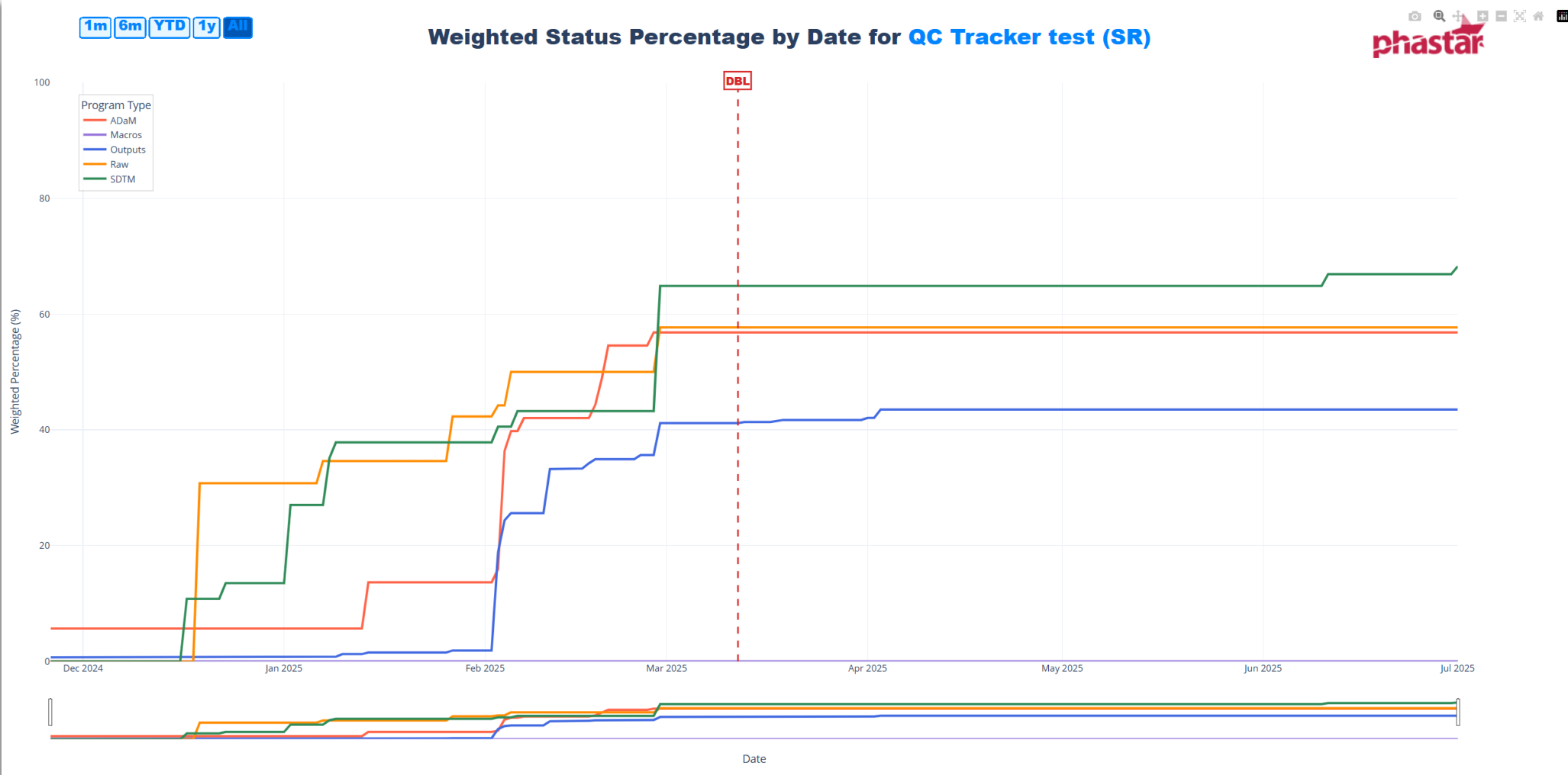
Monday DEV QC Tracker Status Plot Generator

Generating Plot...

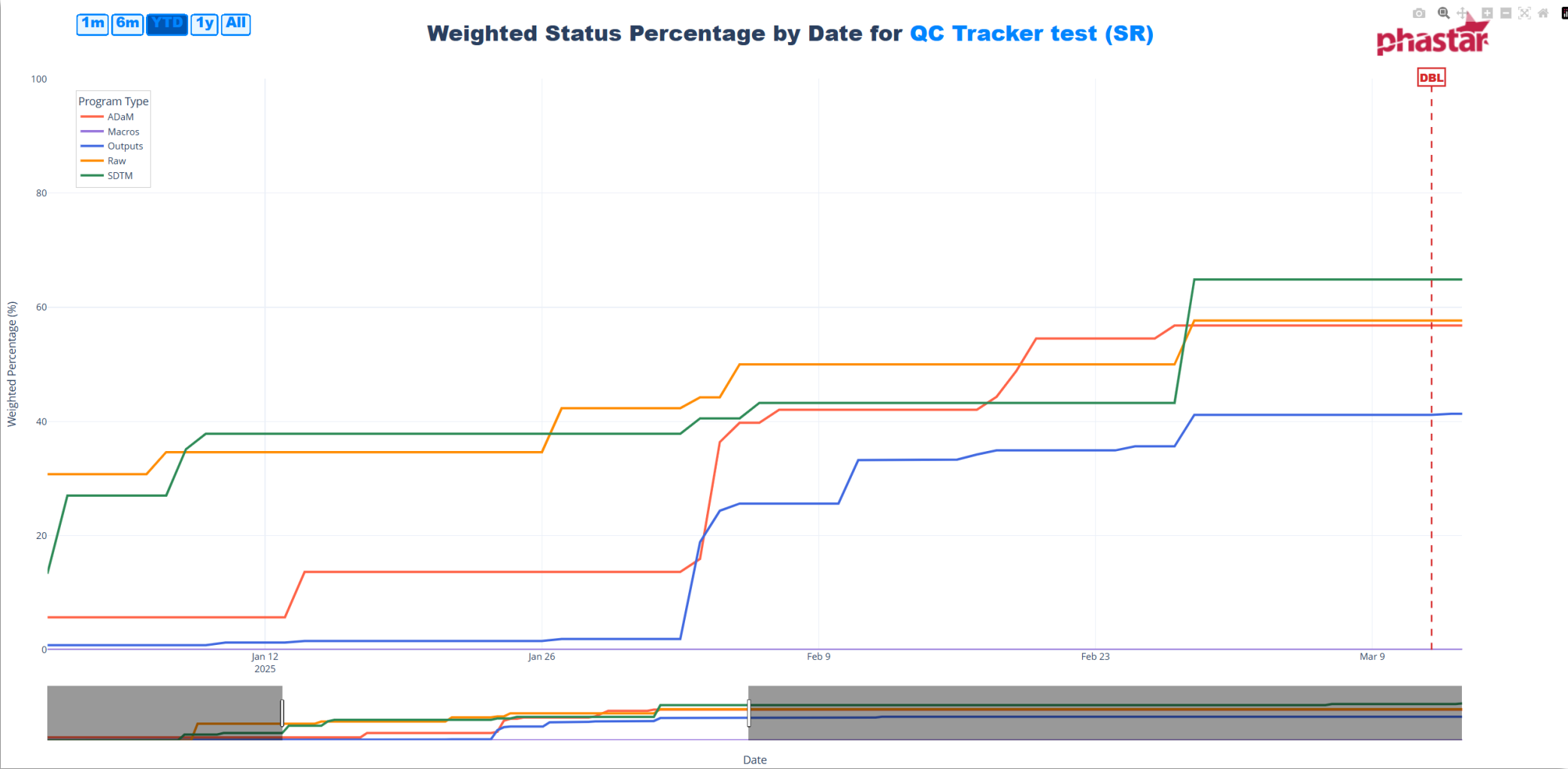


Processing board: QC Tracker (Outputs)

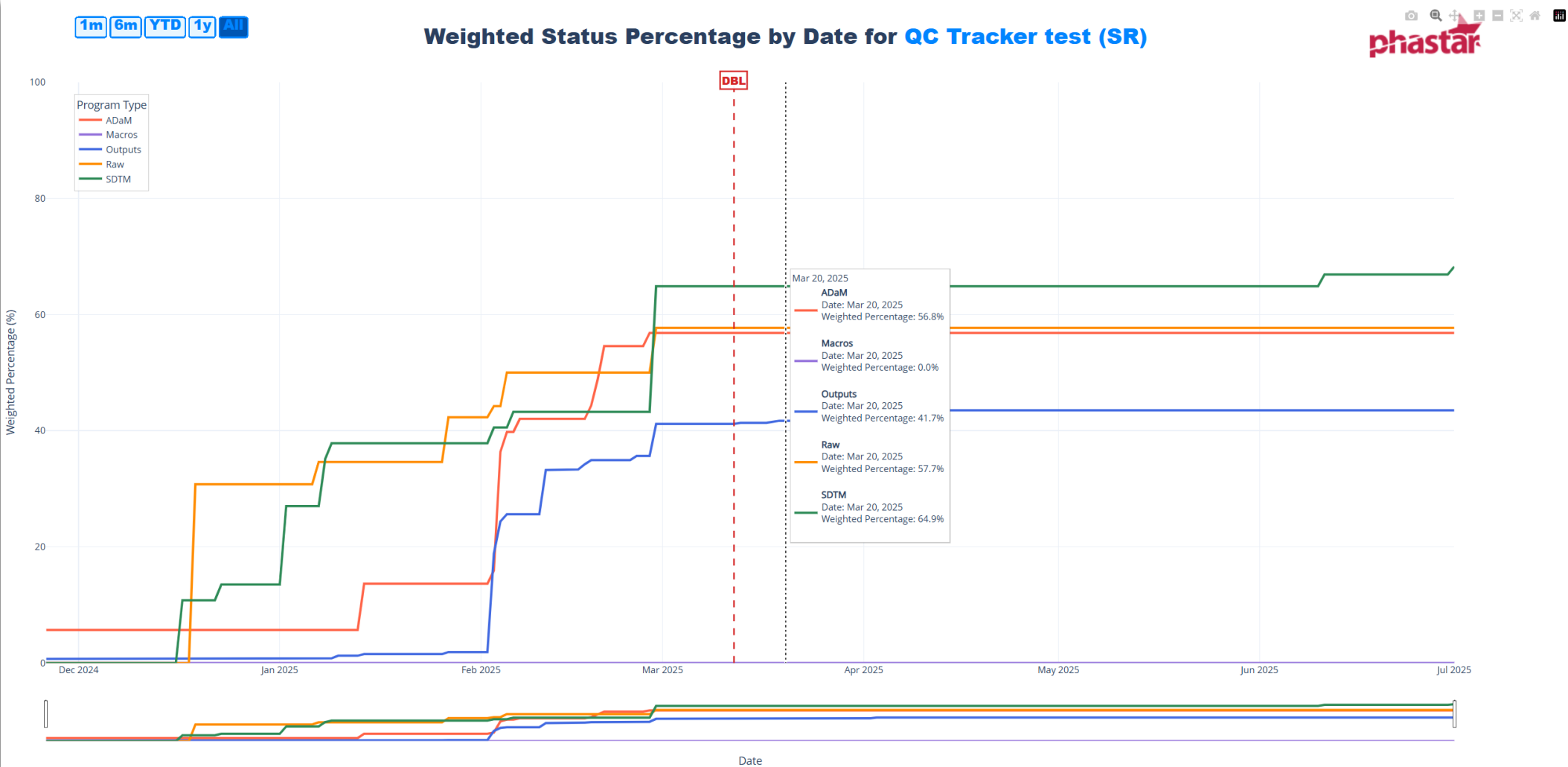
Status Plot



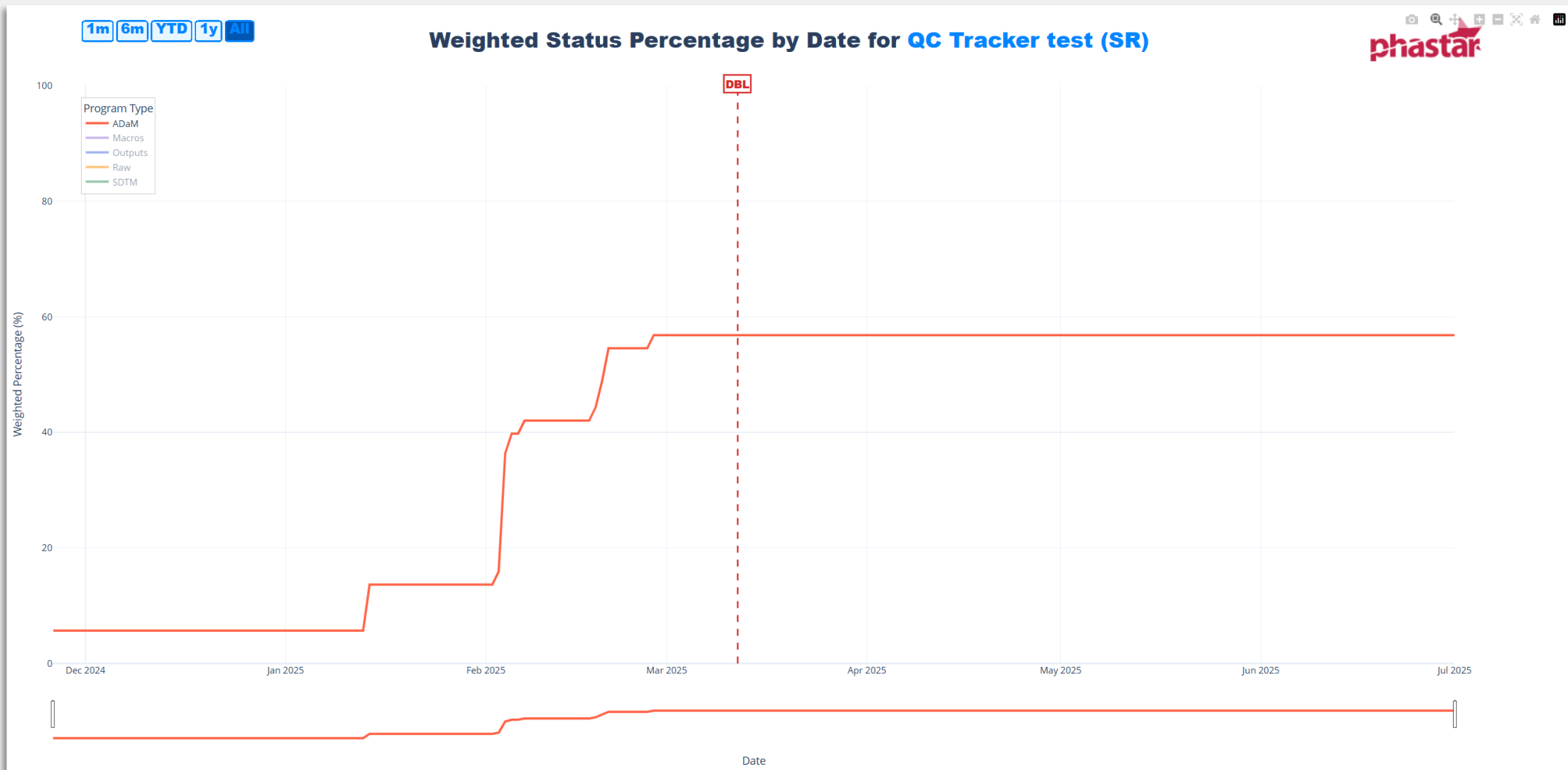
Date Slicer



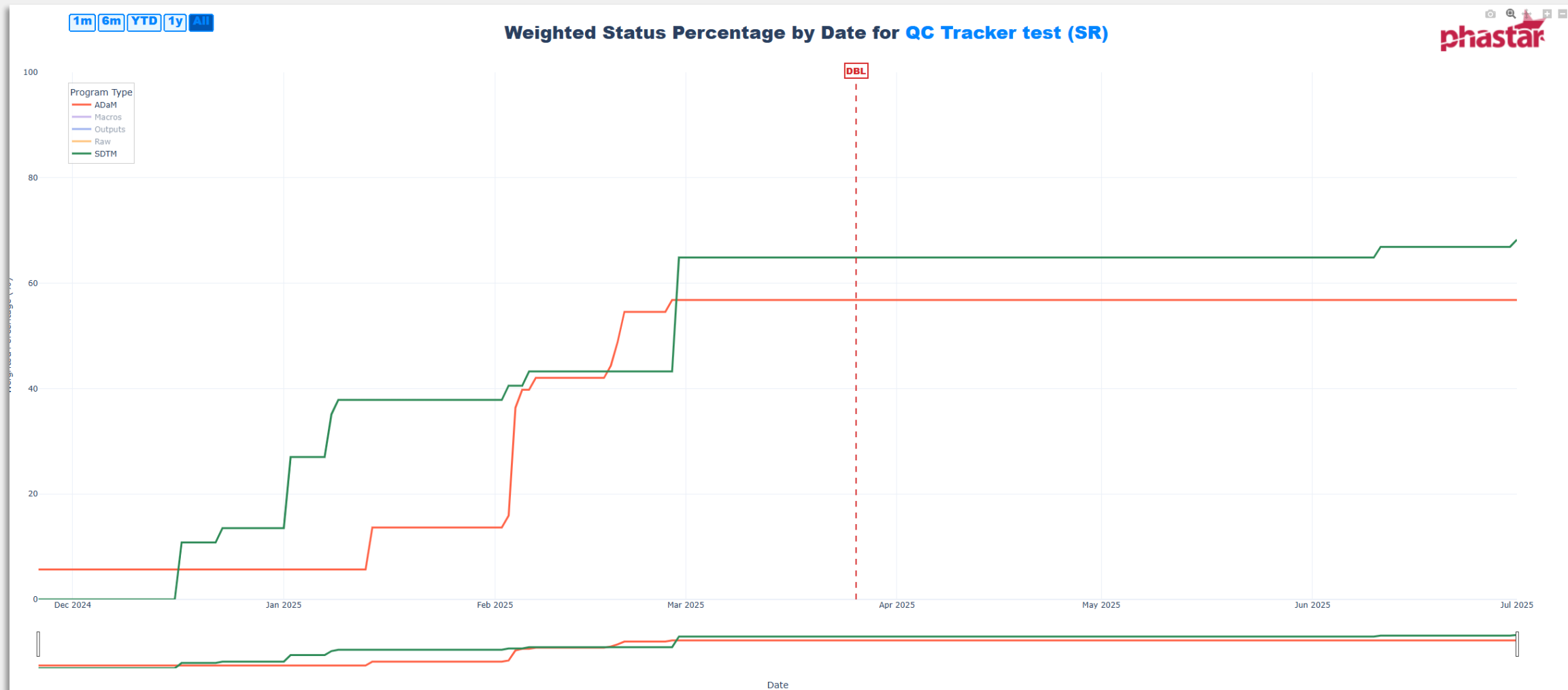
Hover Over



Select one program type



Select more than one program type



Challenges

- Steep learning curve with new technologies and languages
- Web app
- UI technologies and design
- Understanding GraphQL queries
- Processing the JSON files returned
- Unit tests
- Integration tests
- Containerisation
- Version control
- CI/CD workflows

SAS® always the elephant in the room

What next?

- Now have the data throughout the project
- New analysis and visualisation
 - Dashboard, Burn up/down, Resource utilisation
- Optimisation of API calls and data movements
- Improvements to UI/UX
- Full production version
- Integration with other applications, e.g., autocode generators, version control
- What happens if part of the tech stack changes?
- My knowledge increases

Questions

