



**PROCOGIA**



# Empowering Decisions: Advanced Portfolio Analysis and Management through Shiny

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Harnessing Shiny and Plumber API for User-Centric Financial Innovation

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# Background

## Traditional Challenges in Portfolio Analysis and Management



### Fragmented Tools

**Portfolio Analysts:** Use Excel and BI Tools, Manual Errors, and Different approaches to analyze

**Portfolio Manager:** Use Non-interactive tools, No real-time data access, Poor collaboration

**Researchers:** Faces challenges in obtaining a unified & accurate view



### Inefficient Data Ecosystem

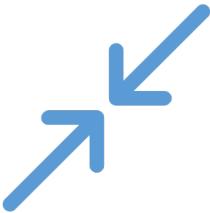
**Scattered Storage:** Spreadsheets, Database, Inconsistencies in data entries, Multiple versions

**Slow Insights:** Cluttered Dashboards, Unable to share with others

**Manual Reporting:** Less productivity, Multiple sources of truth

# Introduction

## A New Era in Portfolio Analytics



### **Break the Silos:**

Disrupting the status quo with immediate, actionable insights through interactive toolsets.



### **User-Centric Approach:**

Continuous feedback loops with users.  
Iteratively improved features and usability  
We started building tools by putting users at the center.

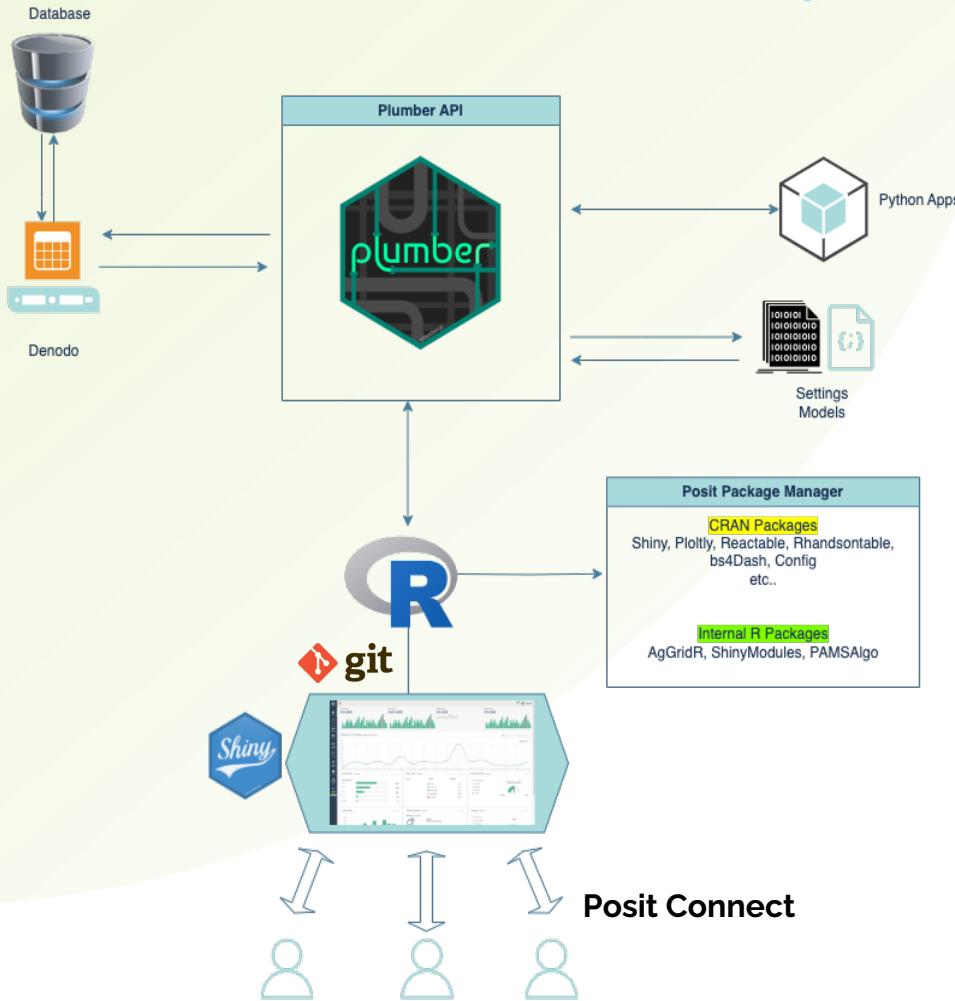


### **Iterative Development Process:**

The iterative process of developing, testing, and refining the tools.  
Utilized Shiny to create dynamic, responsive web applications.

# Overview

## A New Era in Portfolio Analytics



The screenshot shows the "Portfolio Analysis Tool" interface:

**Header:** Client: ABC Client || Plan: ClientHUB DEMO || Study: Sample Study || Last Saved: 2024-05-09T16:09:57

**Left Sidebar:**

- Welcome, lovekumar.patel
- Open/New Study
- Study Info
- Study Summary** (selected)
- Portfolio Management
- Rebalance Table
- Preliminary Performance
- Asset Allocation
- Asset Allocation
- Market
- Market Dashboards
- Portfolio Implementation
- Performance and Risk
- Factor Analysis
- Underlying Exposure
- Manager Selection
- Manager Detail
- Fees

**Study Summary Content:**

**Mix Inputs:**

Display Name	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6
1 Fund 1	\$25,000	\$250	\$0	\$5,000	\$7,859	\$4,555
2 Fund 2	\$25,000	\$2,100	\$0	\$2,000	\$7,859	\$345
3 Fund 3	\$102,100.25	\$0	\$2,500	\$0	\$394	\$4,543
4 Fund 4	\$0	\$0	\$2,000	\$1,500	\$0	\$0
5 Fund 5	\$15,489	\$0	\$0	\$4,544	\$34,545	\$0
6 Index Fund 1	\$102,546	\$15,000	\$0	\$4,666	\$0	\$43,345
7 Equity	\$36,000	\$2,000	\$300,000	\$0	\$43,535	\$35,435
8 Custom Developed	\$148,000	\$0	\$0	\$0	\$45,840	\$3,234

**Summary Stats:**

Measure	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6
Asset Duration	261.48%	198.73%	0.00%	237.32%	0.00%	227.44%
Standard Deviation Accounting	9.48%	6.72%	18.31%	9.76%	17.66%	5.46%
Expected Rtn (Geo - 10 Years)	6.64%	5.88%	5.67%	6.50%	6.89%	5.83%
Expected Rtn (Arith - 10 Years)	7.28%	6.17%	7.46%	7.21%	9.01%	6.03%
Expected Rtn (Geo - 30 Years)	7.35%	6.39%	7.30%	7.26%	8.24%	6.16%
Expected Rtn (Arith - 30 Years)	8.03%	6.70%	9.20%	8.02%	10.48%	6.37%
Standard Deviation	12.37%	8.24%	20.96%	13.08%	23.01%	6.79%
Sharpe Ratio (10-Year)	20.69%	21.83%	7.56%	18.48%	12.20%	25.75%
Sharpe Ratio (30-Year)	31.41%	35.42%	18.28%	28.97%	20.72%	39.62%

**Right Sidebar:**

- App Level Inputs
- Version: 2024 Q1 Assumptions
- Analysis Start Date: End Date: 1-2012 / 3-2024
- Run Calculations
- Allocation: +, -, C, -

# Overview Components

- Portfolio Management
  - Create
  - Clone
  - Save
  - Archive
  - Delete

The screenshot shows the 'Portfolio Analysis Tool' interface. At the top, a header bar displays the client information: 'Client: ABC Client || Plan: ClientHUB DEMO || Study: My Portfolio || Last Saved: 2024-06-20T21:55:15.207'. Below the header is a navigation sidebar with various menu items: 'Open/New Study', 'Study Info', 'Study Summary', 'Portfolio Management' (which is selected), 'Rebalance Table', 'Preliminary Performance', 'Asset Allocation', 'Asset Allocation', 'Market', 'Market Dashboards', 'Portfolio Implementation', 'Performance and Risk', 'Factor Analysis', 'Underlying Exposure', 'Manager Selection', 'Manager Detail', and 'Fees'. A large button at the bottom of the sidebar says 'Save'. To the right of the sidebar is a table titled 'Select study' with columns: 'study\_name', 'primary\_study', 'version\_name', 'updated\_date', and 'updated\_by'. Two rows are visible: 'Test' (primary\_study: TRUE, version\_name: 2023 Q1 Assumptions, updated\_date: 2024-06-20T21:55:15.207, updated\_by: lovekumar.patel@procogia.com) and 'My Portfolio' (primary\_study: FALSE, version\_name: 2024 Q1 Assumptions, updated\_date: 2024-06-20T21:55:15.207, updated\_by: lovekumar.patel@procogia.com). At the bottom of this section are buttons for 'Open Study', 'New Study', 'Test', 'Delete Study', and 'Switch Study'.

study_name	primary_study	version_name	updated_date	updated_by
Test	TRUE	2023 Q1 Assumptions	2024-06-20T21:55:15.207	lovekumar.patel@procogia.com
My Portfolio	FALSE	2024 Q1 Assumptions	2024-06-20T21:55:15.207	lovekumar.patel@procogia.com

# Overview Components

- Portfolio Management
  - Customize
    - Asset Allocations
    - Customize Funds
    - Cashflow
    - Risk Parameters
    - Active vs Passive

The screenshot displays the 'Portfolio Analysis Tool' interface with the title bar 'Client: ABC Client || Plan: ClientHUB DEMO || Study: Test || Last Saved: NA'. The left sidebar lists various components: Welcome, Open/New Study, Study Info, Study Summary (selected), Portfolio Management (Rebalance Table, Preliminary Performance), Asset Allocation (Asset Allocation), Market (Market Dashboards), Portfolio Implementation (Performance and Risk, Factor Analysis, Underlying Exposure), Manager Selection (Manager Detail, Fees), and a Save button. The main content area shows two tables under the 'Study Summary' tab.

**Mix Inputs:**

Display Name	Mix1	Mix2	Mix3
1 Fund 1	\$150	\$0	\$300
2 Fund 2	\$150	\$250	\$50
3 Fund 3	\$150	\$150	\$400
4 Fund 4	\$0	\$100	\$0
5 Fund 5	\$500	\$100	\$0

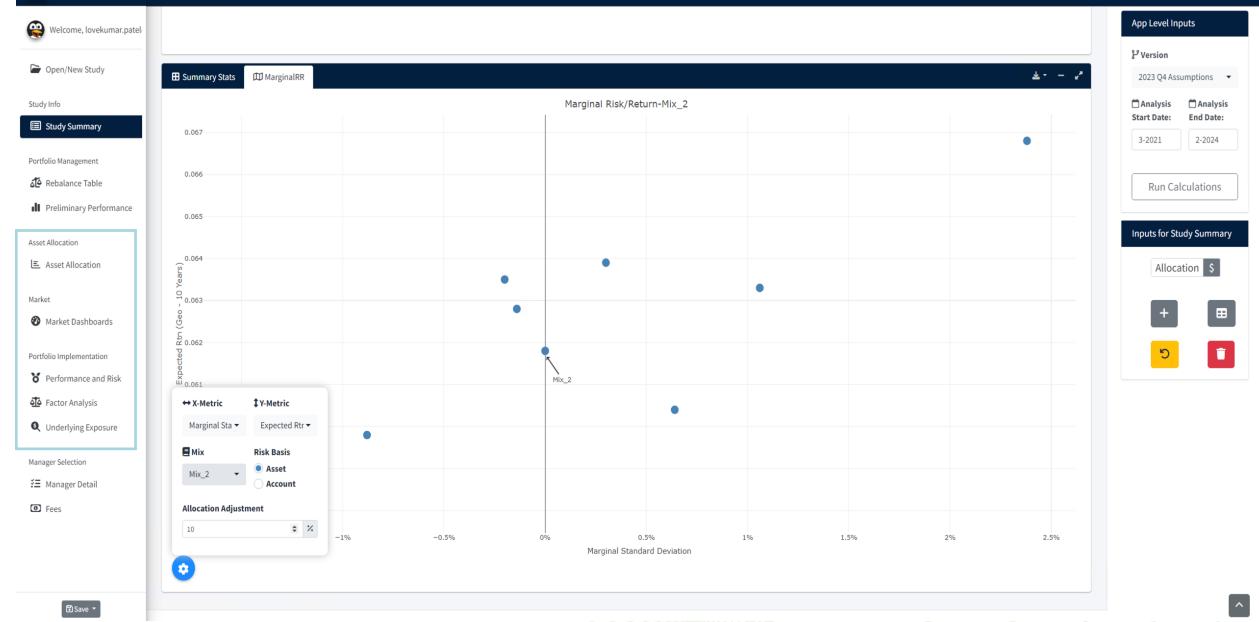
**Summary Stats:**

Measure	Mix1	Mix2	Mix3
Expected Rtn (Geo - 10 Years)	5.51%	6.47%	5.45%
Standard Deviation Accounting	10.04%	8.57%	5.50%
Expected Rtn (Arith - 10 Years)	6.10%	6.97%	5.66%
Expected Rtn (Geo - 30 Years)	6.57%	6.92%	5.68%
Expected Rtn (Arith - 30 Years)	7.20%	7.45%	5.90%
Standard Deviation	11.83%	10.95%	7.06%
Sharpe Ratio (10-Year)	14.31%	24.18%	23.14%
Sharpe Ratio (30-Year)	27.40%	32.75%	33.26%
Asset Duration	151.73%	193.82%	276.41%

On the right side, there is a panel titled 'App Level Inputs' with sections for Version (2023 Q1 Assumptions), Analysis (Start Date: 8-2020, End Date: 7-2023), and Run Calculations. Below it is a section for 'Inputs for Study Summary' with an Allocation field and a set of icons for adding, deleting, and modifying data.

# Overview Components

- Portfolio Analysis
  - Analyze Overall Statistics
  - Assess Macroeconomic Trends
  - Market Dashboards
  - Factor Analysis
  - Risk-Adjusted Return



# Implementation

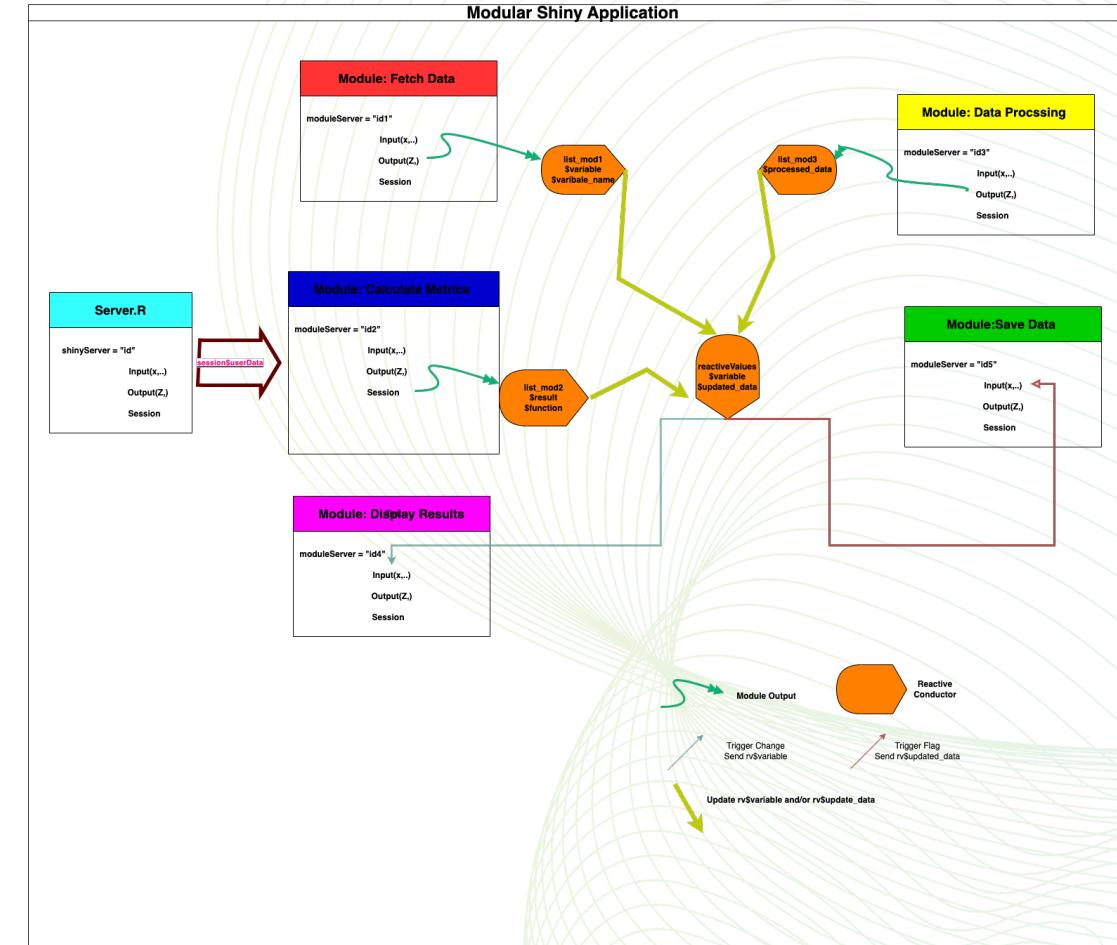
## Key Points



# Implementation

## Modular and Integrative System Design

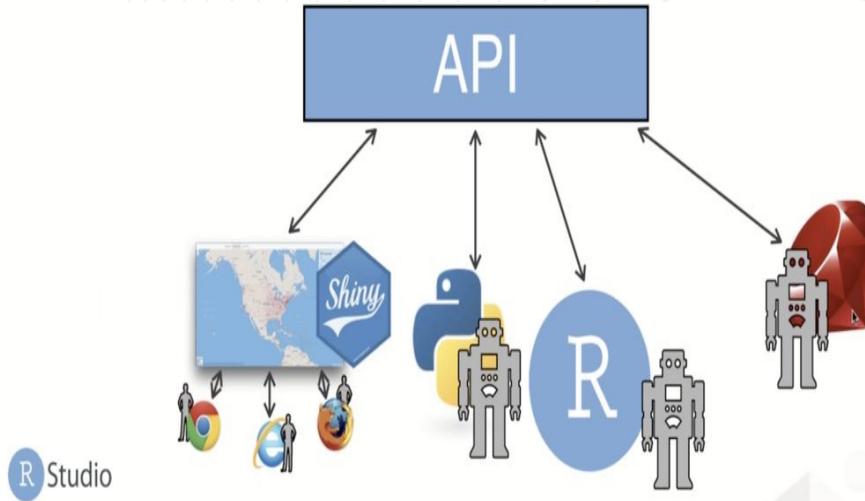
- Importance of Reusability and Modular Design:
  - Enhances maintainability and scalability.
  - Promotes consistency across different applications.
  - Speeds up development by allowing reuse of pre-built components.
- Share reactive among multiple modules:
  - Nested modules
  - Dynamic module calls
  - Customizable modules tailored to specific financial needs.



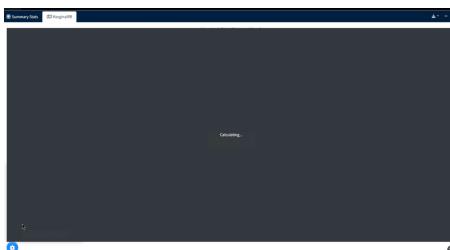
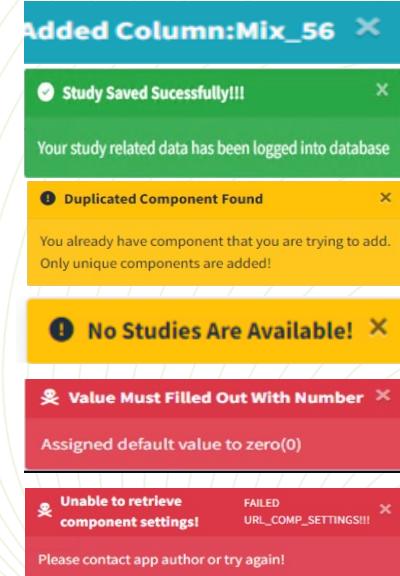
# Implementation

## Plumber API Integration

- Role of Plumber API in Driving the System:
  - Facilitates backend services and data handling.
  - Provides endpoints for data retrieval and processing.
- Seamless Integration with Other Applications:
  - API endpoints can be consumed by various applications, ensuring interoperability.
  - Supports a wide range of use cases and environments.



# Implementation Error Handling and User Feedback



Are you sure ??

By clicking delete, you will delete study from table  
permanently

Delete

Cancel



Are you sure? Do you really wish  
to switch primary study?

You already have a primary study, this option will assign  
primary study to your new study.

Switch

Cancel

# Implementation

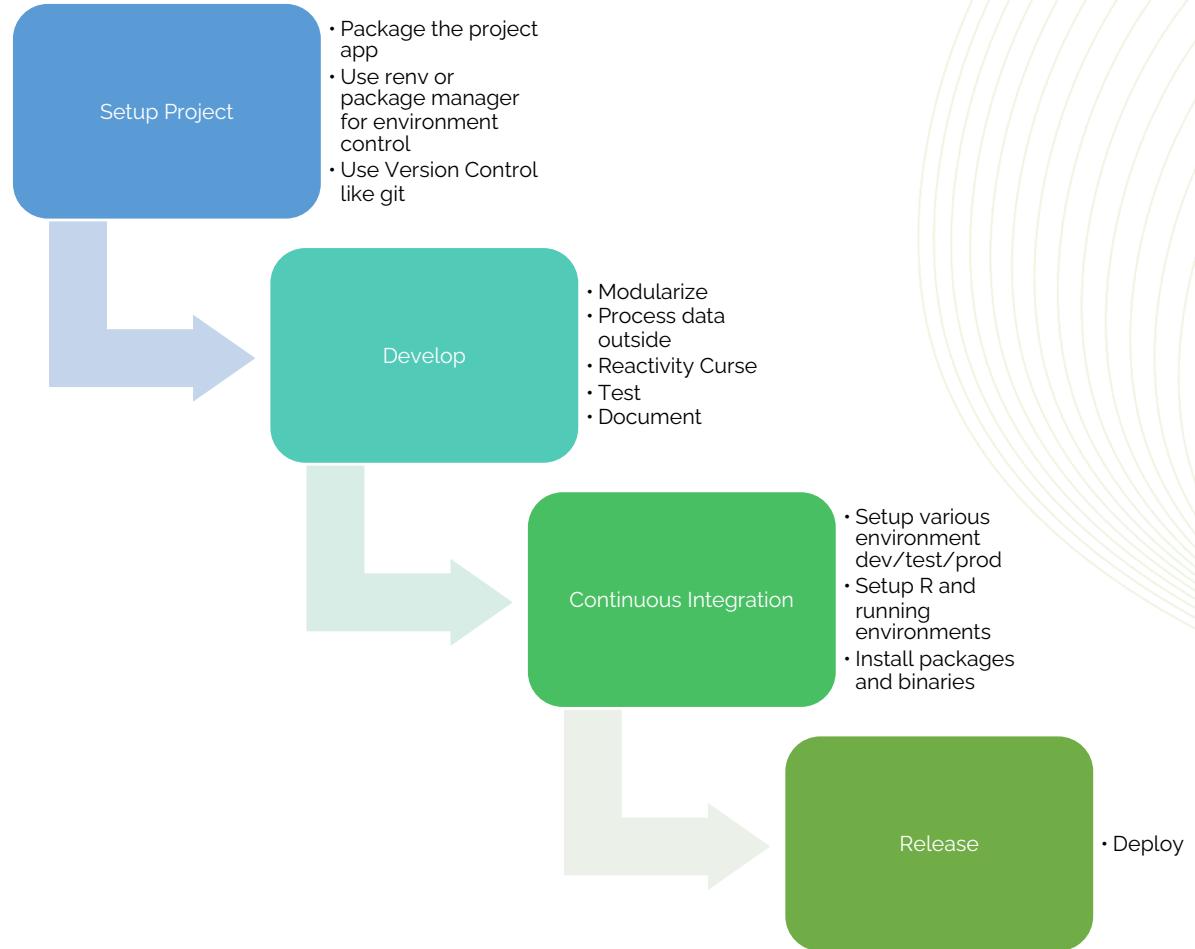
## Integrate Custom JS and CSS - Unlock New Capabilities

Market value as of 2024-05-31

Fund	Market Value	Policy	Jul 2024	Aug 2024	Sep 2024	Portfolio Weight	New Market Value	New Portfolio Weight
▼ Total Plan	\$6,040.00	115.65%	\$0.00	\$30,250.00	\$0.00	100.00%	\$36,290.00	100.00%
▼ Equity	\$500.00	50.00%	\$0.00	\$250.00	\$0.00	8.28%	\$750.00	2.07%
Equity Fund	\$500.00	50.00%	\$0.00	\$250.00	\$0.00	8.28%	\$750.00	2.07%
▼ Fixed Income	\$0.00	0.00%	\$0.00	\$30,000.00	\$0.00	0.00%	\$30,000.00	82.67%
Fixed Income Fund	\$0.00	0.00%	\$0.00	\$30,000.00	\$0.00	0.00%	\$30,000.00	82.67%
▼ Multi Asset	\$3,000.00	10.00%	\$0.00	\$0.00	\$0.00	49.67%	\$3,000.00	8.27%
Multi Asset Fund	\$3,000.00	10.00%	\$0.00	\$0.00	\$0.00	49.67%	\$3,000.00	8.27%
▼ Real Assets	\$2,540.00	35.40%	\$0.00	\$0.00	\$0.00	42.05%	\$2,540.00	7.00%
Real Assets Fund	\$2,540.00	35.40%	\$0.00	\$0.00	\$0.00	42.05%	\$2,540.00	7.00%
▼ Cash	\$0.00	20.25%	\$0.00	\$0.00	\$0.00	0.00%	\$0.00	0.00%
Cash Fund	\$0.00	20.25%	\$0.00	\$0.00	\$0.00	0.00%	\$0.00	0.00%

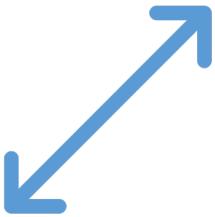
# Implementation

## Best Practices with Shiny



# Still Evolving.....

## Client Satisfaction



### **Adding Features with Users at the Center:**

Every feature addition is driven by user feedback and market needs.

We prioritize usability and relevance, ensuring each update enhances the user experience.



### **Ongoing Maintenance and Improvement:**

Regular updates and maintenance ensure the system remains robust and secure.

Continuous performance optimizations and bug fixes to keep the platform reliable.



### **Building Strong Client Relationships:**

We believe in being good listeners and understanding our client's challenges deeply.

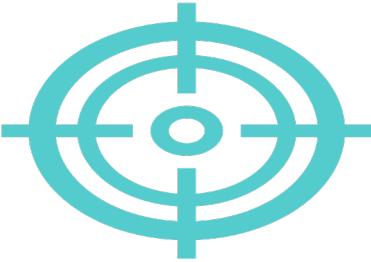
Treating their problems as our own helps us deliver tailored solutions that truly make a difference.

Tangible outcomes: improved decision-making, efficiency, and client satisfaction.

# Real-World Impact



**Efficiency:** Decision-making time increased by 40%



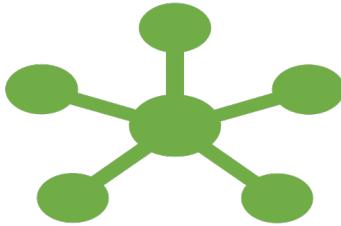
**Accuracy:** Improved data accuracy by eliminating manual data consolidation.



**Productivity:** Reduced repeated tasks by 70%



**User Experience:** Enhanced user satisfaction due to intuitive, interactive interfaces.



**Collaboration:** Increased cross-departmental collaboration through shared insights.

# References

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- bs4Dash, <https://cran.r-project.org/web/packages-bs4Dash/index.html>
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- AG-Grid, <https://www.ag-grid.com/>
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- golem, <https://cran.r-project.org/web/packages/golem/index.html>
- Git, <https://git-scm.com/>
- Reactable, <https://cran.r-project.org/web/packages/reactable/index.html>
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- plotly, <https://cran.r-project.org/web/packages/plotly/index.html>
- htmlwidgets, <https://cran.r-project.org/web/packages/htmlwidgets/index.html>
- <https://www.ardata.fr/en/post/2019/04/26/share-reactive-among-shiny-modules/>
- <https://pbs.twimg.com/media/DigcHF1XsAAZzA1.jpg>

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