

**MICHIGAN STATE**  

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**U N I V E R S I T Y**

# Beta Presentation

## Investment Portfolio Construction

### The Capstone Experience

Team Principal IPC

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*From Students...  
...to Professionals*

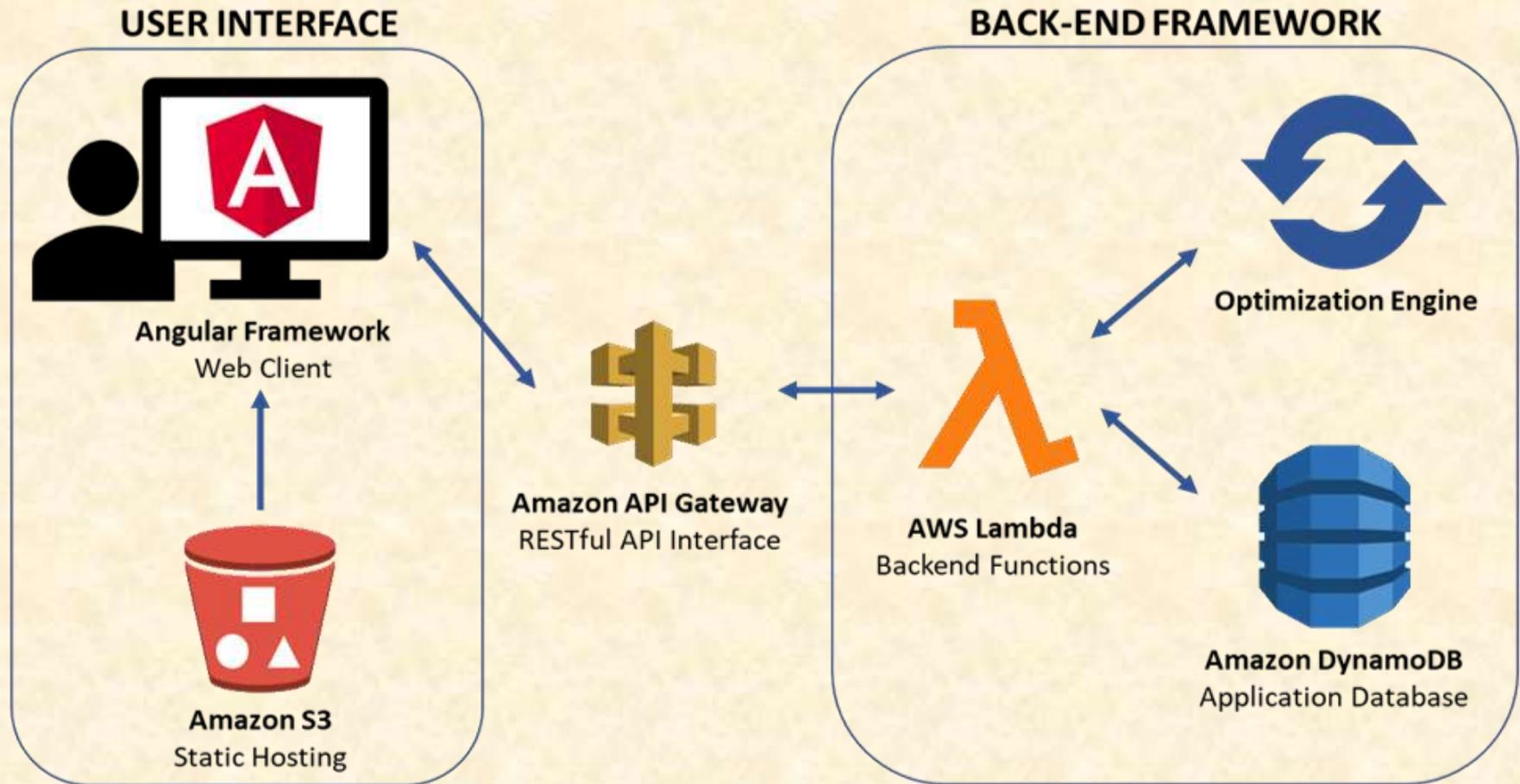
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Spring 2020

# Project Overview

- Principal's current process involves hard-coding parameters to generate a single type of investment portfolio construction
- Our application provides a user interface for saving and loading optimization parameters and passing them to Principal's existing optimization engine
- The application assigns groups to its users, providing them with the ability to construct a variety of portfolio constructions based on custom-built portfolio-level and quantile-level constraints



# System Architecture



# Home Page

Principal® Sean Kennedy

Scenario: Short-term Aggressive / Constraint Set: narrowSectors

Home Scope Specs Results

### Create New Constraint Set

Name: techHeavy Description: Portfolio weighted heavily in technology sector + Generate Constraint Set

### Load Recently Saved Constraint Sets

| Name           | Date         | Description                         |
|----------------|--------------|-------------------------------------|
| narrowSectors  | 4 - 4 - 2020 | sectors about technology and energy |
| stockQuantiles | 4 - 4 - 2020 | stock constraint set                |

Load Delete

### Load Recently Saved Results

| Name | Date | Constraint Set |
|------|------|----------------|
|------|------|----------------|

Load Delete



# Constraint Scoping Page

The screenshot shows the Principal Constraint Scoping Page. At the top, the Principal logo is on the left, and the user name "Sean Kennedy" is on the right. Below the header, there is a "Save" button and a breadcrumb trail: "Scenario: Short-term Aggressive / Constraint Set: narrowSectors". A navigation bar contains tabs for "Home", "Scope" (which is active), "Specs", and "Results".

The main configuration area includes three dropdown menus: "Select Level:" set to "Stock", "Select Type:" set to "Quantile", and "Select Signal:" set to "DRP". To the right, the "Weighting Method:" section has two radio buttons: "Absolute" (unselected) and "Benchmark" (selected). A green "+ Add Constraint" button is positioned to the right of these options.

Below the configuration area, there are three constraint panels, each with a "Delete" button:

- Grouping Constraints:**

| Type   | Weight   |
|--------|----------|
| Sector | Absolute |
| Sector | Absolute |
- Stock Constraints:**

| Type     | Signal | Weight    |
|----------|--------|-----------|
| Quantile | DRP    | Benchmark |
- Portfolio Constraints:**

| Type | Weight |
|------|--------|
|------|--------|



# Constraint Specification Page

The screenshot shows the Principal software interface for constraint specification. The top navigation bar includes the Principal logo, a user profile for Sean Kennedy, and a breadcrumb trail: Home > Scope > Specs > Results. The current page is 'Specs' for the scenario 'Short-term Aggressive' with constraint set 'narrowSectors'. There are three main sections: 'Grouping Constraints', 'Stock Constraints', and 'Portfolio Constraints'. The 'Grouping Constraints' section contains two rows, both with 'Sector' type and 'Absolute' weight. The 'Stock Constraints' section contains one row with 'Quantile' type, 'DRP' signal, and 'Benchmark' weight. The 'Portfolio Constraints' section is currently empty. Below these is the 'Objective Function' section, which includes radio buttons for 'Plus' and 'Minus' signs, a 'Value' input field, and a 'Category' dropdown menu set to 'Relative Return'. A table below the objective function shows two terms: 'Plus' with a value of 0.212 and category 'Absolute Return', and 'Subtraction' with a value of 0.06 and category 'Tracking Error'. There are buttons for '+ Add Term to Objective Function' and 'Delete'.

Principal® Sean Kennedy

Scenario: Short-term Aggressive / Constraint Set: narrowSectors

Home Scope Specs Results

### Grouping Constraints

| Type     | Weight                                       |
|----------|--|
| ▼ Sector | Absolute <input checked="" type="checkbox"/> |
| ▼ Sector | Absolute <input checked="" type="checkbox"/> |

### Stock Constraints

| Type       | Signal | Weight  |
|------------|--------|---|
| ▼ Quantile | DRP    | Benchmark <input checked="" type="checkbox"/> |

### Portfolio Constraints

| Type | Weight |
|------|--------|
|------|--------|

### Objective Function

Sign:  Plus  Minus

Value:

Category:

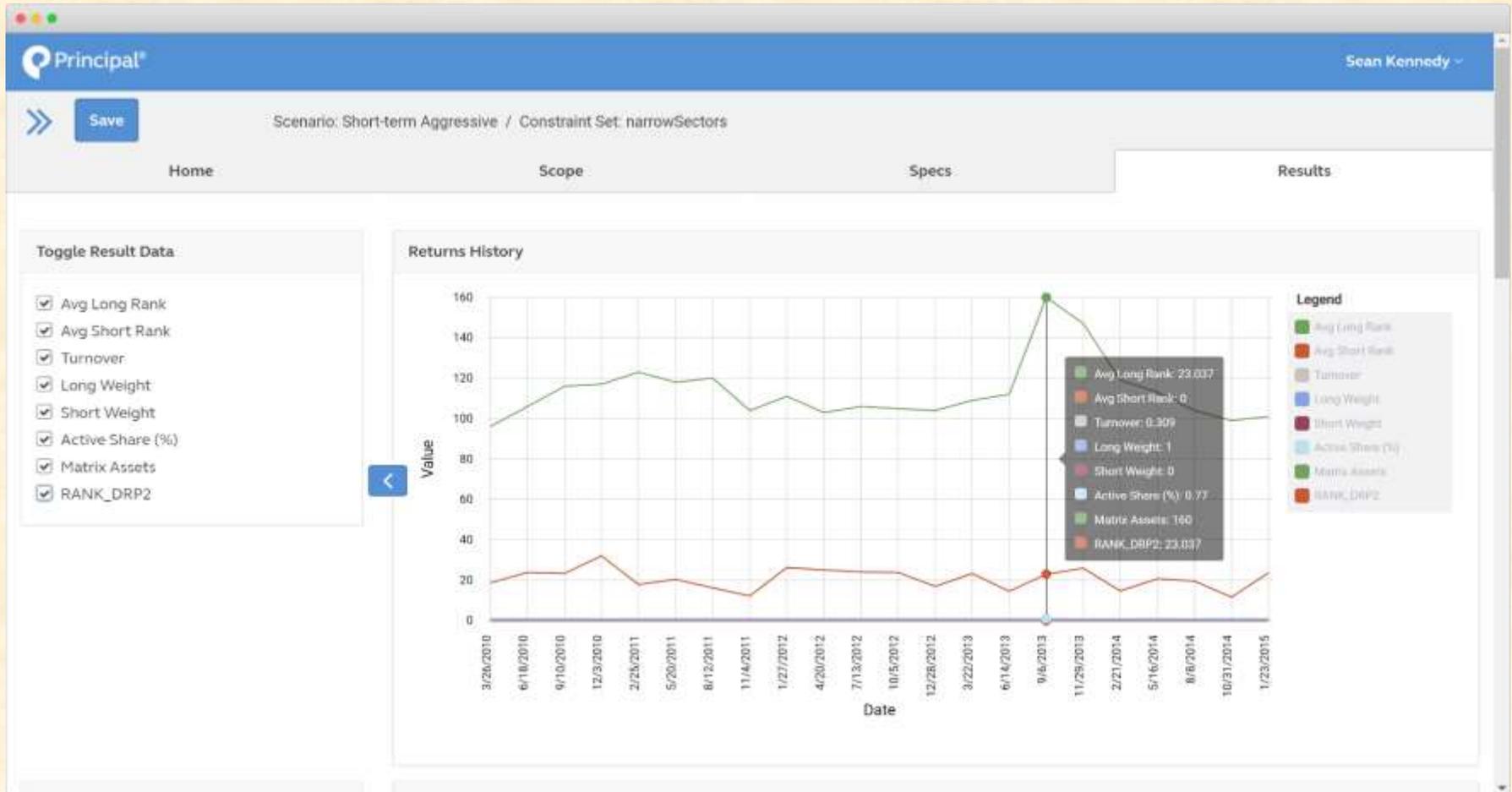
+ Add Term to Objective Function

| Operation   | Value | Category        |
|-------------|-------|-----------------|
| Plus        | 0.212 | Absolute Return |
| Subtraction | 0.06  | Tracking Error  |

Delete



# Results Page



# What's left to do?

- Add plug-in services so that it is easy for Principal to put the software into production quickly on a variety of databases
- Fully integrate with other Principal team's user authentication
- Add configuration plug-ins for additional world views that Principal can implement
- Finish code documentation



# Questions?

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