6170
Fall 2014
tracker: A new way for budget tracking

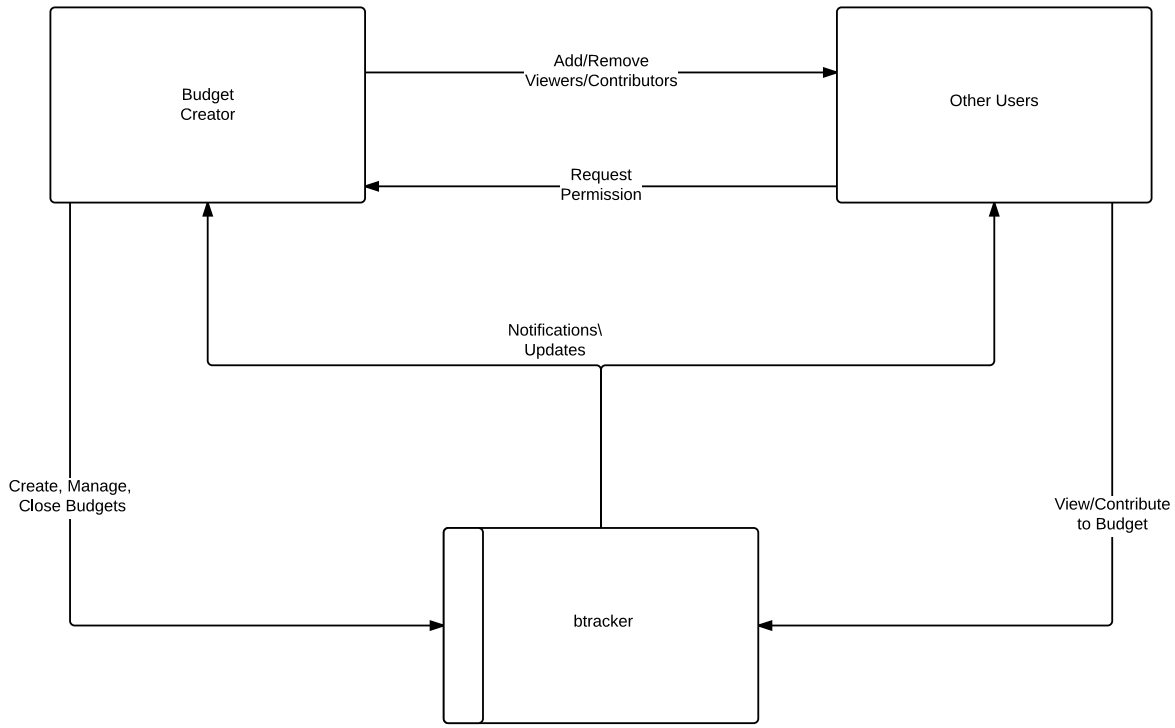
Motivation

btracker is an online application that allows for multiple users to create and maintain budgets. It supports creating budgets, following budgets, updating budgets, labeling purchases with section tags, and closing budgets with a final budget analysis. It does not sync budgets with credit card/ bank transactions or sync with Gmail, Apple Mail, or other 3rd party organization tools.

The purposes of tracker are:

- **Create a collaborative environment for maintaining budgets.** Managing budgets should never be a one man job. We plan on creating an environment that allows for a user to create budgets, share to other users, and allow those other users to view and request edits for the budget.
- **Simplify the labeling of purchases when adding items to a budget.** tracker uses a section tagging system to label budget items with one or more key words.
- **(Potentially) provide visualization templates for created budgets.** With data provided by the users, tracker could potentially provide templates for visualizing budgets for data analytics.

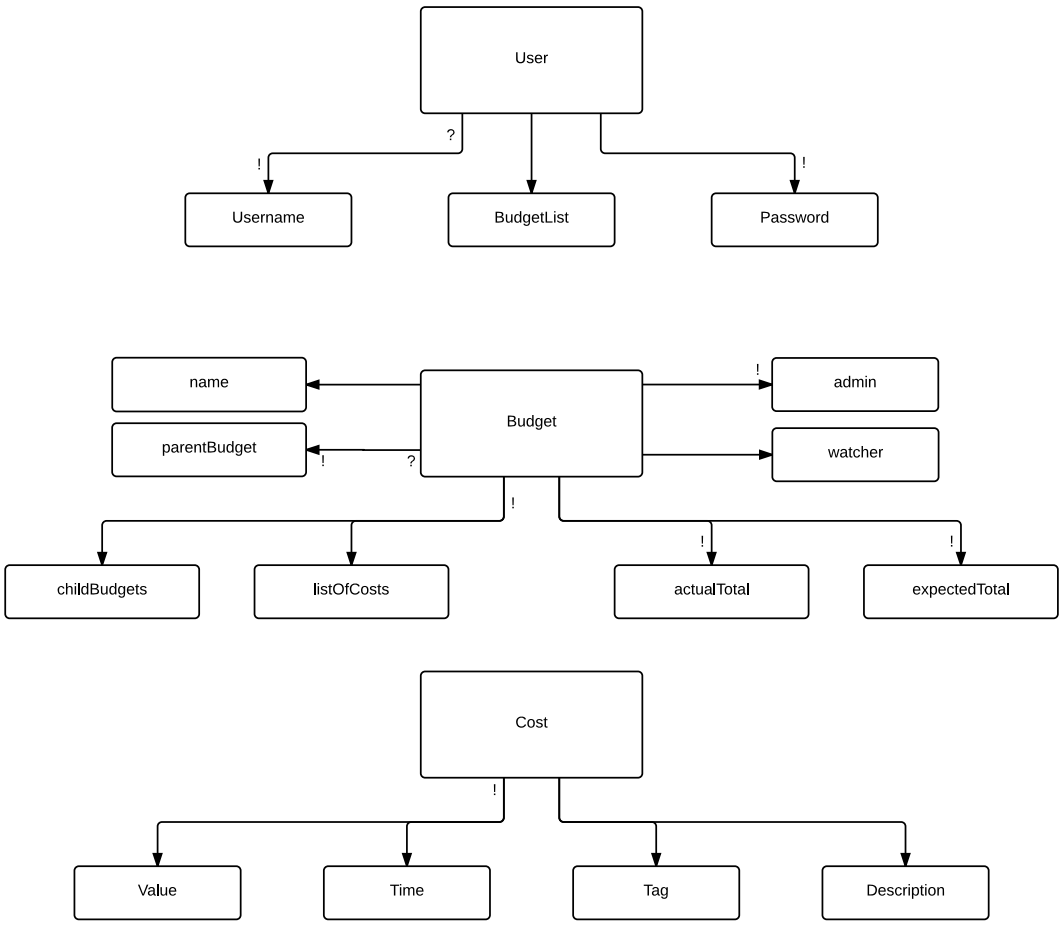
Context Diagram



Concepts

Tags: Allows for better, more efficient organization in a budget. Each budget will have a list of section tags with it that corresponds to different sections of spending in the overall budget. These ‘sections’ are made of smaller budgets and keywords associated with it.
Budget Item: An Item represents an individual purchase that should be accounted for in the budget. All items will have a name, a short description, and a ‘tag’ to be added in a specific section bin in the budget. All items start with the section tag ‘misc.’.
Shared Budget: A shared budget is the representation of the budget being created. It allows for multiple people to view and/or contribute to a single budget. There is exactly 1 admin.
Cost: An item that can be added to a budget. Each cost item has an associated price and list of Tags that associate the cost with one or more budgets.
Watchers: Watchers are users that are not admins of a budget, but are still getting updates and suggesting edits to a budget, allowing for optimization of communicating budget progression.

Data Model



Additional Constraints

- Budget with no parent is considered the ‘root’ budget.

Design Challenges

How often should a budget update when multiple people are collaborating? This would be a more dire concern if the budget was a real time update, instead of a 'per budget item created' structure, but is still a concern.

Potential Solution:

- Send a push notification to all users viewing/contributing to the budget when a new budget item is added to the budget.

What happens if multiple people are attempting to edit a single budget item? With any collaborate web application comes concurrency issues. The potential solutions to this problem can be also applied to any other potential concurrency issue in the application.

Potential Solutions:

- Multi-treading. I am under the impression that javascript does not support multithreading, but I am not familiar with 3rd party frameworks that could support this.
- Only the original author can edit the create item. This does reduce collaboration abilities, but removes a large burden in regard to potential concurrency issues.
- When someone edits a budget item, they remove the old one and create a new one (all budget items are immutable). Memory management becomes problem as budgets get larger, and btracker will also have to decide when budget items are deleted/replaced. Can no longer use object id's for identification because new object is created. Greatly increases the number of database calls for replacing an object.
- Simulate the Github model. Have only the admin have the ability to officially edit the budget. And watchers are allow to 'commit' edits to budget, with the admin accepting request when done correct.

Should cost be associated with more than one budget? The cost item is created while focused on a budget. This is primarily a scoping design challenge.

Potential Solutions:

- Allow for filtering using the tags. This allows for both aspects of the tag scoping to be shown.
- Constrain to one tag per cost item. This removes the potential of confusing user of where money is being allocating and accidentally double budgeting.