

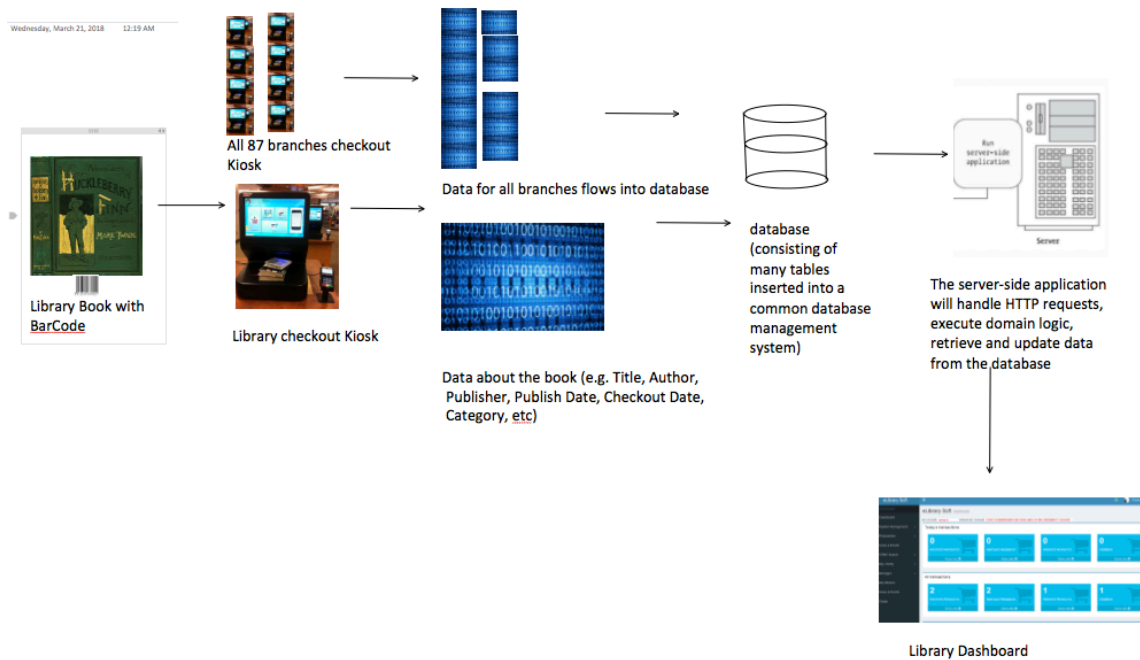
New York Public Library Dashboard Project

By: Peter Sun

New York Public Library's mission statement is "to inspire lifelong learning, advance knowledge, and strengthen our communities". As the nation's largest public library system, it has served the New York boroughs for over 100 years. The public library system has an annual budget of 245 million dollars, with 3,150 staff members in 87 branches and 4 research branches serving over 17 million patrons each year. The library system has a tremendous impact on the communities it serves and beyond. At the heart of the library, even in the digital age, is its physical books. A library without books simply doesn't feel like a library and the New York Library System has a lot of it, around 54 million or so. Yet "or so" is the issue here. With so many items to keep track of there is no wonder that there is debate about New York Public Library's precise number of books. According to the New York Times Article: "*A Slippery Number: How Many Books Can Fit in the New York Library?*" the number of books that are in the main library ranged from 1.8 million to 4.5 million, that's 150% in potential difference. If we were to extrapolate that to the entire library system would have an estimate of between 32 million items to 86 million items. Evidently a margin of error in that region is unacceptable to advancing New York Public Library's mission statement.

New York Public Library has come to GA Group with the problem statement of: "How do we keep track of all of our inventory across all of our branches?" The team originally proposed a monolithic service solution to the problem by proposing to use a barcode system that keeps track of all 54 million items and display that information on an easy to understand dashboard similar to a simplified graphic representation below:

Figure 1. Monolith System for New York Public Library



In this setup each barcode would be the identifier for books/items. The identifier will allow properties such as Title, Author, Publisher, Publish Date, Category, and more be assigned to the object. Each time the object is scanned by some kiosk or personnel its location is recorded to the Database and its properties is obtained from the database and shown to the admin user. The interface that customers use such as kiosk will likely run on html/javascript while the server side will likely run on HTTP requests. The GA team spent time wire framing the dashboard (Appendix A) for displaying information and creating some user stories to help use better understand what the final product could potentially look like.

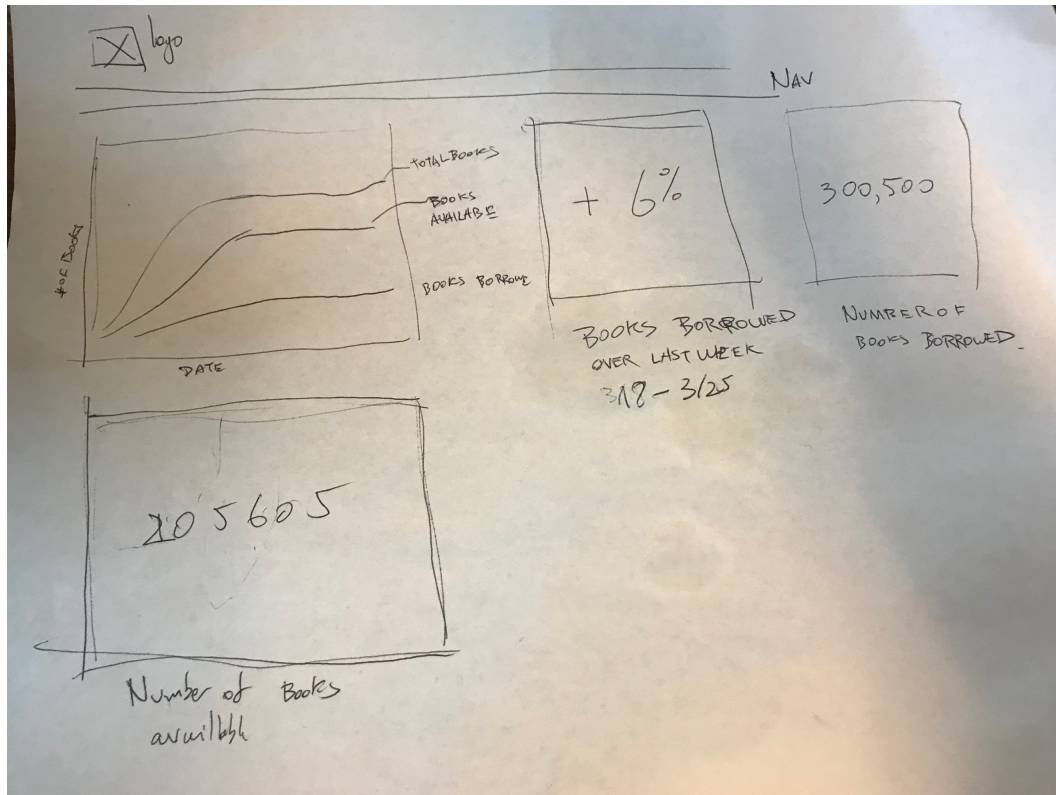
This format of letting barcode be the identifier for objects can be used on variety of objects aside from books. The objects can be assigned whichever property that is appropriate for it. According to the New York Times Article, in addition to the books the library system also holds around 15 million microforms, photographs, music sheets, maps, programs, and the like. It also has boxes filled with manuscripts, archival items and ephemera, and others. Each one of these objects can be assigned their own unique properties that identifies it in the system. Therefore, in order to scale the monolith system, the entire New York Public Library system would adopt the barcode as identifier for all objects in the catalog to track their whereabouts and status.

Given that the monolith system has its advantages it is also not without its problems. To deploy a monolith system on the scale of New York Public Library's 54 or so million items and 90 branches would require a very lengthy period of development and testing. The source code would also risk getting complicated very quickly as the sheer number of objects to be maintained and deployed would amount to serious challenge. Each time a modification or upgrade needed to be done to the system the software engineers would have to review all the source code to make sure everything is in good working order before deploying. The system would also discourage innovative features such as word maps from being implemented in fear of creating issues to the source code. All in all, the monolith system would be ideal if it was only deployed to track objects within the Library System. However, it is very hard to predict the future and assume there won't be more interesting features that can be created from the data gathered.

The other method is using the micro-service architecture which as gained popularity in recent years and it has subsequently been adopted by many high-tech companies such as [Uber](#), and such. The advantages of a micro-service architecture are that each feature can be discretized and only have to interact with other features through their APIs. This way many features can be deployed within a single app and minimize chances of whole system crashing. For example, in the earlier example if a book title popularity feature (see Appendix A.3.) was to be added based on data collected from books checked out it would be much easier to deploy via micro-service architecture. Therefore micro service architecture in addition to solving New York Public Library's item tracking problem can also be used to add various features to improve the experience for all those involved and advance the library's mission statement.

Appendix:

A.1. Wireframe for dashboard



A.2. User Story using Trello

New York Public Library ☆ Personal Private

Be able to see what state library book is in ...

When the worker checks the dashboard he/she is easily able to see how many books are available or in circulation.

When the worker checks the dashboard he/she is able to see how many books are in the library.

Add a card...

Dashboard organizes information according to importance ...

When user checks dashboard would easily be able to detect trends and status.

When user check dashboard would be able to understand information through graphs.

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