

*Florida International University*  
*Knight Foundation School of Computing and Information Sciences*

Capstone 2

# Final Deliverable

Project Title: Customization of Nextcloud iOS App

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### ***Abstract***

*This document presents the information necessary to gain a good understanding of the Nextcloud iOS app customization project. The project aims to enhance user experience by introducing theming options, allowing users to personalize key elements such as the app slogan, logo, background image, color, etc. The customization feature is an extension of the existing Nextcloud platform, providing users with a more tailored and visually personalized environment.*

*The project initiation involves thorough requirements gathering to identify user needs and preferences. Following this, the system design outlines the architecture, components, and interactions necessary for seamless customization. Object design introduces structured entities to manage and persist user customization data effectively.*

*The implementation phase delves into the coding aspects, employing Swift for iOS development. Verification processes, such as end-to-end testing, ensure the correctness, security, and usability of the implemented features.*

*This project document serves as a comprehensive guide for project stakeholders, developers, and any individuals interested in understanding the goals, design, implementation, and verification processes of the Nextcloud iOS app customization project.*

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## INTRODUCTION

Welcome to the culmination of the Nextcloud iOS App Customization Project—a documentation journey that encapsulates the evolution and implementation of personalized theming options, empowering users to shape their Nextcloud mobile experience. From conceptual design to Swift code execution, this document navigates the initiation, development, and verification phases, offering stakeholders, developers, and enthusiasts a comprehensive view of the meticulous processes that have defined this project. Join us in exploring the transformation of user requirements into tangible customization features, witnessing the synergy between design patterns and real-world implementation, and understanding the robust testing protocols ensuring

reliability and security. More than a chronicle, this documentation is an invitation to delve into the narrative of innovation, collaboration, and a commitment to delivering a superior and uniquely tailored Nextcloud experience on iOS.

## **Current System**

NextCloud's system currently lacks mobile accessibility for altering theme options, restricting users from adjusting server themes on their mobile devices. Theme modifications, such as logo, background image, slogan, and color, can solely be administered at an administrative level through the website application. This limitation confines users to making these alterations exclusively via the website, impeding mobile customization of NextCloud's themes.

## **Purpose of New System**

The recent update to the NextCloud iOS app introduced a feature allowing users to personalize their background image. This enhancement stores the selected image directly on the user's device, enabling easy access and utilization as the new background within the app. Users can now seamlessly customize their experience without impacting server settings, enjoying a personalized background stored locally on their device.

## USER STORIES

The following section provides the detailed user stories that were implemented in this iteration of the project. These user stories served as the basis for the implementation of the project's features. This section also shows the user stories that are to be considered for future development.

### Implemented User Stories

#### User Story #1:

- As a developer, I want to conduct research that is vital for the development of this project and set-up my development environment.

#### User Story #2:

- As a developer , I want to make a button on the login screen for users/non-users to be able to click on and be redirected to another screen where customization of the login screen is achieved .

#### User Story #3:

- As a user, I want to be able to customize the background color of the login screen of my app.

#### User Story #4:

- As a user, I want to be able to customize the background of the login screen of my app with a picture from my personal device.

#### User Story #5:

- As a user, I want to be able to customize the logo of the login screen of my app.

#### User Story #6:

- As a user, I want to be able to customize the slogan of the login screen of my app.

#### User Story #7:

- As a developer , I want to make sure my code is clean and the app behaves as expected and all features work good together.

## **PROJECT PLAN**

This section describes the planning that went into the realization of this project. This project incorporated the agile development techniques and as such required the sprints to be planned. These sprint plannings are detailed in the section. This section also describes the components, both software and hardware, chosen for this project.

### **Hardware and Software Resources**

The following is a list of all hardware and software resources that were used in this project:

- Xcode to write our code for our application.
- Github to create a github repo, pull and push code and merge branches.
- Mac terminal to handle dependencies (carthage & ios-platform xs-framework)
- Languages used throughout the app are Swift & Objective-C



## Sprints Plan

### *Sprint 1*

- As a developer I want to review all of the features of the NextCloud application so that I can become familiar with all of their features.
- As a developer I want to install XCode so that I can have my environment ready for when it is time to code.
- As a developer I want to review all of the documentation in the website for NextCloud so that I can understand all of the details within the developer documentation and user documentation .
- As a developer I want to have access to the Nextcloud host for Capstone 2 so that I can keep track of the product's process.

### *Sprint 2*

- Finish setting all of the dependencies to our project .
- Be able to run the project on your local machine .
- Learn Swift language to get acclimated.
- Make a small change to the code and try running it in your local machine to make sure that configurations can be done.

### *Sprint 3*

- Make a small change to the code and try running it in your local machine to make sure that configurations can be done (High Priority)
- Create a new repository branch (High Priority)
- Update the landing page to FIU theme.
- Learn how/where NextCloud recognizes servers
- Learn how the “add a new account” QR code works properly.
- Learn how the main code works in order to make changes properly.

***Sprint 4***

- Update the landing page to FIU theme.
- As a developer I want to create the storyboard / logic behind the customizable screen.
- As a developer I want to make the color of the app customizable for the user.
- As a developer I want to create the storyboard/logic behind changing the color of the app.
- As a developer I want to create the storyboard/logic behind changing the logo.
- As a developer I want to create advanced options(i.e Legal notice link, privacy policy link)

***Sprint 5***

- Update the landing page to FIU theme.
- As a developer I want to create the storyboard / logic behind the customizable screen.
- As a developer I want to make the color of the app customizable for the user.
- As a developer I want to create the storyboard/logic behind changing the color of the app.
- As a developer I want to create the storyboard/logic behind changing the logo.
- As a developer I want to create advanced options(i.e Legal notice link, privacy policy link)

***Sprint 6***

- Work individually on customizing the nextCloud ios app.
- Have the project ready for presentation.
- Prepare slides for the presentation
- Building Technical Skills for sprint
- Research common User Experience improvements
- Prepare a demo for presentation.

***Sprint 7***

- Have the project ready for presentation.
- Prepare slides for the presentation
- Prepare a demo for presentation.

## SYSTEM DESIGN

This section contains information on the design decisions that went into this project. The architecture patterns are outlined and explained. The entire system is shown in a package diagram and the subsystems are explained. Finally, the design patterns used in the project are discussed.

### Architectural Patterns

We are the first team at Florida International university to work within the Nextcloud application. We were in charge of creating the first iteration to build upon for future semesters where the customization of the Nextcloud iOS application might be picked up again. We focused on understanding the application, setting up all dependencies and creating new storyboards to put our project in.

### System and Subsystem Decomposition

Our team's implementations for the Nextcloud iOS app focuses on the theming aspect of the app. The first visible implementation is the theme button added on the login screen which leads to the theme changing screen. The System Decomposition consists of the UI and the Background Management.

The UI is mad with a set of 2 different view controllers labled NCLLogin, for the view controller that manages the login screen and the ThemeViewController for all the theme changes to be made. Settings like the slogan or color change don't have much background management aside from sending the user data straight from the user input area to the login view controller.

For the background image and the logo extra storage is required locally. The image handler allows the user to save the chosen image as a copy in another location belonging to the app. Then the NCLLogin view controller will search that directory for any images and if there is an image saved for the logo it will be used and the same concept applies for the background image.

#### System Decomposition:

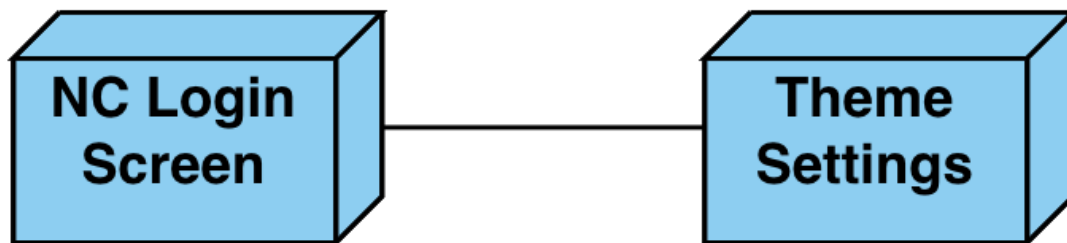
1. User Interface (UI):
  - a. Login View Controller:
    - Manages the login screen.

- Displays the login screen with any theme changes.
- b. Theme View Controller:
  - Allows the user to choose between multiple theme settings and save the change they would like to make.
- 2. Background Management:
  - a. Image Storing:
    - Retrieving user's choice of an image and storing it in a location locally within the device on some directory belonging to the app.

Subsystem Decomposition (Detailed Components within Background Management):

1. Image Manager:
  - a. Get an image already in storage and saving a copy in another location set for the app to retrieve.
2. Local Storage:
  - a. Background Presenting: Accessing an image in a directory set aside for the app's theme options

## Deployment Diagram



## **Design Patterns**

- Observer Pattern: The LoginController observes changes in the ThemingController and it updates UI accordingly
- Decorator Pattern: Applied a theming decorator to UI components to change their appearance based on customization.
- Builder Pattern: Applied in constructing instances of Theming with various customization details.

## **SYSTEM VALIDATION**

The system validation process for the NextcloudiOS app customization project ensures the seamless functionality, security and user satisfaction of the implemented customization features. Throughout a series of rigorous tests, including end to end testing, the system correctness, reliability and resilience against potential vulnerabilities are verified. User feedback and continuous iteration contribute to an adaptable system that aligns with user expectations. The comprehensive documentation serves as a guide for users and developers, facilitating effective utilization and maintenance of the theming options. Overall, the system validation affirms the project's success in delivering a user centric, secure and well-tested customization experience within the NextcloudiOS app.

## GLOSSARY

**Gantt Chart:** a chart in which a series of horizontal lines shows the amount of work done or production completed in certain periods of time in relation to the amount planned for those periods.

**Observer pattern:** is a software design pattern in which an object(subject), maintains a list of its dependents and notifies them automatically of any state changes.

**Design patterns:** is a general repeatable solution to a commonly occurring problem in software design.

**Documentation:** In the software development process, software documentation is the information that describes the product to the people who develop, deploy and use it.

**End-to-end testing:** a software testing methodology that verifies the working order of a software product in a start-to-finish process.

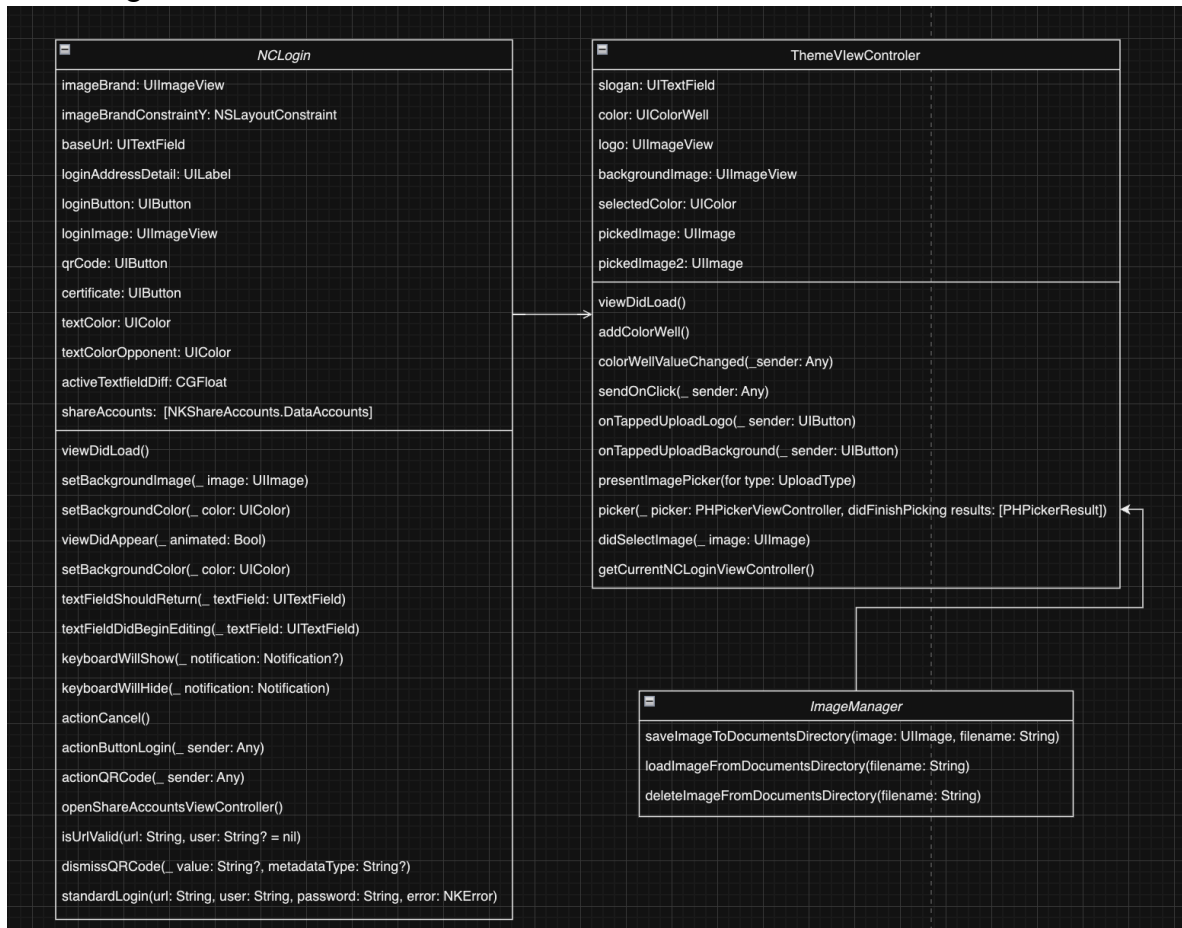
**UML Diagrams:** is a way to visually represent the architecture, design, and implementation of complex software systems.

**Sprint:** a short, time-boxed period when a scrum team works to complete a set amount of work.

## APPENDIX

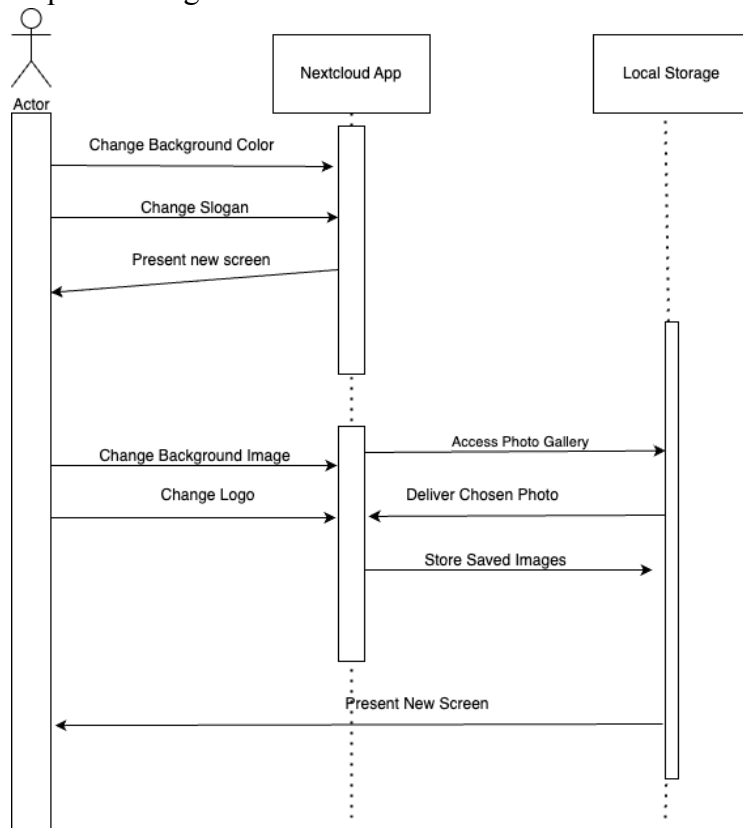
### Appendix A - UML Diagrams

#### 1. Class Diagram

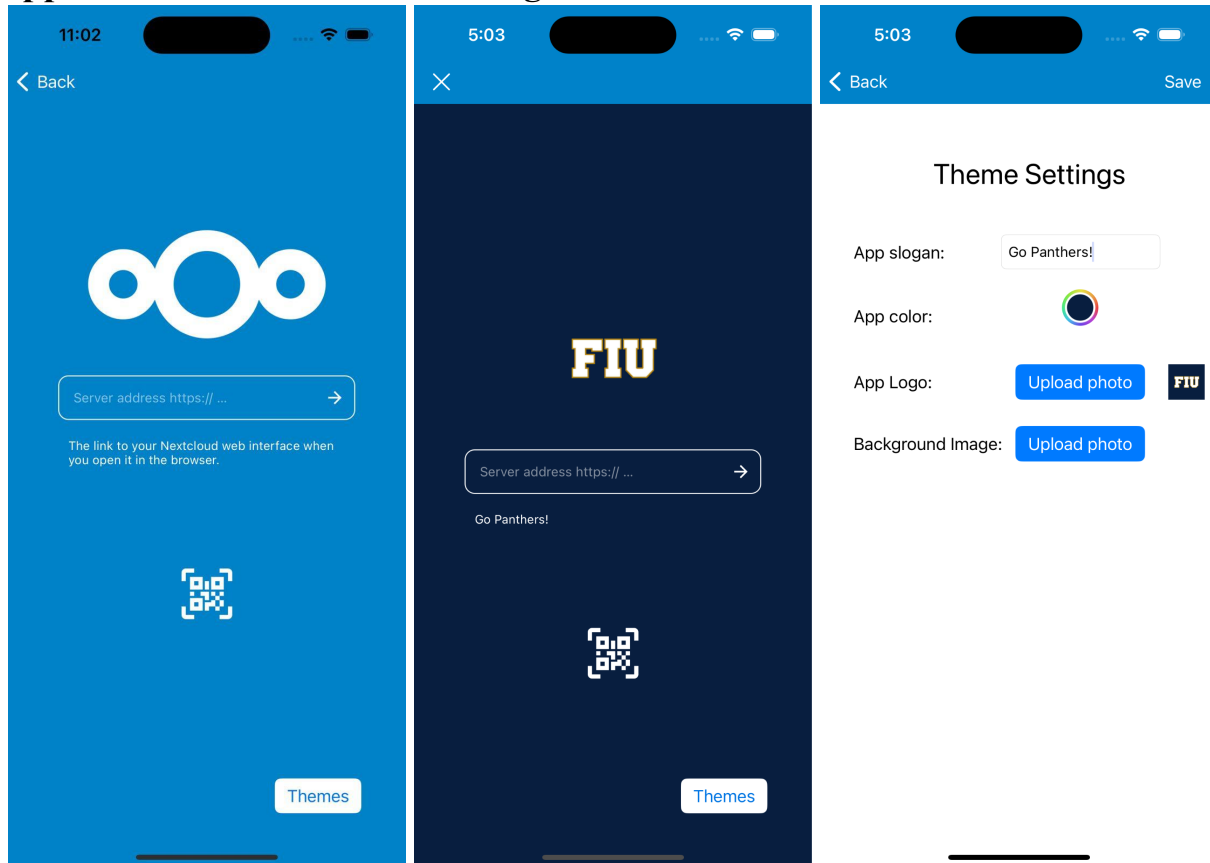




## 2. Sequence Diagram



## Appendix B - User Interface Design



## Appendix C - Sprint Review Reports

### *Sprint 1*

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- As a developer I want have access to Nextcloud host for Capstone 2 so that I can keep track of the product's process.
- As a developer I want to review all of the documentation in the website for NextCloud so that I can understand all of the details within the developer documentation and user documentation .
- As a developer I want install XCode so that I can have my environment ready for when is time to code.
- As a developer I want review all of the features of the NextCloud application so that I can become familiar with all of their features.

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- All stories for this Sprint #1 were finished on a timely matter

### *Sprint 2*

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- Finish setting all of the dependencies to our project (Finished)
- Be able to run the project on your local machine (Finished)

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Sprint Planning meeting.

- Make a small change to the code and try running it in your local machine to make sure that configurations can be done (High Priority)
- Create a new repository branch (High Priority)

### ***Sprint 3***

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- Make a small change to the code and try running it in your local machine to make sure that configurations can be done.
- Create a new repository branch.
- Learn how/where NextCloud recognizes servers
- Learn how the “add a new account” QR code works properly.
- Learn how the main code works in order to make changes properly.
- As a developer I want to create an option inside the settings where the user can customize their app theme.
- As a developer I want to create the storyboard and logic behind the “Theming” button.
- As a developer I want to make the name of the app customizable for the user.
- As a developer I want to make the background picture of the login screen customizable.
- As a developer I want to make the slogan of the app customizable for the user.
- As a developer I want to make the picture of the logo of the app customizable for the user.

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Sprint Planning meeting.

- Update the landing page to FIU theme.
- As a developer I want to create the storyboard / logic behind the customizable screen.
- As a developer I want to make the color of the app customizable for the user.
- As a developer I want to create the storyboard/logic behind changing the color of the app.
- As a developer I want to create the storyboard/logic behind changing the logo.
- As a developer I want to create advanced options(i.e Legal notice link, privacy policy link)

### ***Sprint 4***

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- As a developer I want to follow the design guidelines implemented by other groups so that all the projects have a look-alike feel implementation .
- As a developer I want to create a button into the Login screen so that the user can easily access it without being logged in.

- As a developer I want to create a storyboard that follows after the button is clicked and that it shows a theme menu.
- As a developer I want to have the functionality implemented if the user chooses to upload the picture to access their personal photos.
- As a developer I want to create the storyboard / logic behind the customizable screen.

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Sprint Planning meeting.

- Update the landing page to FIU theme.
- As a developer I want to create the storyboard/logic behind changing the color of the app.
- As a developer I want to create the storyboard/logic behind changing the logo.
- As a developer I want to create advanced options(i.e Legal notice link, privacy policy link)

### ***Sprint 5***

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- As a developer I want to create the storyboard / logic behind the customizable screen.
- As a developer I want to make the color of the app customizable for the user.
- As a developer I want to create the storyboard/logic behind changing the color of the app.
- As a developer I want to create the storyboard/logic behind changing the logo.

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Sprint Planning meeting.

- Update the landing page to FIU theme.
- As a developer I want to create advanced options(i.e Legal notice link, privacy policy link)

### ***Sprint 6***

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- Update the landing page to FIU them

- As a developer I want to create the storyboard/logic behind changing the color of the app.
- As a developer I want to create the storyboard/logic behind changing the logo.

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Sprint Planning meeting.

- As a developer I want to create advanced options(i.e Legal notice link, privacy policy link)

### ***Sprint 7***

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- Prepare a demo for presentation.
- Have the project ready for presentation.
- Prepare slides for the presentation

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Sprint Planning meeting.

- None

## Appendix D - User Manuals, Installation/Maintenance Document, Shortcomings/Wishlist Document and other documents

### Installation / Developer Environment Set-up

1. Access our github repo through this link  
[:https://github.com/jcuetocalnick/NextCloudIOS.git](https://github.com/jcuetocalnick/NextCloudIOS.git)
2. Make sure that the selected branch is “theming\_nextcloud” and once you are there click on “Code” and select “HTTPS” and copy the link that’s in there.
3. Go to your terminal and cd to where you want your project to clone example: cd Desktop
4. After you are where you want your project you run this command : git clone <https://github.com/jcuetocalnick/NextCloudIOS.git> and this will clone the repo on your local device where you specified .
5. Now open your project once cloned and wait for it to build , you will see that it will have several errors but we will fix them in the next steps.
6. After getting “Build Failed “ we are gonna go to this link  
[:https://github.com/Carthage/Carthage/releases](https://github.com/Carthage/Carthage/releases) and download “Carthage.pkg” and properly download into our computer.
7. After we have done this we go back to our terminal and without cd into your project run this command to install Brew in our machine: /bin/bash -c "\$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh) """)"
8. Afterwards run brew install carthage
9. Now cd back to where your project is and run the following commands:  
-brew install carthage  
-brew link carthage  
-brew link carthage  
-brew link --overwrite carthage  
-carthage update --use-xcframeworks --platform iOS
10. After these steps errors should go away but may come back because we are missing a file that we need in our project , thats because we are missing just a few more steps .
11. We need a googleFile which can be obtained here  
[:https://github.com/firebase/quickstart-ios/blob/master/mock-GoogleService-Info.plist](https://github.com/firebase/quickstart-ios/blob/master/mock-GoogleService-Info.plist) and click on the download icon , you will prompted to “download raw file”
12. The downloaded file you are going to drop it inside the folder where your project is located .

13. Now we need to rename it , (keep same name, erase “Mock” from it) should look like this → GoogleService-Info.plist. Hit save.
14. Go into your XCode and on the very top option select Xcode → Settings → Locations → and click on Command Line Tools (there should only be one option there click on it and enter your password)
15. Go back to your terminal and run the following command  
-carthage update --cache-builds --use-xcframeworks --platform ios

-Run your project !

## Quick GIT Guide

[GIT Documentation](#)

**How to create a new branch locally (do this before your changes on someone else's branch)**

```
$ git checkout -b <branch_name>
```

**How to switch to another GitHub branch:**

```
$ git checkout <existing_branch>
```

**How to merge changes from another branch into yours:**

There are two ways to do this, from the command line or GitHub. Using the command line, you have to resolve conflicts manually and could become a hassle. If you make a pull request on GitHub, you get to see what the conflicts are (if any) and pick which files to merge.



```
$ git pull origin <branch>
```

**How to push changes to Github:**

Use this command to verify the branch you are pushing to is correct, and see your changes.

```
$ git status
```

Use this command to add the changes you want to add to the commit.

```
$ git add <path/to/filename>
```

Then, use this command to commit your changes to have them queued for pushing. 

```
$ git commit -m "<short description of commit>"
```

Lastly, push your changes into Github with this command.

```
$ git push
```

Alternatively, if you made changes on the wrong branch, use this command to push.

## REFERENCES

[NextCloud Support](#)

[NextCloud Developer Manual](#)

[NextCloud IOS App Repo](#)

[Videos to help you understand our application and how to set up dependencies and developer environment.](#)