

#WWDC18

# Source Control Workflows in Xcode

Session 418

Eric Dudiak, Xcode Engineer

Create a new repository

Make and view changes

Host and share repositories

Resolve and avoid conflicts

Pull requests and forks

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Resolve and avoid conflicts

**Pull requests and forks**

# A New Project



Source Control

General Accounts Behaviors Navigation Fonts & Colors Text Editing Key Bindings Source Control Components Locations Server & Bots

General Git

Author Name: Eric Dudiak

Author Email: eric@dudiak.com

Ignored Files:

+ -

Options:  Prefer to rebase when pulling  
 Show merge commits in per-file log



Source Control dialog box:

Source Control:  Create Git repository on my Mac  
Xcode will place your project under source control

Buttons: New Folder, Options, Cancel, Create

Background dialog box:

Buttons: Cancel, Previous, Finish

NO ERROR

Right pane: No Selection

Sources

Search

Recents

Applications

Desktop

Documents

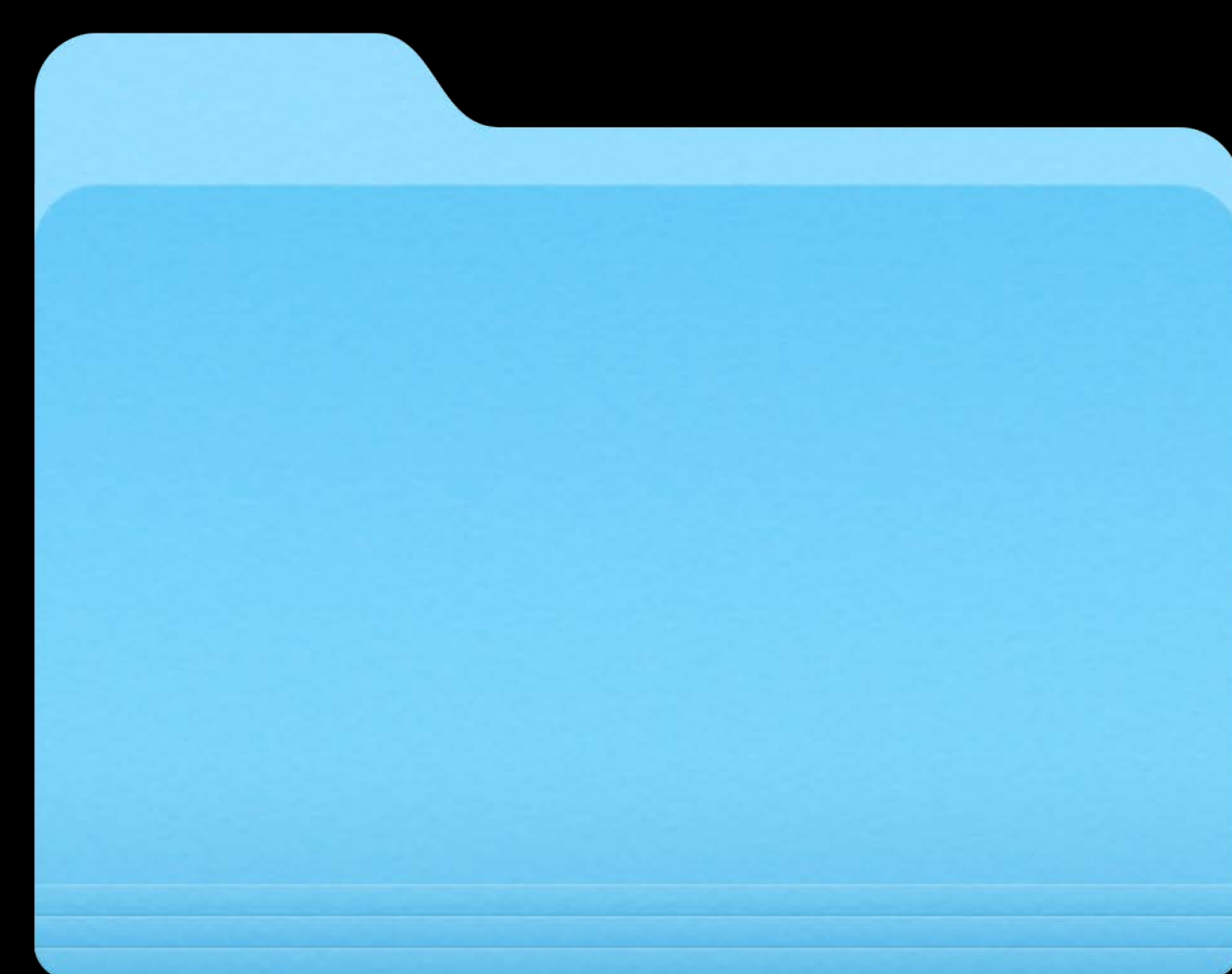
Downloads

Remote Disc

Network

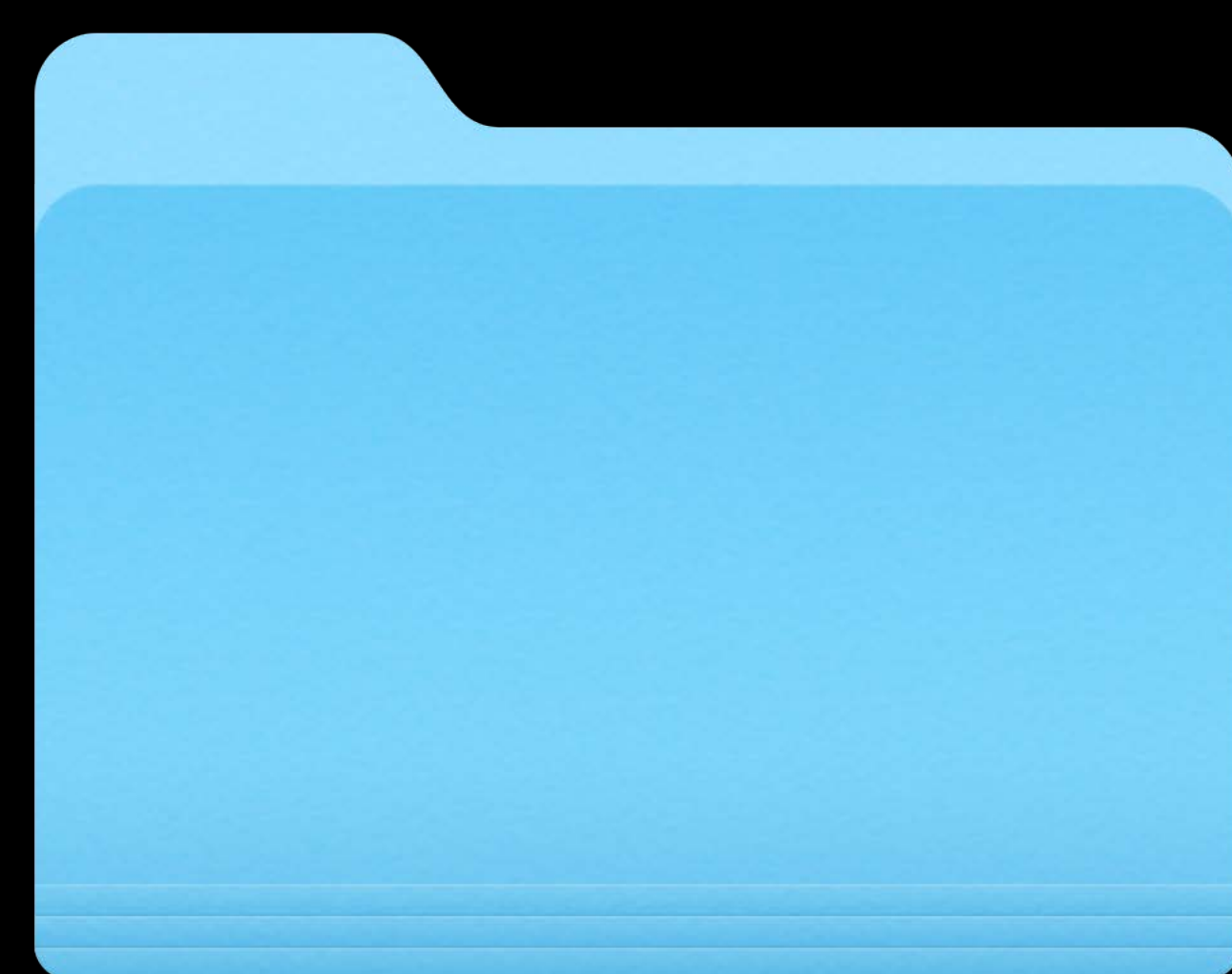
Solar System

# New Project



My Project

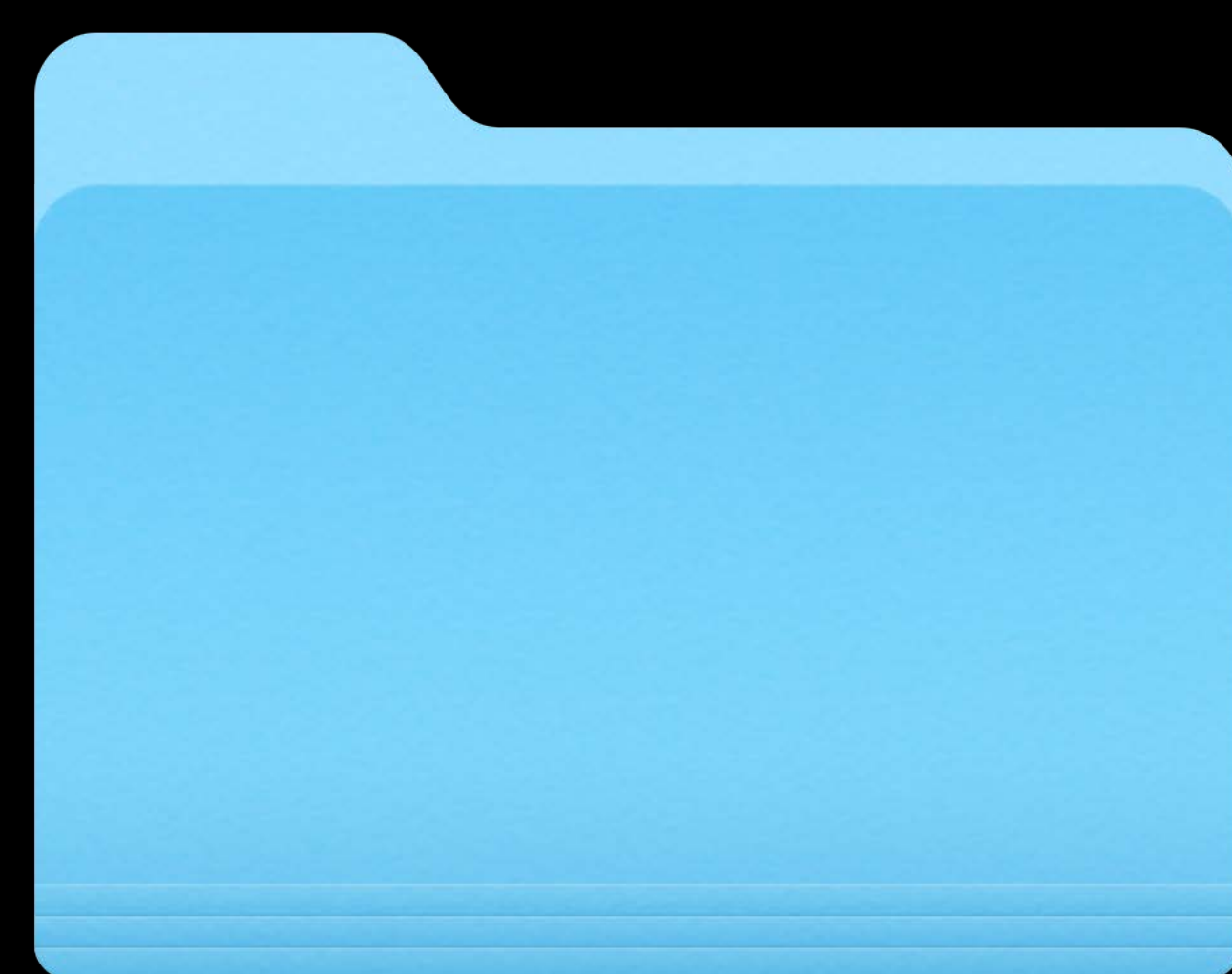
# New Project



My Project



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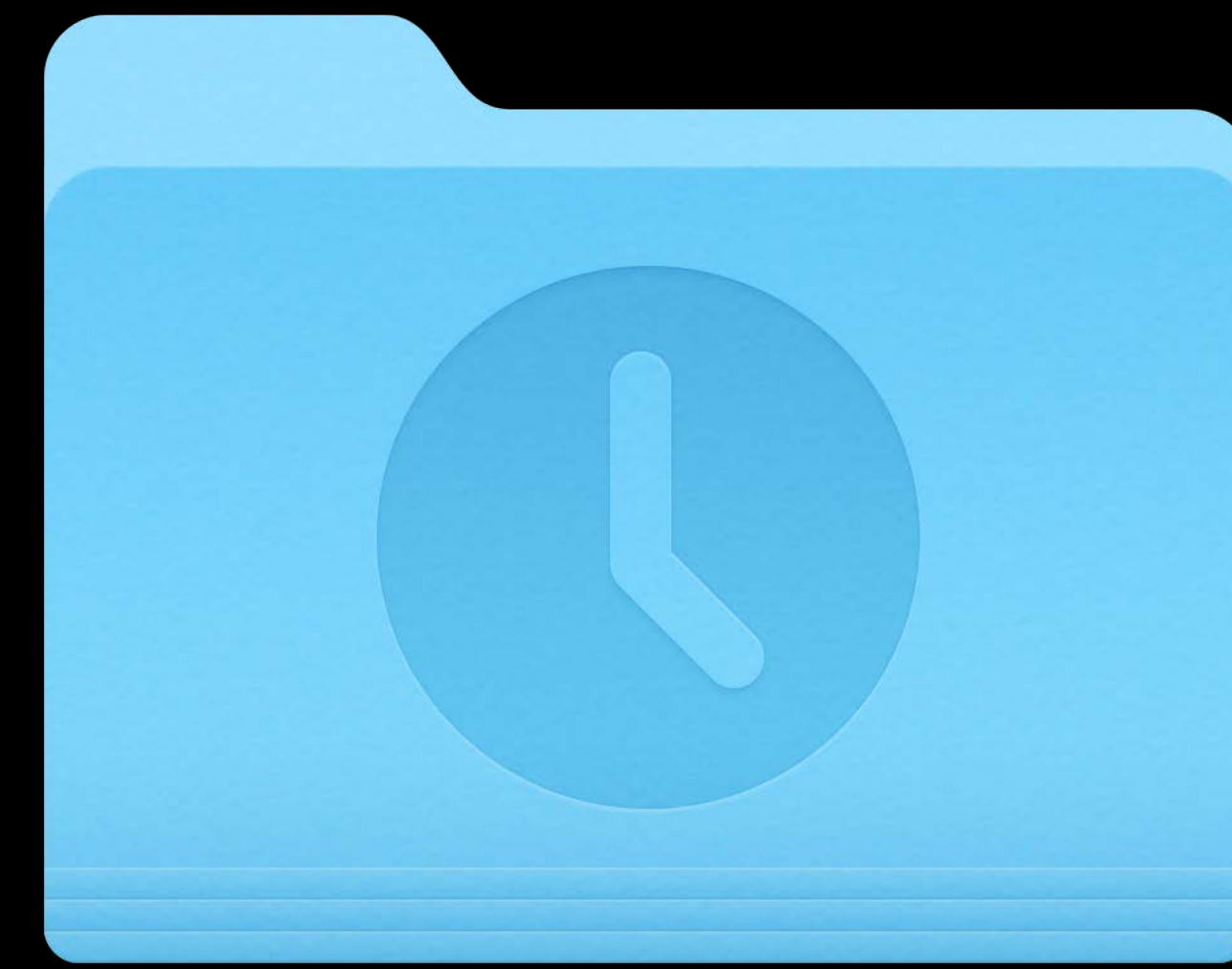


.git



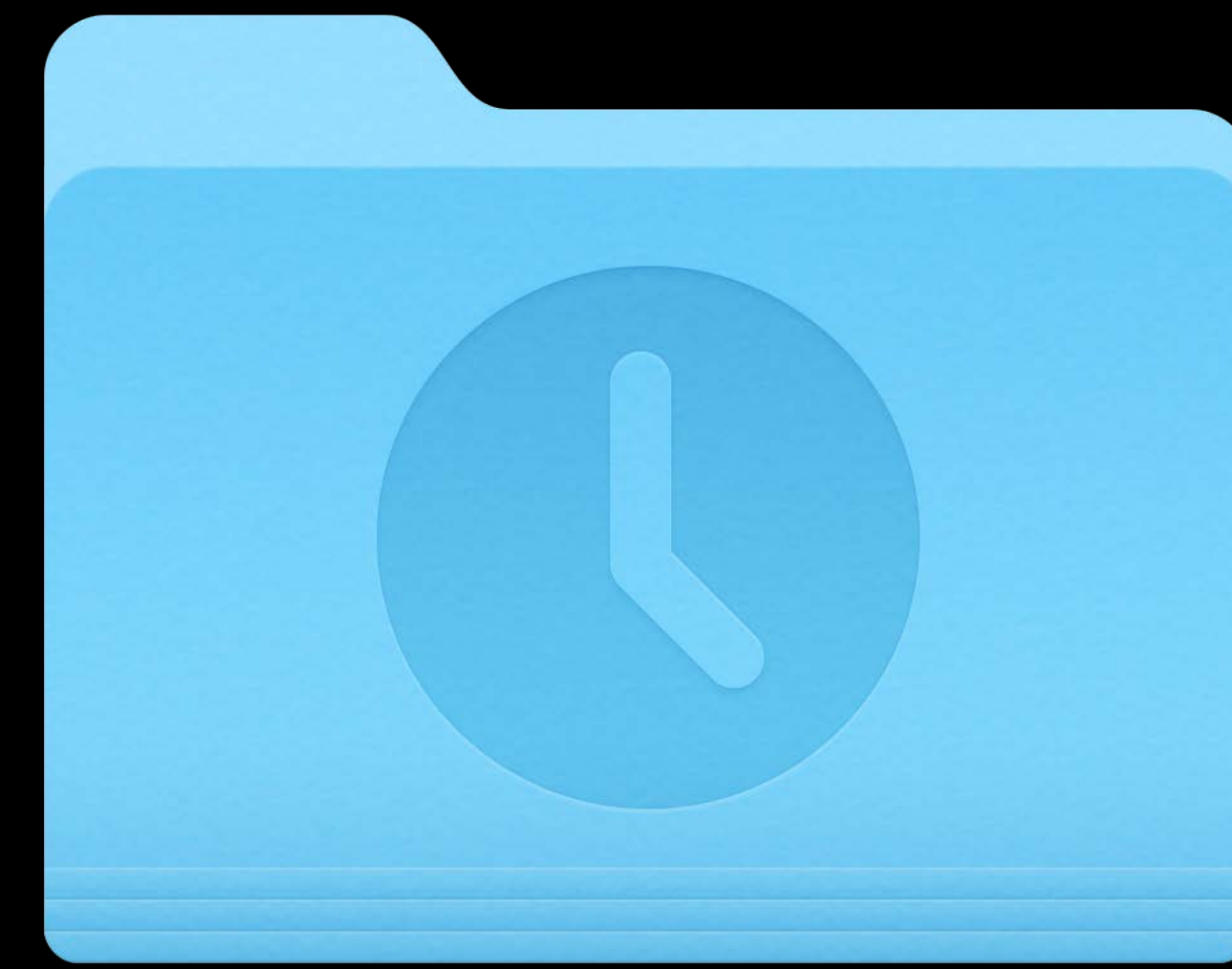
My Project

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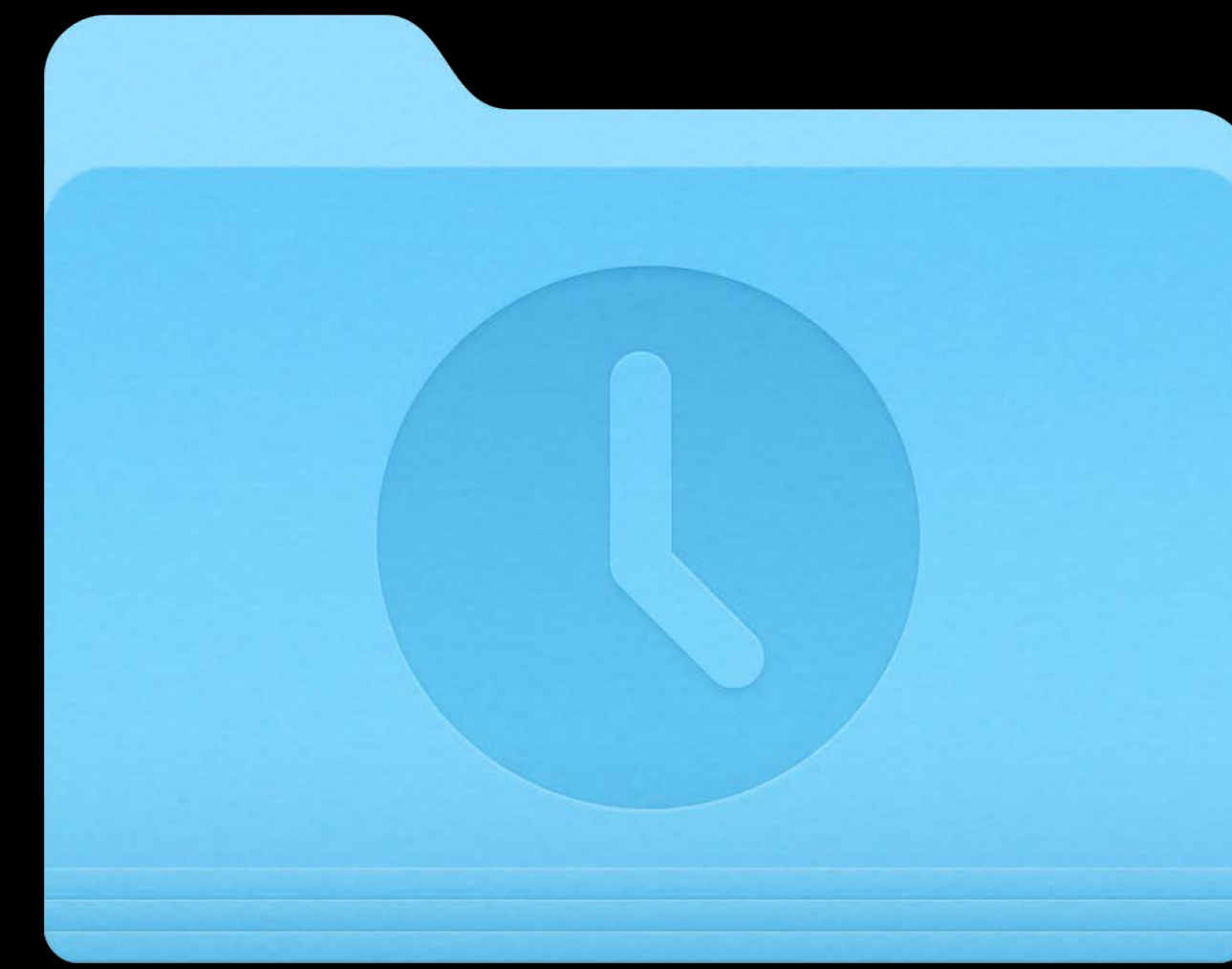
My Project

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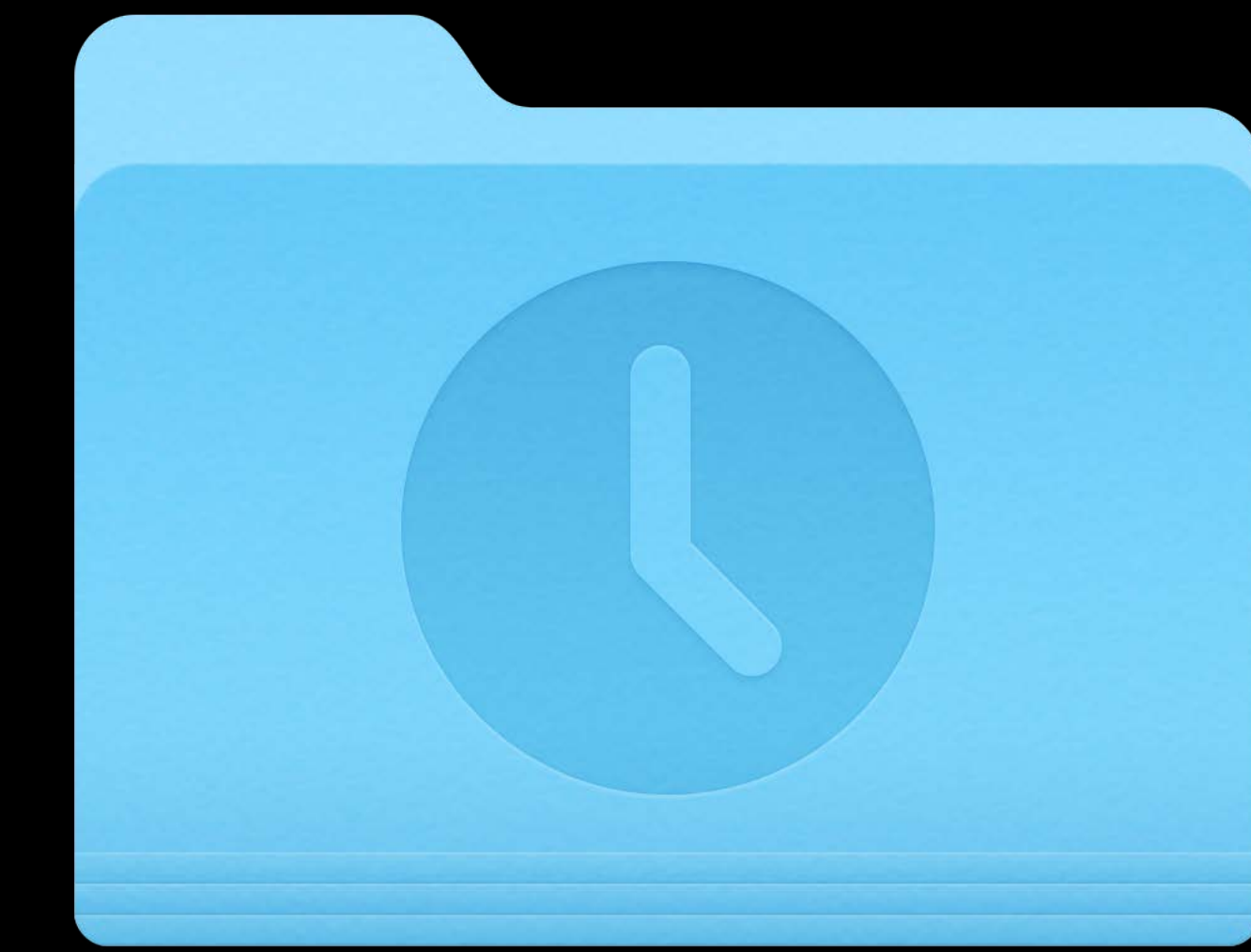


My Project

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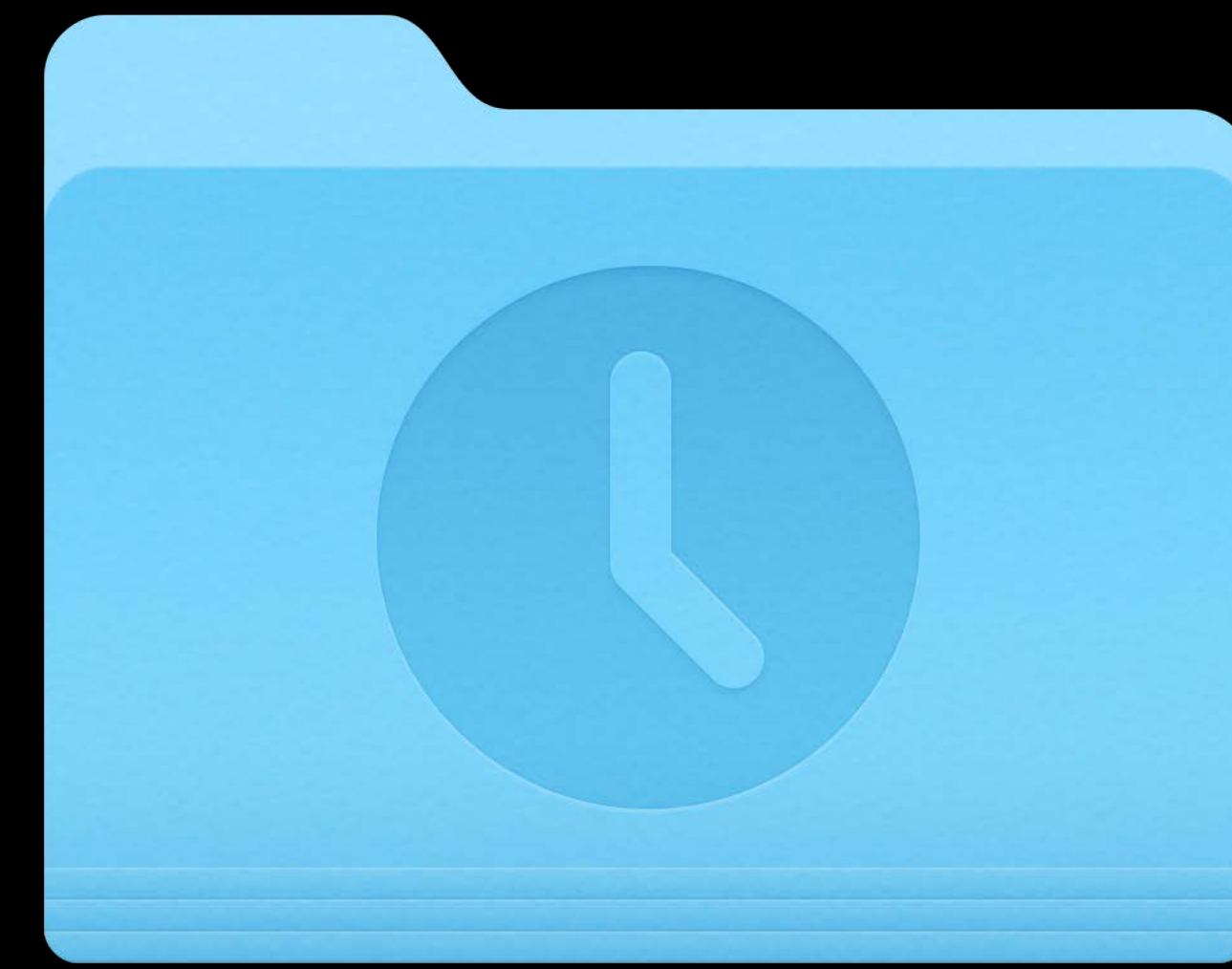


My Project



My Project

# New Project



My Project

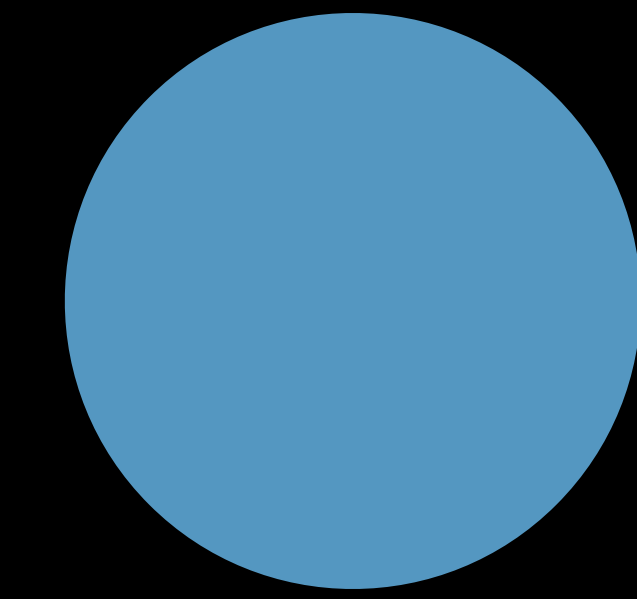


My Project

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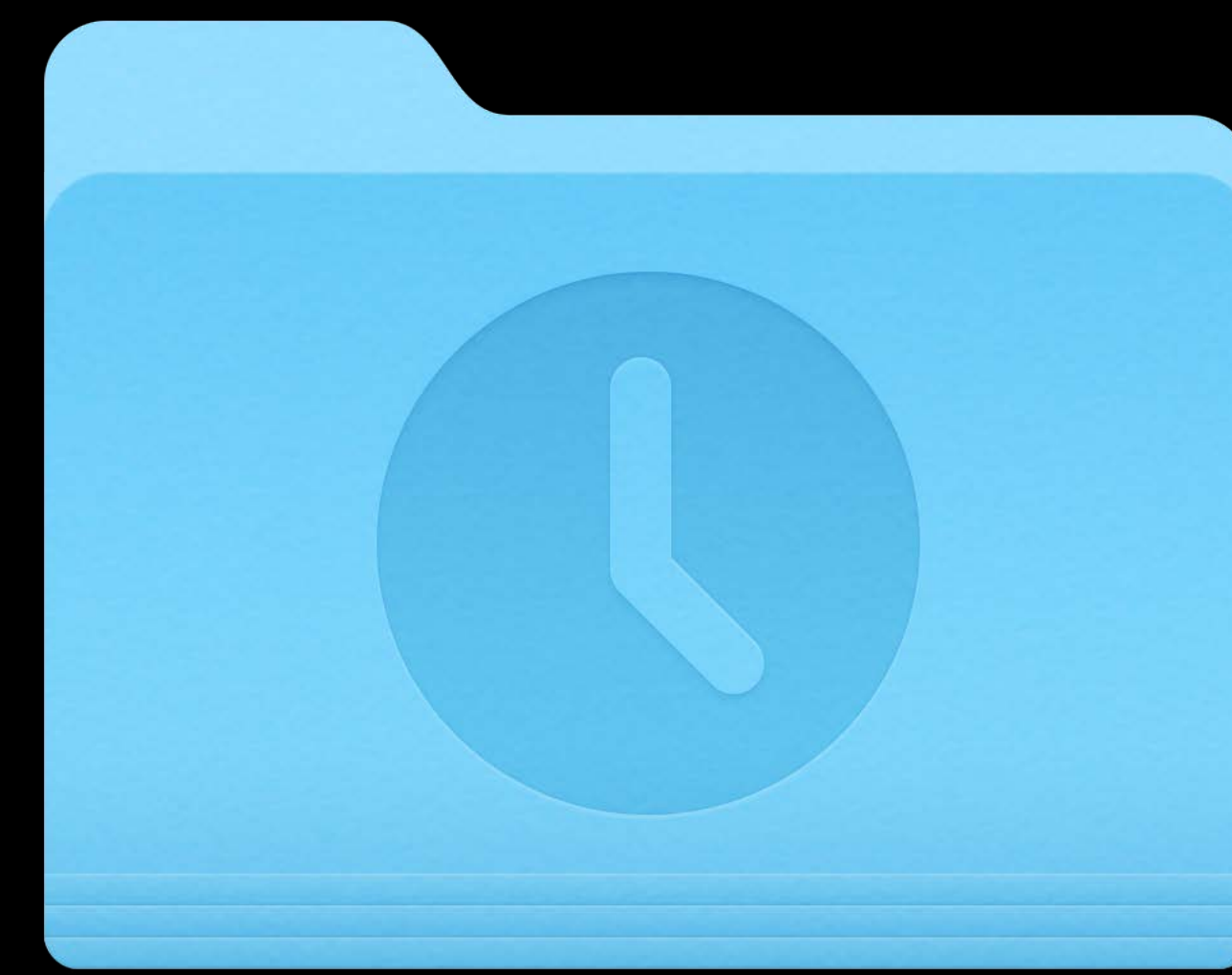


My Project

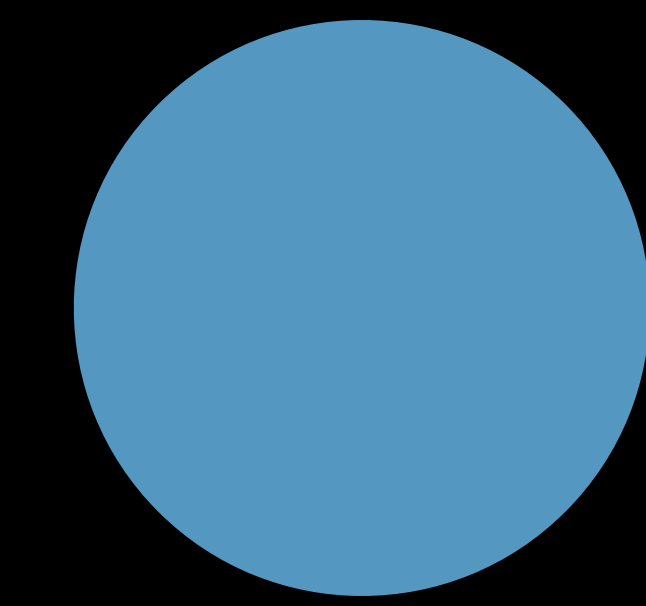




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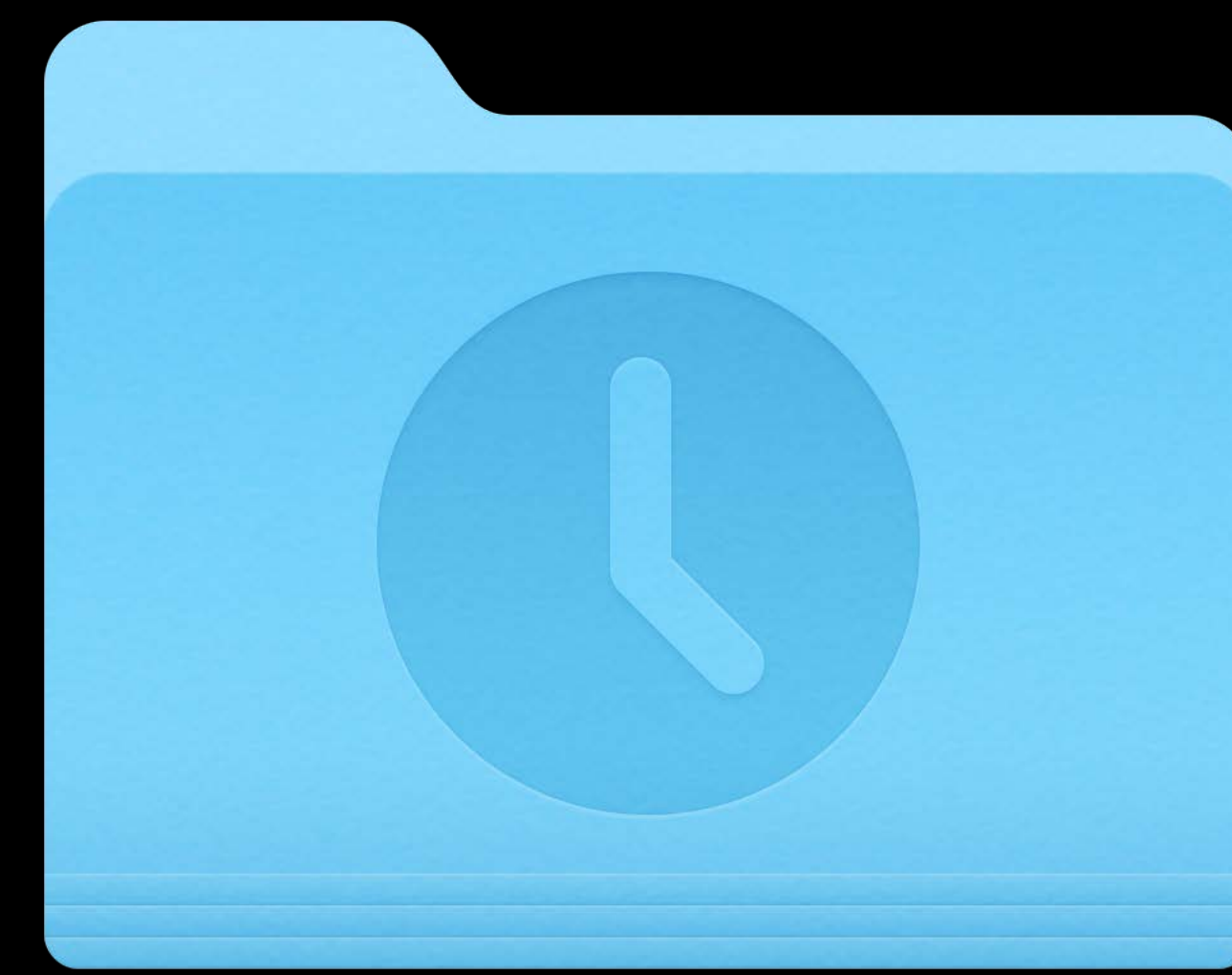


My Project

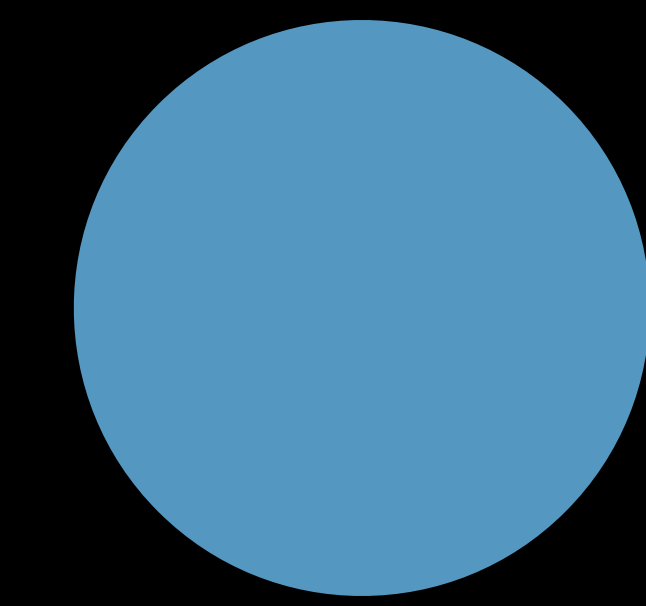


A Commit

# New Project



My Project

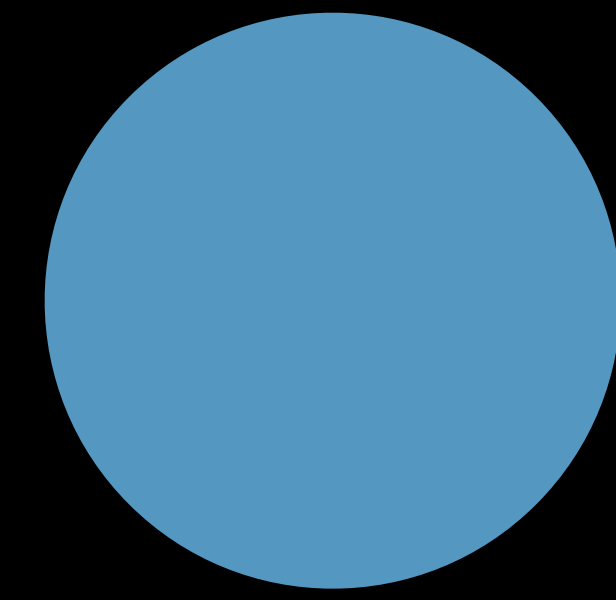


4f29be292c24

# New Project



My Project

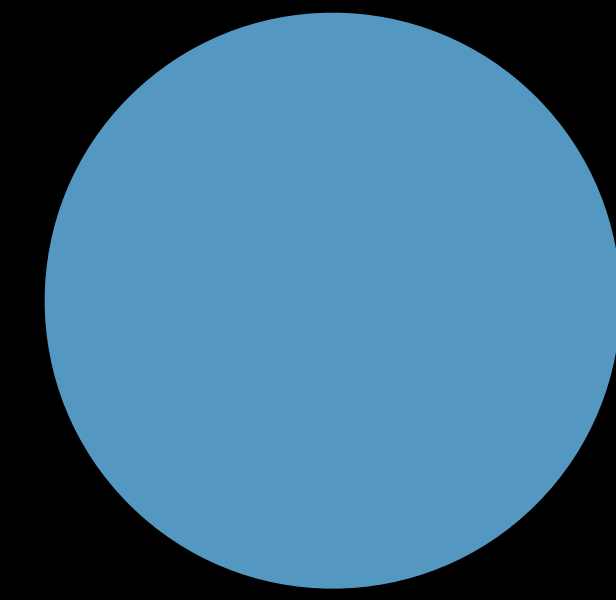


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My Project

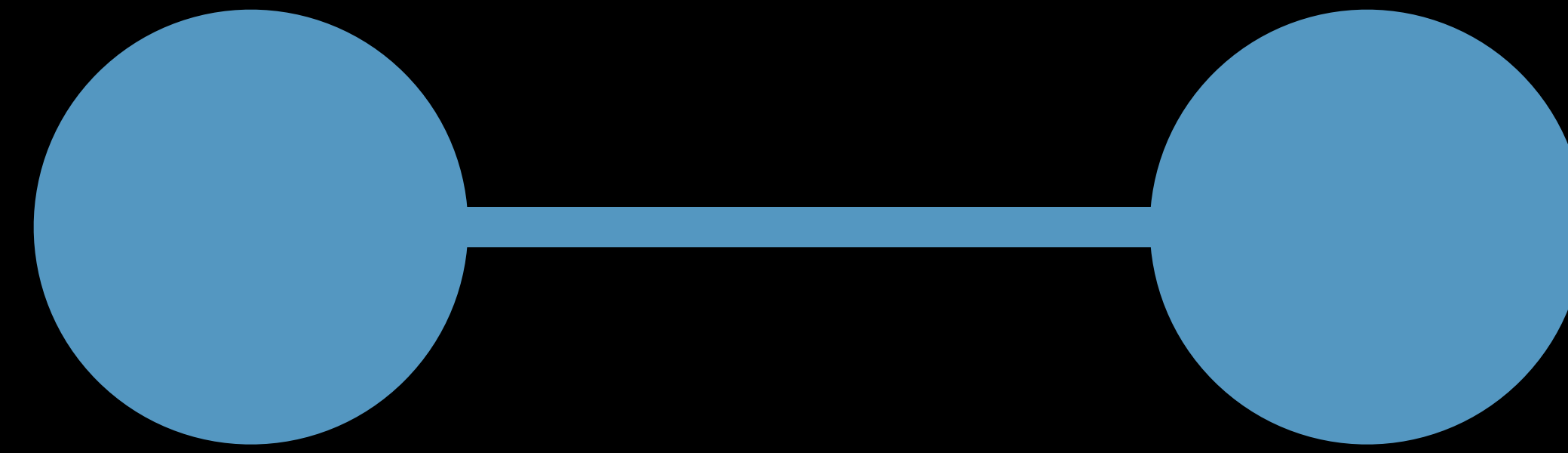


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My Project



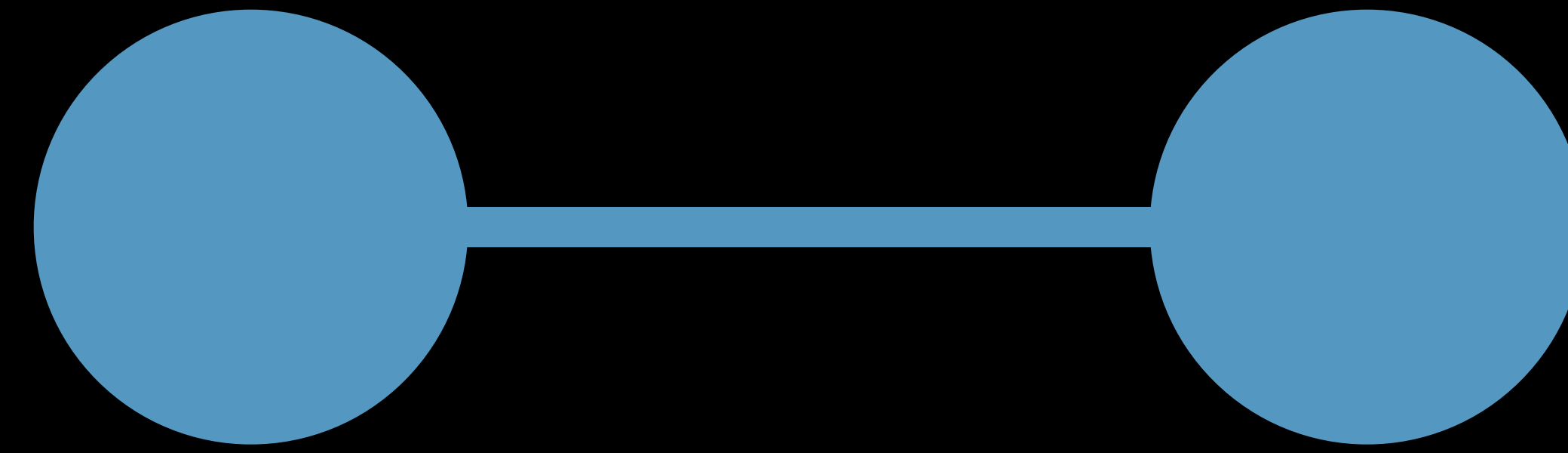
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34b593c56cb4

# New Project



My Project



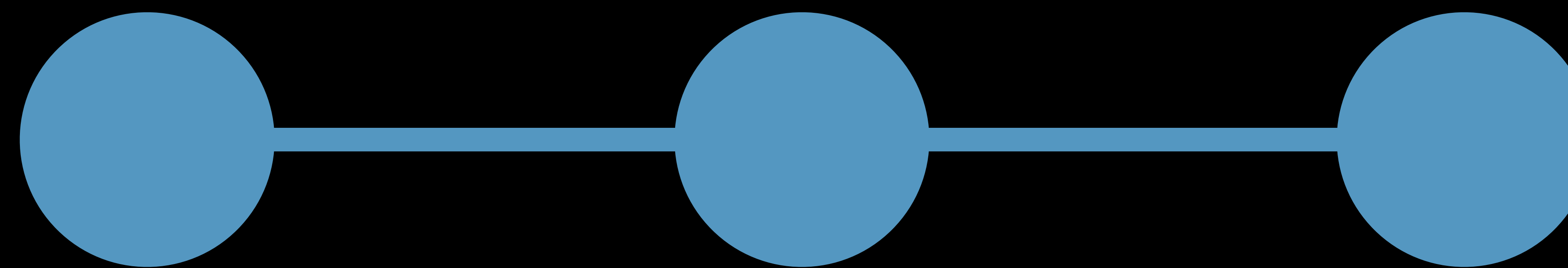
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My Project



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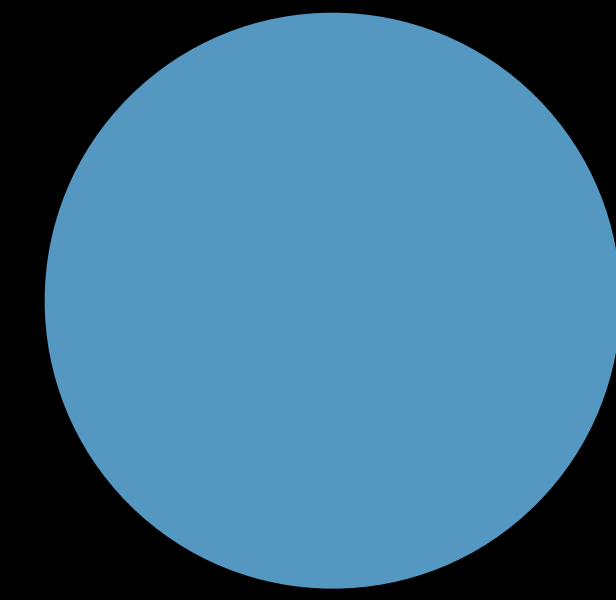
b4c207ad33da



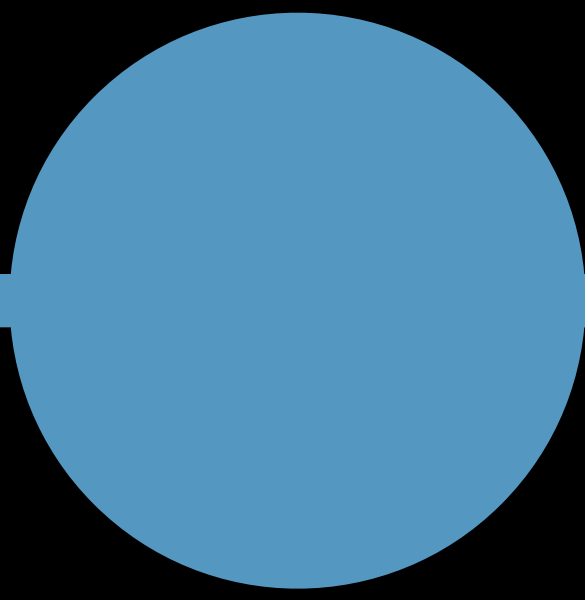
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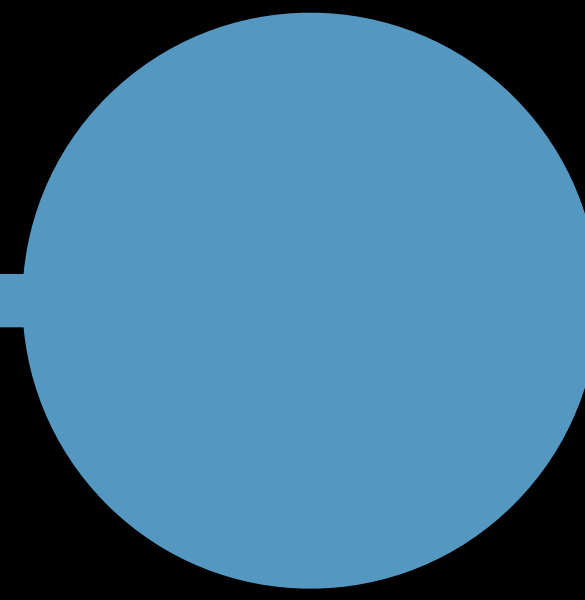
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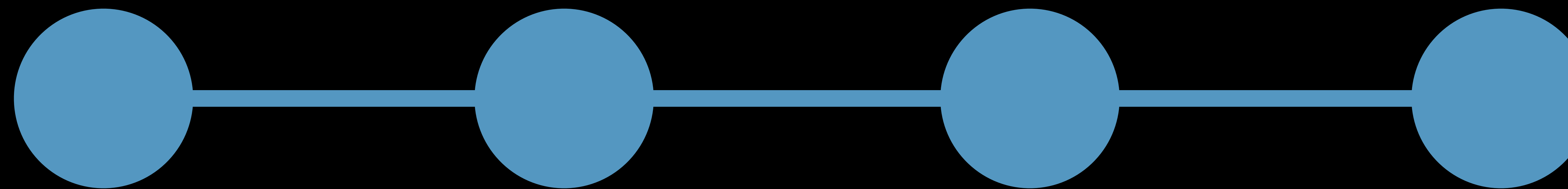


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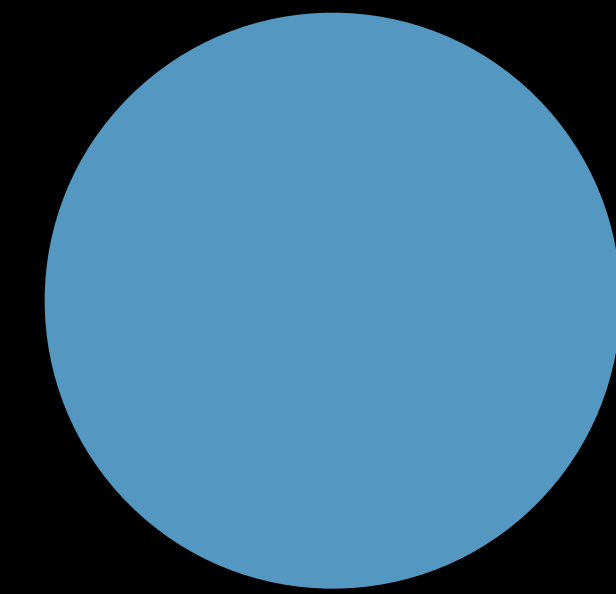
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1d152f1160b3

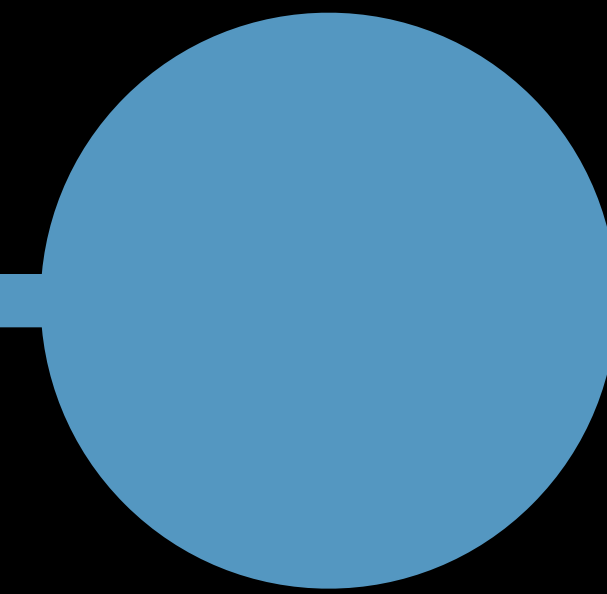
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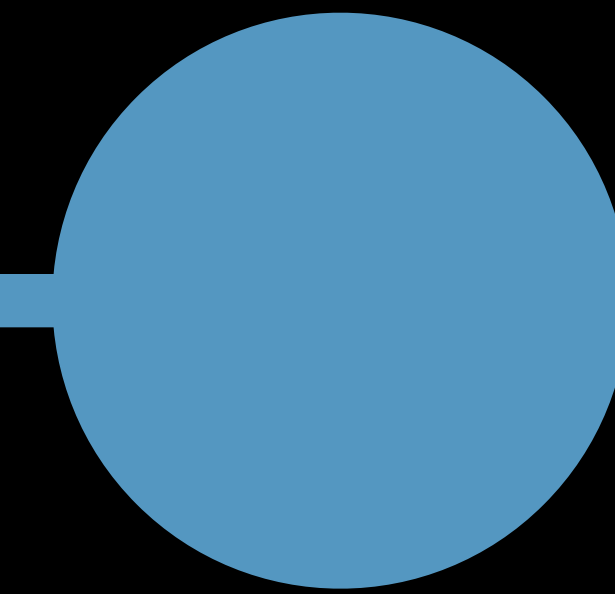
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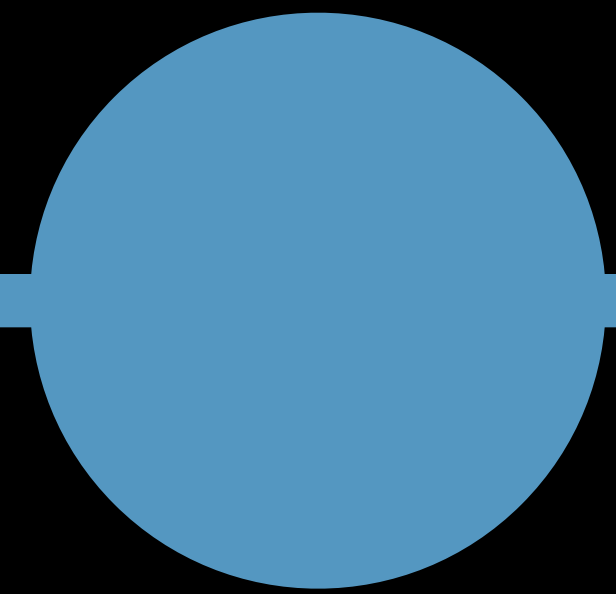
4f29be292c24



34b593c56cb4



b4c207ad33da



1d152f1160b3

# Making Changes



```
Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM
Solar System > Shared > Model Classes > Planet.swift > No Selection

Solar System
├── README.md
├── Shared
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├── Solar System Mac
├── Resources
├── PlanetPhysics
├── Solar System iOS UI Tests
├── Instrumentation
└── Products

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│       ├── Asteroid.m
│       ├── Planet.swift
│       ├── Moon.swift
│       ├── Orbit.swift
│       ├── SolarSystem.swift
│       ├── Star.swift
│       ├── SolarDays.swift
│       ├── TransNeptunianObject.swift
│       └── TelescopicSurvey.swift
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**Committing**



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Solar System > Shared > Model Classes > Planet.swift > No Selection

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- Commit... ⌘⌘C
- Push...
- Pull... ⌘⌘X
- Fetch and Refresh Status
- Discard All Changes...
- Add Selected Files
- Discard Changes in Selected Files...
- Mark Selected Files as Resolved
- Create Git Repositories...
- Clone...

Solar System > iPhone 8 Plus

Today at 3:18 PM

planet.swift > No Selection

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Filter



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Solar System > iPhone 8 Plus

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Enter commit message here

Push to remote: origin/master

Cancel Commit 1 File



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33     func add(nearbyObject: TransNeptunianObject) {
34         nearbyObjects.append(nearbyObject)
35     }
36     /// Remove a nearby object

```

1

2

Convert SmallPlanet to TransNeptunianObject.

Push to remote: origin/master Cancel Commit 1 File



# Viewing History

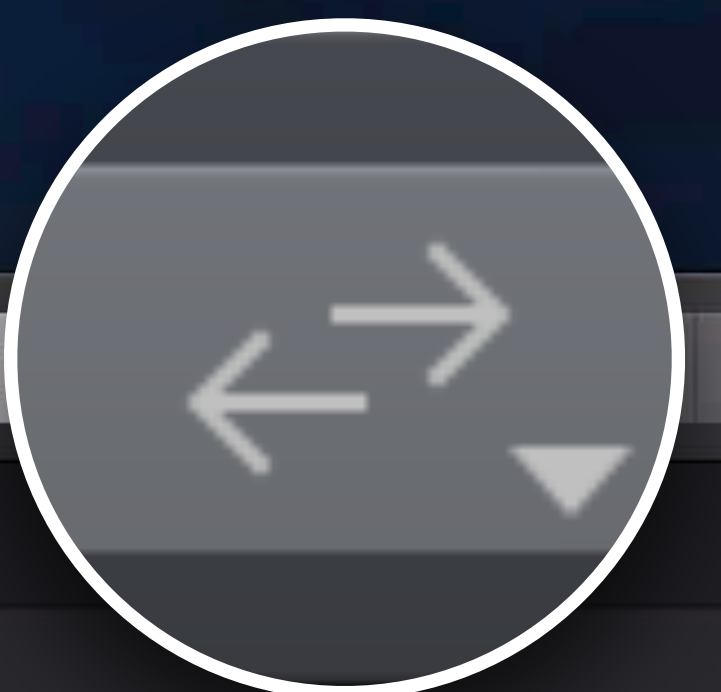


```
Solar System > iPhone 8 Plus Solar System: Ready | Today at 3:18 PM
Solar System > Shared > Model Classes > Planet.swift > No Selection

Solar System
├── README.md
├── Shared
│   ├── Networking
│   ├── CameraModel Classes
│   ├── Fly-By Classes
│   └── Model Classes
│       ├── Asteroid.h
│       ├── Asteroid.m
│       ├── Planet.swift
│       ├── Moon.swift
│       ├── Orbit.swift
│       ├── SolarSystem.swift
│       ├── Star.swift
│       ├── SolarDays.swift
│       ├── TransNeptunianObject.swift
│       └── TelescopicSurvey.swift
├── Model Protocols
├── View Classes
├── View Model Classes
├── Solar System iOS
├── Solar System Mac
├── Resources
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├── Instrumentation
└── Products

10 public class Planet: Hashable {
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46     /// Finds the nearest object among the nearby objects
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Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM

Solar System > Shared > Model Classes > Planet.swift > No Selection

- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
      - SolarSystem.swift
      - Star.swift
      - SolarDays.swift
      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
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  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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+ Filter



```
Solar System: Ready | Today at 3:18 PM
Solar System > Shared > Model Classes > Planet.swift > No Selection

Solar System
├── README.md
├── Shared
│   ├── Networking
│   ├── CameraModel Classes
│   ├── Fly-By Classes
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│       ├── Asteroid.h
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│       ├── Planet.swift
│       ├── Moon.swift
│       ├── Orbit.swift
│       ├── SolarSystem.swift
│       ├── Star.swift
│       ├── SolarDays.swift
│       ├── TransNeptunianObject.swift
│       └── TelescopicSurvey.swift
├── Model Protocols
├── View Classes
├── View Model Classes
├── Solar System iOS
├── Solar System Mac
├── Resources
├── PlanetPhysics
├── Solar System iOS UI Tests
├── Instrumentation
└── Products

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- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
      - SolarSystem.swift
      - Star.swift
      - SolarDays.swift
      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
  - Solar System iOS
  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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- Comparison
- Authors
- Log



- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
      - SolarSystem.swift
      - Star.swift
      - SolarDays.swift
      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
  - Solar System iOS
  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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Solar System

- README.md
- Shared
  - Networking
  - CameraModel Classes
  - Fly-By Classes
  - Model Classes
    - Asteroid.h
    - Asteroid.m
    - Planet.swift
    - Moon.swift
    - Orbit.swift
    - SolarSystem.swift
    - Star.swift
    - SolarDays.swift
    - TransNeptunianObject.swift
    - TelescopicSurvey.swift
  - Model Protocols
  - View Classes
  - View Model Classes
- Solar System iOS
- Solar System Mac
- Resources
- PlanetPhysics
- Solar System iOS UI Tests
- Instrumentation
- Products

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- Local Revision
- 5/18/18 Eric Dudiak ea79f90 (HEAD)
- 5/17/18 Kacper Harasim 6b3c1f1
- 5/17/18 Kacper Harasim 1b5a62c
- 4/30/18 Kacper Harasim 216e614
- 5/17/18 Kacper Harasim 5644b5d
- 5/16/18 Kacper Harasim bd1592b
- 5/16/18 Kacper Harasim ebcd854
- 5/14/18 Ken Orr 31b3acf
- 5/8/18 Ken Orr 3c017a6
- 5/8/18 Ken Orr c96ada7
- 5/8/18 Ken Orr a557604
- 4/17/18 Ken Orr ad52e1c
- 4/17/18 Andrew Nesbitt cd75aac
- 4/17/18 Sebastian Fischer d890e9d
- 4/16/18 Sebastian Fischer 3269a8e
- 4/16/18 Ken Orr 29423cc
- 4/16/18 Sebastian Fischer ebee57e
- 4/15/18 Sebastian Fischer d4f468a
- 4/15/18 Sebastian Fischer e8206fd
- 4/13/18 Andrew Nesbitt a5c2d11
- 3/26/18 Sebastian Fischer f051c39



- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
      - SolarSystem.swift
      - Star.swift
      - SolarDays.swift
      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
  - Solar System iOS
  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
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      - Star.swift
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      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
  - Solar System iOS
  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
      - SolarSystem.swift
      - Star.swift
      - SolarDays.swift
      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
  - Solar System iOS
  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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```

- Comparison
- Authors
- Log



11		Ken Orr	May 16, 2017
12	<code>let name: String</code>	Not Committed	
13	<code>let color: UIColor</code>		
14	<code>private(set) var satellites: [Moon] = []</code>		
15	<code>private(set) var nearbyObjects: [TransNeptunianObject] = []</code>		
16	<code>private(set) var orbitingStar: Star?</code>		
17		Ken Orr	May 20, 2017
18	<code>public init(name: String, color: UIColor) {</code>	Ken Orr	May 16, 2017
19	<code>self.name = name</code>	Try to keep things flat.	
20	<code>self.color = color</code>		
21	<code>}</code>		
22			
23	<code>/// Add a satellite orbiting the planet</code>	Eric Dudiak	May 28, 2018
24	<code>public func addSatellite(_ satellite: Moon) {</code>	Allow adding satellites.	
25	<code>satellite.parentPlanet = self</code>		
26	<code>moons.append(satellite)</code>		
27	<code>}</code>	Ken Orr	May 16, 2017
28		Russ Bishop	May 17, 2017
29	<code>/// Add a nearby object</code>	Russ Bishop	May 20, 2017
30	<code>///</code>	Russ Bishop	May 20, 2017
31	<code>/// - Parameter nearbyObject: The object to add</code>	More references for SmallPlanet rename	
32	<code>func add(nearbyObject: TransNeptunianObject) {</code>	Not Committed	
33	<code>nearbyObjects.append(nearbyObject)</code>	Russ Bishop	May 17, 2017
34	<code>}</code>	Add a few more references for rename	
35		Ken Orr	May 19, 2017
36	<code>/// Remove a nearby object</code>	Russ Bishop	May 20, 2017
37	<code>///</code>	Russ Bishop	May 20, 2017
38	<code>/// - Parameter nearbyObject: The object to remove</code>	More references for SmallPlanet rename	
39	<code>func remove(nearbyObject: TransNeptunianObject) {</code>	Not Committed	
40	<code>guard let index = nearbyObjects.index(of: nearbyObject) else {</code>	Russ Bishop	May 20, 2017
41	<code>return</code>	More references for SmallPlanet rename	
42	<code>}</code>		
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44	<code>}</code>		
45			
46	<code>/// Finds the nearest object among the nearby objects</code>	Russ Bishop	May 20, 2017



Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM

Solar System > Shared > Model Classes > Planet.swift > No Selection

11		Ken Orr	May 16, 2017
12	<code>let name: String</code>	Not Committed	
13	<code>let color: UIColor</code>		
14	<code>private(set) var satellites: [Moon] = []</code>		
15	<code>private(set) var nearbyObjects: [TransNeptunianObject] = []</code>		
16	<code>private(set) var orbitingStar: Star?</code>		
17		Ken Orr	May 20, 2017
18	<code>public init(name: String, color: UIColor) {</code>	Ken Orr	May 16, 2017
19	<code>self.name = name</code>	Try to keep things flat.	
20	<code>self.color = color</code>		
21	<code>}</code>		
22			
23	<code>/// Add a satellite orbiting the planet</code>	Eric Dudiak	May 28, 2018
24	<code>public func addSatellite(_ satellite: Moon) {</code>	Allow adding satellites.	
25	<code>satellite.parentPlanet = self</code>		
26	<code>moons.append(satellite)</code>		
27	<code>}</code>	Ken Orr	May 16, 2017
28		Russ Bishop	May 17, 2017
29	<code>/// Add a nearby object</code>	Russ Bishop	May 20, 2017
30	<code>///</code>	Russ Bishop	May 20, 2017
31	<code>/// - Parameter nearbyObject: The object to add</code>	More references for SmallPlanet rename	
32	<code>func add(nearbyObject: TransNeptunianObject) {</code>	Not Committed	
33	<code>nearbyObjects.append(nearbyObject)</code>	Russ Bishop	May 17, 2017
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Solar System > master > Local Revision



Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM

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Filter | Solar System > master > Local Revision



Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM

Solar System > Shared > Model Classes > Planet.swift > No Selection

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Today

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April 16, 2018

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Reshuffling navigator around, adding macOS unit test bundles, adding testing script for myself

April 13, 2018

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April 11, 2018

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Update copyright info

June 2, 2017

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Unify copyright notice in comments.

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Filter | Solar System > master > Local Revision



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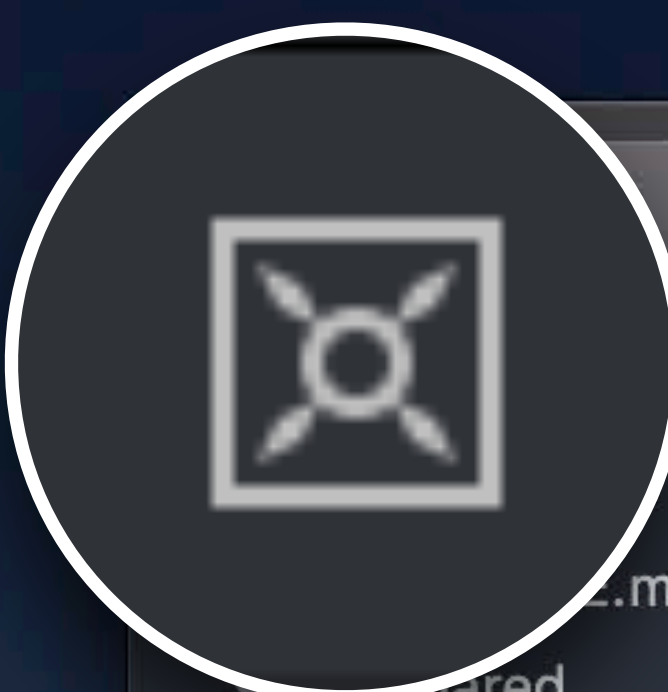
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Solar System > Branches > master

All Last 24 Hours Last 7 Days Last 30 Days Filter

Author	Commit Hash	Message	Date
Eric Dudiak	68dac54	Allow adding satellites.	Today
Eric Dudiak	4010ede	Allow customization of news feed.	Today
Eric Dudiak	07bf6f4	Change colors based on feedback.	Today
Eric Dudiak	47f52a3	Improve news feed layout.	Today
Sebastian Fischer	2e0066a	Update news feed updates.	5/25/18
Sebastian Fischer	dbe8f40	Trigger news feed update after 3 seconds.	5/25/18
Ken Orr	46ac784	Improve performance of planet updates.	5/25/18
Sebastian Fischer	4dee464	Remove unused runtime attributes.	5/25/18
Sebastian Fischer	5184955	Show loading indicator during planet updates.	5/25/18
Ken Orr	d82790a	Update acknowledgements.	5/25/18
Daniel Delwood	aaddfc5	Improved code clarity and readability	5/24/18
Daniel Delwood	daa6a98	Implementing tracing with slightly more detail	5/24/18
Daniel Delwood	a584229	Less attribution, cleaner syntax.	5/24/18
Ken Orr	d1575f5	Clean up syntax of comets.	5/24/18
Kacper Harasim	8648338	Allow toggle of comet display.	5/24/18
Kacper Harasim	6ee4b49	Planet data fetcher adopted decodable	5/24/18
Ken Orr	45523d5	Added comets.	5/24/18
Ken Orr	7bebaf6	Improve dialog wording based on feedback.	5/24/18
Ken Orr	b0ebd82	Update copyrights.	5/24/18



Solar System: Ready | Today at 3:18 PM

Solar System > Branches > master

All Last 24 Hours Last 7 Days Last 30 Days Filter

Author	Commit Message	Commit Hash	Date
Eric Dudiak	Allow adding satellites.	68dac54	Today
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**Hosting**



# Hosting

By default, only a local copy of history

Storing off-site makes for a good backup

Allows syncing between machines

Supports collaboration





# Hosting

In addition to any default Git server

Enhanced support for popular services

- GitHub
- Bitbucket
- GitLab.com

Including self-hosted and enterprise versions





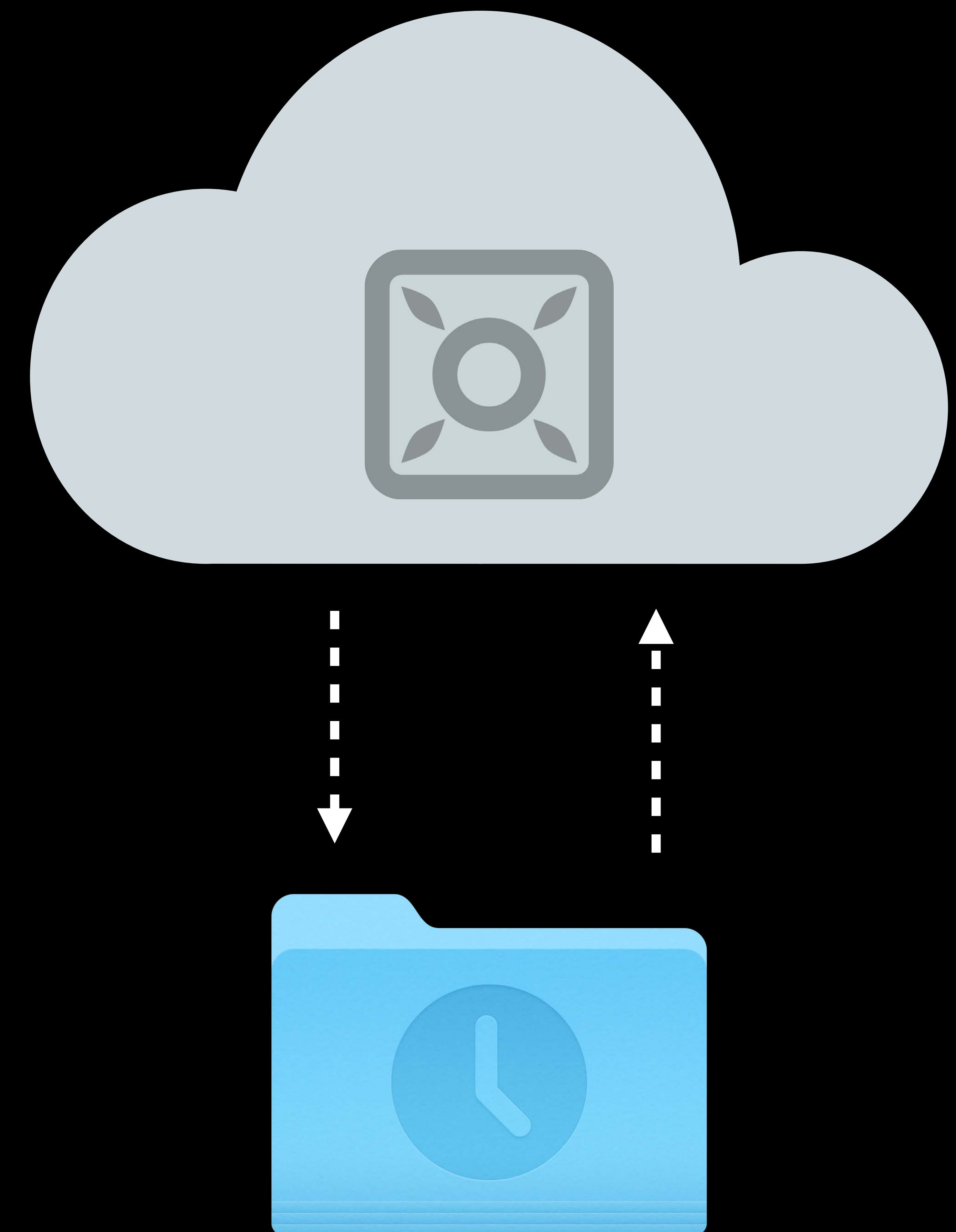
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Accounts

General Accounts Behaviors Navigation Fonts & Colors Text Editing Key Bindings Source Control Components Locations Server & Bots

Select the type of account you would like to add:

- Bitbucket Cloud
- Bitbucket Server
- GitHub
- GitHub Enterprise

No Accounts

Cancel Continue

+ - ⚙



Accounts

General Accounts Behaviors Navigation Fonts & Colors Text Editing Key Bindings Source Control Components Locations Server & Bots

Sign in to your Bitbucket Cloud account

Account: eric@dudiak.com

Password: [masked]

[Forgot password?](#)

Cancel Sign In

No Accounts

Click the add (+) button to create a new account

+ - [gear icon]



Accounts

General Accounts Behaviors Navigation Fonts & Colors Text Editing Key Bindings Source Control Components Locations Server & Bots

Source Control Accounts

- Bitbucket Cloud <https://bitbucket.org>

**Bitbucket Cloud**

Account: dudiak

Description: Bitbucket Cloud

Clone Using:  HTTPS  SSH  
New repositories will be cloned from Bitbucket Cloud using SSH.

SSH Key: None ⌵  
⚠ SSH key not configured Create...

+ - ⚙



**Security**



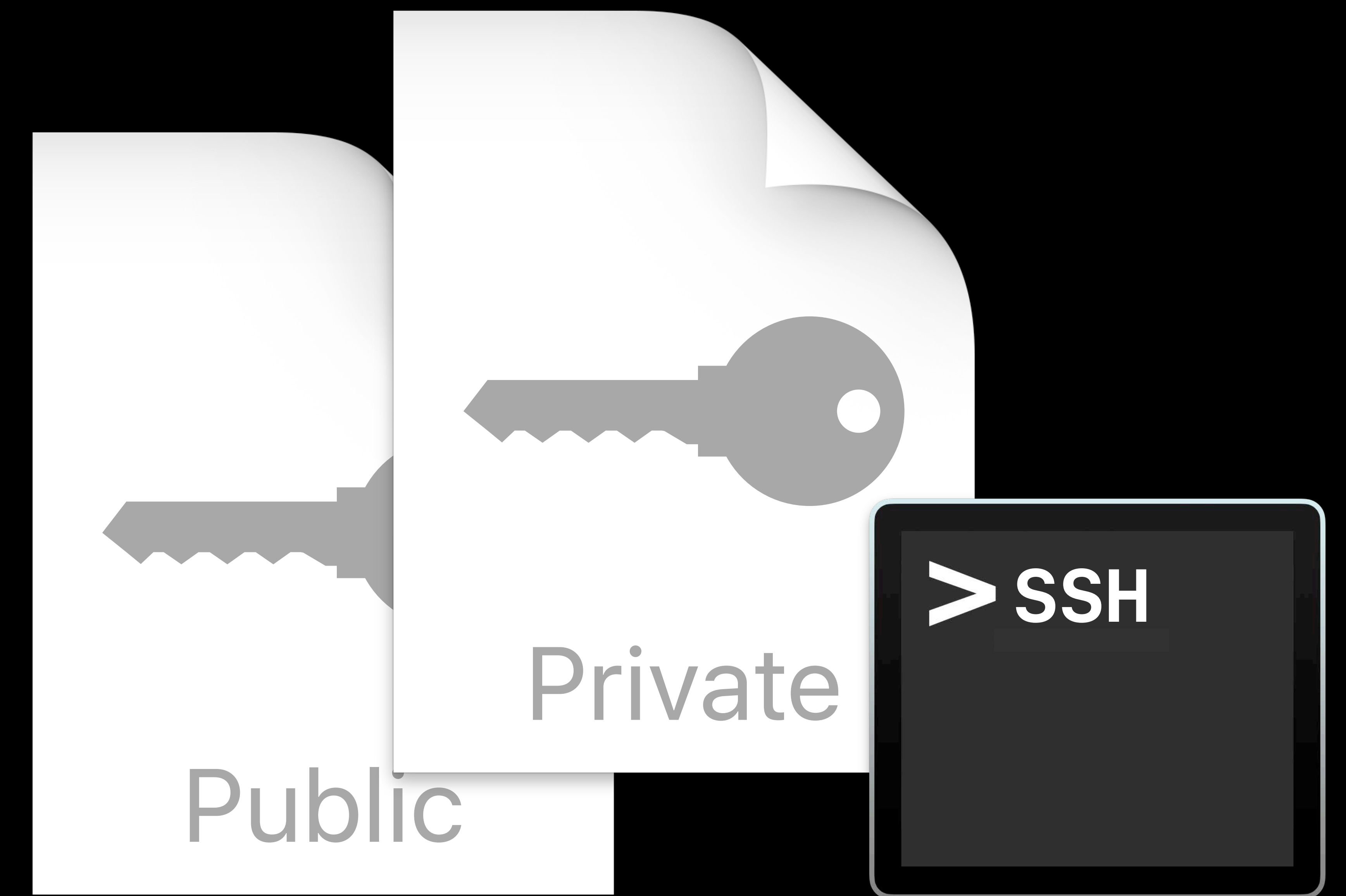
# Security

Transferring Git data can be secured

Two methods

- HTTPS
- SSH

SSH requires additional setup





Accounts

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Source Control Accounts

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### Create SSH key

Enter a passphrase for the new SSH key:

Cancel Create

Clone Using:  HTTPS  SSH  
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⚠ SSH key not configured

+ - ⚙



Accounts

General Accounts Behaviors Navigation Fonts & Colors Text Editing Key Bindings Source Control Components Locations Server & Bots

Source Control Accounts

- Bitbucket Cloud <https://bitbucket.org>

### Upload SSH key

To perform this operation Xcode will need to upload the SSH key '/Users/dudiak/.ssh/id\_rsa' to Bitbucket Cloud. Do you want to upload?

Cancel Upload

Clone Using:  HTTPS  SSH

New repositories will be cloned from Bitbucket Cloud using SSH.

SSH Key:

ssh-rsa AAAAB3NzaC1yc2EAAA...dudiak@eric-dudiaks-imac.local

⚠ SSH key does not exist on "Bitbucket Cloud" Upload...

+ - ⚙



Accounts

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New repositories will be cloned from Bitbucket Cloud using SSH.

SSH Key: id\_rsa  
ssh-rsa AAAAB3NzaC1yc2EAAA...dudiak@eric-dudiaks-imac.local

✓ Successfully uploaded SSH key

+ - ⚙



Solar System > iPhone 8 Plus  
Solar System: Ready | Today at 3:18 PM

No Selection

- Branch from "master"...
- Tag "master"...
- Checkout...
- Merge from Branch...
- Merge into Branch...
- Create "Solar System" Remote...**
- Add Existing Remote...
- View on Host...
- Delete...
- Source Control Navigator Help

Filter



Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM

No Selection

- Solar System master
  - Branches
    - master (current)
    - Eric
      - cleanup
      - perfWork
      - HotFix1
      - HotFix2
  - Tags
    - 1.0
    - 1.0.1
    - 1.0.2
    - 1.0.3
    - 1.1
  - Remotes

### Create "Solar System" remote:

Account: Bitbucket Cloud

Owner: dudiak

Repository Name: Solar System  
<https://bitbucket.org/dudiak/Solar%20System>

Description: Optional

Visibility:  Public  
Anyone can see this repository. You choose who can commit.

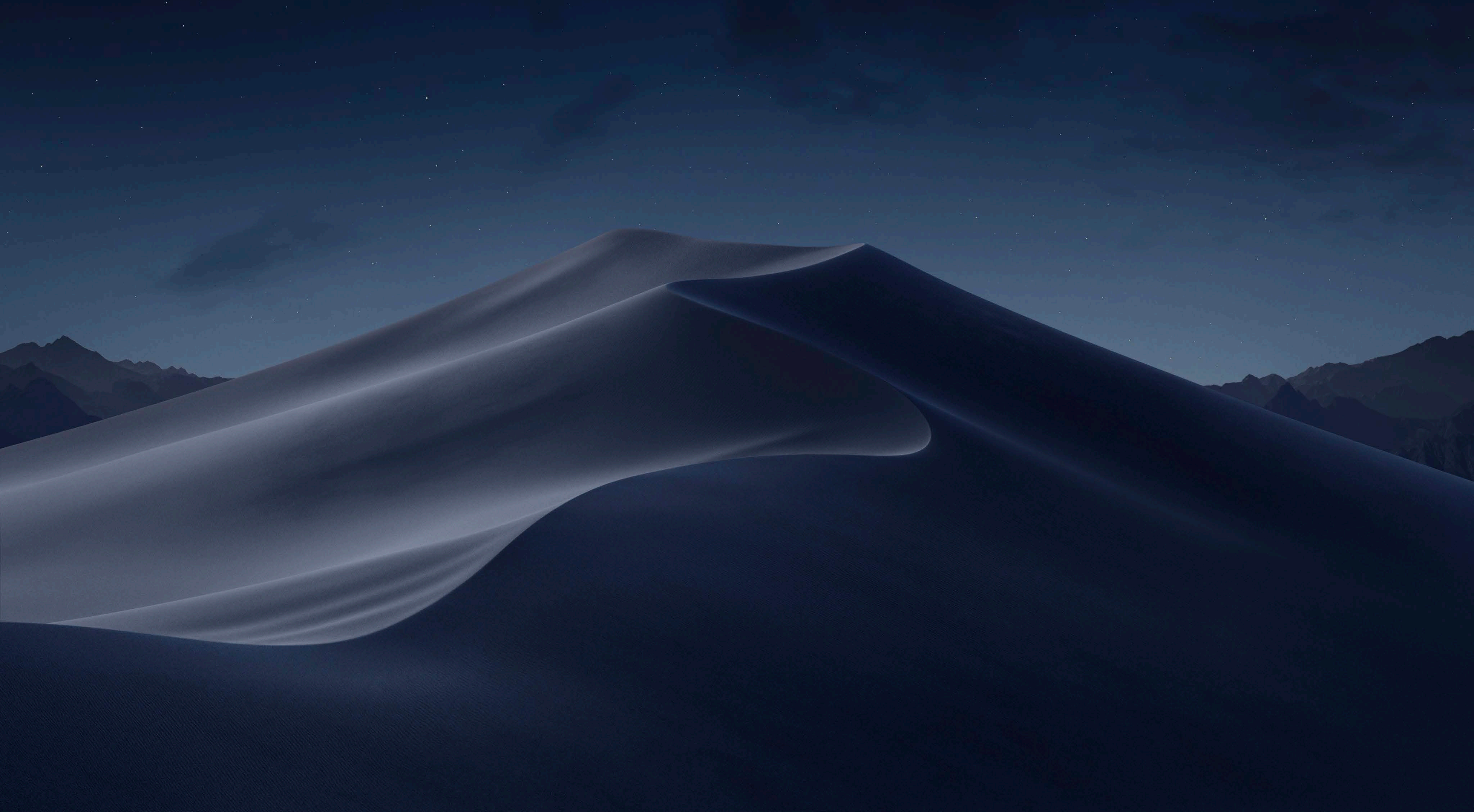
Private  
You can choose who can see and commit to this repository.

Remote Name: origin

Cancel Create

Filter







- Commit... ⌘⌘C
- Push...
- Pull... ⌘⌘X
- Fetch and Refresh Status

---

- Discard All Changes...

---

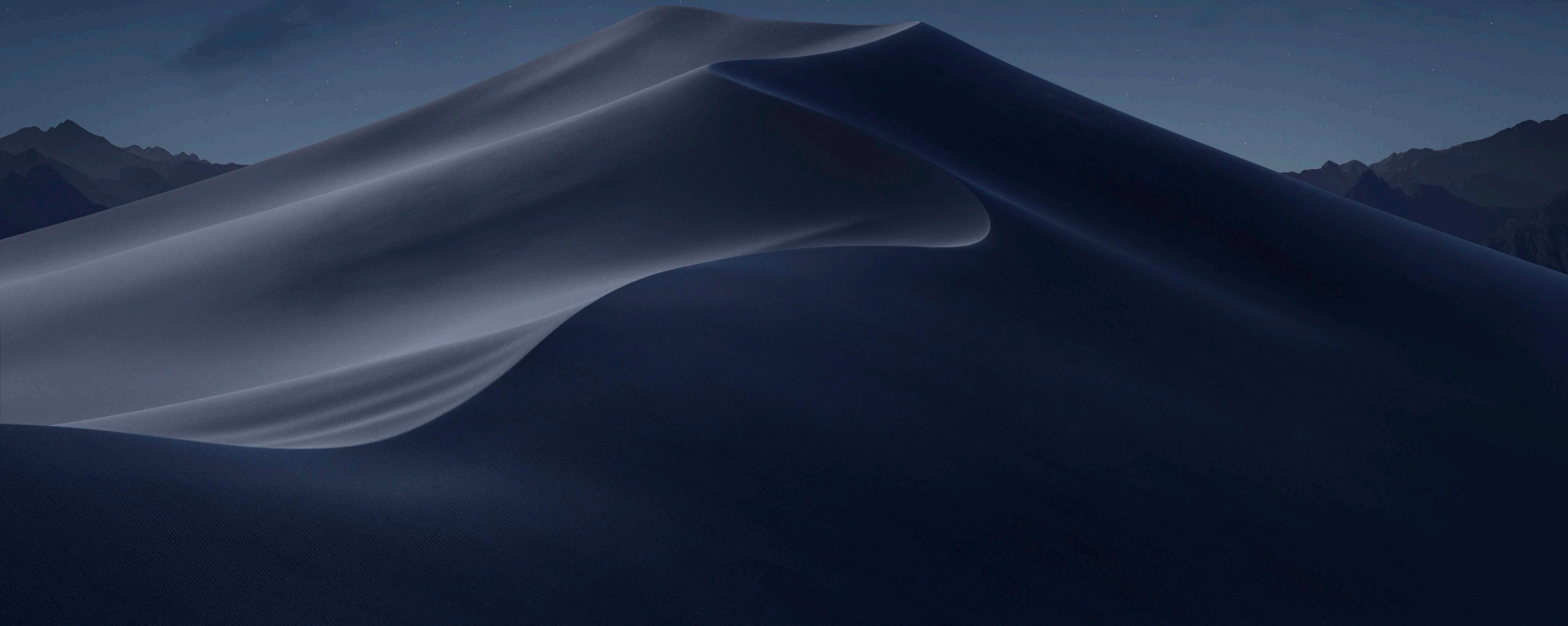
- Add
- Discard Changes in Selected Files...
- Mark as Resolved

---

- Create Git Repositories...

---

- Clone...





- Commit... ⌘⌘C
- Push...
- Pull... ⌘⌘X
- Fetch and Refresh Status

---

- Discard All Changes...

---

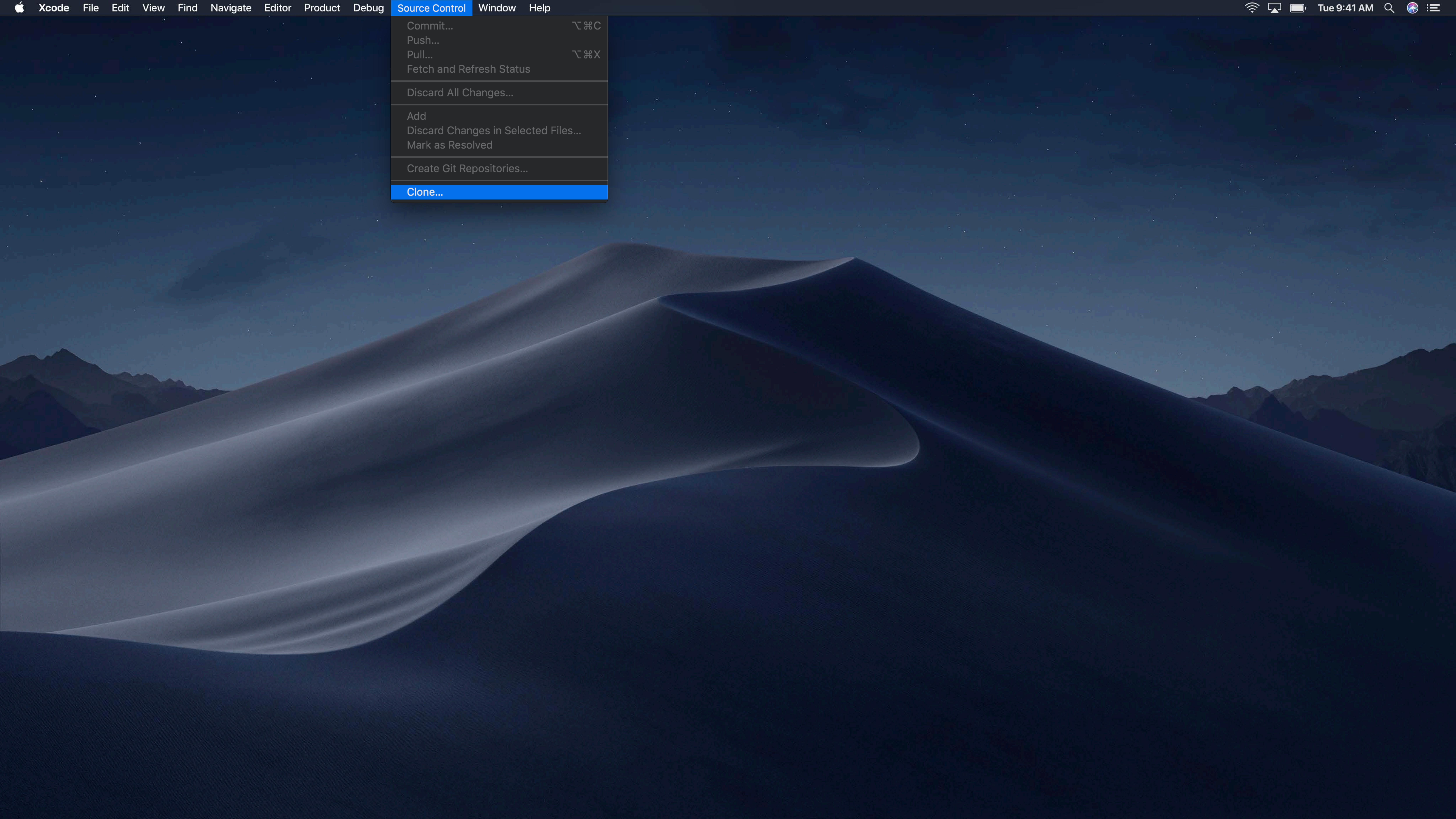
- Add
- Discard Changes in Selected Files...
- Mark as Resolved

---

- Create Git Repositories...

---

- Clone...**





Search or enter repository URL

dudiak	Last Updated	Owner
SCMStickers	Jun 7, 2017, 3:38 PM	dudiak
swift-package-manager	Feb 22, 2017, 1:59 PM	dudiak
TOTP	May 30, 2017, 1:28 PM	dudiak
AsthmaHealth	Oct 26, 2016, 12:26 PM	ResearchKit
git	Today, 9:47 AM	git
GlucoSuccess	Jul 29, 2015, 11:24 AM	ResearchKit
libgit2	May 25, 2018, 12:26 PM	libgit2
MyHeartCounts	Oct 27, 2015, 4:16 PM	ResearchKit
NanoStore	Nov 25, 2017, 10:53 AM	tciuro
ResearchKit	Apr 12, 2018, 9:19 PM	ResearchKit
swift	Today, 5:06 PM	apple
zlib	Yesterday, 1:37 AM	madler

Done Clone



Search or enter repository URL

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SCMStickers	Jun 7, 2017, 3:38 PM	dudiak
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swift	Today, 5:06 PM	apple
zlib	Yesterday, 1:37 AM	madler

Done Clone



# Pulling and Pushing



```
Solar System > iPhone 8 Plus
Solar System: Ready | Today at 3:18 PM

Solar System > Shared > Model Classes > Planet.swift > No Selection

Solar System
├── README.md
├── Shared
├── Solar System iOS
├── Solar System Mac
├── Resources
├── PlanetPhysics
├── Solar System iOS UI Tests
├── Instrumentation
└── Products

10 public class Planet: Hashable {
11
12     let name: String
13     let color: UIColor
14     private(set) var satellites: [Moon] = []
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46     /// Finds the nearest object among the nearby objects
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- Commit... ⌘⌘C
- Push...
- Pull... ⌘⌘X
- Fetch and Refresh Status
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- Mark Selected Files as Resolved
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Push local changes:

origin/master

Include tags

Cancel Push



```
Solar System > iPhone 8 Plus | Solar System: Ready | Today at 3:18 PM
Solar System > Shared > Model Classes > Planet.swift > No Selection

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- Commit... ⌘⌘C
- Push...
- Pull... ⌘⌘X
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Solar System > iPhone 8 Plus

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- Commit... ⌘⌘C
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**Pull remote changes:**

origin/master

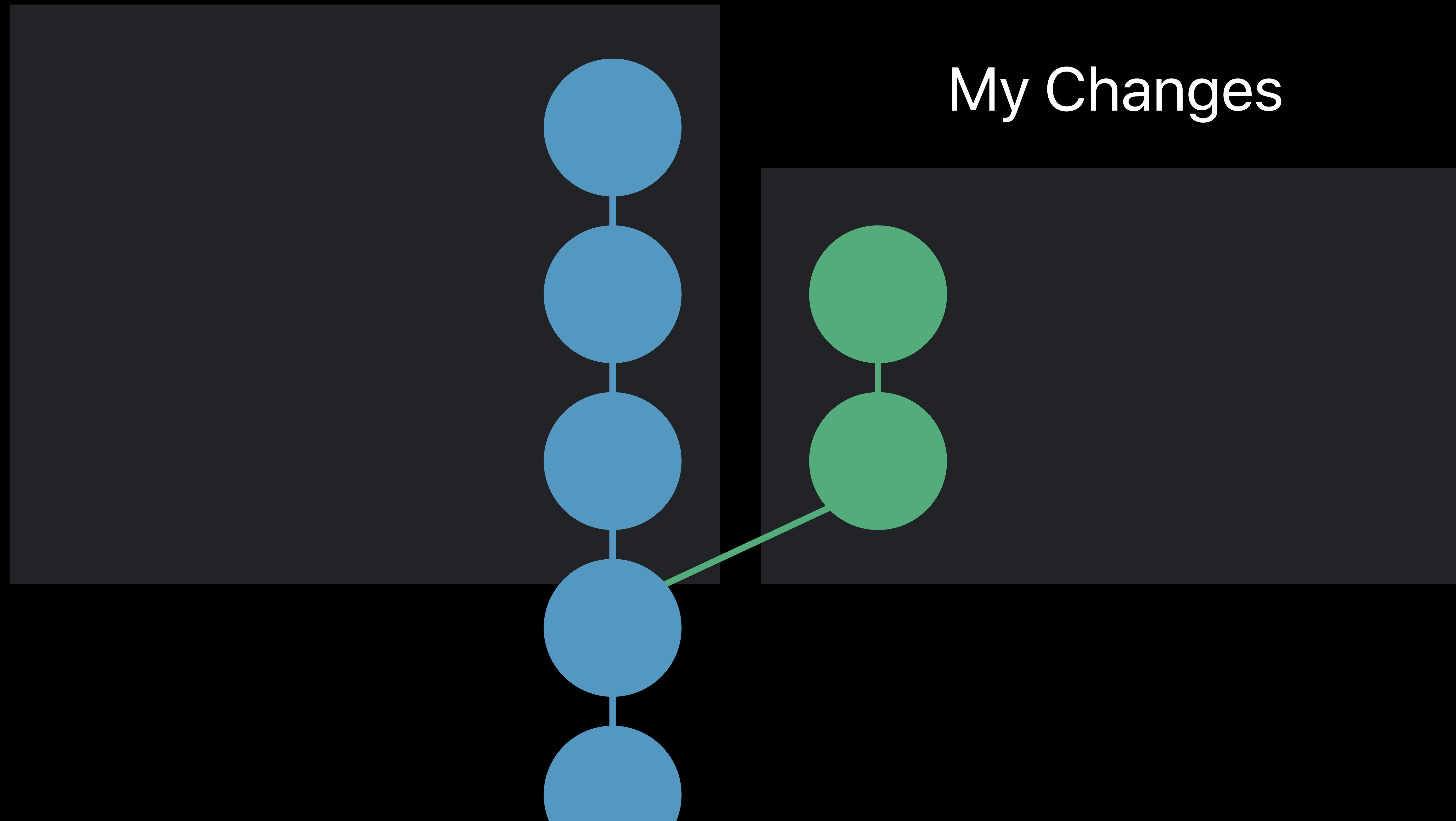
Rebase local changes onto upstream changes

Cancel Pull



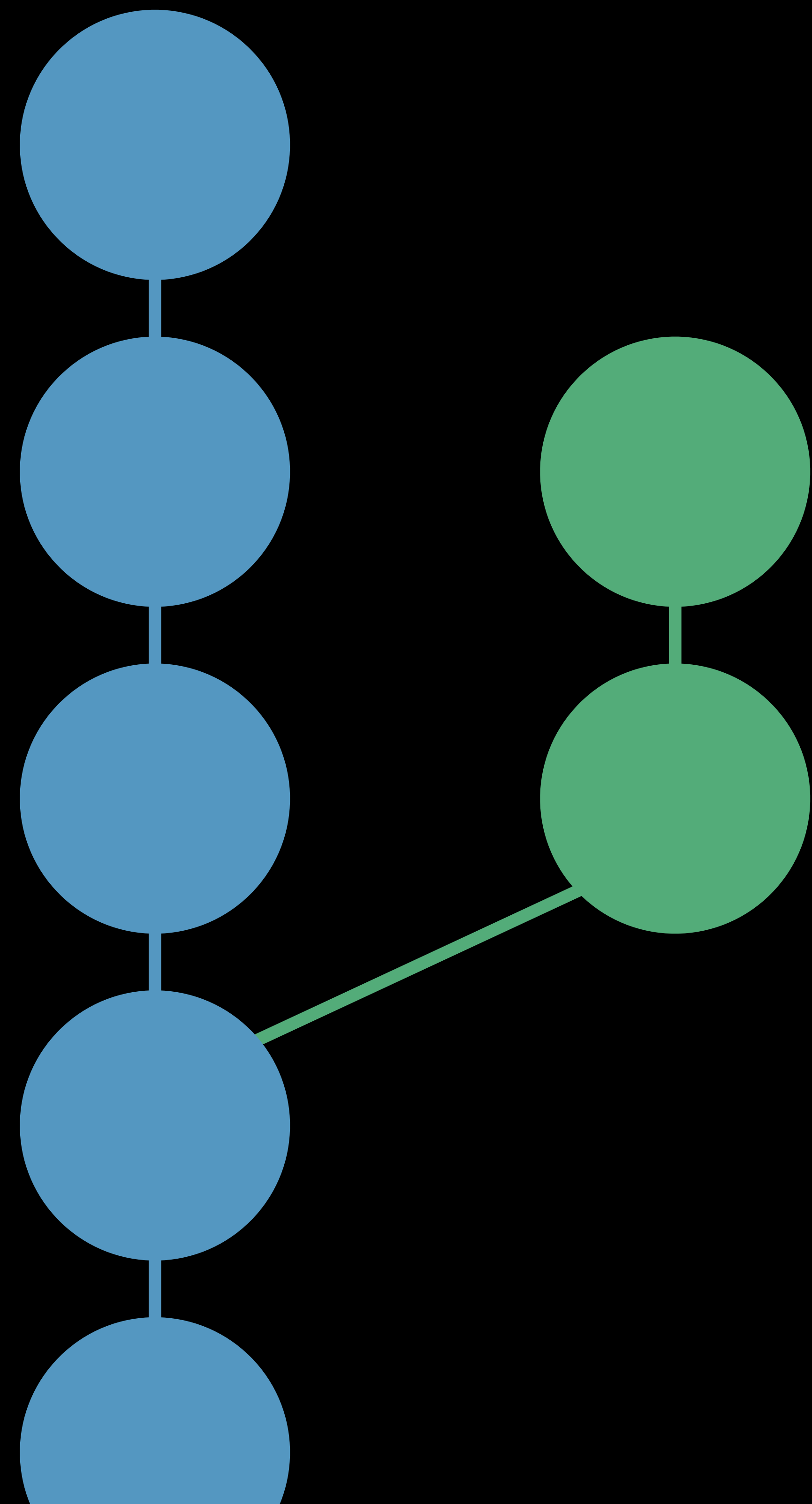
Upstream Changes

My Changes

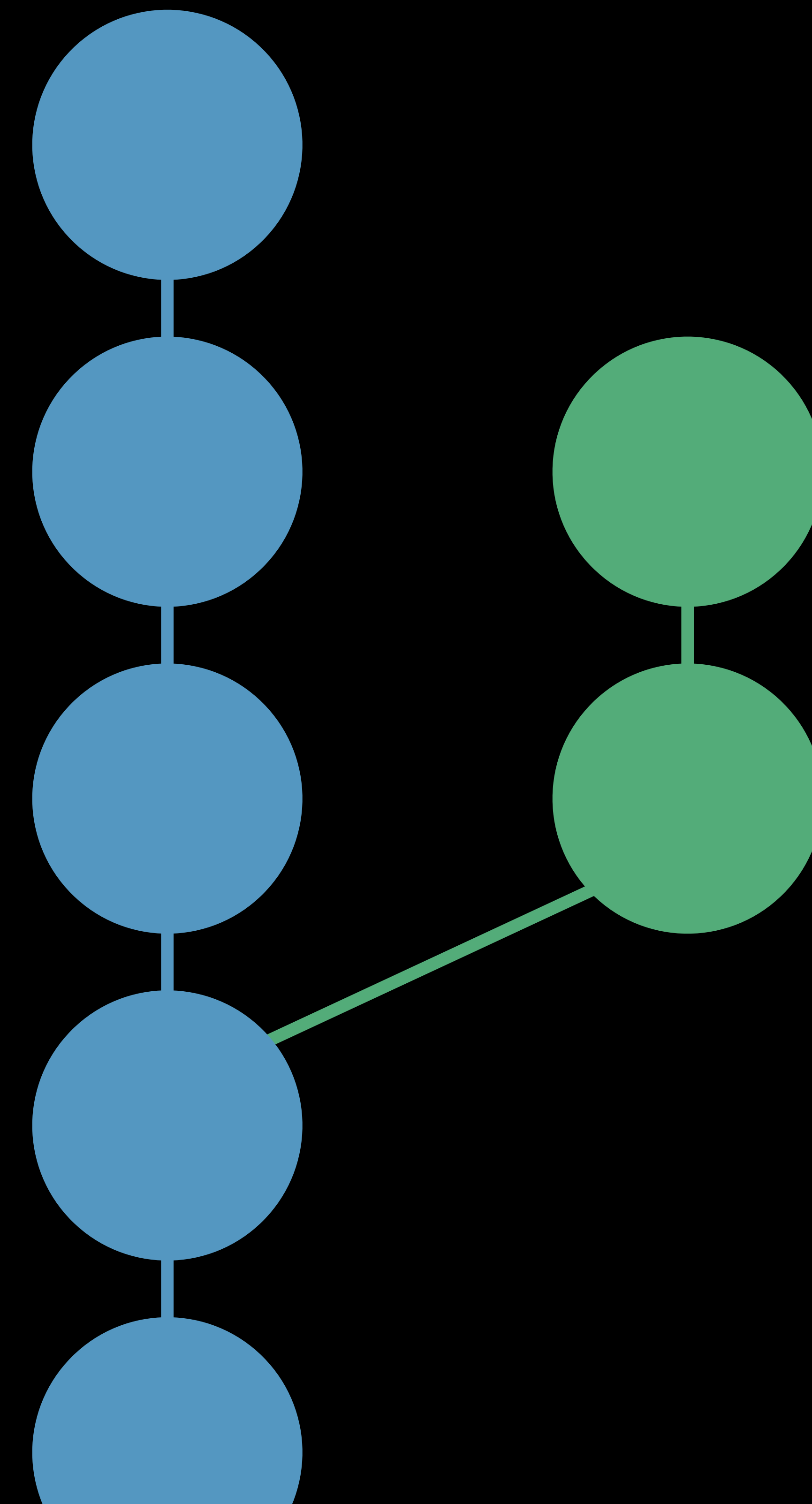




# Pull Merge

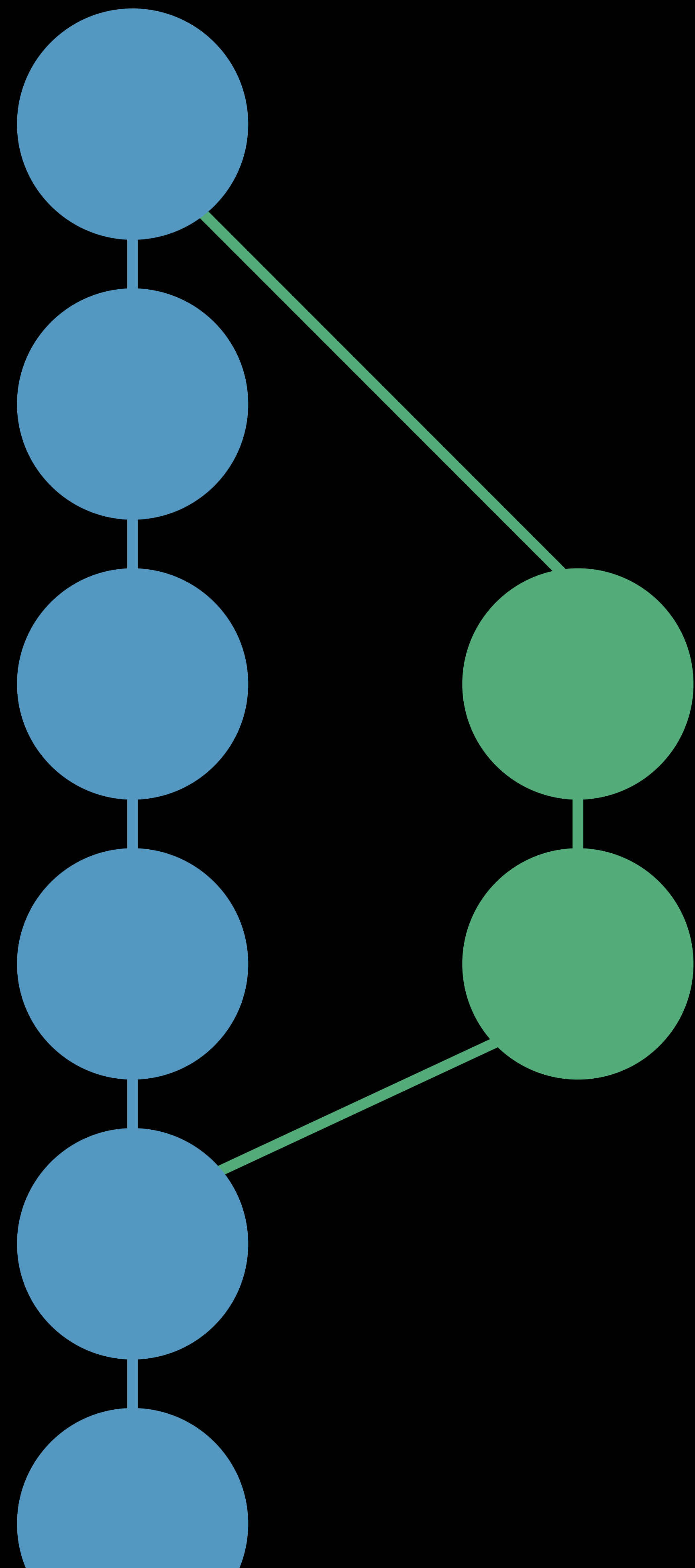


# Pull Rebase

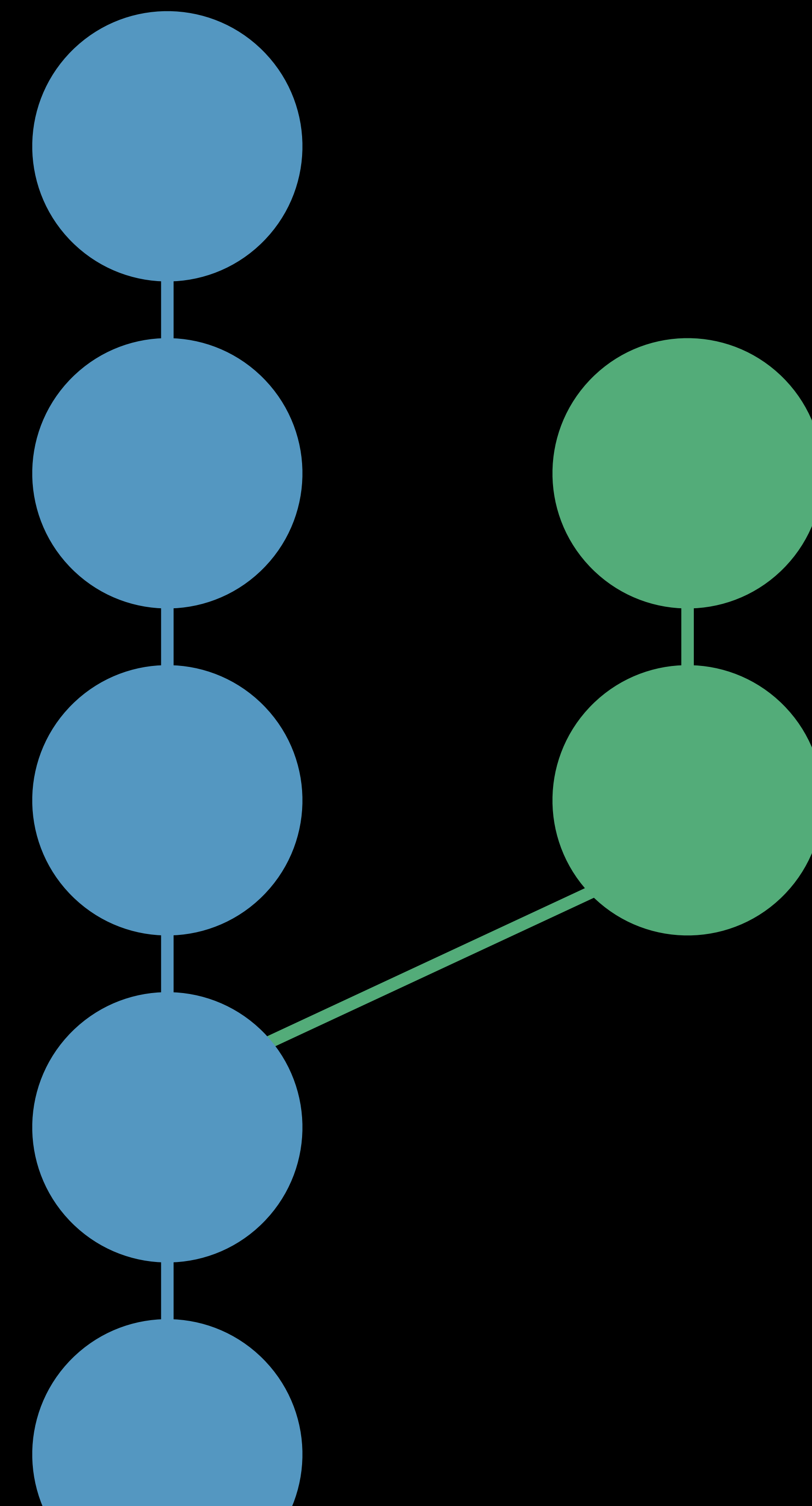




# Pull Merge

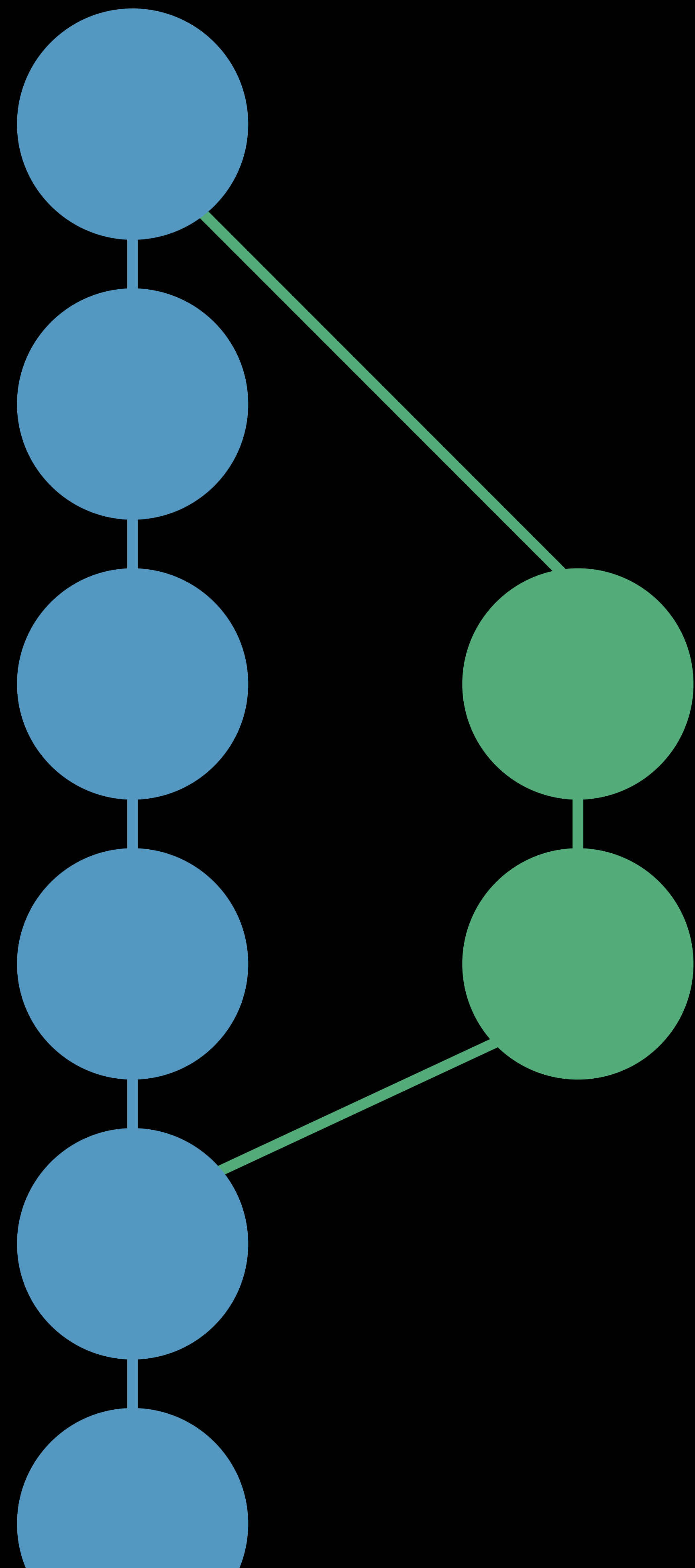


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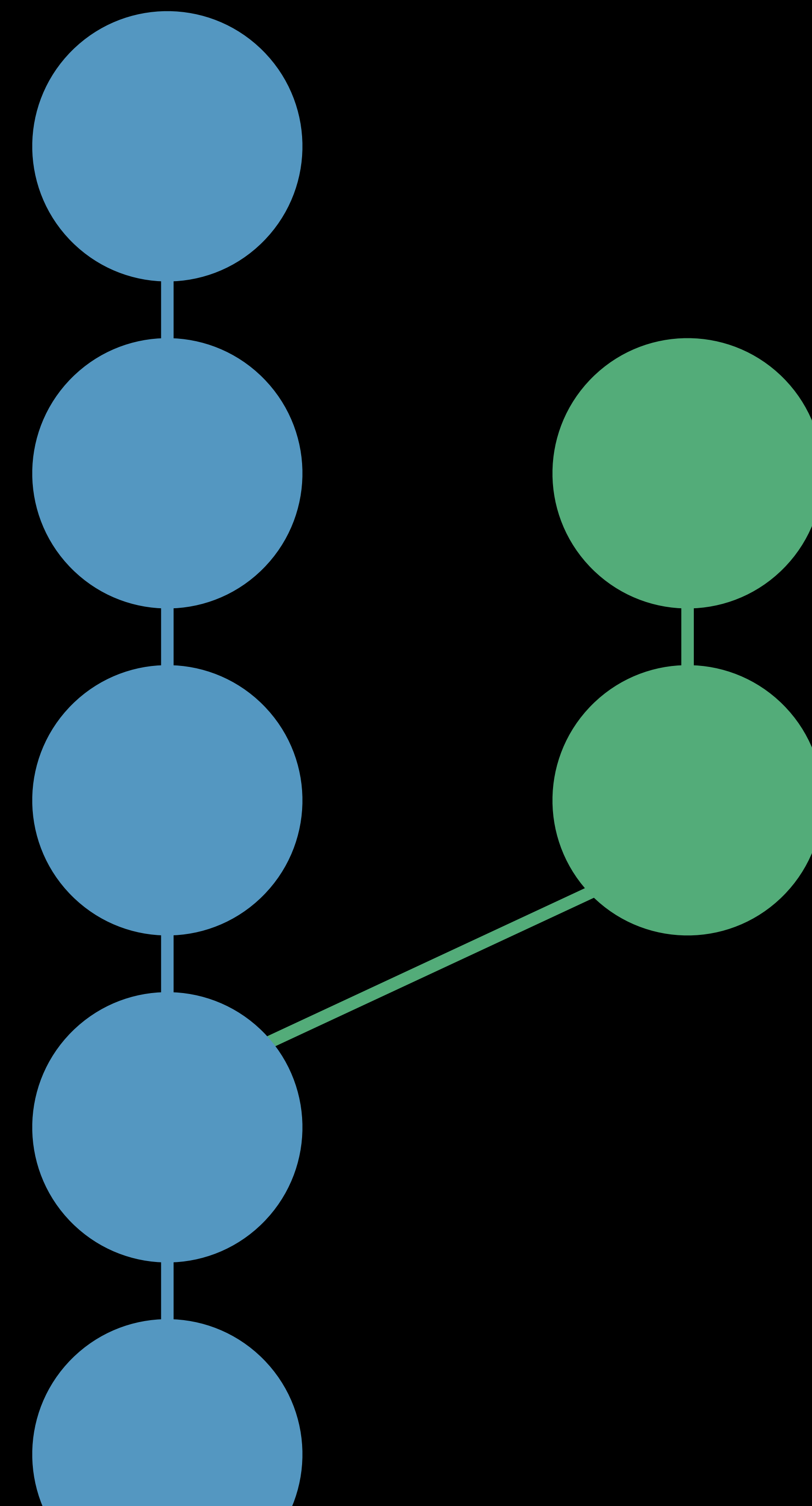




# Pull Merge

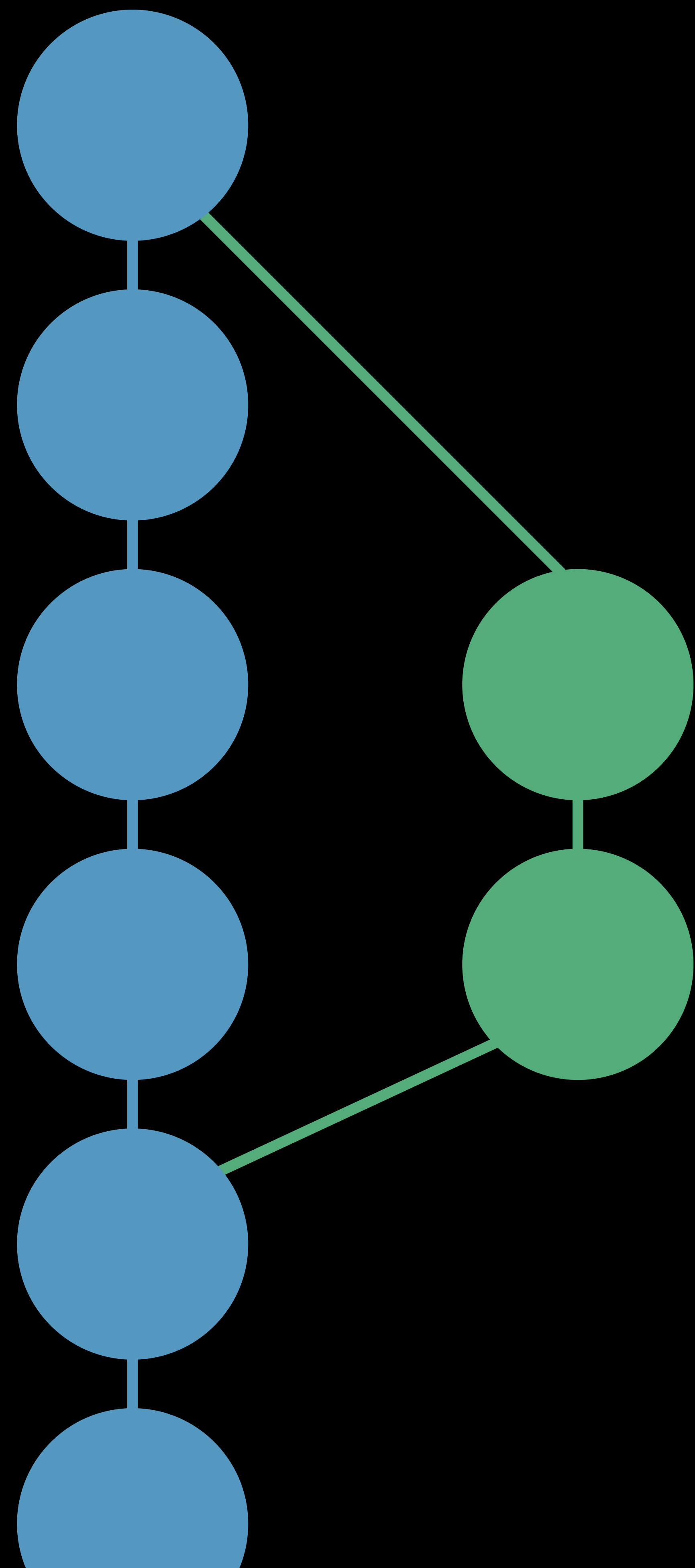


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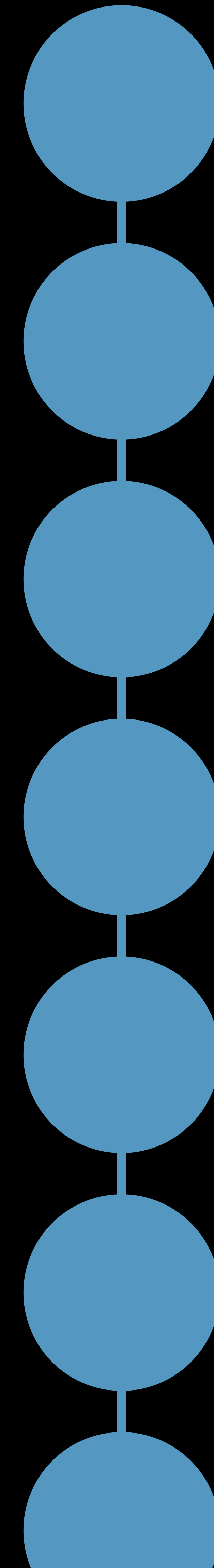




# Pull Merge



# Pull Rebase





**Conflicts**



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```

? v

2 v

3 v

< 1/3 >

Cancel Pull



Hierarchical Flat

- Solar System > Shared > Model Classes > Planet.swift

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12     let title: String
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14     private(set) var moons: [Moon] = []
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16     private(set) var parentStar: Star!
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- Choose Left
- Choose Right
- Choose Left Then Right
- Choose Right Then Left

Cancel Pull



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1

2

3

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Source Control

General Accounts Behaviors Navigation Fonts & Colors Text Editing Key Bindings Source Control Components Locations Server & Bots

General Git

Source Control:  Enable Source Control

- Refresh local status automatically
- Fetch and refresh server status automatically
- Add and remove files automatically

Text Editing:  Show Source Control changes

- Include upstream changes

Comparison View: Local Revision on Left Side

Source Control Navigator: Sort by Name



Source Control

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```
Solar System: Ready | Today at 3:18 PM
Solar System > Shared > Model Classes > Planet.swift > No Selection

Solar System
├── README.md
├── Shared
│   ├── Networking
│   ├── CameraModel Classes
│   ├── Fly-By Classes
│   └── Model Classes
│       ├── Asteroid.h
│       ├── Asteroid.m
│       ├── Planet.swift
│       ├── Moon.swift
│       ├── Orbit.swift
│       ├── SolarSystem.swift
│       ├── Star.swift
│       ├── SolarDays.swift
│       ├── TransNeptunianObject.swift
│       └── TelescopicSurvey.swift
├── Model Protocols
├── View Classes
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Solar System > iPhone 8 Plus Solar System: Ready | Today at 3:18 PM

Solar System > Shared > Model Classes > Planet.swift > No Selection

```
10 public class Planet: Hashable {
11
12     let name: String
13     let color: UIColor
14     private(set) var satellites: [Moon] = []
15     private(set) var nearbyObjects: [TransNeptunianObject] = []
16     private(set) var orbitingStar: Star?
17
18     public init(name: String, color: UIColor) {
19         self.name = name
20         self.color = color
21     }
22
23     /// Add a satellite orbiting the planet
24     public func addSatellite(_ satellite: Moon) {
25         satellite.parentPlanet = self
26         moons.append(satellite)
27     }
28
29     /// Add a nearby object
30     ///
31     /// - Parameter nearbyObject: The object to add
32     func add(nearbyObject: TransNeptunianObject) {
33         nearbyObjects.append(nearbyObject)
34     }
35
36     /// Remove a nearby object
37     ///
38     /// - Parameter nearbyObject: The object to remove
39     func remove(nearbyObject: TransNeptunianObject) {
40         guard let index = nearbyObjects.index(of: nearbyObject) else {
41             return
42         }
43         nearbyObjects.remove(at: index)
44     }
45
46     /// Finds the nearest object among the nearby objects
```

Filter



Solar System > Shared > Model Classes > Planet.swift > No Selection

- Solar System
  - README.md
  - Shared
    - Networking
    - CameraModel Classes
    - Fly-By Classes
    - Model Classes
      - Asteroid.h
      - Asteroid.m
      - Planet.swift
      - Moon.swift
      - Orbit.swift
      - SolarSystem.swift
      - Star.swift
      - SolarDays.swift
      - TransNeptunianObject.swift
      - TelescopicSurvey.swift
    - Model Protocols
    - View Classes
    - View Model Classes
  - Solar System iOS
  - Solar System Mac
  - Resources
  - PlanetPhysics
  - Solar System iOS UI Tests
  - Instrumentation
  - Products

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Actions

- Discard Change

In Conflict With

- 
**Kieran Senior** 35e1424  
 May 28, 2018 at 5:54 PM  
 Improve removing of nearby objects.

Show Commit 35e1424



# Pull Requests and Forks

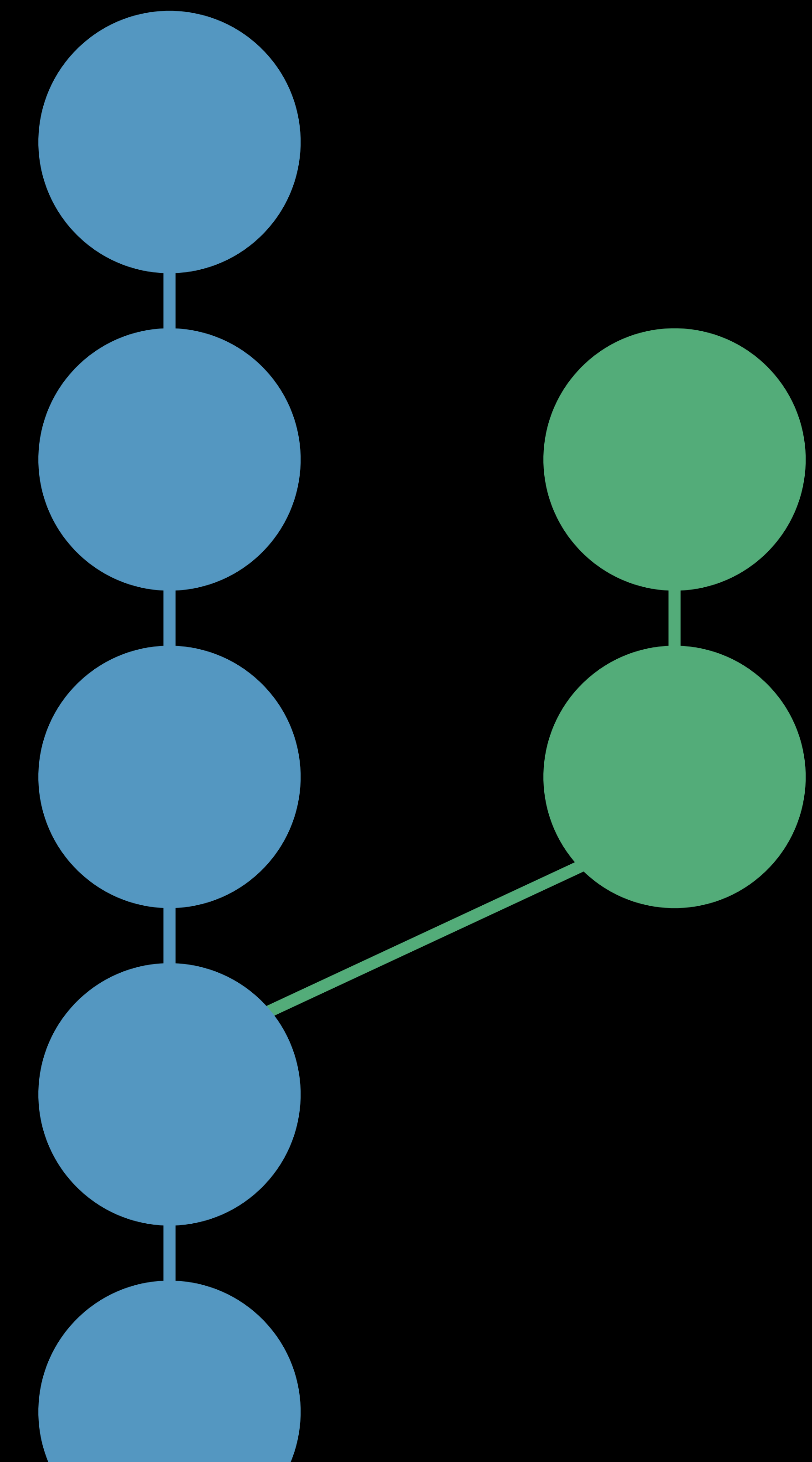


# Pull Request

A form of code review on a hosted service

Used when changes are done off of the main branch

The branch can be checked out locally to build and run



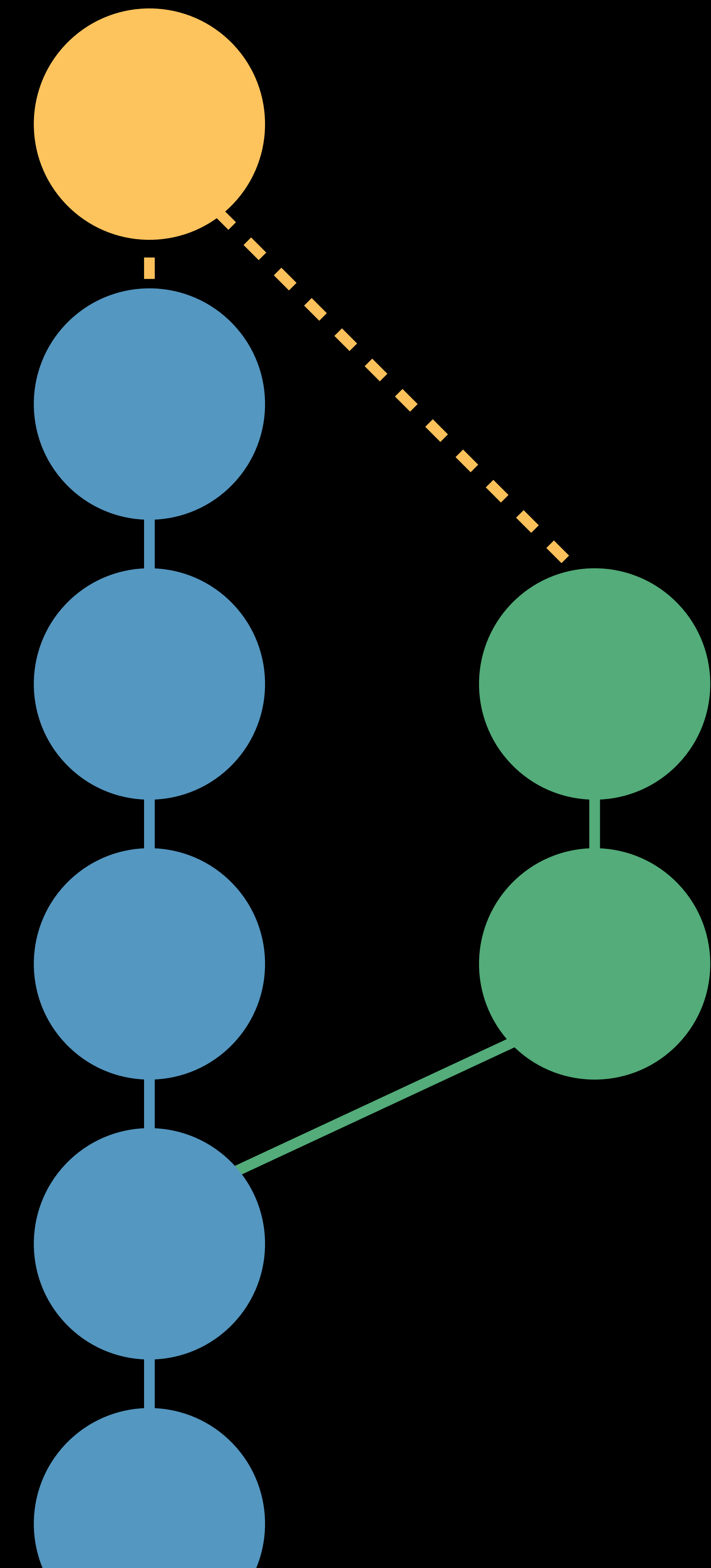


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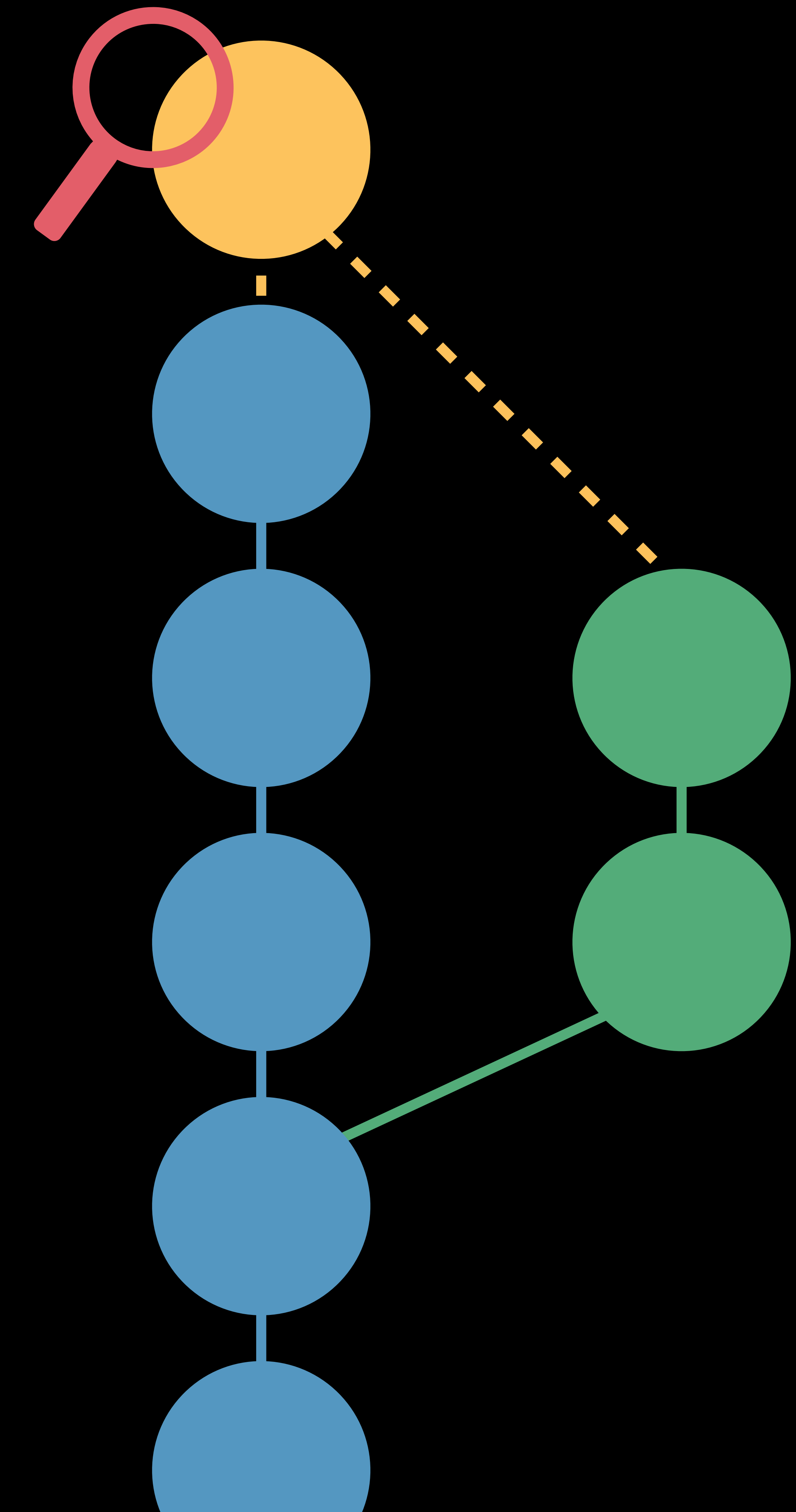


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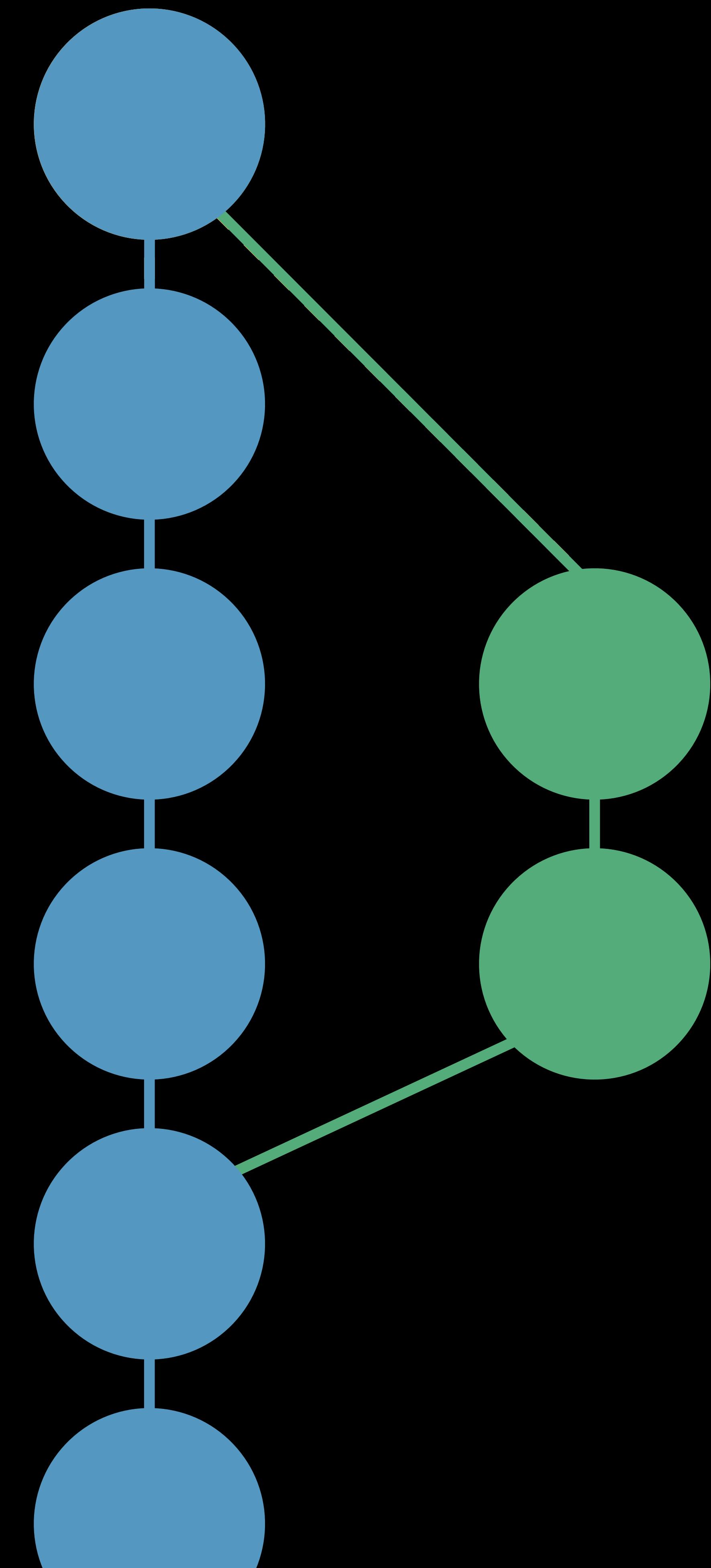


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# Forks

Additional server copy of a repository

Has its own branches

Use PRs to re-integrate work

Clone separately or as second remote





# Forks

Additional server copy of a repository

Has its own branches

Use PRs to re-integrate work

Clone separately or as second remote





# Summary

Using Git locally

Viewing history

Synchronizing changes

Resolving conflicts

Hosting features



# More Information

<https://developer.apple.com/session418>

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GitHub and the New Source Control Workflows in Xcode 9

WWDC 2017

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Xcode Open Hours

Tools Lab B

Tuesday–Thursday

---



 **WWDC18**