EVERYTHING — BUT THE KITCHEN — SYNCS

Drew McCormack
The Mental Faculty B.V.

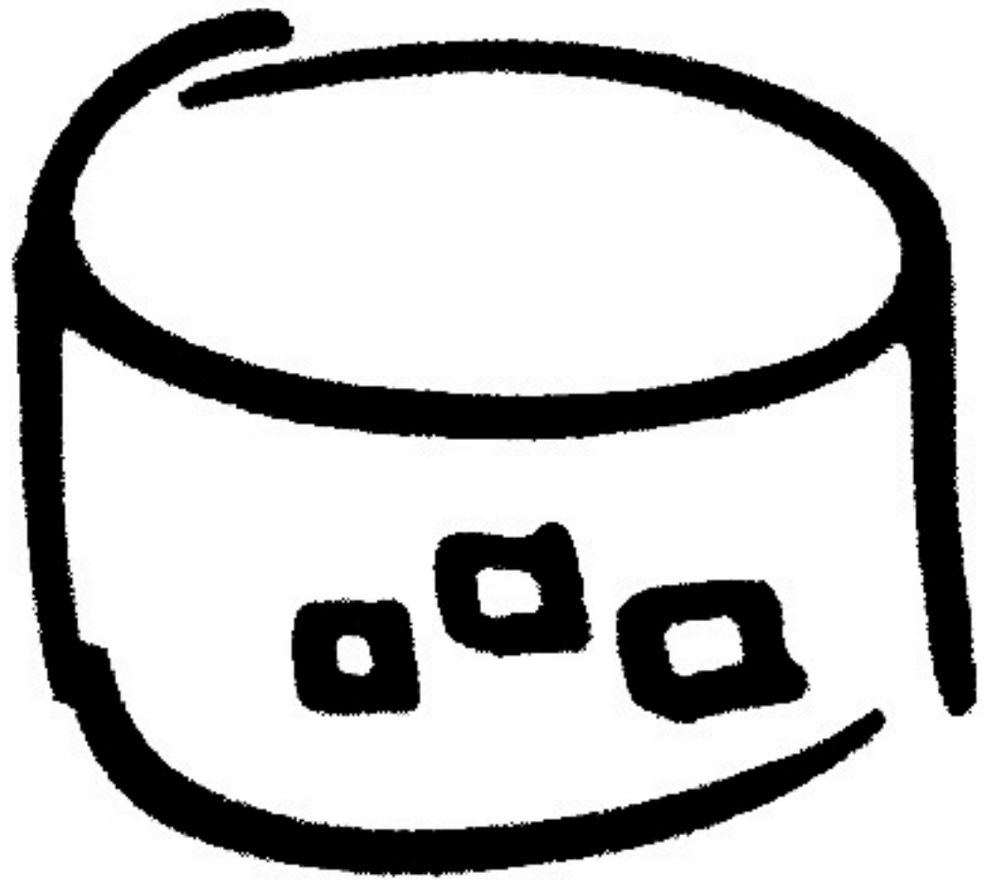
goto; conference aarhus

INTERNATIONAL SOFTWARE DEVELOPMENT CONFERENCE

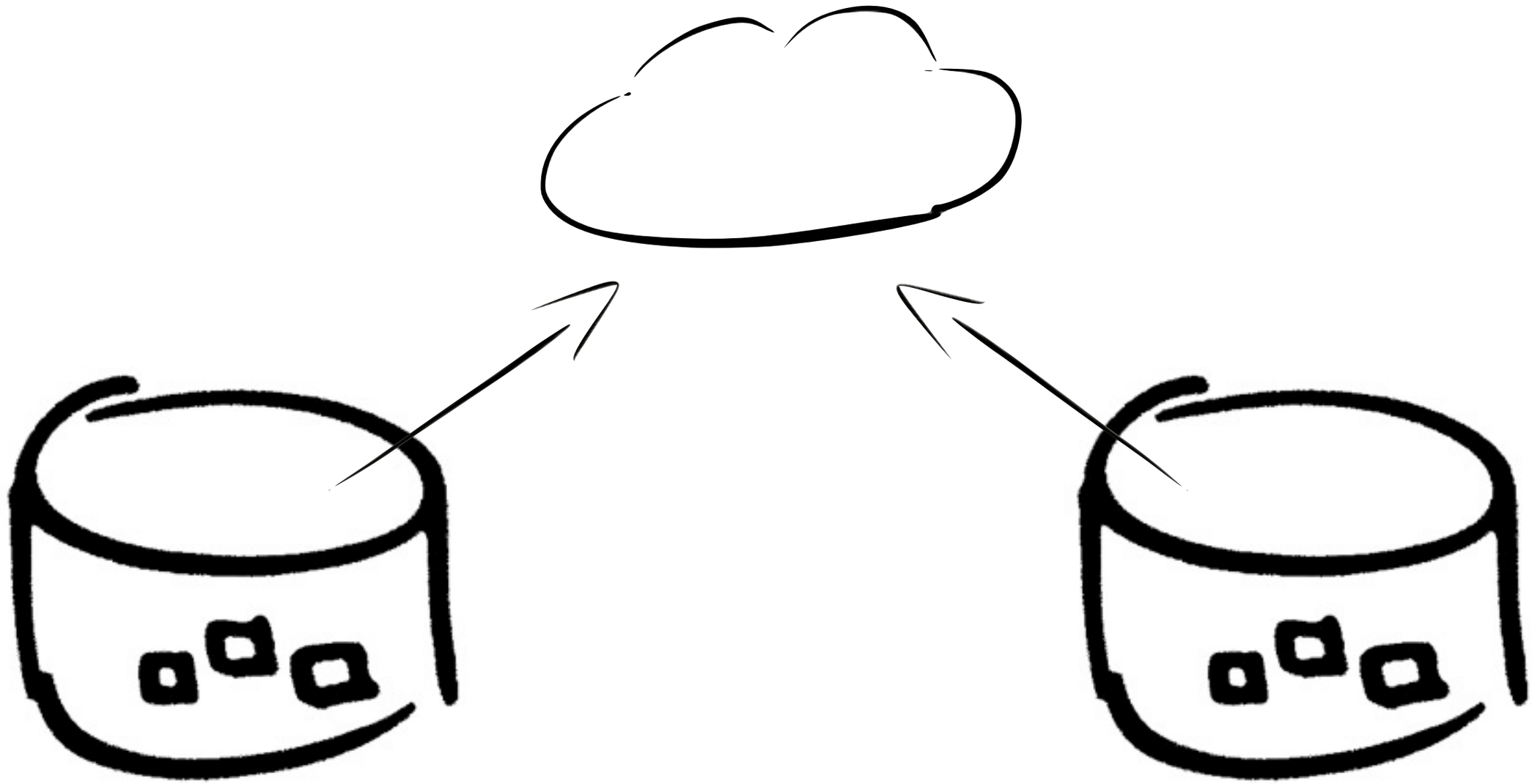
gotocon.com

Craig Federighi

Senior Vice President
Software Engineering

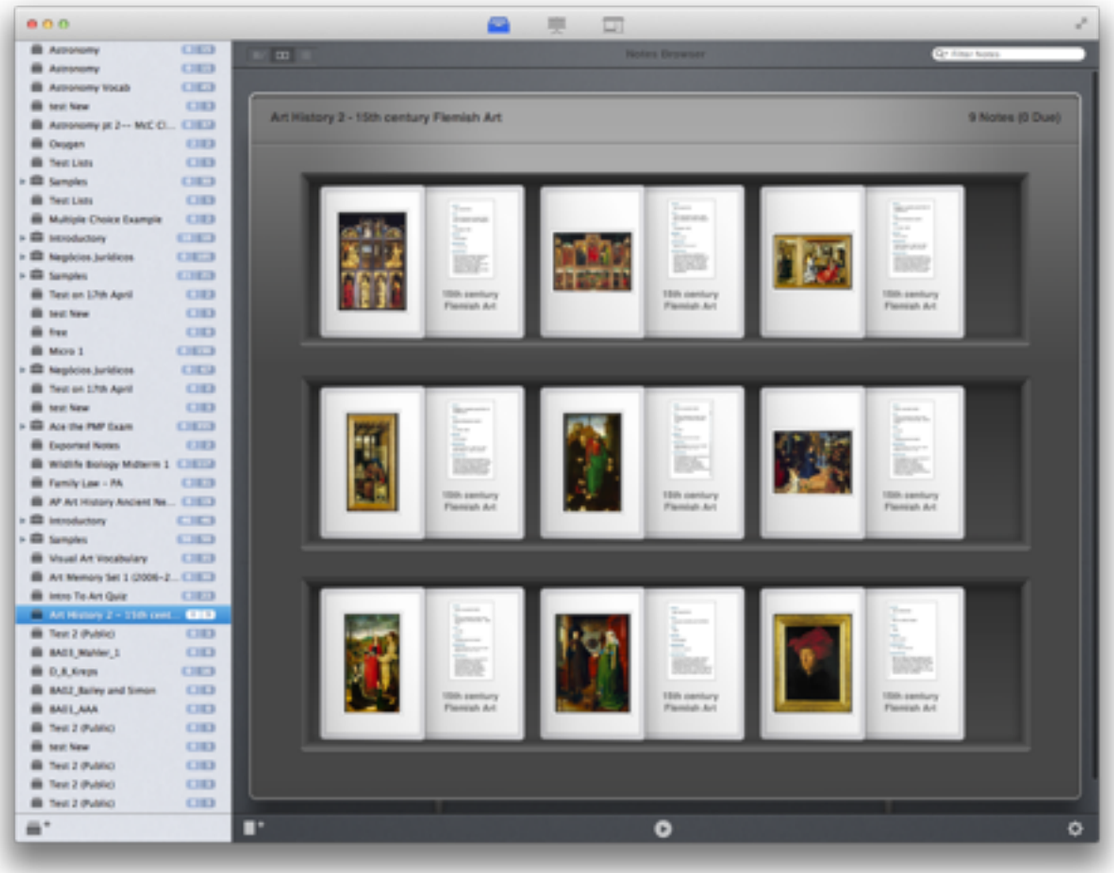


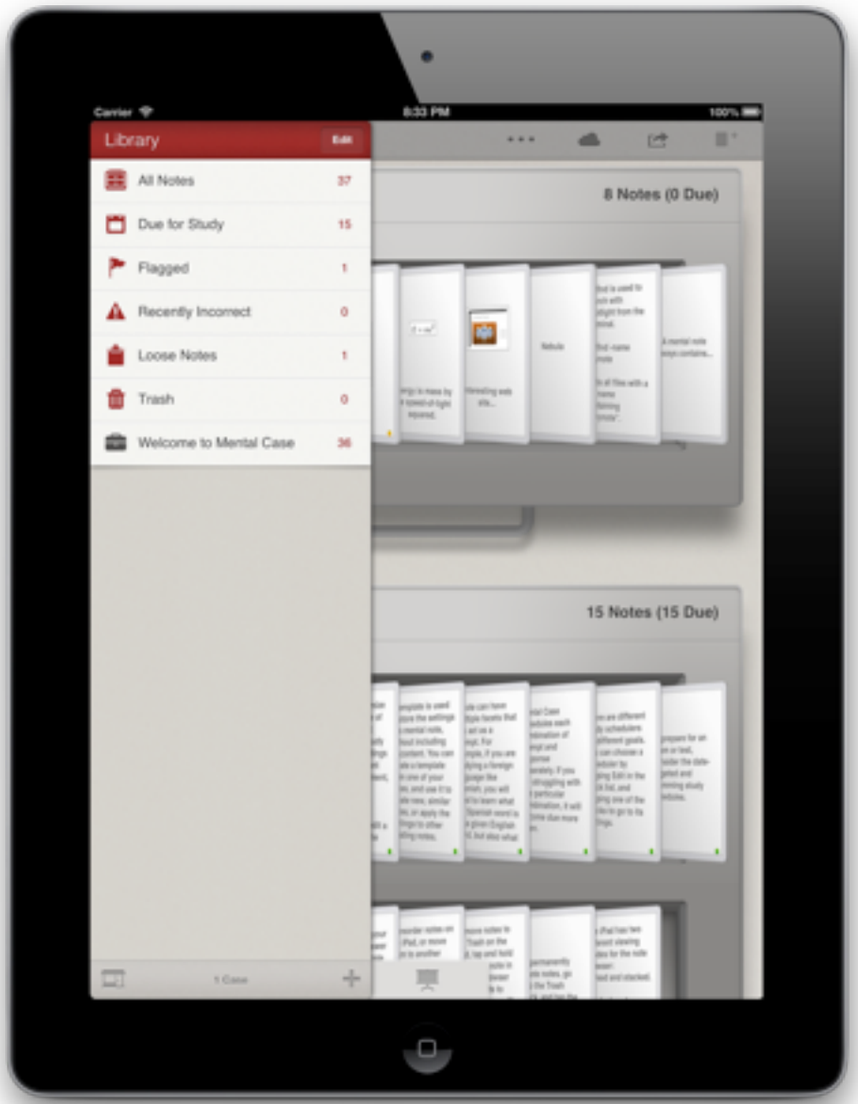
NSManagedObjectContext



NSManagedObjectContexts

Mental about Sync


Art History 2 - 15th century Flemish Art
9 Notes (0 Due)


Library
All Notes 37
Due for Study 15
Flagged 1
Recently Incorrect 0
Loose Notes 1
Trash 0
Welcome to Mental Case 36
8 Notes (0 Due)
15 Notes (15 Due)

Mental Case

Why is there no cloud sync?

It's ridiculous that I have to connect to the same Wi-Fi network

What year is this?

The Mental Blog

SOFTWARE WITH INTELLECT

May 16, 2012

4 notes

Under the Sheets with iCloud and Core Data: The Basics

There can be no doubt that iCloud is an important part of Apple's future. It's now less than a year old, but it has been a mixed start. The service itself seems up to the enormous data traffic it has to push, but some aspects of client-side integration are still very rough around the edges.

You don't have to look far in Apple's developer forums to know that Core Data syncing is one of those rough spots. An appeal on Twitter, and extensive Googling, led me to just one shipping app that currently offers Core Data syncing over iCloud: Time Butler. I know of no other shipping app that is using it, and certainly no apps from well-known, established developers.

(All eyes are currently on Bare Bones, who have vowed to offer iCloud syncing in their shoebox app Yojimbo before MobileMe syncing is turned off in a few months. Time will tell if they achieve that goal.)

Mental Case

I've spent the last 3-4 month[illegible]s integrating Core Data syncing over iCloud into Mental Case for Mac. It is n[illegible]t in[illegible] with a limited audience.

To say it has been a challenge would be an understatement — it has probably

About the author

Drew McCormack (@drewmccormack) is founder of The Mental Faculty, developer of Mental Case

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The Pre-Ubiquitous Era

To stop worrying about it will require worrying about it a lot at first.

Ken Arnold

Cultured Code

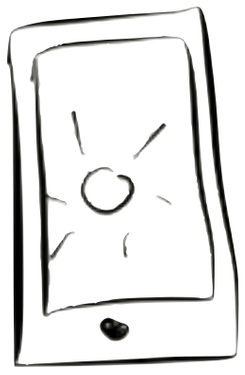
Bare Bones

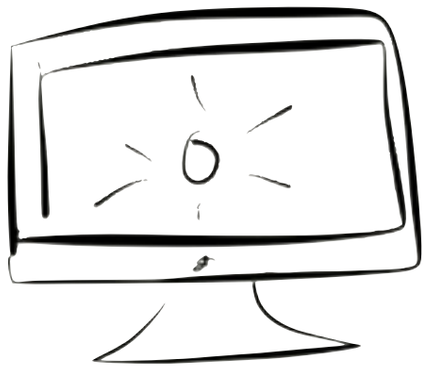
Black Pixel

Synchronization Architectures

PHP
Java
Rails
Django
Node.js
Google App Engine*
...

Smart Server





Complete Web App

Complete Web App

Pros

Central truth

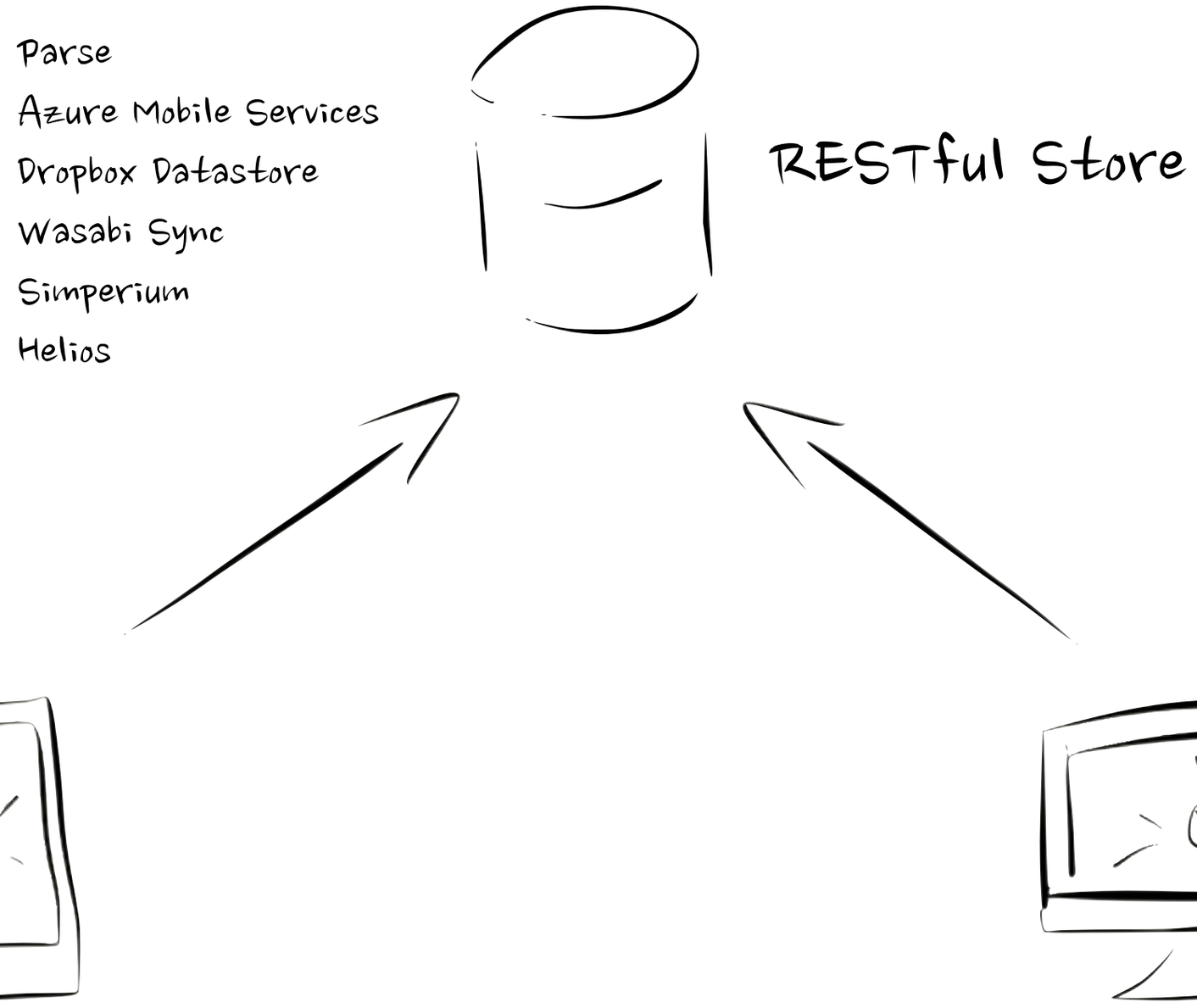
Cross platform

No lock in

Cons

Expensive

Duplicated effort



Structured Store

Structured Store

Pros

Central truth

Simple server

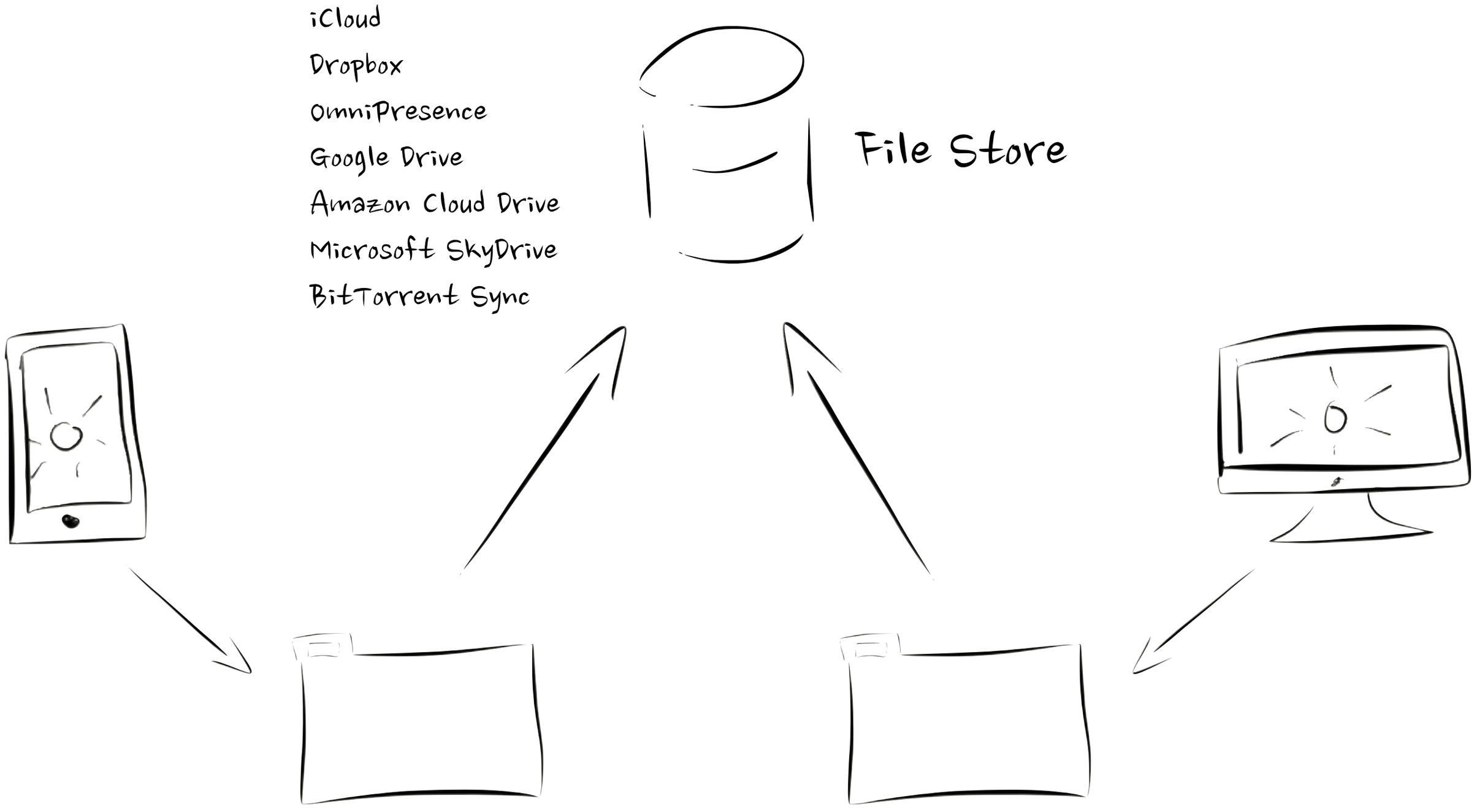
No duplicated effort

Cons

Expensive

Vendor lock in

Core Data integration?



File Syncing Service

File Syncing Service

Pros	Cons
Free	No central truth
No lock in	Risk of divergence
No server code	No well established framework

Syncing Databases via Files


Merten
16A
250V

Database

Changes
Deltas
Transactions

```
{
    "entity": "Movie",
    "globalid": "Movie3c075471aad0",
    "type": "insert",
    "properties": {
        "title": "Twister",
        "cast": ["Actor4543937534", "Actor9845976497"]
    }
}
```

iCloud–Core Data Sync

Problems with iCloud–Core Data

Buggy

Black box

Difficult to test

Yearly release schedule

Lock in


Henry
'AutoSave'
Low Energy
System
Numatic

TICDS

(Tim Isted Core Data Sync)

TICDS Background

Open Source (MIT)

First developed by Tim Isted

Maintained by No Thirst Software

Support for Dropbox and iCloud

Shipping in Mental Case and MoneyWell

Not All Roses

Creator is no longer active

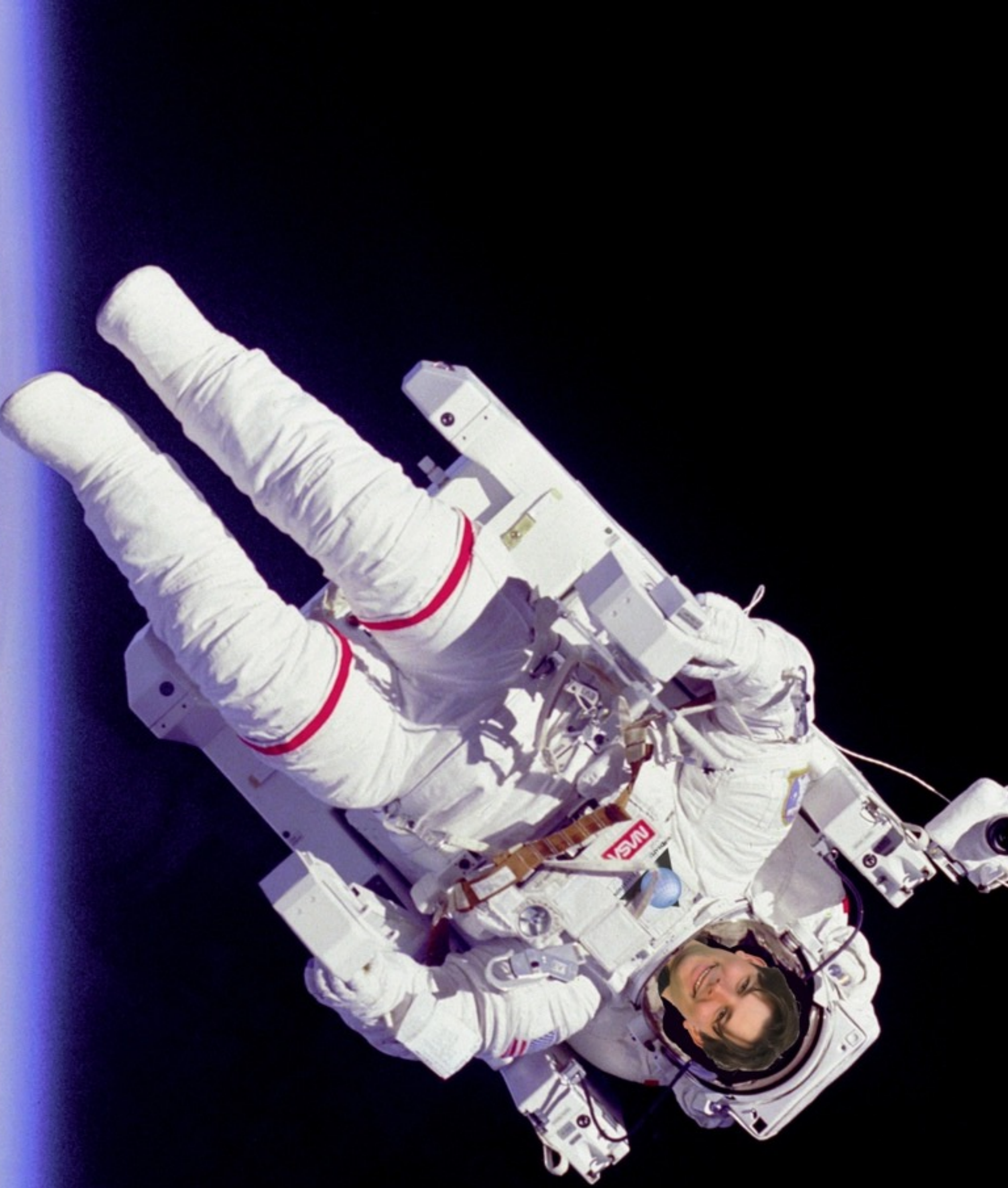
Original design/code around 5 years old

Uploads copy of store for each device

Can be slow

Worst: No guarantee stores stay in sync

Where do we go from here?



Core Plot


700.0
600.0
500.0
400.0
300.0
200.0
100.0
2000
500000.0
460000.0
Carrier
7:43 PM
10.0
20.0
30.0
40.0
50.0
60.0
Carrier
7:44 PM
250.0
200.0
150.0
100.0
50.0
.0
5.0
10.0
15.0
Scatter Plot
Bar Chart
Carrier
11:50 AM
3.5
3.0
2.5
1.5
Scatter Plot

Introducing Ensembles

Core Data Ensembles

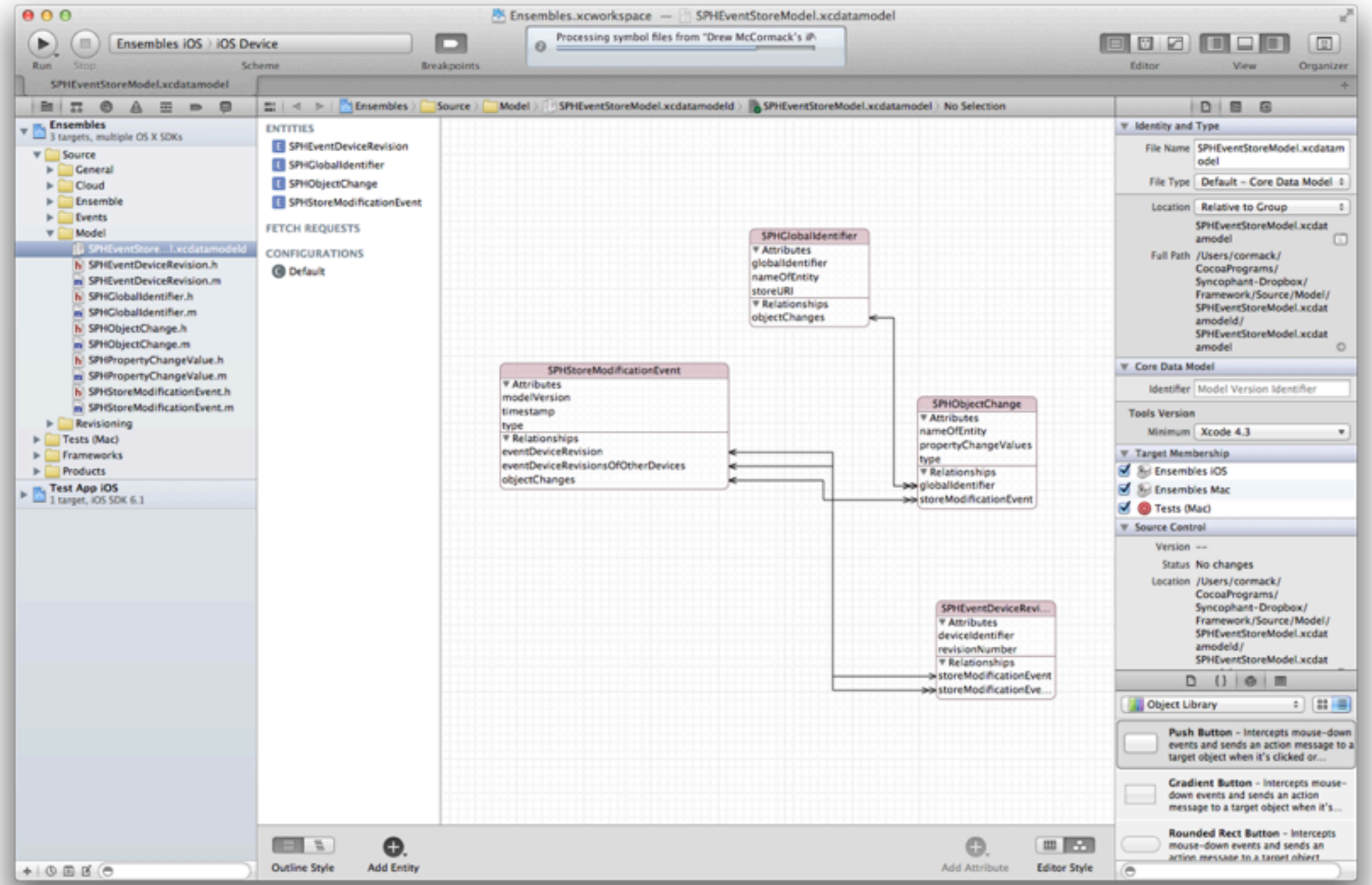
Open source framework

Commercial Licenses?

Syncs Core Data SQLite stores

Mac and iOS

New Concept: *Persistent Store Ensemble*

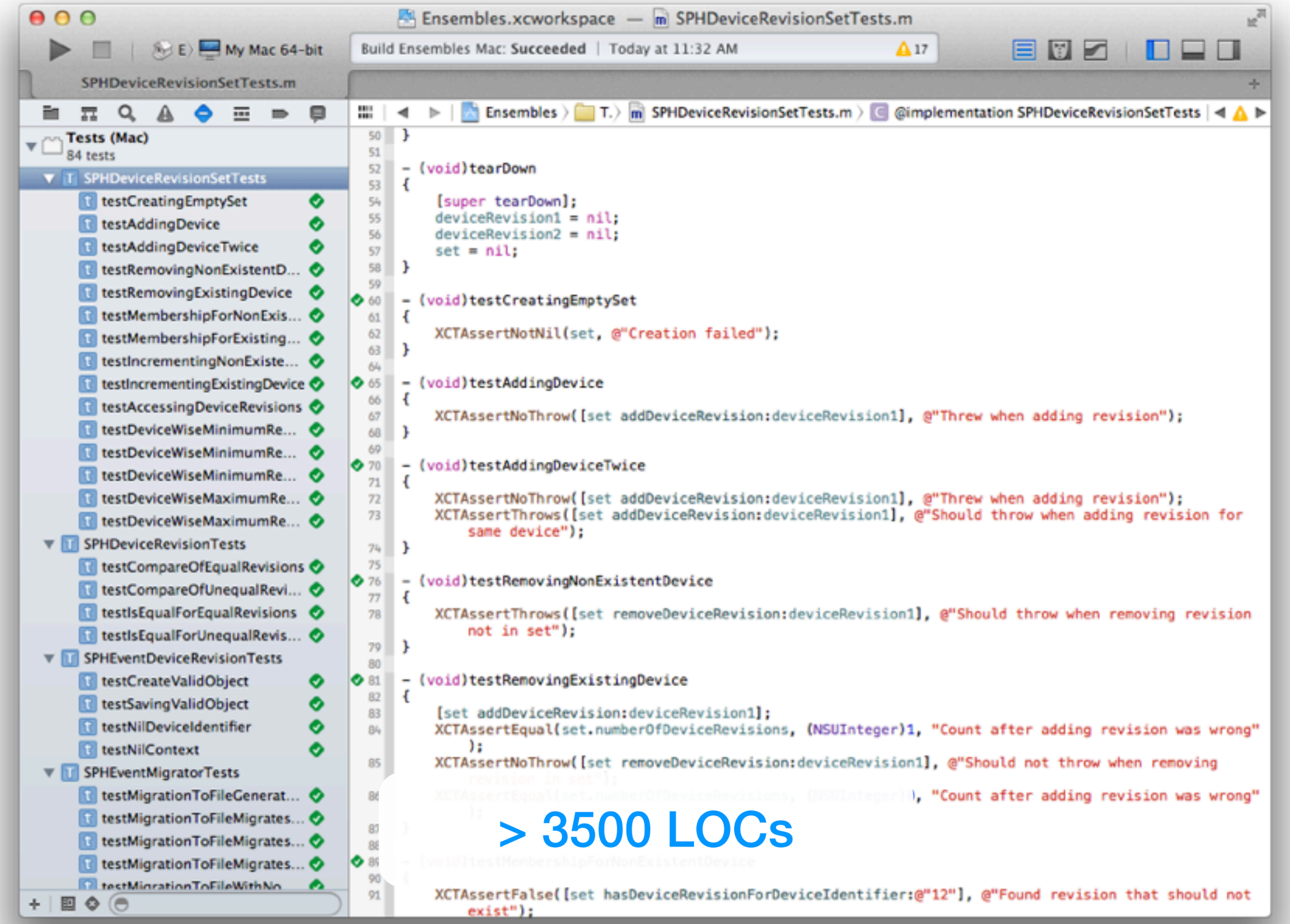


Non-Invasive

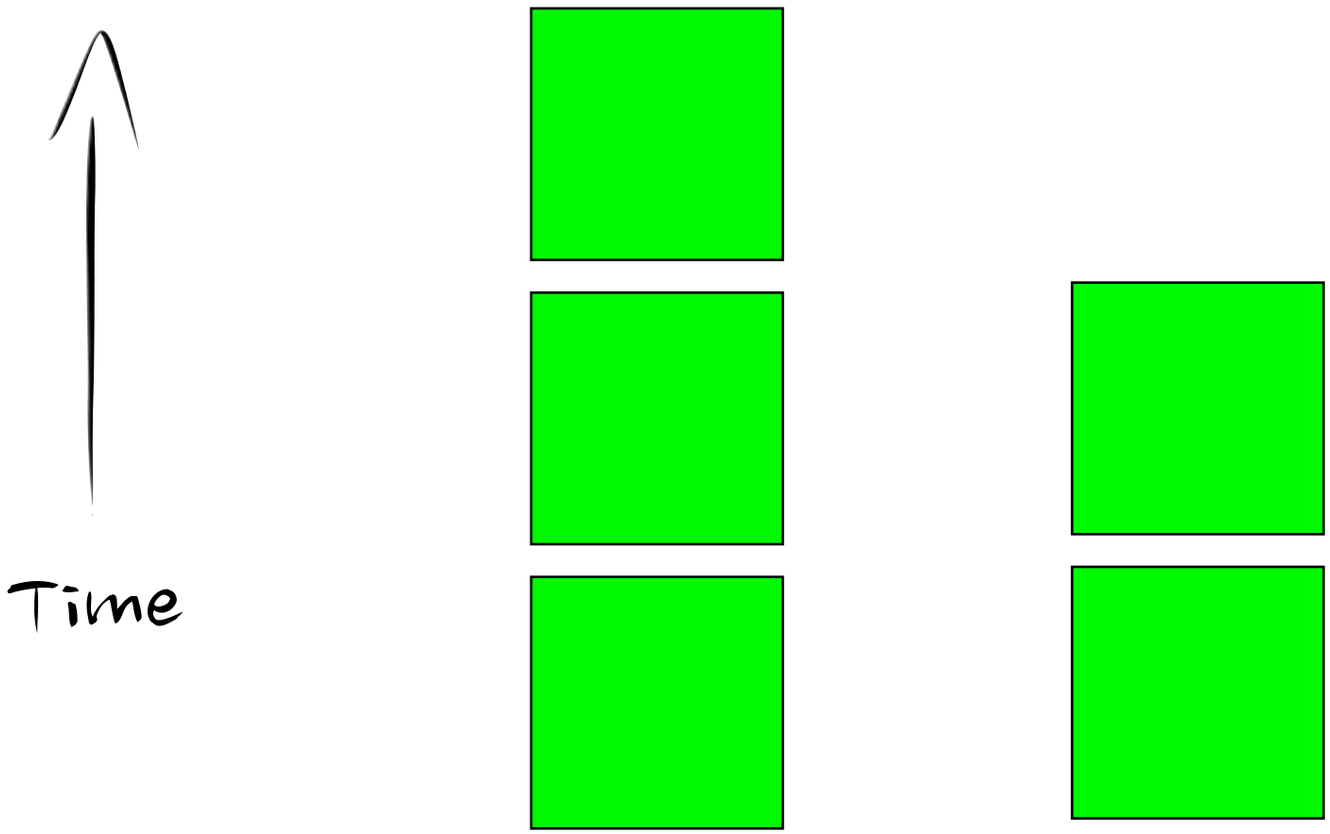
Backend Agnostic

Testable

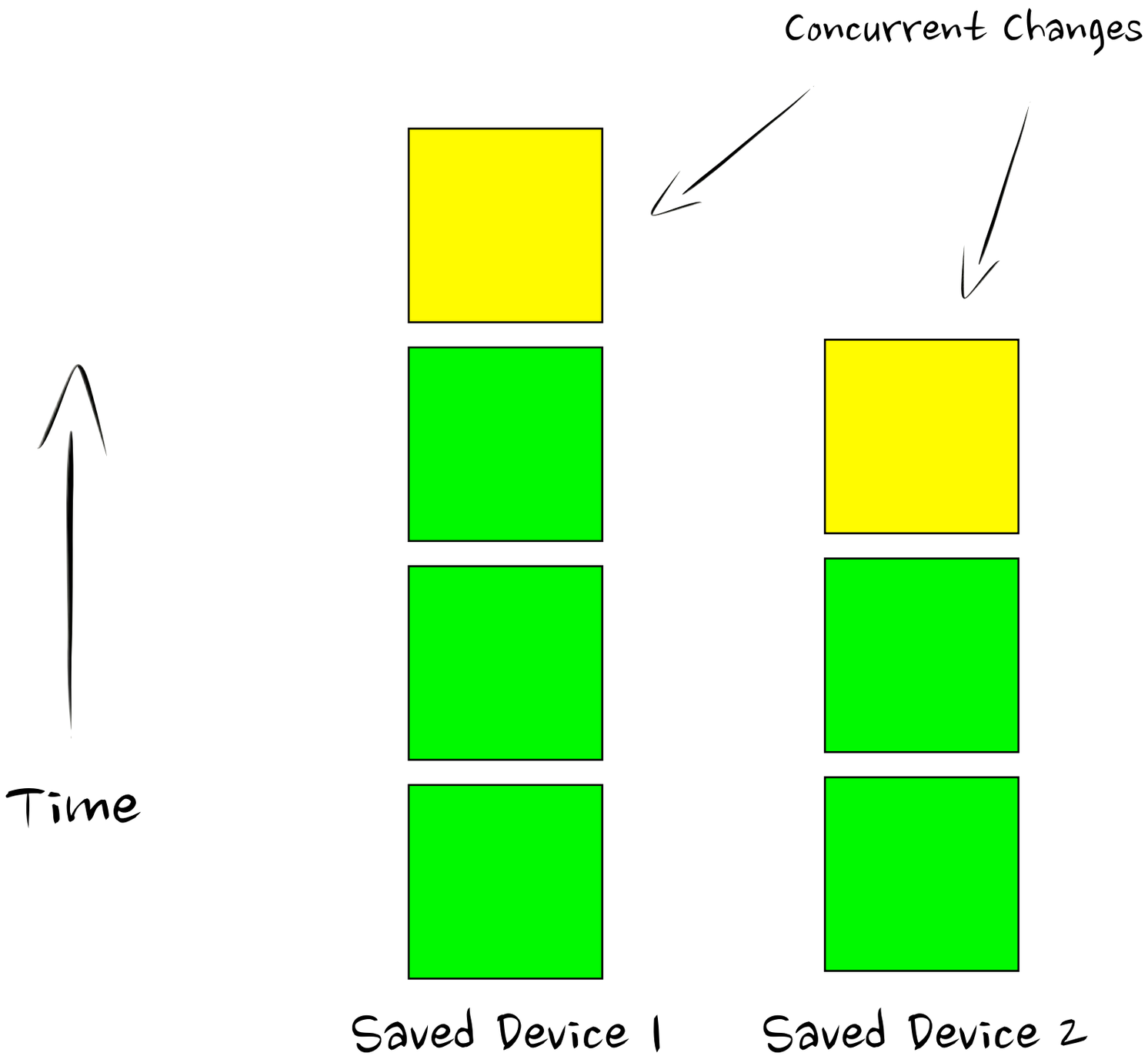
```objc
@protocol CDECloudFileSystem <NSObject>

- (void)fileExistsAtPath:(NSString *)path
   completion:(void(^)(BOOL exists, BOOL isDir, NSError *error))b;

- (void)contentsOfDirectoryAtPath:(NSString *)path
   completion:(void(^)(NSArray *contents, NSError *error))b;

- (void)createDirectoryAtPath:(NSString *)path
   completion:(SPHCompletionBlock)block;

- (void)uploadLocalFile:(NSString *)fromPath
   toPath:(NSString *)toPath
   completion:(CDECompletionBlock)block;

...

@end
```


Ensembles.xcworkspace — SPHDeviceRevisionSetTests.m
Build Ensembles Mac: Succeeded | Today at 11:32 AM
SPHDeviceRevisionSetTests.m
Tests (Mac)
84 tests
SPHDeviceRevisionSetTests
testCreatingEmptySet
testAddingDevice
testAddingDeviceTwice
testRemovingNonExistentD...
testRemovingExistingDevice
testMembershipForNonExis...
testMembershipForExisting...
testIncrementingNonExiste...
testIncrementingExistingDevice
testAccessingDeviceRevisions
testDeviceWiseMinimumRe...
testDeviceWiseMinimumRe...
testDeviceWiseMinimumRe...
testDeviceWiseMaximumRe...
testDeviceWiseMaximumRe...
SPHDeviceRevisionTests
testCompareOfEqualRevisions
testCompareOfUnequalRevi...
testIsEqualForEqualRevisions
testIsEqualForUnequalRevis...
SPHEventDeviceRevisionTests
testCreateValidObject
testSavingValidObject
testNilDeviceIdentifier
testNilContext
SPHEventMigratorTests
testMigrationToFileGenerat...
testMigrationToFileMigrates...
testMigrationToFileMigrates...
testMigrationToFileMigrates...
Ensembles > T. > SPHDeviceRevisionSetTests.m > @implementation SPHDeviceRevisionSetTests
> 3500 LOCs

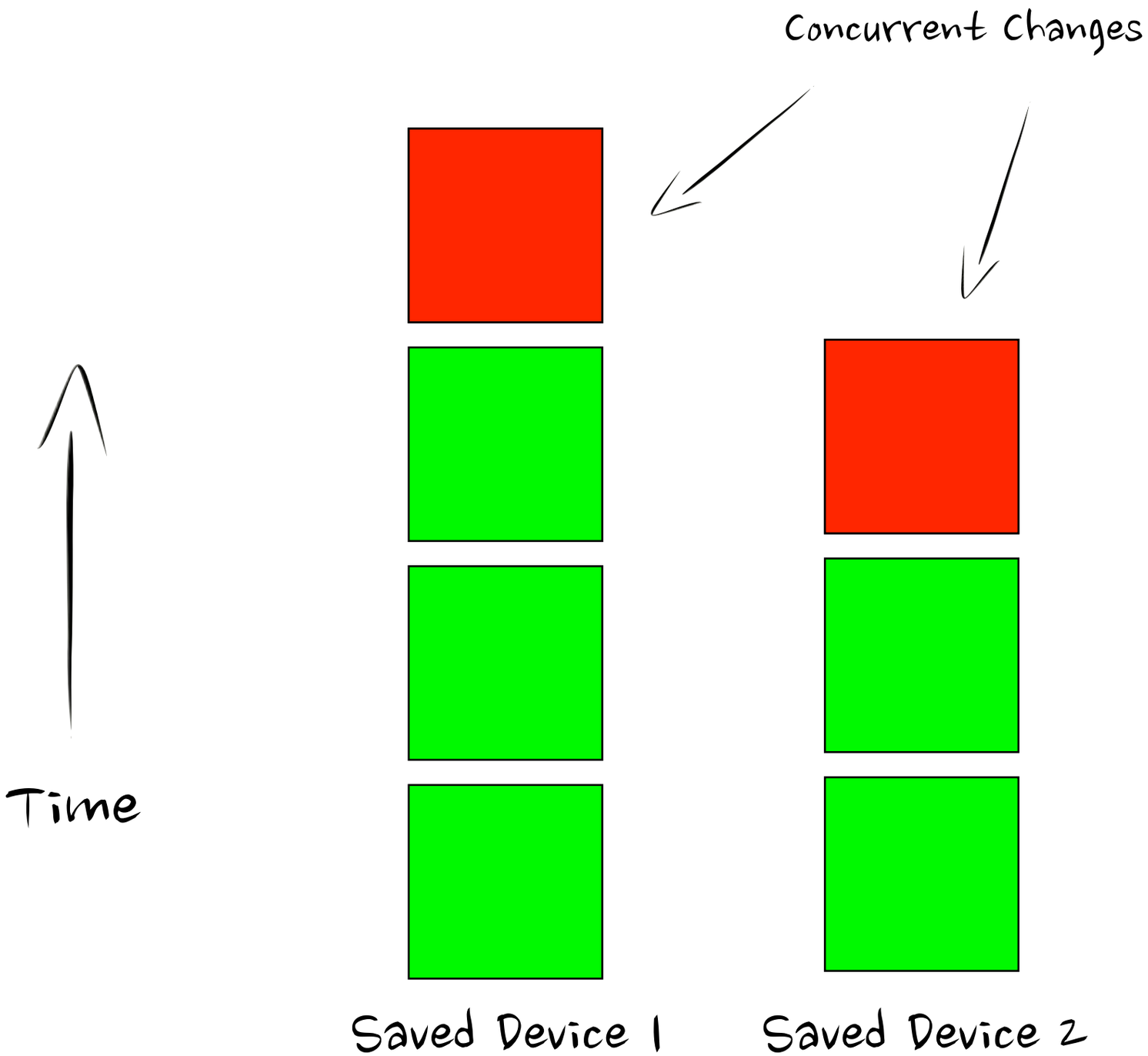
Tested



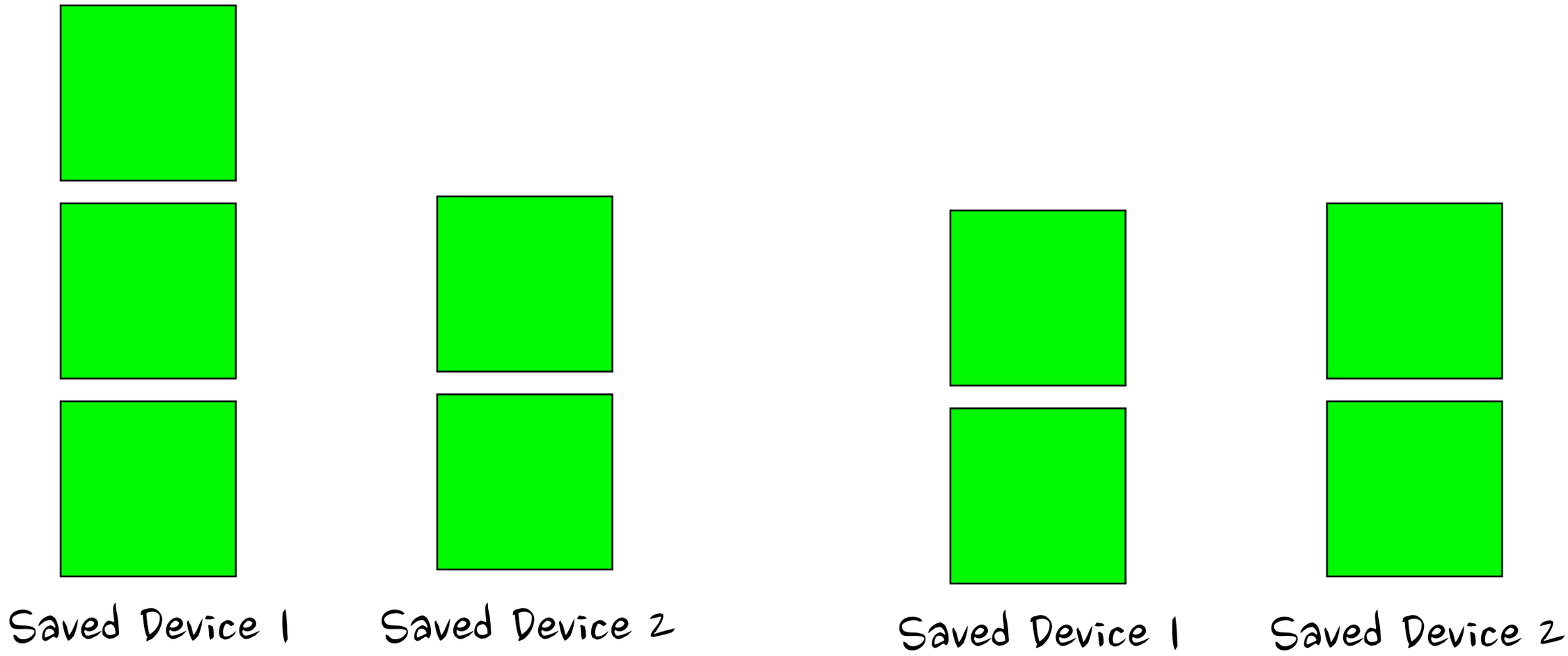
Merging (Centralized)



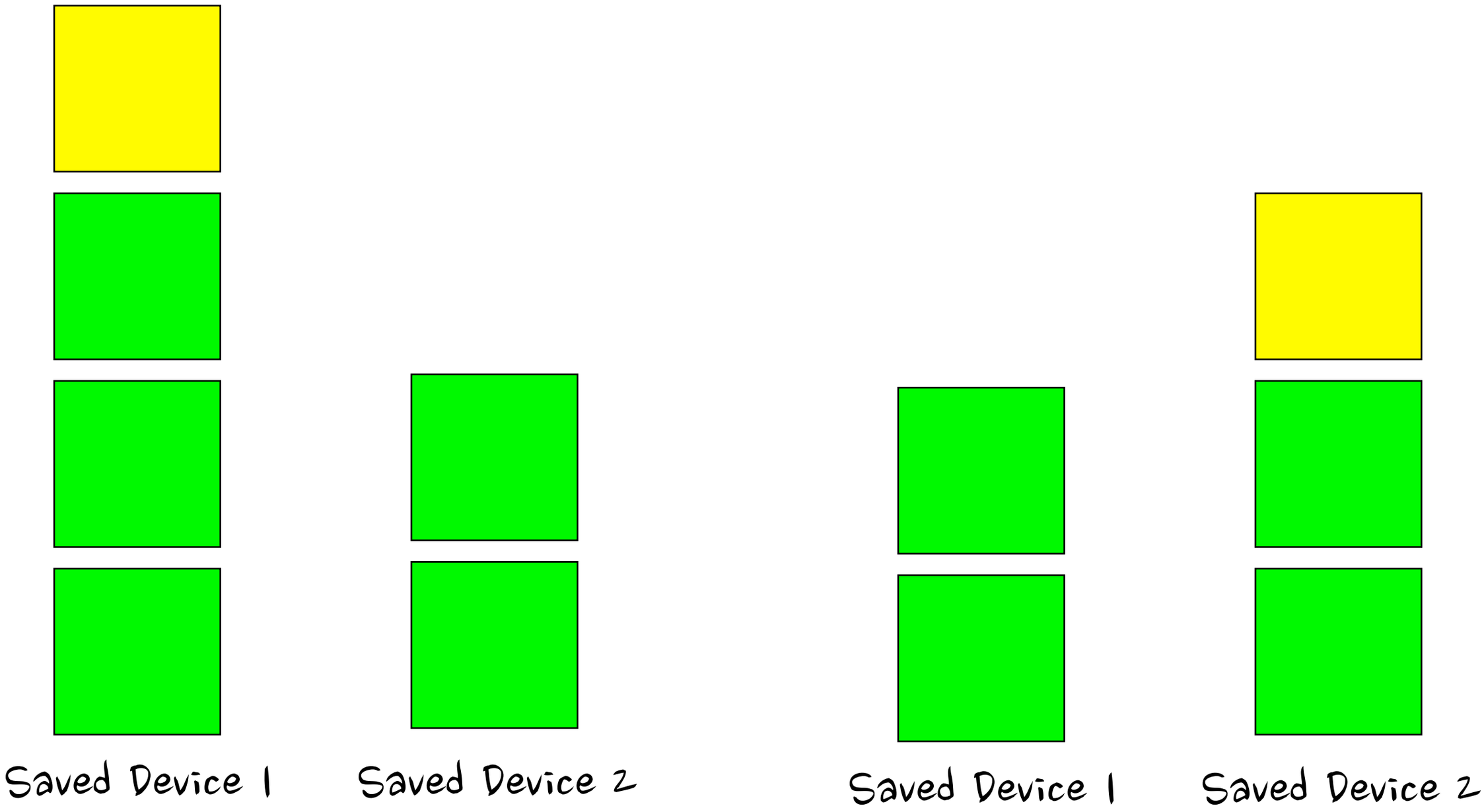
Merging (Centralized)



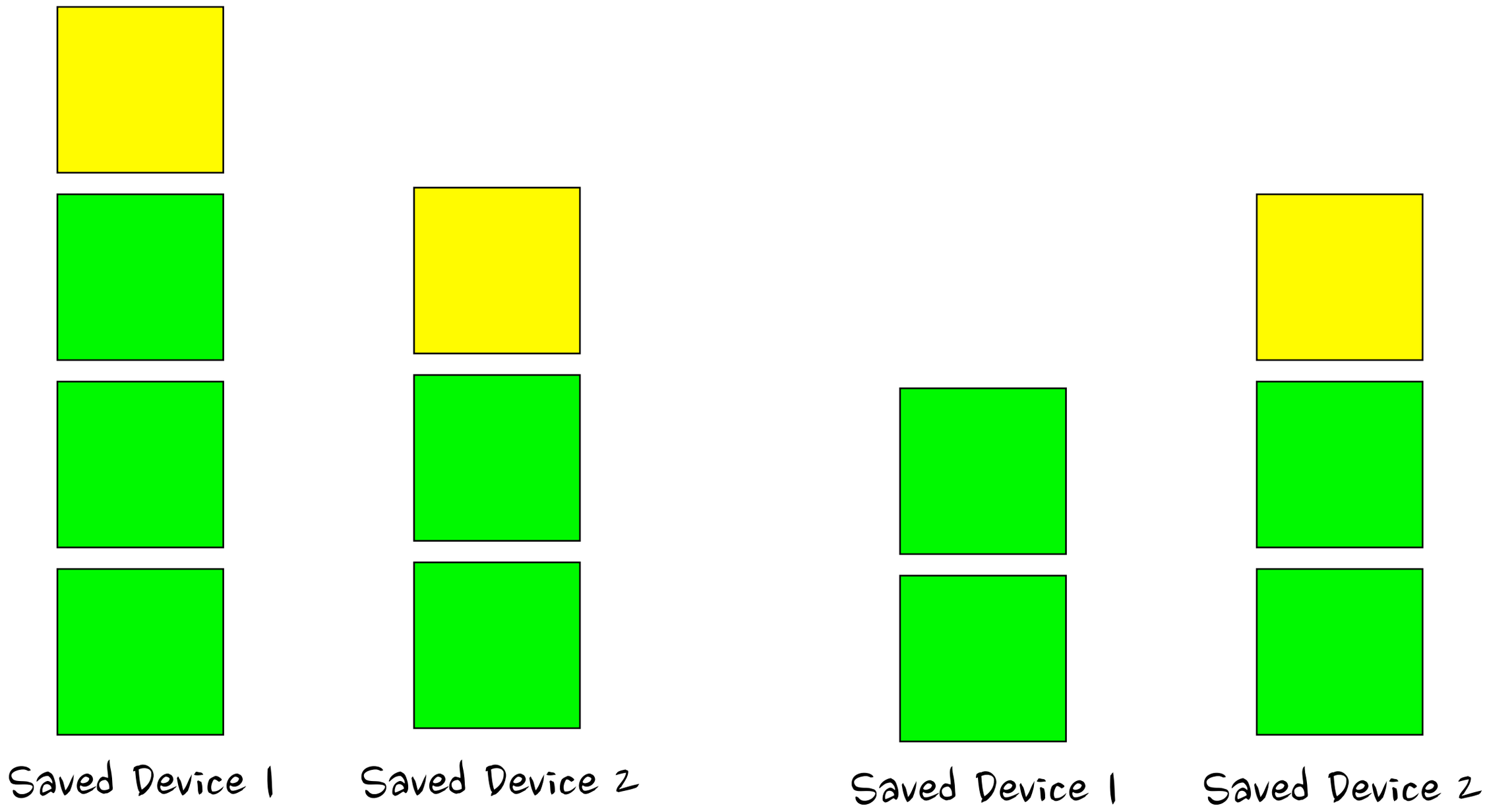
Merging (Centralized)



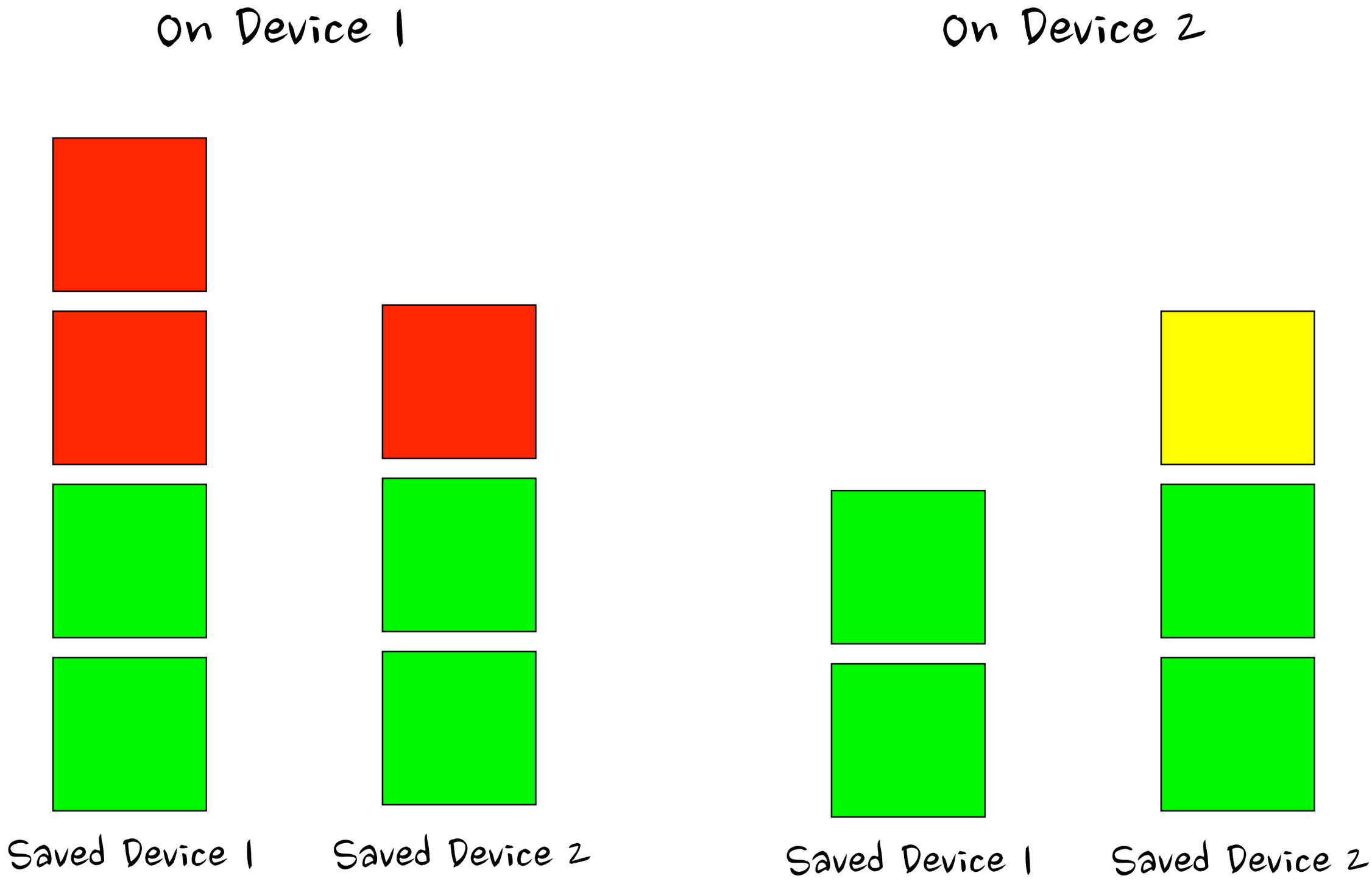
Merging (Decentralized)



Merging (Decentralized)



Merging (Decentralized)



Merging (Decentralized)

Milen Dzhumerov (@milend)

blog.helftone.com/clear-in-the-icloud

Clear in the iCloud

30 May 2013
by Milen

There has been a lot of talk about iCloud + CoreData (referred to as iCCD hereafter) over the past few months and I think it is a good time for me to share our journey in getting iCloud integrated in Clear. If you do not want to read through all the details:

```
cloudFileSystem =
    [[CDEICloudFileSystem alloc] initWithUbiquityContainerIdentifier:@"..."];
ensemble =
    [[CDEPersistentStoreEnsemble alloc] initWithEnsembleIdentifier:@"MainStore"
        persistentStorePath:storePath
        managedObjectModel:model
        cloudFileSystem:cloudFileSystem];
ensemble.delegate = self;
```

Easy…as possible

```
- (void)applicationDidBecomeActive:(UIApplication *)application
{
    if (!ensemble.isLeeched) {
        [ensemble leechPersistentStoreWithCompletion:NULL];
    }
    else {
        [ensemble mergeWithCompletion:NULL];
    }
}
```

Easy…as possible

```objc
- (void)persistentStoreEnsemble:(CDEPersistentStoreEnsemble *)ensemble
    didSaveMergeChangesWithNotification:(NSNotification *)notif
{
    [managedObjectContext performBlock:^{
        [managedObjectContext mergeChangesFromContextDidSaveNotification:notif];
    }];
}
```

```objc
- (NSArray *)persistentStoreEnsemble:(CDEPersistentStoreEnsemble *)ensemble
    globalIdentifiersForManagedObjects:(NSArray *)objects
{
    return [objects valueForKeyPath:@"uniqueIdentifier"];
}
```

Easy…as possible

Current Status

6000 lines of (dense) framework code

3500 lines of unit tests

First full sync a week ago

Where's the code?

github.com/drewmccormack/ensembles

Take This...

It's still early days for decentralized database sync

TICDS is currently best Core Data offering

Core Data Ensembles is next generation

Twitter: @drewmccormack

Attributions

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