Persistence: Core Data

Stop trying to make Core Data a database. It's not a database.

by Fernando Olivares

Agenda

1.5-hour session

- Author Introduction
- Live coding
- Core Data Theory
- Conclusion & Where to go from here
- Q&A

Author Introduction

Fernando

- ~10 years of experience
- Worked at small startups (1SecondEveryday) to publicly traded companies (J2 Global Inc.)
- Instructor at Big Nerd Ranch, bloc.io, Lambda School
- Won a few awards: The Storyteller Within (Apple), ERA Accelerator Top 10 (ERA NY)
- Product and Project experience
- iOS-only
- @fromJrToSr

Core Data

What exactly is Core Data?

- Object-graph persistence framework
- Core Data "saves your application’s permanent data for offline use, to cache temporary data, and to add undo functionality to your app on a single device."
- Extremely powerful and efficient: complex queries, batch sizing, memory faulting, background execution, relationships between models.
- Based in Objective-C.

Core Data

Radio is our music source.

Radio

FM 101.3
FM 99.3

Songs

"Everybody wants to rule the world"

"Everybody"

"Gonna make you sweat
(Everybody dance now)"

Person who likes songs

Listens for great songs to cover

Core Data

No radio means no music.

Radio

Person who likes songs

Listens for great songs
to cover

Core Data

We'd really like to listen to those songs again.

Radio

FM 101.3
FM 99.3

Songs

"Everybody wants to rule the world"

"Everybody"

"Gonna make you sweat
(Everybody dance now)"

Person who likes songs

Listens for great songs to cover

Artist

Can sing and perform as well as write music in musical notation

Core Data

How to record a great song.

Radio

Person who likes songs

Playing "Everybody" by the Backstreet Boys 🗣️🎶

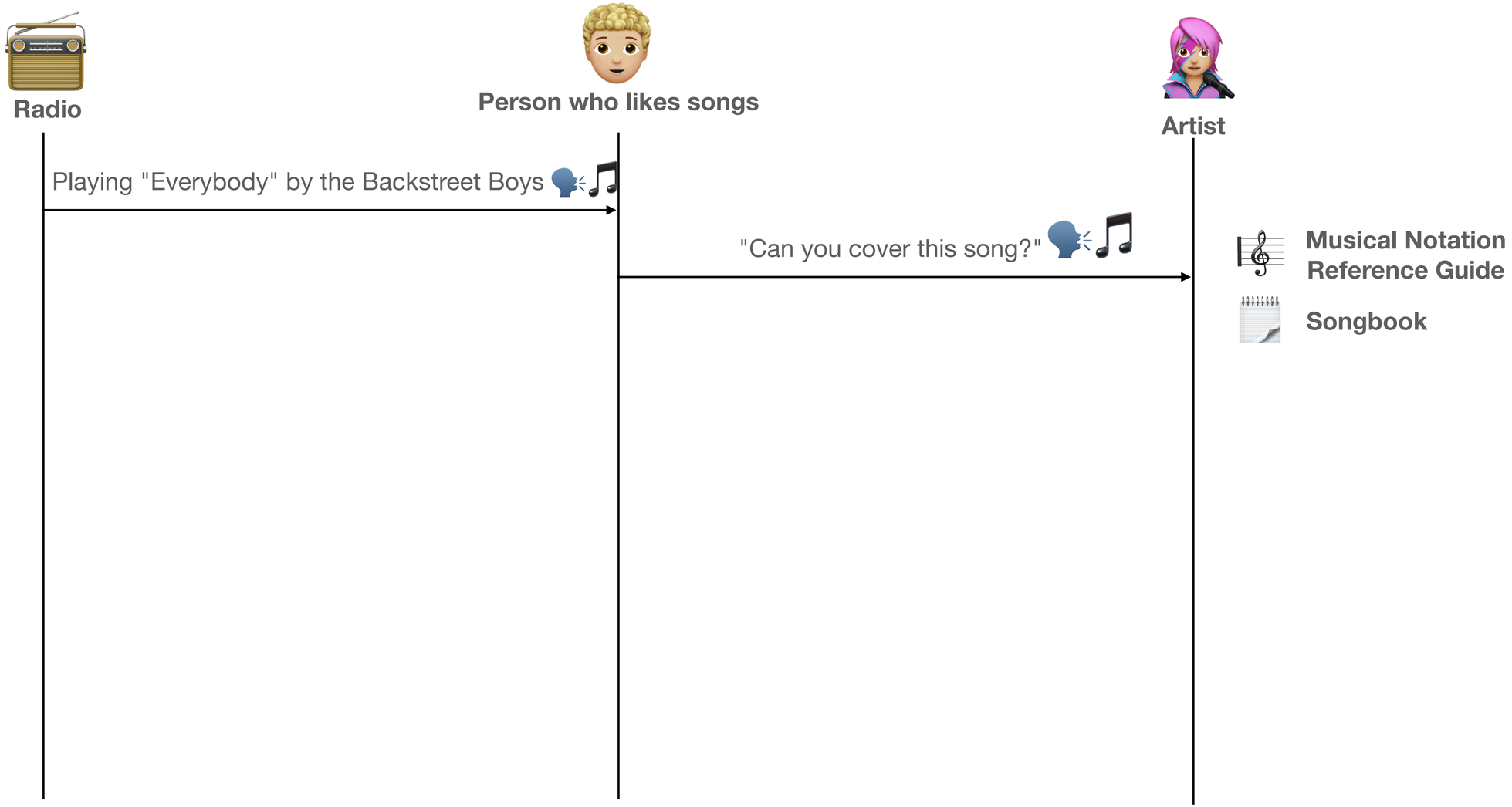
Artist

Musical Notation Reference Guide

Songbook

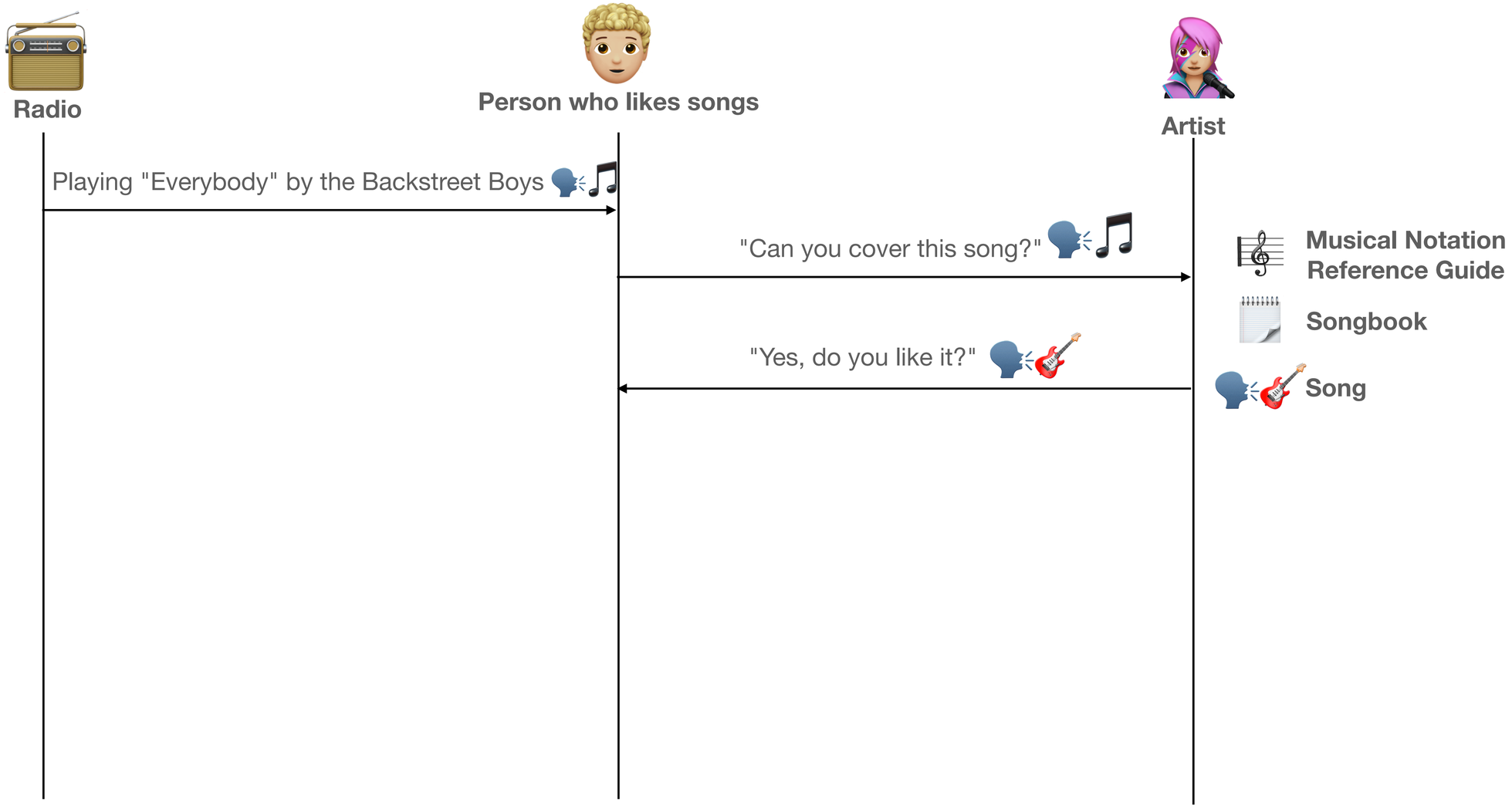
Core Data

How to record a great song.



Core Data

How to record a great song.



Core Data

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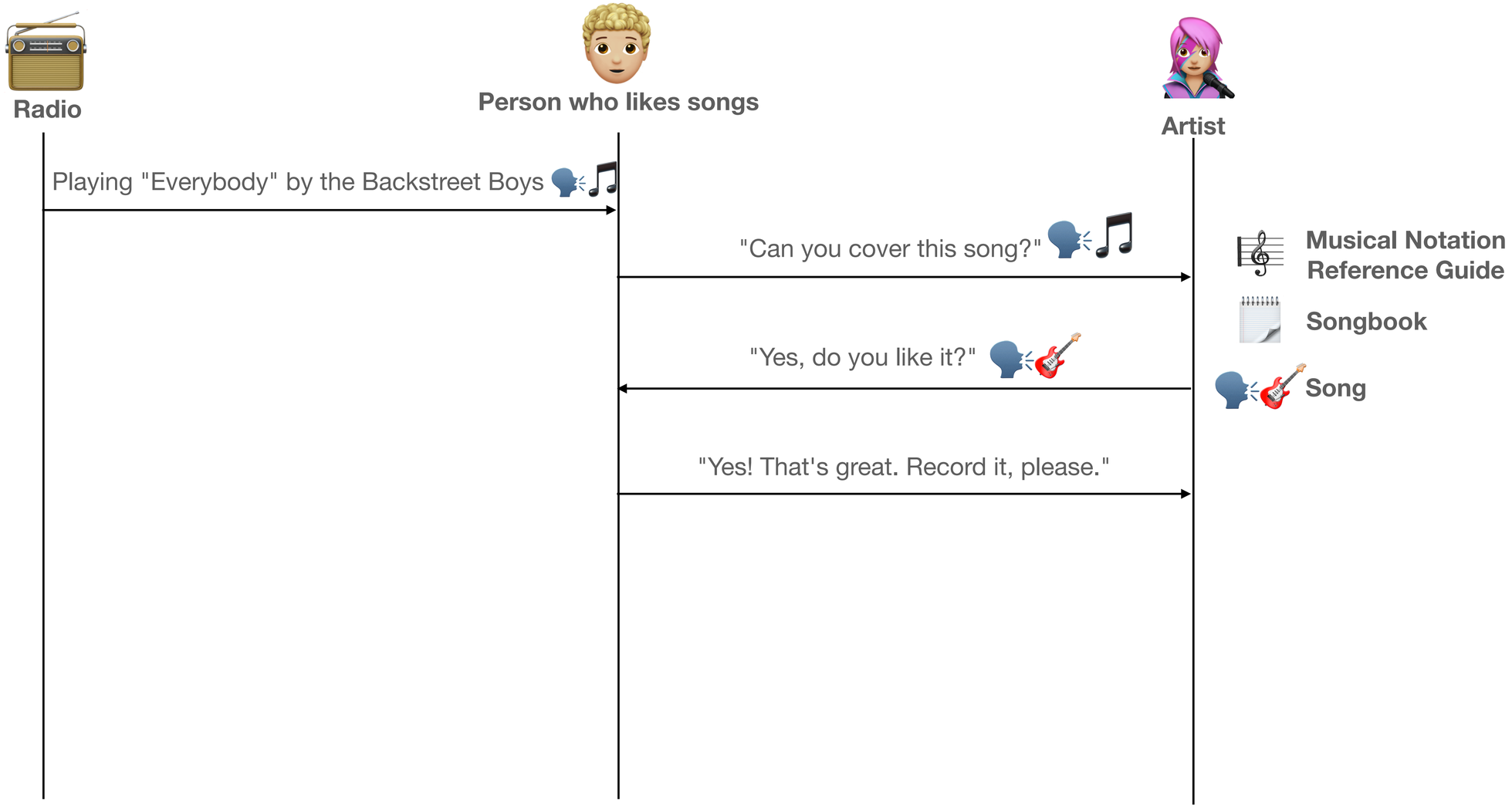

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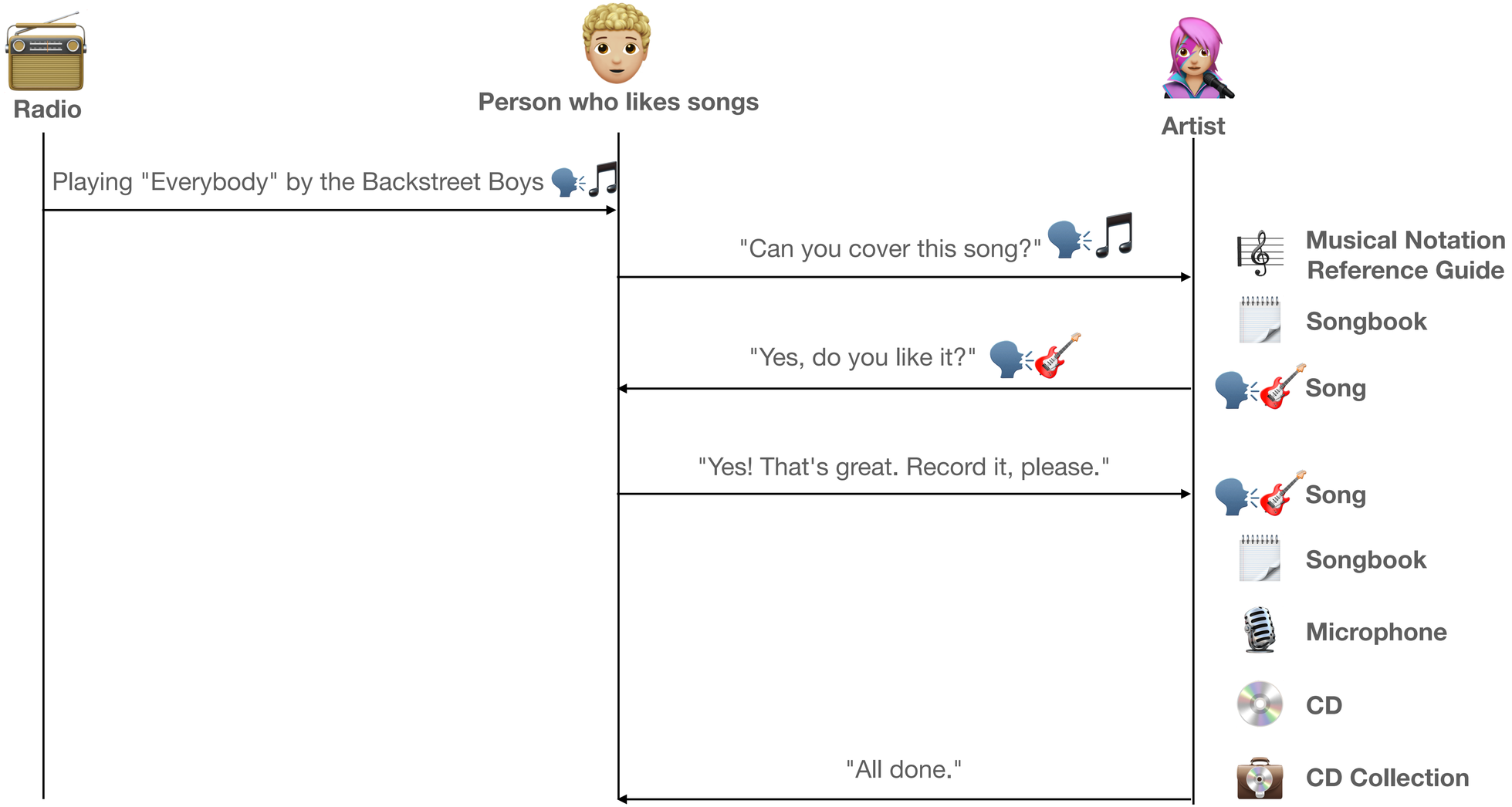
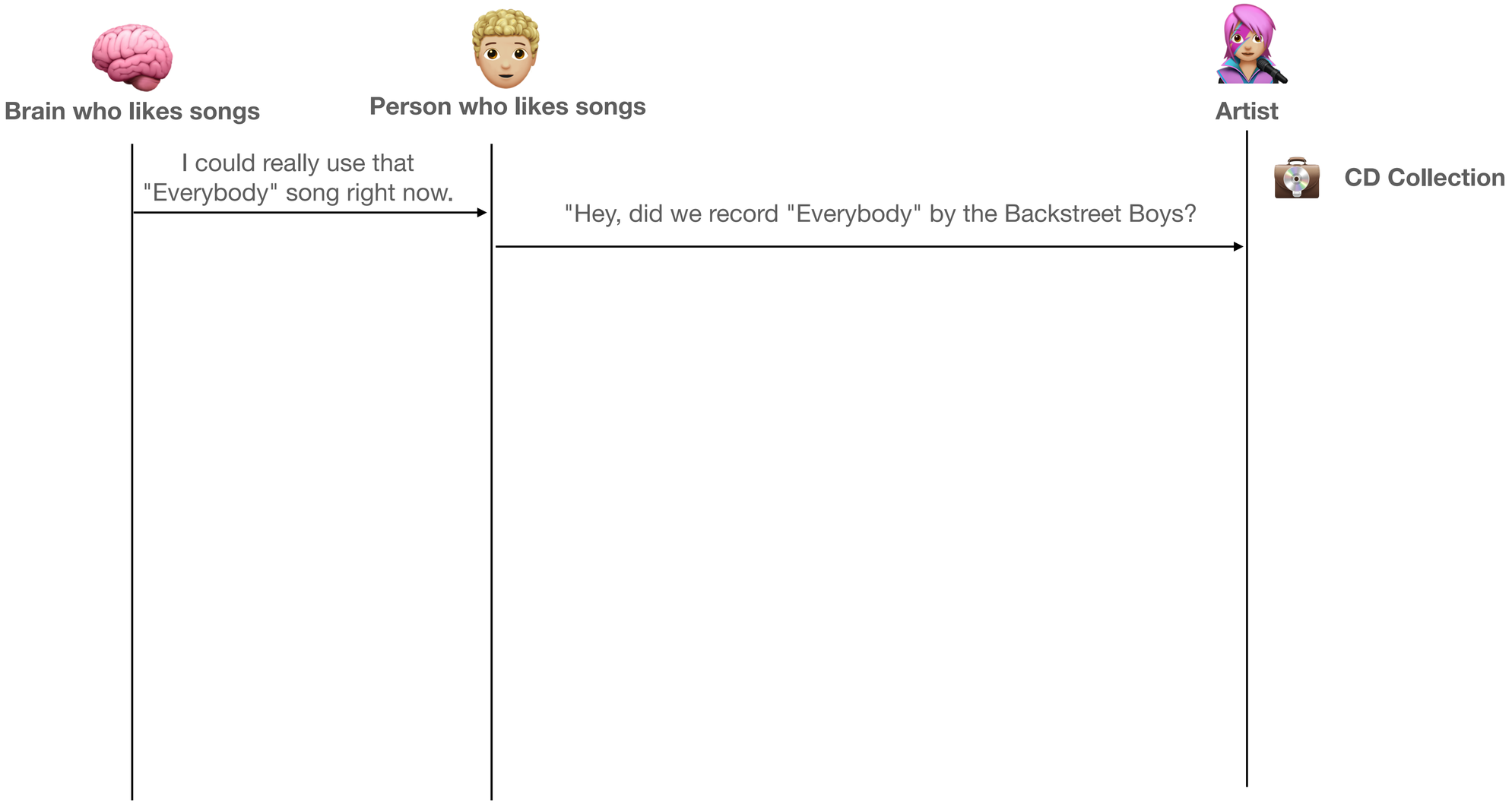


Core Data

I want to listen to that song.



Core Data

I want to listen to that song.

Brain who likes songs

Person who likes songs

Artist

I could really use that "Everybody" song right now.

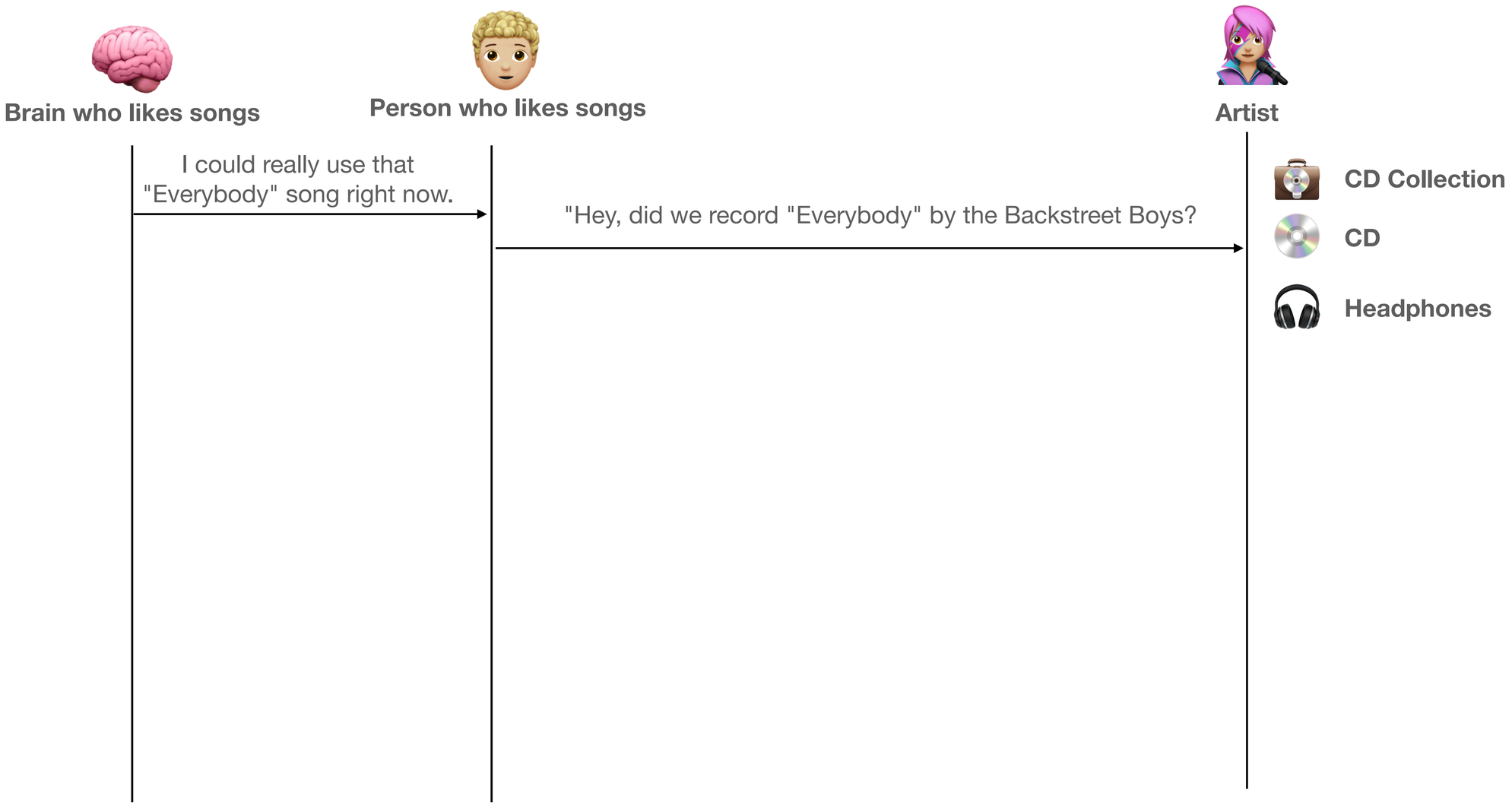
"Hey, did we record "Everybody" by the Backstreet Boys?

CD Collection

CD

Core Data

I want to listen to that song.



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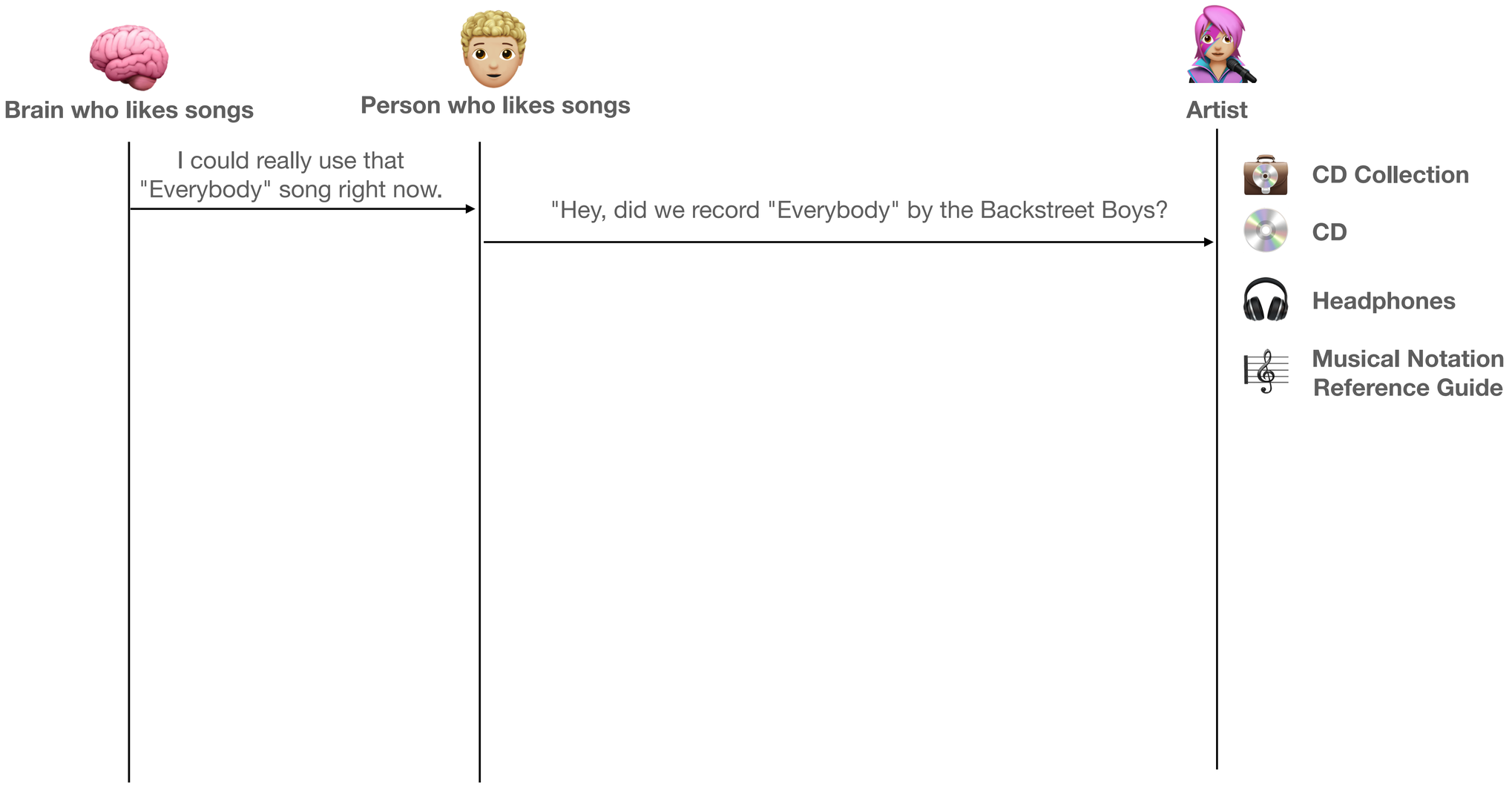

Core Data

I want to listen to that song.

Brain who likes songs

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I could really use that "Everybody" song right now.

"Hey, did we record "Everybody" by the Backstreet Boys?

CD Collection

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Headphones

Musical Notation Reference Guide

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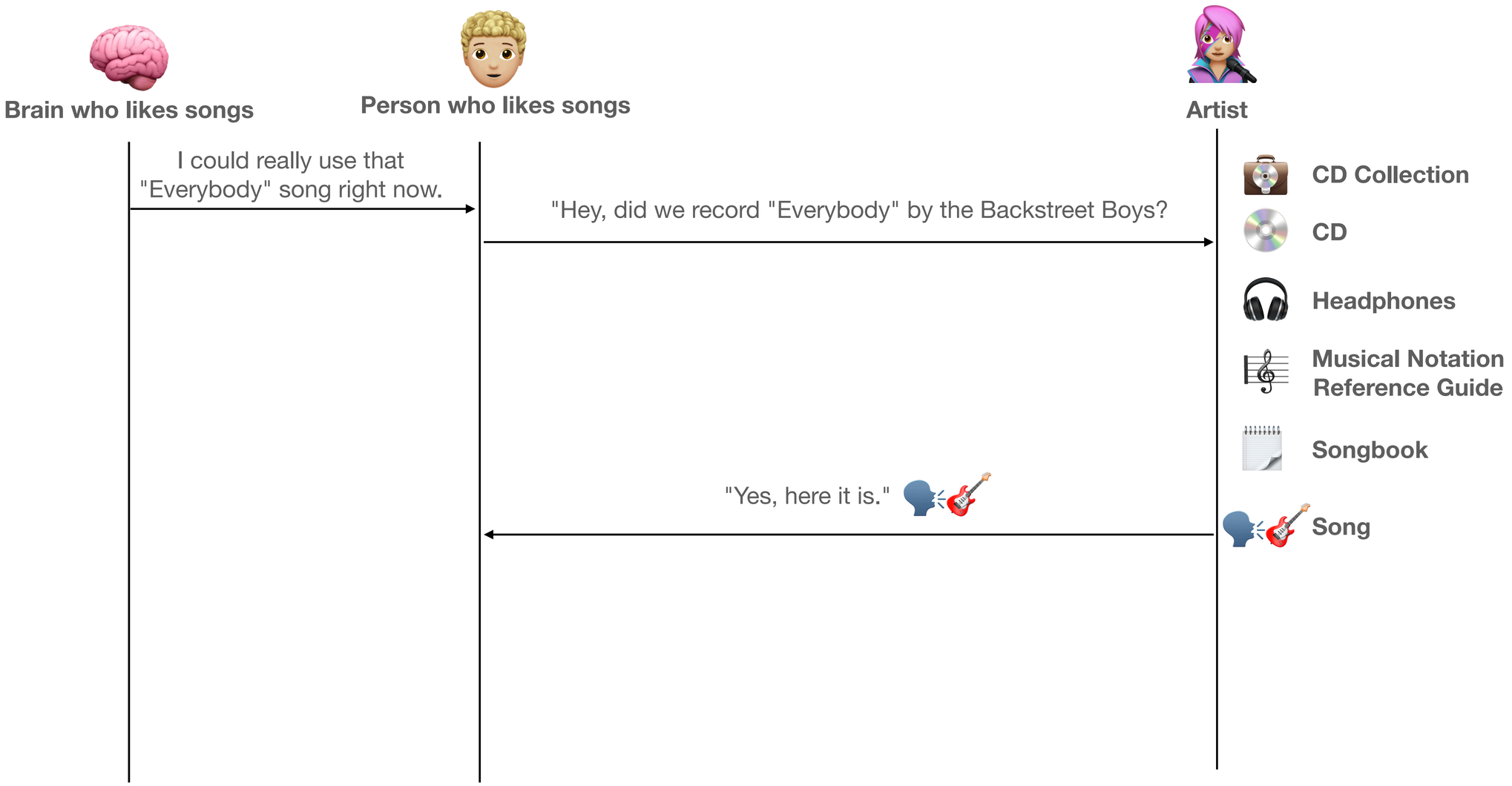
Core Data

I want to listen to that song.



Core Data

I want to listen to that song.

Brain who likes songs

Person who likes songs

Artist

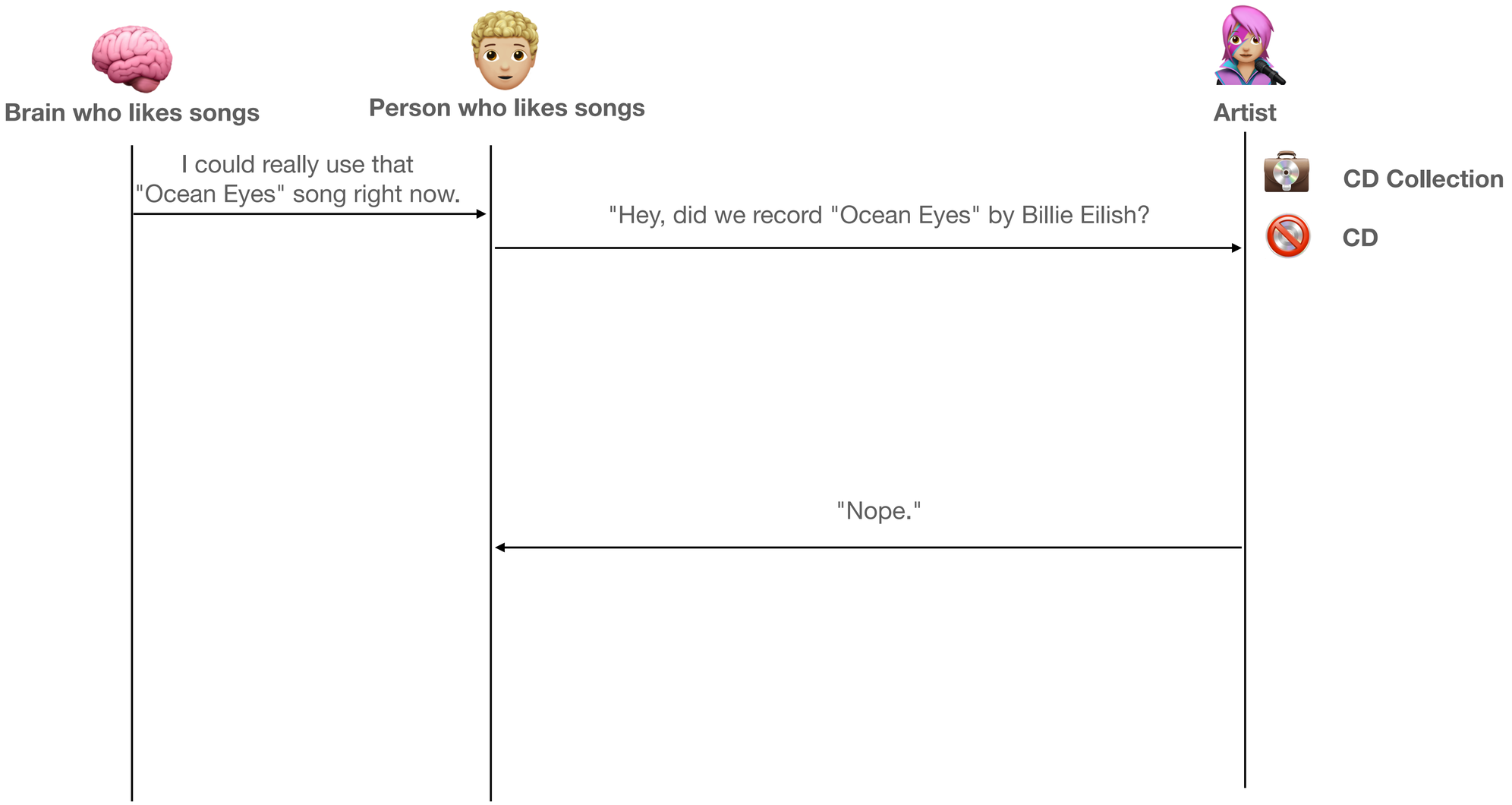
CD Collection

I could really use that "Ocean Eyes" song right now.

"Hey, did we record "Ocean Eyes" by Billie Eilish?

Core Data

I want to listen to that song.



Core Data

In practice, it's simple.

API

iTunes API

Podcasts JSON

Top Podcasts JSON

ViewController

Displays struct Podcasts

NSPersistenceContainer

Can read/write
CoreDataPodcasts

Database/Plist/Binary File

Row/XML entry/Binary

NSPersistentStoreCoordinator

CoreDataPodcast
NSManagedObject

NSManagedObjectContext

xcdatamodeld

Live Demo

NSPersistenceContainer

Core Data Stack

NSPersistenceContainer's tools.

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NSPersistenceContainer

Can read/write CoreDataPodcasts

CoreDataPodcast
NSManagedObject
Individual objects

NSManagedObjectContext

Contains the individual objects that represent the graph

xcdatamodeld

Contains the object graph description

Core Data Stack

Instructions on building an object graph.

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The object graph.

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The individual objects, inheriting from NSManagedObject.

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There are other tools...

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NSPersistentStore

NSPersistentStoreCoordinator

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Core Data Stack

How to go from context to disk.

API

iTunes API

Podcasts JSON

Top Podcasts JSON

ViewController

Displays struct Podcasts

NSPersistentStore

NSPersistenceContainer

Can read/write CoreDataPodcasts

NSPersistentStoreCoordinator

Transforms from NSManagedObjects to whatever NSPersistentStore handles 💿 (and viceversa)

CoreDataPodcast
NSManagedObject

Individual objects

NSManagedObjectContext

Contains the individual objects that represent the graph

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Contains the object graph description

Core Data Stack

The pure, persisted data.

API

iTunes API

Podcasts JSON

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Displays struct Podcasts

NSPersistenceContainer

Can read/write CoreDataPodcasts

NSPersistentStore

Contains the data at rest

NSPersistentStoreCoordinator

Transforms from NSManagedObjects to whatever NSPersistentStore handles 💿 (and viceversa)

CoreDataPodcast
NSManagedObject

Individual objects

NSManagedObjectContext

Contains the individual objects that represent the graph

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Contains the object graph description

Core Data Stack

With our powers combined...

API

iTunes API

Podcasts JSON

Top Podcasts JSON

ViewController

Displays struct Podcasts

NSPersistentStore

Contains the data at rest

NSPersistentStoreCoordinator

Transforms from NSManagedObjects to whatever NSPersistentStore handles 💿 (and viceversa)

NSPersistenceContainer

Can read/write CoreDataPodcasts

CoreDataPodcast
NSManagedObject

Individual objects

NSManagedObjectContext

Contains the individual objects that represent the graph

xcdatamodeld

Contains the object graph description

Core Data

It's not a database.

- 🎼 How to build CoreDataPodcast
- 🗣🎸 CoreDataPodcast
- 🗒 CoreDataPodcast objects exist in the managed object context
- 🎙 Until the objects are saved using the persistent store coordinator, they are not persistent.
- 💿 Once the objects are persisted, they can be reconstituted back into CoreDataPodcasts.

https://stackoverflow.com/questions/14634395/what-is-coredata-faulting

Core Data

What exactly is Core Data?

- It's a framework that gives you extremely powerful persistence at the cost of complexity.
- Core Data has many, many moving parts that you can configure: the objects themselves (and their relations), fetch requests, the contexts, the persistent store coordinator, the persistent store.
- Do not use for simple apps. Saving a "small" JSON to disk using Codable is going to be easier and faster.
- Based in Objective-C.

Core Data

More Advanced Concepts

- **NSFetchedResultsController**
  https://cocoacasts.com/populate-a-table-view-with-nsfetchedresultscontroller-and-swift-3
- **NSPredicate**
  https://nshipster.com/nspredicate/
- **BackgroundContexts**
  https://www.raywenderlich.com/7586-multiple-managed-object-contexts-with-core-data-tutorial
- **Synchronization between Core Data and remote data source**
  https://www.donnywals.com/implementing-a-one-way-sync-strategy-with-core-data-urlsession-and-combine/
- **Performing migrations**
  https://www.raywenderlich.com/7585-lightweight-migrations-in-core-data-tutorial
- **Debugging SQLite issues**
  https://www.avanderlee.com/debugging/core-data-debugging-xcode/
- **Listening for changes**
  https://developer.apple.com/documentation/coredata/consuming_relevant_store_changes

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I'm no Spiderman but I try

- Practice Swift weekly with a 15-minute exercise.
https://mailchi.mp/hey/weekly-swift-exercise-signup

- Donations are welcome and include the recorded session.
https://paypal.me/fromjuniortosenior

- Private 1-1 sessions ($49)
https://fernando-olivares-s-school.teachable.com/purchase?product_id=2927003

- 2-week course with code reviews ($299)
https://fernando-olivares-s-school.teachable.com/p/from-junior-to-senior

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Q&A