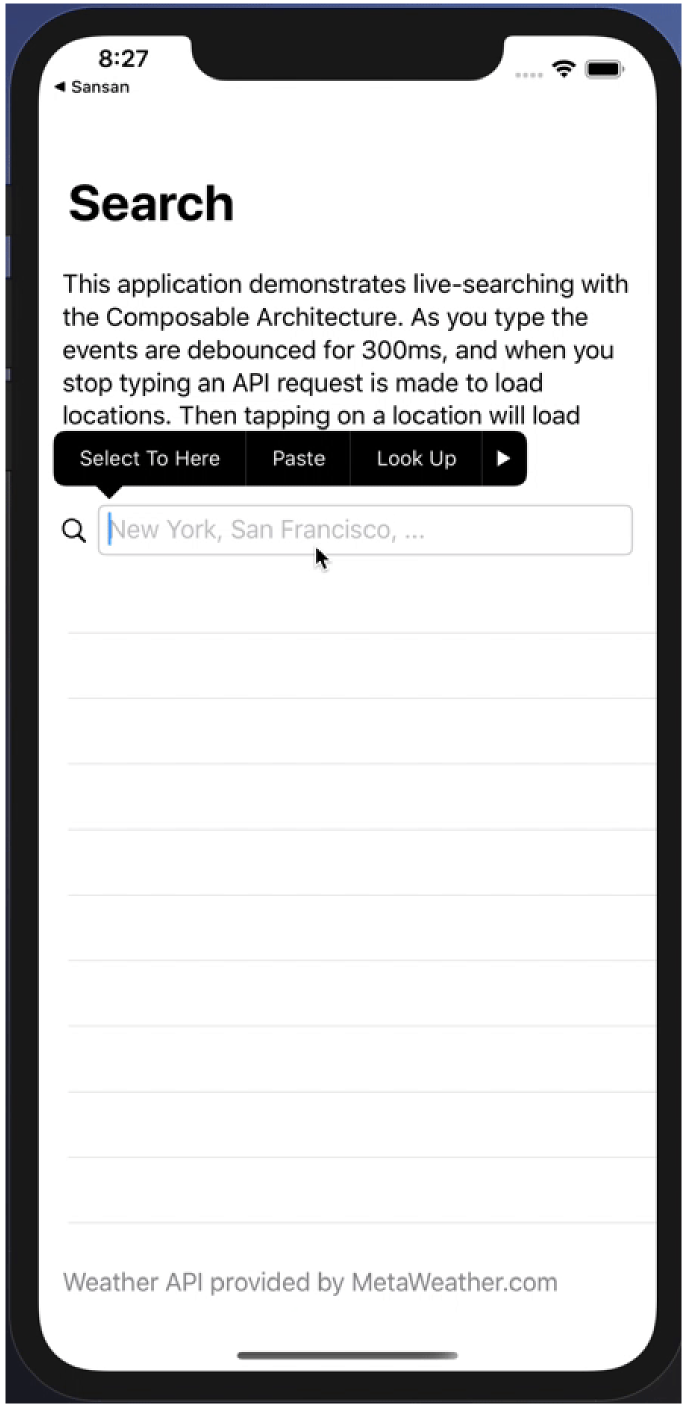
Examples の Search プロジェクトから学ぶ TCA

自己紹介

- アイカワ（@kalupas0930）
- 名刺管理サービスを作っている
  新卒 iOS エンジニア
- 函館出身です
- 最近は Flutter, 機械学習の勉強をしてます
- SwiftUI と Combine 最近勉強し始めました

今回紹介する題材

- TCA の Exmaples の Search アプリ
  - 地名を入力する
  - 300ms 何も打たない
  - API Request が飛んで、該当する地名があれば表示される
  - 表示された地名をタップすると、その地域の天気情報が見れる
- Search アプリの Test
  - TCA の テストサポート機能
  - テストを書くのが楽・テスト結果もわかりやすい



Search

This application demonstrates live-searching with the Composable Architecture. As you type the events are debounced for 300ms, and when you stop typing an API request is made to load locations. Then tapping on a location will load

New York, San Francisco, ...

Weather API provided by MetaWeather.com

TCA の全体像

TCA のフロー図を入れる

ファイルツリー

- 全体のファイルツリー

```
\Search
|---\Search.xcodeproj
|---\Search // 今回は主にここと
|---\SearchTests // ここを紹介します
|--- README.md
```

まずは Search 自体について

Search のファイルツリー

```
\Search
|--- SearchView.swift // TCA の色々な要素* が詰め込まれています
|--- ActivityIndicator.swift // ただの ActivityIndicator
|--- SceneDelegate.swift // SearchView の初期化
|--- WeatherClient.swift // Model と API client の実装
|--- Info.plist
|--- Assets.xcassets
```

TCA の色々な要素*： State, Action, Environment, Reducer, View

Models

```swift
struct Location: Decodable, Equatable {
  var id: Int
  var title: String
}
```

Models

```
struct LocationWeather: Decodable, Equatable {
  var consolidatedWeather: [ConsolidatedWeather]
  var id: Int

  struct ConsolidatedWeather: Decodable, Equatable {
    var applicableDate: Date
    var maxTemp: Double
    var minTemp: Double
    var theTemp: Double
    var weatherStateName: String?
  }
}
```

API client interface

```
struct WeatherClient {
  var searchLocation: (String) -> Effect<[Location], Failure>
  var weather: (Int) -> Effect<LocationWeather, Failure>

  struct Failure: Error, Equatable {}
}
```

Effectの説明〜〜〜〜〜〜〜〜

API implementation / 全体像

```swift
extension WeatherClient {
  static let live = WeatherClient(
    searchLocation: { query in
      ...
    },
    weather: { id in
      ...
    })
}
```

テスト用に利用することになる Mock API implementation も
ありますがそちらは後ほど紹介します

API implementation / searchLocation

```
extension WeatherClient {
  static let live = WeatherClient(
    searchLocation: { query in
      var components = URLComponents(string: "https://www.metaweather.com/api/location/search")!
      components.queryItems = [URLQueryItem(name: "query", value: query)]

      return URLSession.shared.dataTaskPublisher(for: components.url!)
        .map { data, _ in data }
        .decode(type: [Location].self, decoder: jsonDecoder)
        .mapError { _ in Failure() }
        .eraseToEffect()
    },
    weather: { id in
      ...
    })
}
```

API implementation / weather

```
extension WeatherClient {
  static let live = WeatherClient(
    searchLocation: { query in
      ...
    },
    weather: { id in
      let url = URL(string: "https://www.metaweather.com/api/location/\(id)")!

      return URLSession.shared.dataTaskPublisher(for: url)
        .map { data, _ in data }
        .decode(type: LocationWeather.self, decoder: jsonDecoder)
        .mapError { _ in Failure() }
        .eraseToEffect()
    })
}
```

State, Action

```swift
struct SearchState: Equatable {
  var locations: [Location] = []
  var locationWeather: LocationWeather?
  var locationWeatherRequestInFlight: Location?
  var searchQuery = ""
}

enum SearchAction: Equatable {
  case locationsResponse(Result<[Location], WeatherClient.Failure>)
  case locationTapped(Location)
  case locationWeatherResponse(Result<LocationWeather, WeatherClient.Failure>)
  case searchQueryChanged(String)
}
```

Environment

```swift
struct SearchEnvironment {
  var weatherClient: WeatherClient
  var mainQueue: AnySchedulerOf<DispatchQueue>
}
```

Reducer

```
let searchReducer = Reducer<SearchState, SearchAction, SearchEnvironment> {
  state, action, environment in
  switch action {
  case .locationsResponse(.failure):
  case let .locationsResponse(.success(response)):
  case let .locationTapped(location):
  case let .searchQueryChanged(query):
  case let .locationWeatherResponse(.failure(locationWeather)):
  case let .locationWeatherResponse(.success(locationWeather)):
  }
}
```

View

```swift
struct SearchView: View {
  let store: Store<SearchState, SearchAction>

  var body: some View {
    WithViewStore(self.store) { viewStore in
      ...
    }
  }
```

検索 TextField の動作（View, State）

- View

```
TextField("New York, San Francisco, ...",
          text: viewStore.binding(
          get: { $0.searchQuery }, send: SearchAction.searchQueryChanged)
)
```

- State

```
struct SearchState: Equatable {
  var searchQuery = ""
}
```

検索 TextField の動作（Reducer）

```
let searchReducer = Reducer<SearchState, SearchAction, SearchEnvironment> {
  state, action, environment in
  switch action {
  case .locationsResponse(.failure):
  case let .locationsResponse(.success(response)):
  case let .locationTapped(location):
  case let .searchQueryChanged(query): <-------------- これが呼ばれる
  case let .locationWeatherResponse(.failure(locationWeather)):
  case let .locationWeatherResponse(.success(locationWeather)):
  }
}
```

検索 TextField の動作（Reducer）

```swift
case let .searchQueryChanged(query):
  struct SearchLocationId: Hashable {}
  state.searchQuery = query

  guard !query.isEmpty else {
    state.locations = []
    state.locationWeather = nil
    return .cancel(id: SearchLocationId())
  }

  return environment.weatherClient
    .searchLocation(query)
    .receive(on: environment.mainQueue)
    .catchToEffect()
    .debounce(id: SearchLocationId(), for: 0.3, scheduler: environment.mainQueue)
    .map(SearchAction.locationsResponse)
```

検索 TextField の動作（Reducer）

```
let searchReducer = Reducer<SearchState, SearchAction, SearchEnvironment> {
  state, action, environment in
  switch action {
  case .locationsResponse(.failure): <-------------------- 失敗すればこれ
  case let .locationsResponse(.success(response)): <------ 成功すればこれ
  case let .locationTapped(location):
  case let .searchQueryChanged(query):
  case let .locationWeatherResponse(.failure(locationWeather)):
  case let .locationWeatherResponse(.success(locationWeather)):
  }
}
```

検索 TextField の動作（Reducer）

- success

```
case let .locationsResponse(.success(response)):
    state.locations = response
    return .none
```

- failure

```
case .locationsResponse(.failure):
  state.locations = []
  return .none
```

検索結果を押した後の動作

```
Button(action: { viewStore.send(.locationTapped(location)) }) {
    HStack {
      Text(location.title)

      if viewStore.locationWeatherRequestInFlight?.id == location.id {
        ActivityIndicator()
      }
    }
  }

  if location.id == viewStore.locationWeather?.id {
    self.weatherView(locationWeather: viewStore.locationWeather)
  }
```