State Management with Redux und @ngrx/store

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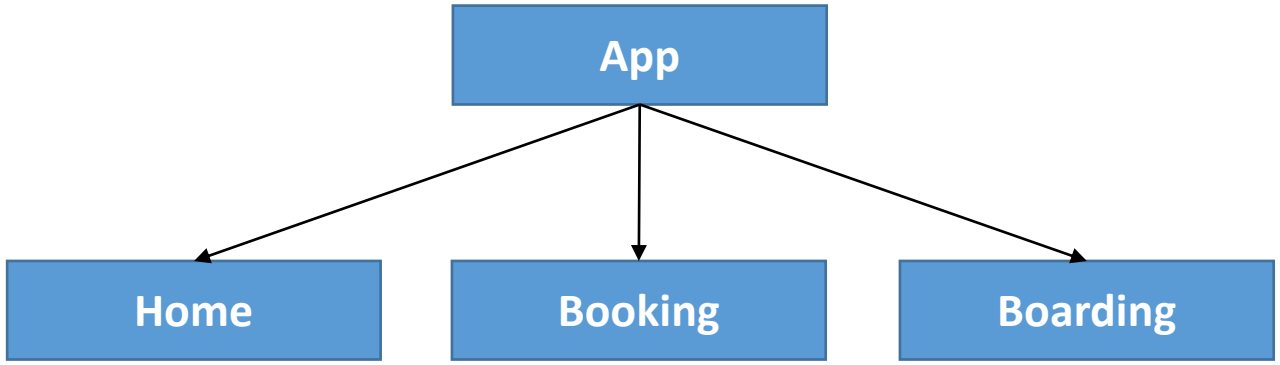
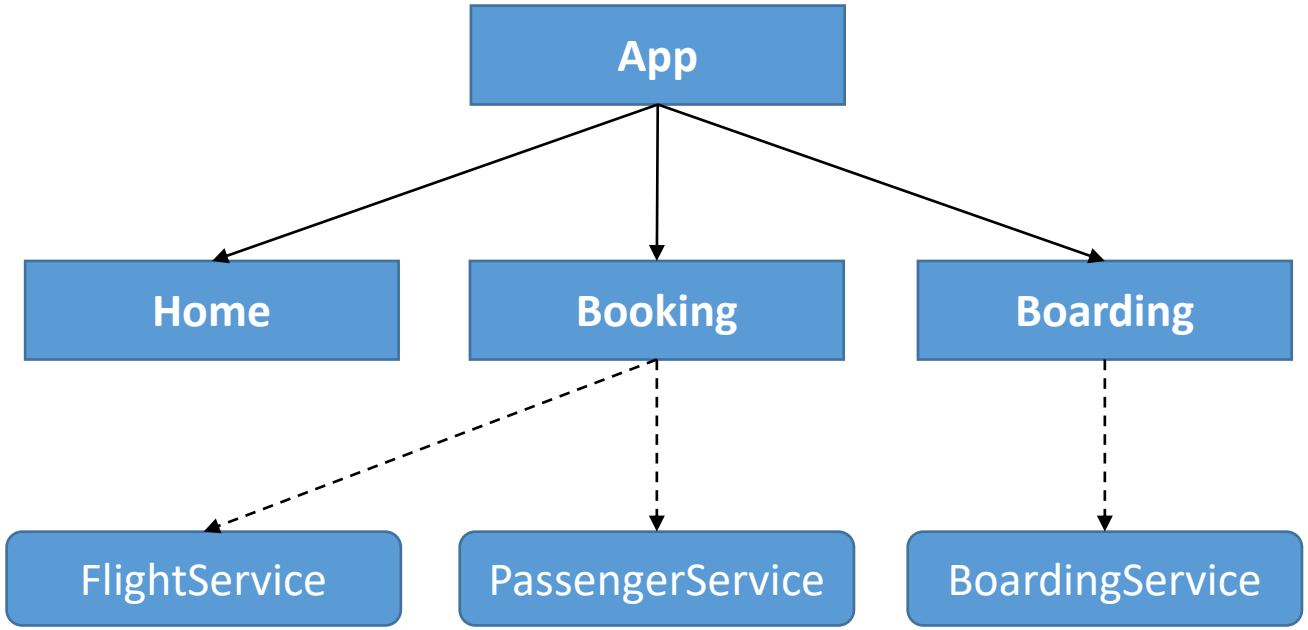
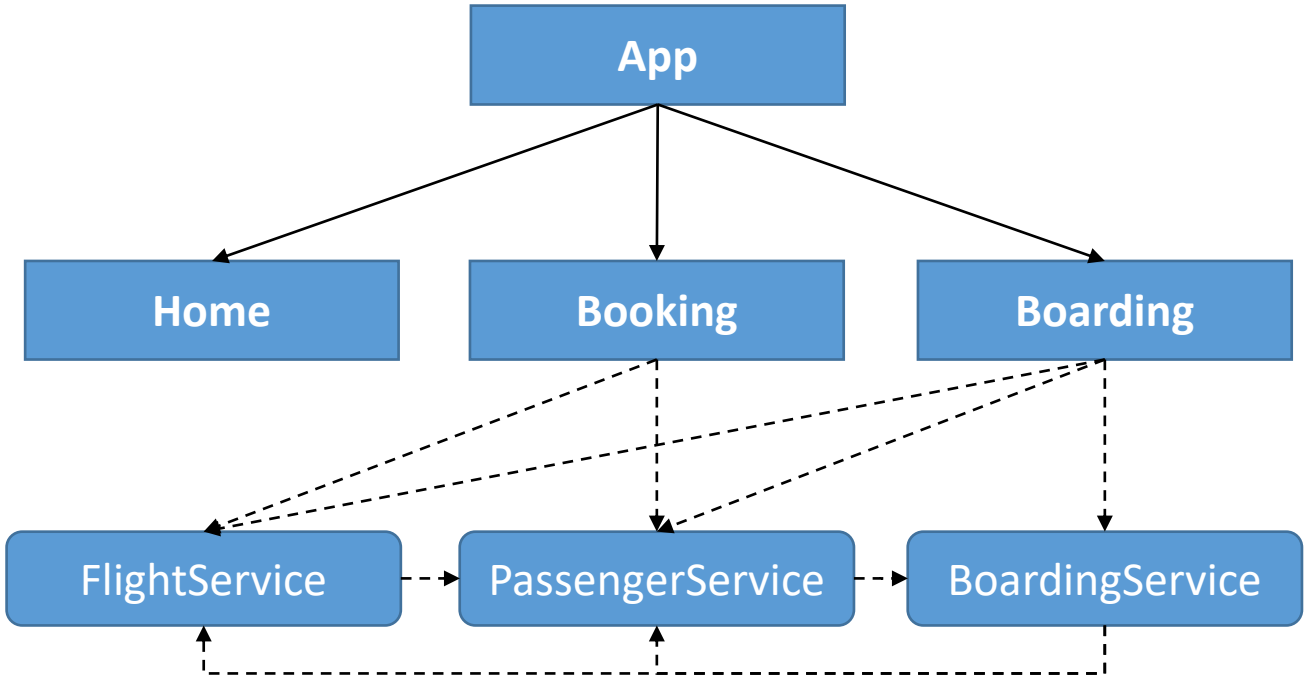
Motivation


App
Home
Booking
Boarding

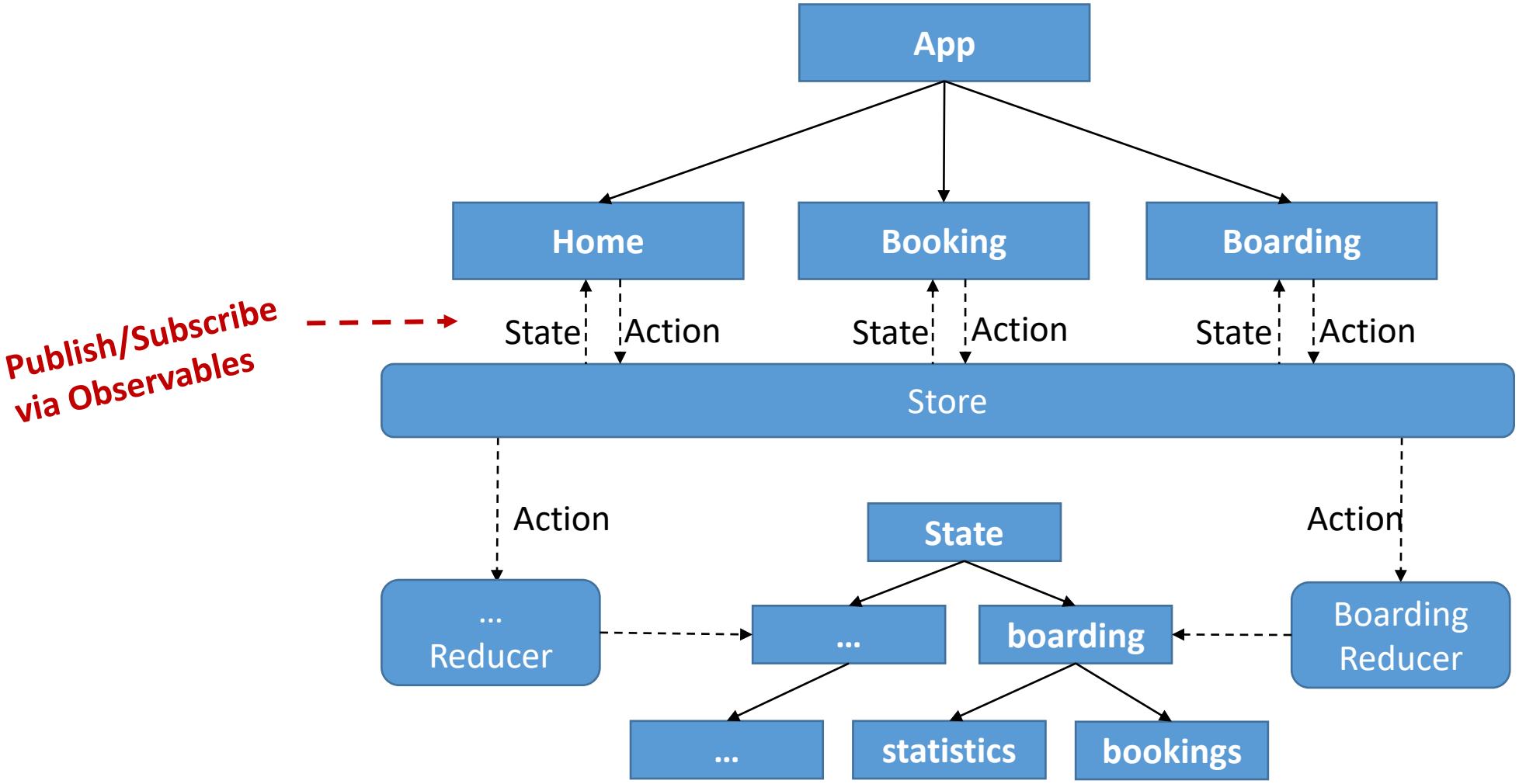

App
Home
Booking
Boarding
FlightService
PassengerService
BoardingService


App
Home
Booking
Boarding
FlightService
PassengerService
BoardingService

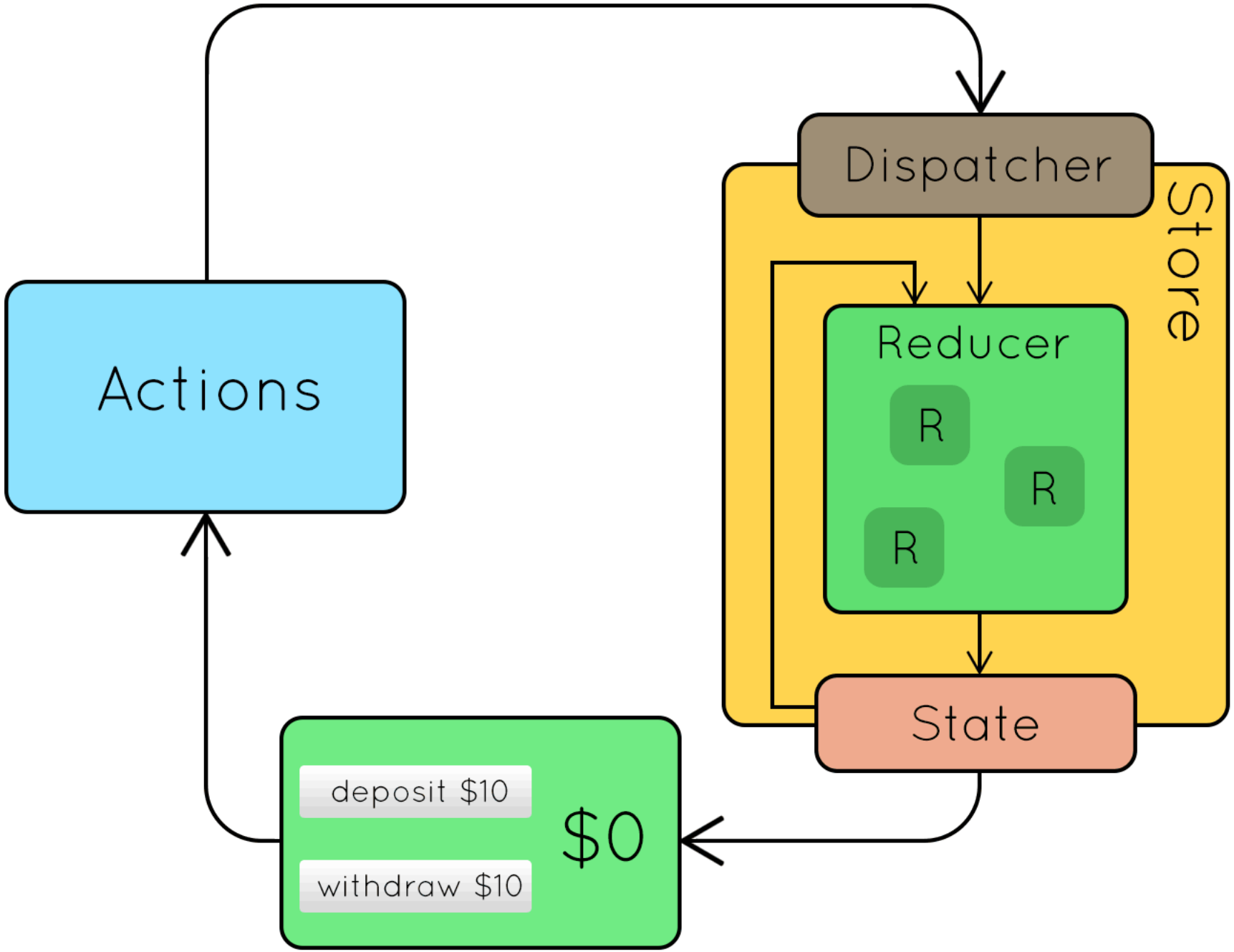
Redux

- Redux makes complex UI manageable
- Origin: React Ecosystem
- Implementation used here: @ngrx/store

npm install @ngrx/store --save



Single Immutable State Tree


Actions
Dispatcher
Store
Reducer
R
R
R
State
deposit $10
withdraw $10
$0

Building Blocks

State

```
export interface FlightBookingState {
  flights: Flight[];
  statistics: FlightStatistics;
  basket: object;
}
```

AppState

```
export interface AppState {
  flightBooking: FlightBookingState;
  currentUser: UserState;
}
```

Actions

```
export const flightsLoaded = createAction(
    '[FlightBooking] FlightsLoaded',
    props<{flights: Flight[]}>()
);
```

Reducer

```
export const flightBookingReducer = createReducer(
    initialState,

    on(flightsLoaded, (state, action) => {
        const flights = action.flights;
        return { ...state, flights };
    })
)
```

Map Reducers to State Tree

```
const reducers = {
  "flightBooking": flightBookingReducer,
  "currentUser": authReducer
}
```

Store

- select(tree => tree.flightBooking.flights): Observable<Flight[]>
- dispatch(flightsLoaded({ flights }))

Registering @ngrx/Store in AppModule

```
@NgModule({
   imports: [
      […]
      StoreModule.forRoot(reducers)
   ],
   […]
})
export class AppModule { }
```

Registering @ngrx/Store in Feature Module

```
@NgModule({
   imports: [
      [...]
      StoreModule.forFeature('flightBooking', flightBookingReducer)
   ],
   [...]
})
export class FlightBookingModule { }
```

State branch for feature

DEMO

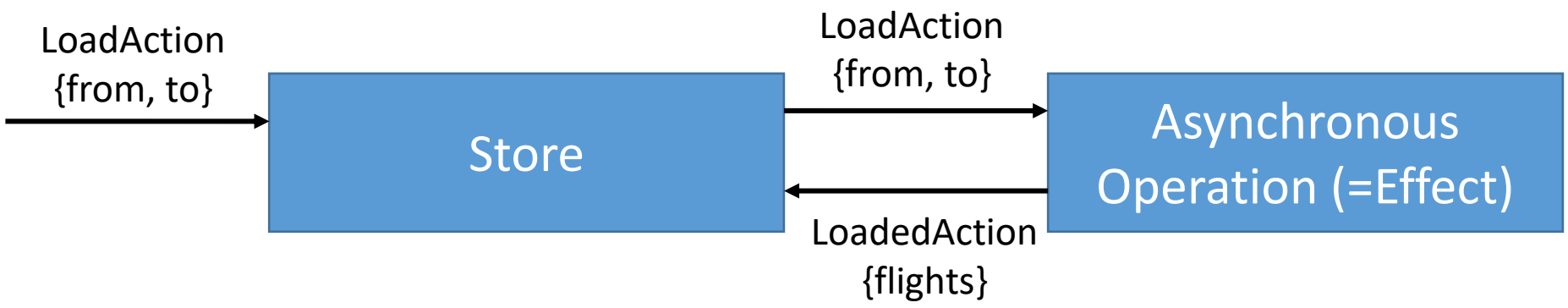
LABS

Effects

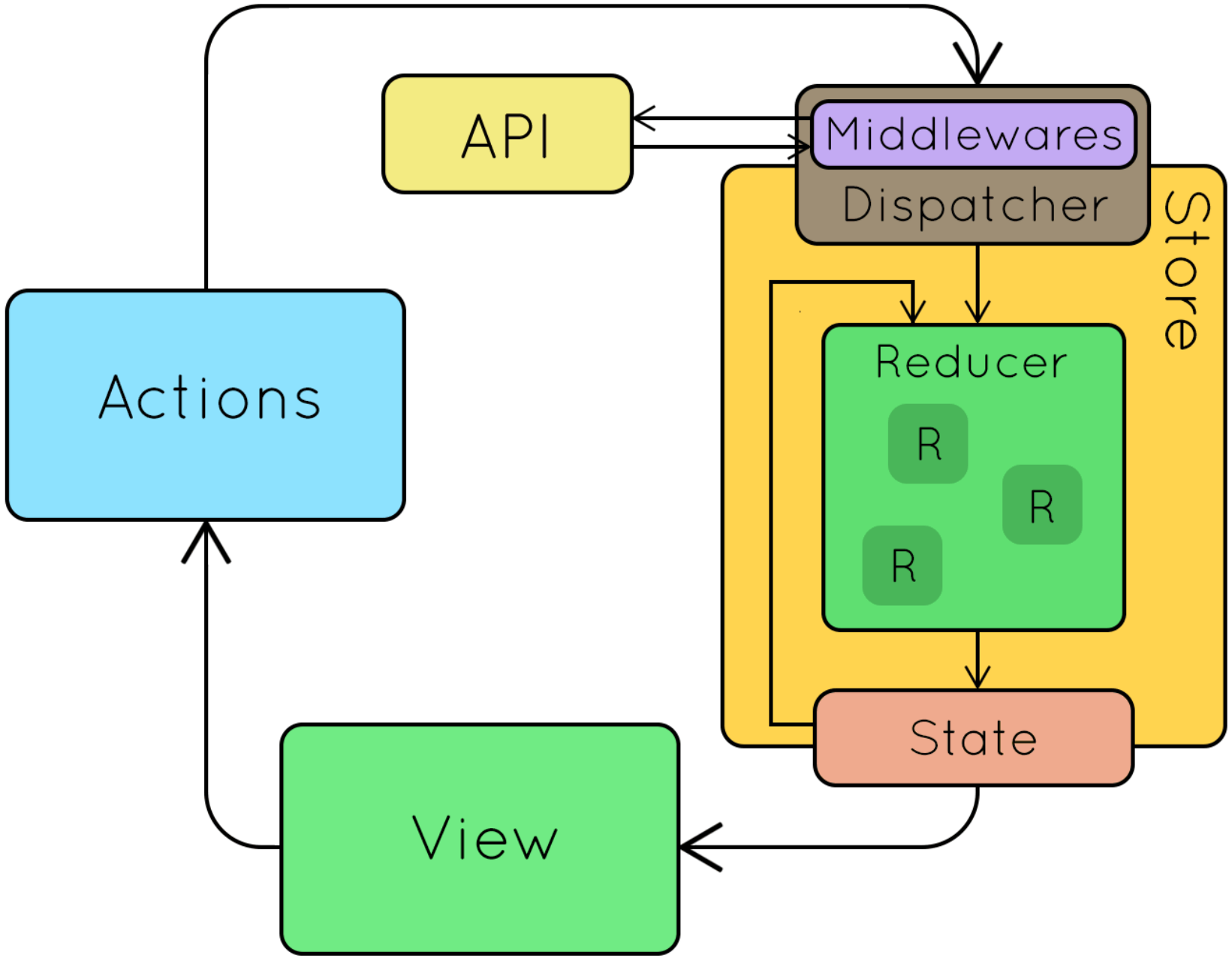
Challange

- Reducers are synchronous by defintion
- What to do with asynchronous operations?

Solution: Effects



ng add @ngrx/effects


API
Middlewares
Dispatcher
Store
Reducer
R
R
R
State
Actions
View

Effects are Observables

Implementing Effects

```
@Injectable()
export class FlightBookingEffects {

    […]

}
```

Implementing Effects

```
@Injectable()
export class FlightBookingEffects {

  constructor(
    private flightService: FlightService, private actions$: Actions) {
  }

  […]

}
```

Implementing Effects

```
@Injectable()
export class FlightBookingEffects {

  constructor(
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  myEffect = createEffect(() => this.actions$.pipe(
                ofType(loadFlights));
}
```

Implementing Effects

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                switchMap(a => this.flightService.find(a.from, a.to, a.urgent)));
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```

Implementing Effects

```
@Injectable()
export class FlightBookingEffects {

  constructor(
    private flightService: FlightService, private actions$: Actions) {
  }

  myEffect = createEffect(() => this.actions$.pipe(
                ofType(loadFlights),
                switchMap(a => this.flightService.find(a.from, a.to, a.urgent)),
                map(flights => flightsLoaded({flights})));

}
```

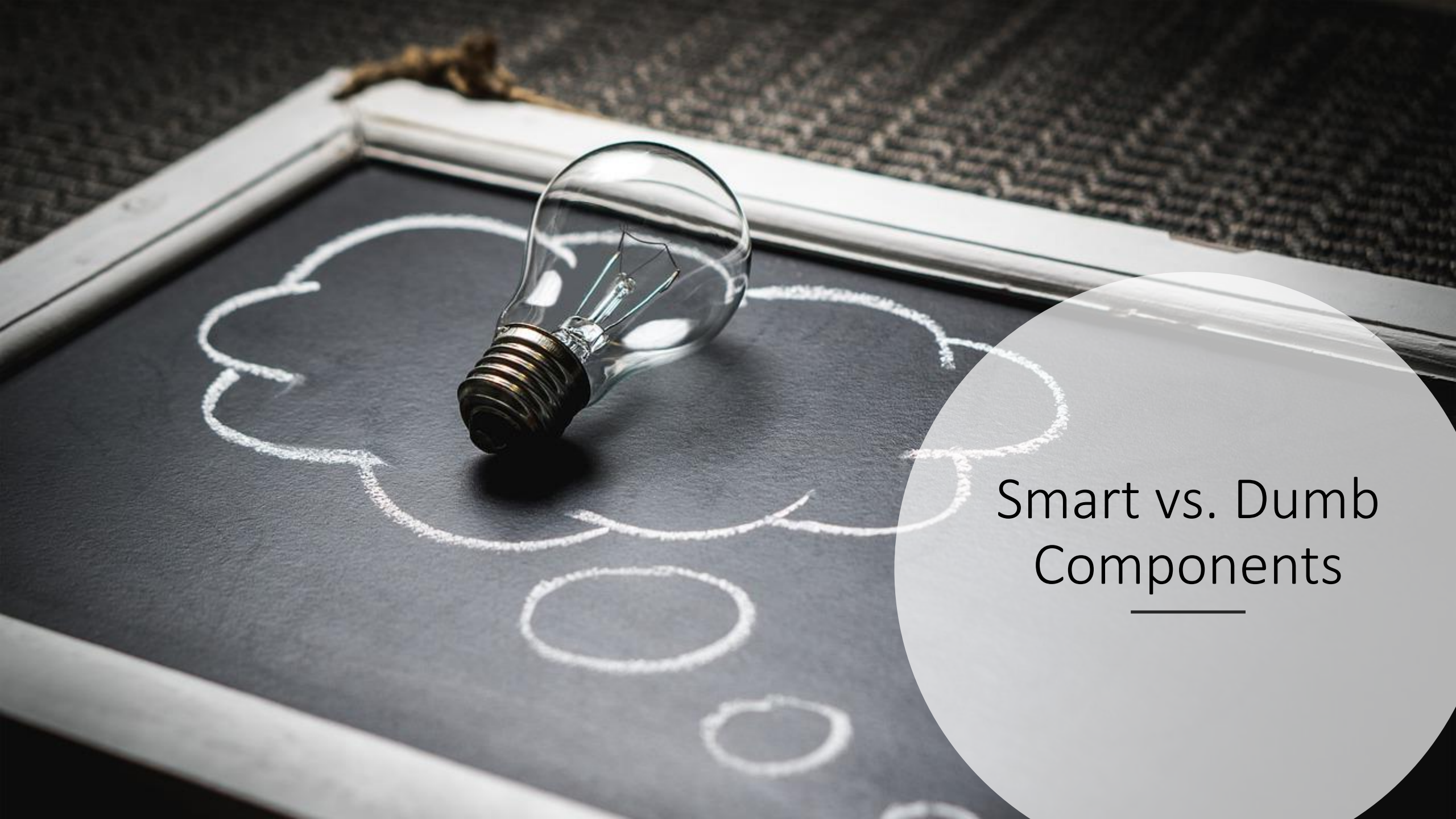
DEMO

LAB

@ngrx/entity and @ngrx/schematics

- ng add @ngrx/entity
- ng add @ngrx/schematics
- ng g module passengers
- ng g entity Passenger --module passengers.module.ts

DEMO



Smart vs. Dumb Components

Thought experiment

- What if <flight-card> would directly talk with the store?
  - Querying specific parts of the state
  - Triggering effects
- Traceability?
- Performance?
- Reuse?

Smart vs. Dumb Components

Smart Component	Dumb
• Drives the "Use Case" • Usually a "Container"	• Independent of Use Case • Reusable • Usually a "Leaf"