C:\ngrx new

Angular + NgRx

Redux with Signal Stores

DevGeekWeek 2024
INSPIRED BY INNOVATION

JOHN BRYCE
תלמדו הייטק. זה עובד!
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Hi, I'm…

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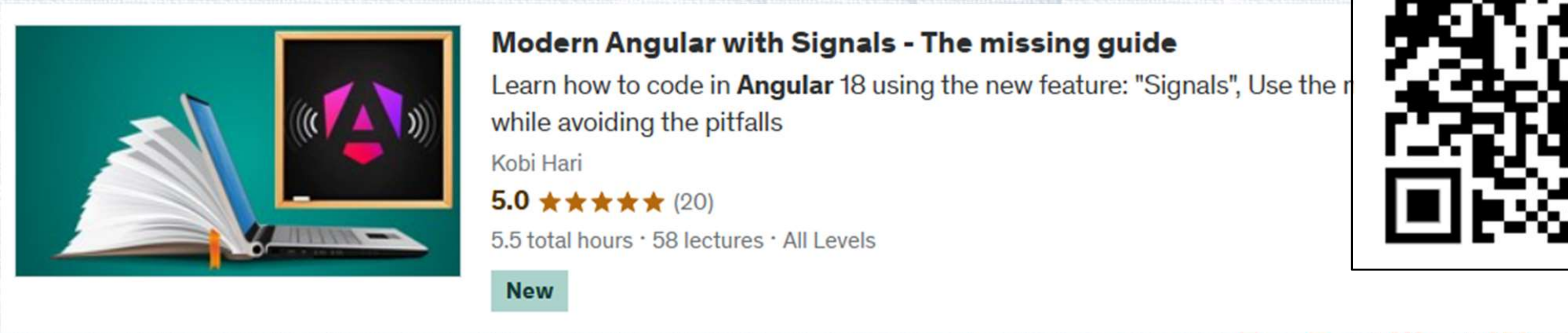
UDEMY Course – On Signals

https://www.udemy.com/course/modern-angular-with-signals-the-missing-guide/?couponCode=HAP241112



Modern Angular with Signals - The missing guide

Learn how to code in **Angular** 18 using the new feature: "Signals", Use the r
while avoiding the pitfalls

Kobi Hari

5.0 ★★★★★ (20)

5.5 total hours · 58 lectures · All Levels

New

Angular + NgRx

NgRx Signal Store

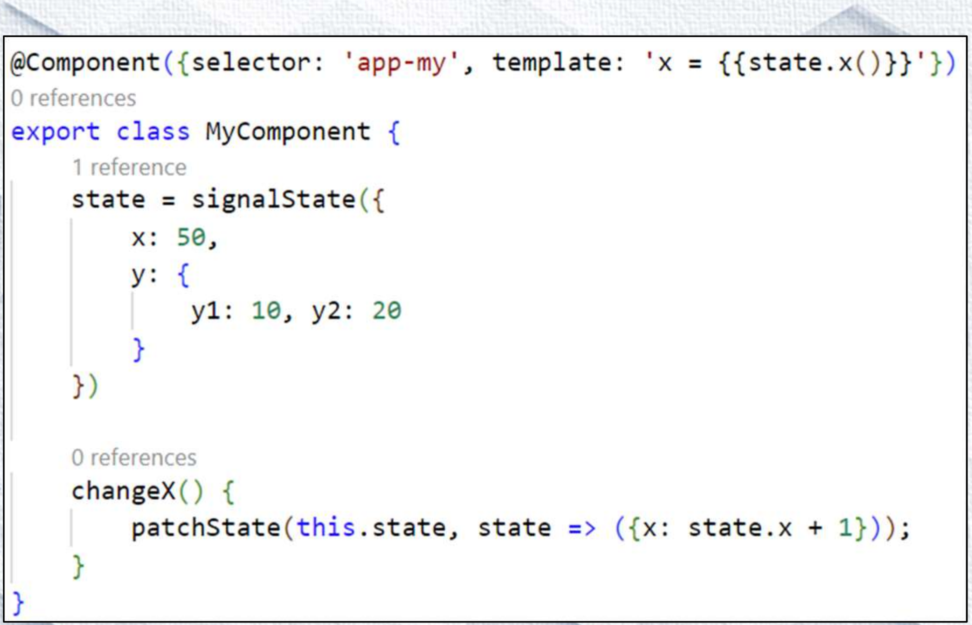
Signal based store as a service

Signal Store

- Signal Store is a service
- It is provided by a component
- It is usually tied to the life-cycle of the component
- It is like a “baby” store
  - It has “`selectors-like`” signals
  - It has “`reducer-like`” methods
  - It has “ `effects-like` ” methods
  - It has no `actions` (!!!)
  - It has “`custom features`” (wait and see!!!)
  - It is completely based on functional programming
  - It is based on Signals instead of Observables

Signal State – The baby store

- Define a state: `T`
- Call the `signalState<T>` function
- What you get is the signal of the entire state.
  - But it also has sub property for each sub property of the state.
  - Each such property is a signal of that property
- In the example:
  - `this.state()` returns the entire object (as a signal)
  - `this.state.x()` returns 50 (as a signal)
  - `this.state.y.y1()` returns 10 (as a signal)
- Signal State is a nice utility around signals

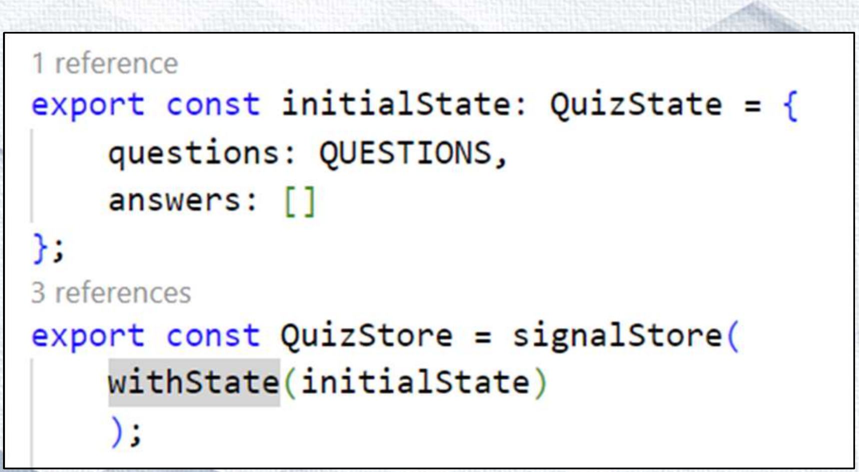


```
@Component({selector: 'app-my', template: 'x = {{state.x()}}'})
0 references
export class MyComponent {
    1 reference
    state = signalState({
        x: 50,
        y: {
            y1: 10, y2: 20
        }
    })

    0 references
    changeX() {
        patchState(this.state, state => ({x: state.x + 1}));
    }
}
```

Signal Store

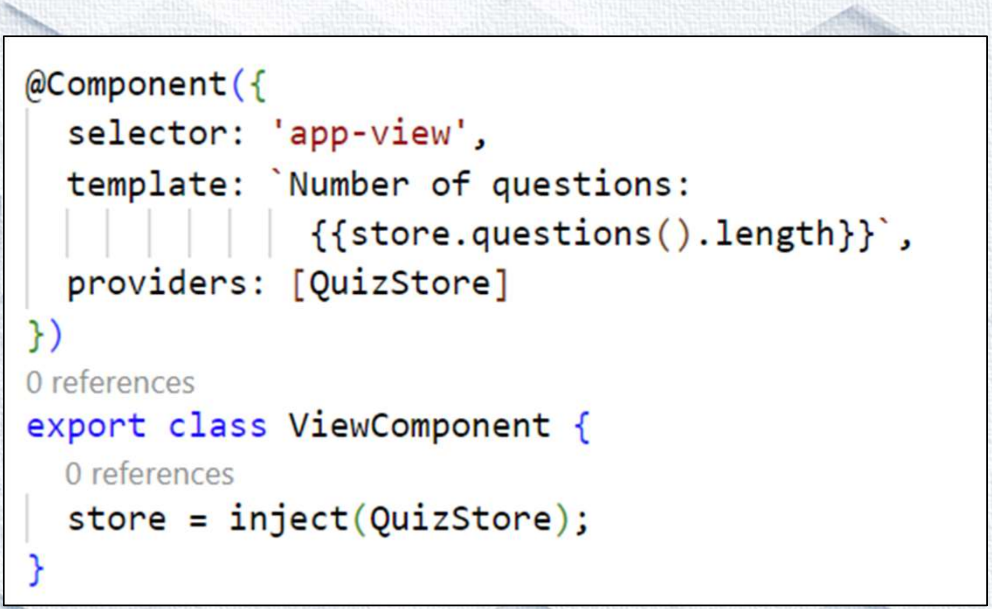
- Signal stores are full blown services
- They have properties, methods.
- You can use them as real stores
- But… they have no class. They are fully functional.
  - You create one by calling the `signalStore` function
  - You enhance it by calling `withXXX` functions as parameters. Each such function builds more functionality into the function.
  - Yes, that was absolutely a valid English sentence in functional programming, get used to it ☺
  - The `signalStore` function, returns a newly created type.
  - You can then use it as injection token.



```
1 reference
export const initialState: QuizState = {
    questions: QUESTIONS,
    answers: []
};
3 references
export const QuizStore = signalStore(
    withState(initialState)
    );
```

Consuming the store

- The `signalStore` function, returns a newly created type.
- You can then use it as injection token.
  - Make sure to provide it at the proper level
  - Then just inject the type.
- Just like signalState
  - it exposes a set of signals you can bind to.
  - You can call `patchState` to modify it.
  - But don't, at least not like this…



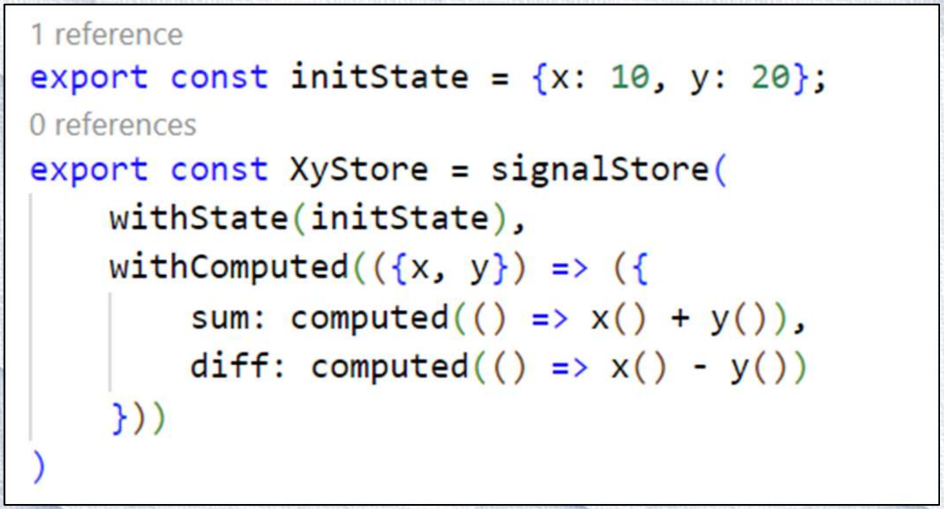
```
@Component({
  selector: 'app-view',
  template: `Number of questions:
              {{store.questions().length}}`,
  providers: [QuizStore]
})
0 references
export class ViewComponent {
  0 references
  store = inject(QuizStore);
}
```

Demo – Using Signal Store

- ✓ Installing the @ngrx/signals package
- ✓ Creating a signal store service
- ✓ Initializing the state
- ✓ Providing it in the component
- ✓ Injecting it into the component
- ✓ Consuming the state

Computed Signals replace Selectors

- The angular signals allow you to derive **computed** signals from them.
- In signal store, this is how you replace selectors.
- Use the withComputed method to define a set of computed signals
- The signals may receive properties already defined as parameters and use them to compute the value



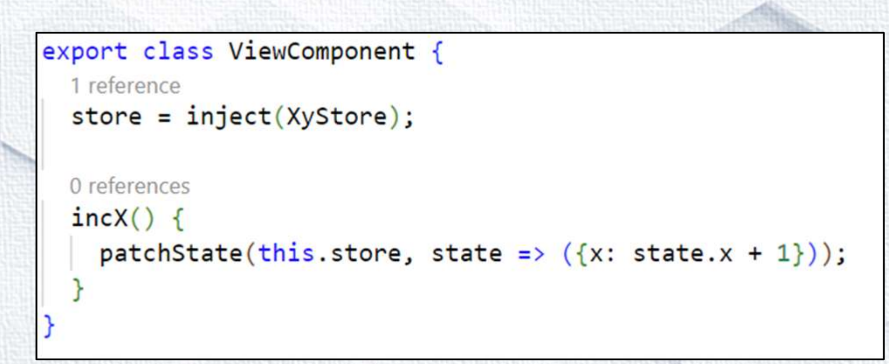
```
1 reference
export const initState = {x: 10, y: 20};
0 references
export const XyStore = signalStore(
    withState(initState),
    withComputed(({x, y}) => ({
        sum: computed(() => x() + y()),
        diff: computed(() => x() - y())
    }))
)
```

Demo – Signal Store `withComputed`

- ✓ `Creating Computed Signals`
- ✓ `Deriving signals from other signals`
- ✓ `Binding to computed values`

Setting the state

- You can use `patchState` to modify the current state.
  - patchState is a function, so it is called independently
  - The first parameter you pass is the store
  - Then you have 2 options
    - Pass a partial new state
    - Pass a function that takes the current state and returns a partial new state
- It’s all very functional…

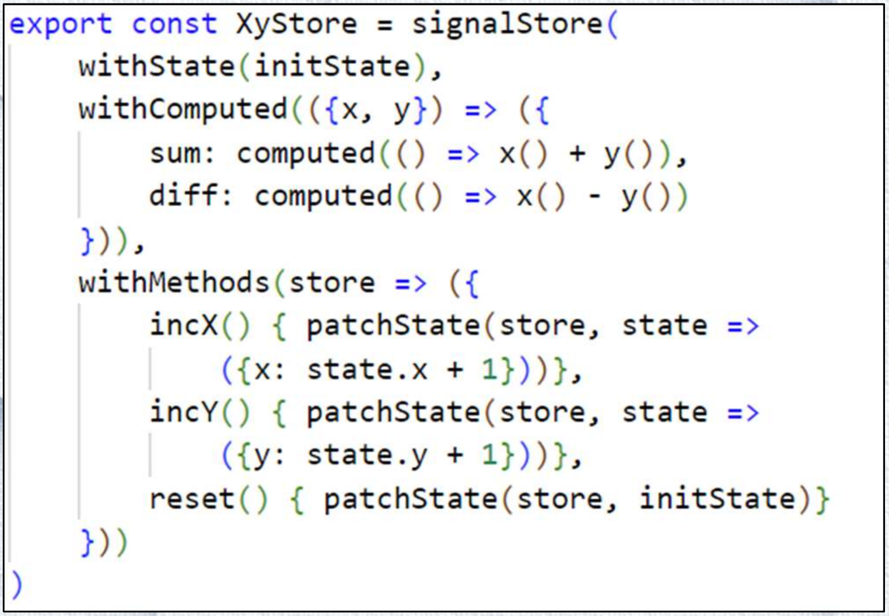


```
export class ViewComponent {
  1 reference
  store = inject(XyStore);

  0 references
  incX() {
    patchState(this.store, state => ({x: state.x + 1}));
  }
}
```

Creating an Updater method

- While the previous method is possible it is not recommended
  - We like our updates to be encapsulated in the store, to make sure only valid states are created
- Updater is replacing “action + reducer”
- The updater method creates a function
- Calling the function is like dispatching an action that updates the state
- We create method using the withMethods function
  - It takes a function that takes the store
  - The function returns an object full of methods
  - These are added to the store



```
export const XyStore = signalStore(
    withState(initState),
    withComputed(({x, y}) => ({
        sum: computed(() => x() + y()),
        diff: computed(() => x() - y())
    })),
    withMethods(store => ({
        incX() { patchState(store, state =>
            ({x: state.x + 1}))},
        incY() { patchState(store, state =>
            ({y: state.y + 1}))},
        reset() { patchState(store, initState)}
    }))
)
```

Consuming an Updater

- Updater methods are called like any class method
- Easy…
- Of course, you have this nice feature were all the signals get automagically updated

```
  onIncX() {
    this.store.incX();
  }
```

Angular + NgRx

Demo – Signals store Updater methods

✓ Using patchState

✓ Passing callbacks to patchState

✓ Defining an Updater

✓ Using the Updater

Creating RxMethods

- Rx Methods are replacement for effects.
- They are asynchronous methods that are triggered like observables.
- Rx methods can be called in various ways.
    - Imperatively – like any other method
    - Reactively by passing an observable, or signal
- They are implemented like an observable that gets a “next” whenever the method is called.

```
withMethods((store, userService = inject(UserService)) => ({
  loadFromServer: rxMethod<string>(
      pipe(
          tap(() => patchState(store, {isLoading: true}))
          exhaustMap(str => userService.getNumber(str)).pipe(
              tapResponse({
                  next: num => patchState(store, {x: num}),
                  error: console.error,
                  finalize: () => patchState(store, {isLoading: false})
              })
          )
      )
  )
}))
```

Consuming rxMethods

- An rxMethod is a function just like normal method
- Calling it is like dispatching an action that is handled by an effect
- You can call it imperatively or declaratively
- It may receive
  - Value
  - Observable
  - Signal.

```
myStr = signal('Hi');
subj$ = new Subject<string>();

ngOnInit() {
  this.store.loadFromServer(this.myStr);
  this.store.loadFromServer(this.subj$);
}

loadAbc() {
  this.store.loadFromServer('abc');
}
```

Demo – Signal store `rxMethod`

- ✓ `Creating rxMethod`
- ✓ `Using tapResponse`
- ✓ `Consuming rxMethods imperatively`
- ✓ `Consuming rxMethods declaratively`

Signal Store Hooks

- You can hook to signal store events just like you can with components and services

```
    withHooks({
        onInit(store) {
            store.loadFromServer('initial')
        },
        onDestroy(store) {
            console.log('Good bye');
        }
    })
```

Signal Store Custom Features

- Probably the best feature of signal store is the fact that you can add your own “withXXX” features.

```
export type CallState = 'init' | 'loading' | 'loaded' | { error:
string };

export function withCallState() {
  return signalStoreFeature(
    withState<{ callState: CallState }>({ callState: 'init' }),
    withComputed(({ callState }) => ({
      loading: computed(() => callState() === 'loading'),
      loaded: computed(() => callState() === 'loaded'),
      error: computed(() => {
        const state = callState();
        return typeof state === 'object' ? state.error : null
      }),
    }))
  );
}
```

```
export const XyStore = signalStore(
    withState(initState),
    withComputed(({x, y}) => ({
        sum: computed(() => x() + y()),
        diff: computed(() => x() - y())
    })),
    withCallState()
);
```

Demo – Signal store `customFeatures`

- ✓ Creating a simple custom feature
- ✓ Realizing that we do not have the dev-tools
- ✓ Understanding how the dev-tools work
- ✓ Let’s get crazy
- ✓ Creating withDevTools - a custom feature that connects the store to redux dev-tools