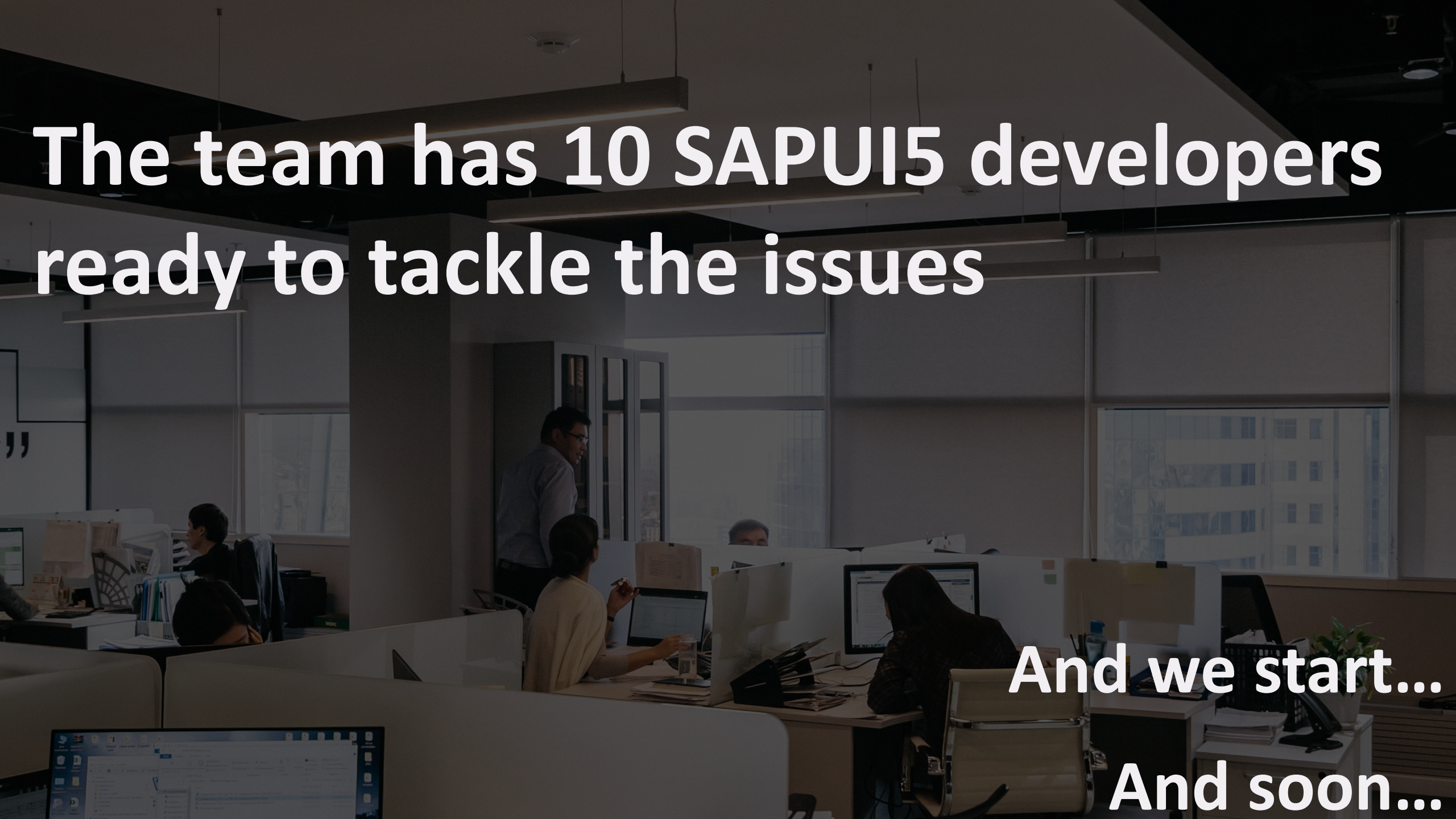
Using TypeScript and PubSub to scale freestyle UI5 apps

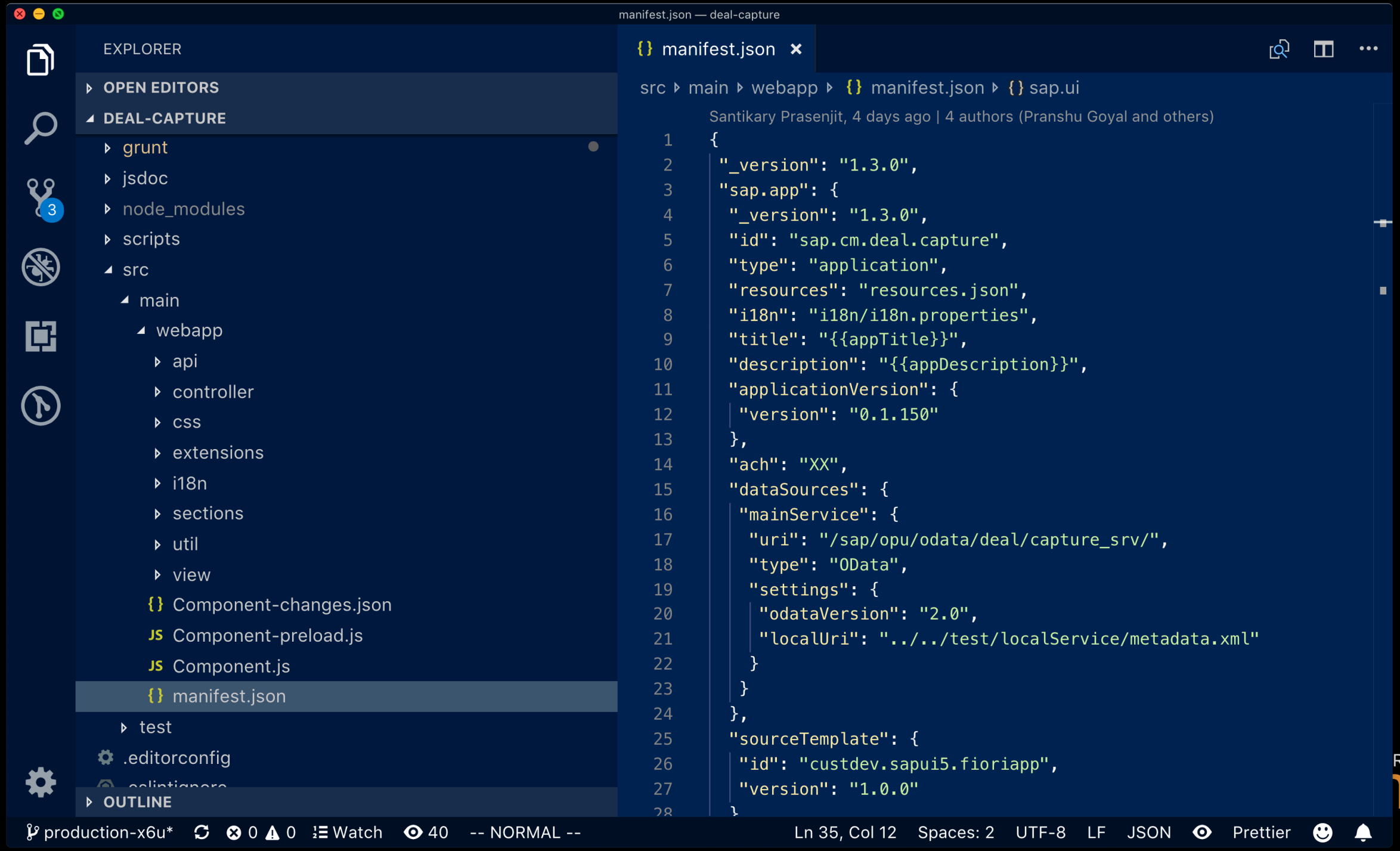
Gabriel Borges, SAP

We are working in an oil trading software

It is a big project

Lots of features built into it


The team has 10 SAPUI5 developers ready to tackle the issues
And we start…
And soon…


manifest.json — deal-capture
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src ▸ main ▸ webapp ▸ manifest.json ▸ sap.ui
Santikary Prasenjit, 4 days ago | 4 authors (Pranshu Goyal and others)
{
"_version": "1.3.0",
"sap.app": {
"_version": "1.3.0",
"id": "sap.cm.deal.capture",
"type": "application",
"resources": "resources.json",
"i18n": "i18n/i18n.properties",
"title": "{{appTitle}}",
"description": "{{appDescription}}",
"applicationVersion": {
"version": "0.1.150"
},
"ach": "XX",
"dataSources": {
"mainService": {
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"type": "OData",
"settings": {
"odataVersion": "2.0",
"localUri": "../../test/localService/metadata.xml"
}
}
},
"sourceTemplate": {
"id": "custdev.sapui5.fioriapp",
"version": "1.0.0"
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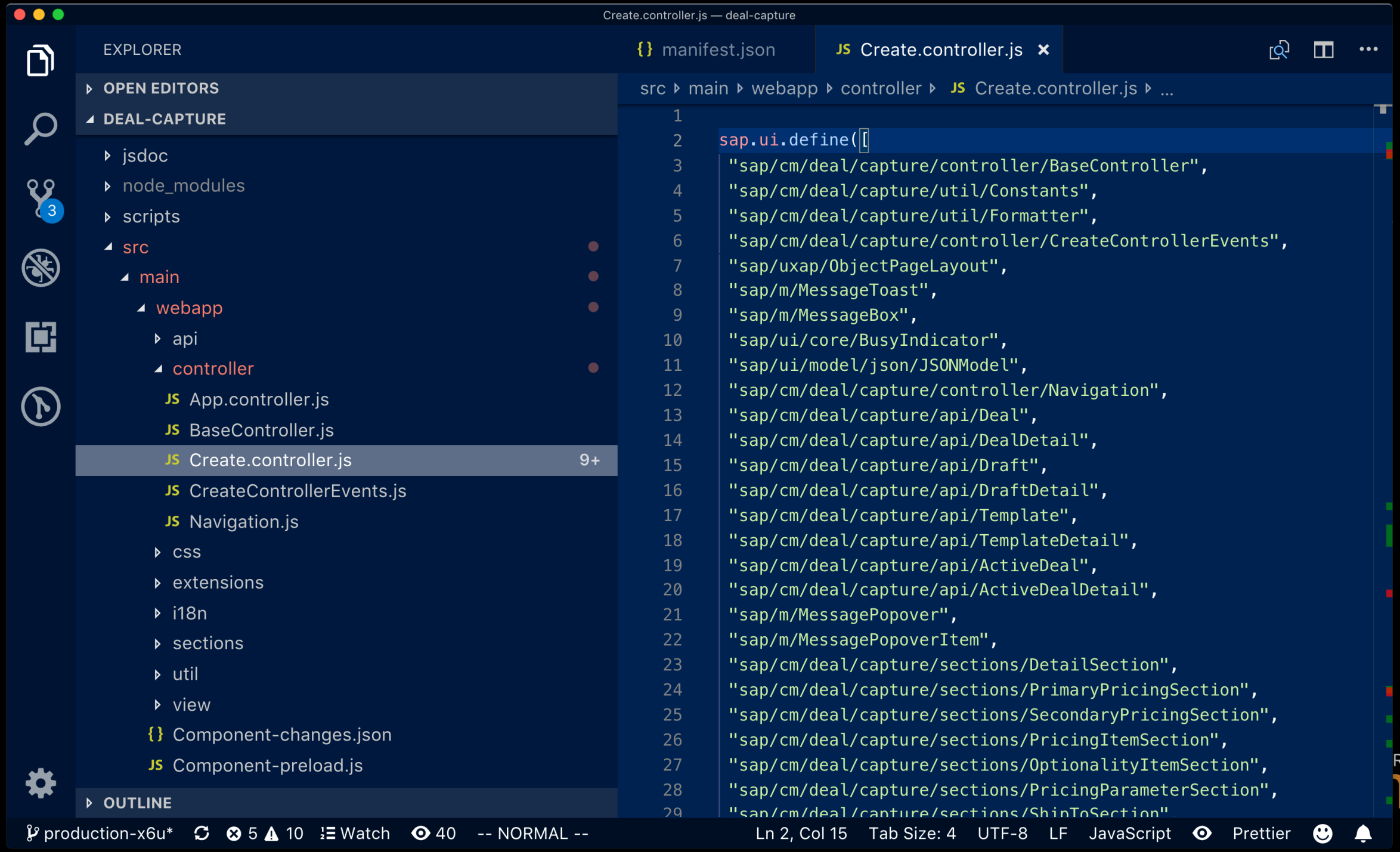
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Create.controller.js 9+
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src ▸ main ▸ webapp ▸ controller ▸ Create.controller.js ▸ ...
sap.ui.define([
"sap/cm/deal/capture/controller/BaseController",
"sap/cm/deal/capture/util/Constants",
"sap/cm/deal/capture/util/Formatter",
"sap/cm/deal/capture/controller/CreateControllerEvents",
"sap/uxap/ObjectPageLayout",
"sap/m/MessageToast",
"sap/m/MessageBox",
"sap/ui/core/BusyIndicator",
"sap/ui/model/json/JSONModel",
"sap/cm/deal/capture/controller/Navigation",
"sap/cm/deal/capture/api/Deal",
"sap/cm/deal/capture/api/DealDetail",
"sap/cm/deal/capture/api/Draft",
"sap/cm/deal/capture/api/DraftDetail",
"sap/cm/deal/capture/api/Template",
"sap/cm/deal/capture/api/TemplateDetail",
"sap/cm/deal/capture/api/ActiveDeal",
"sap/cm/deal/capture/api/ActiveDealDetail",
"sap/m/MessagePopover",
"sap/m/MessagePopoverItem",
"sap/cm/deal/capture/sections/DetailSection",
"sap/cm/deal/capture/sections/PrimaryPricingSection",
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"sap/cm/deal/capture/sections/OptionalityItemSection",
"sap/cm/deal/capture/sections/PricingParameterSection",
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Tab Size: 4
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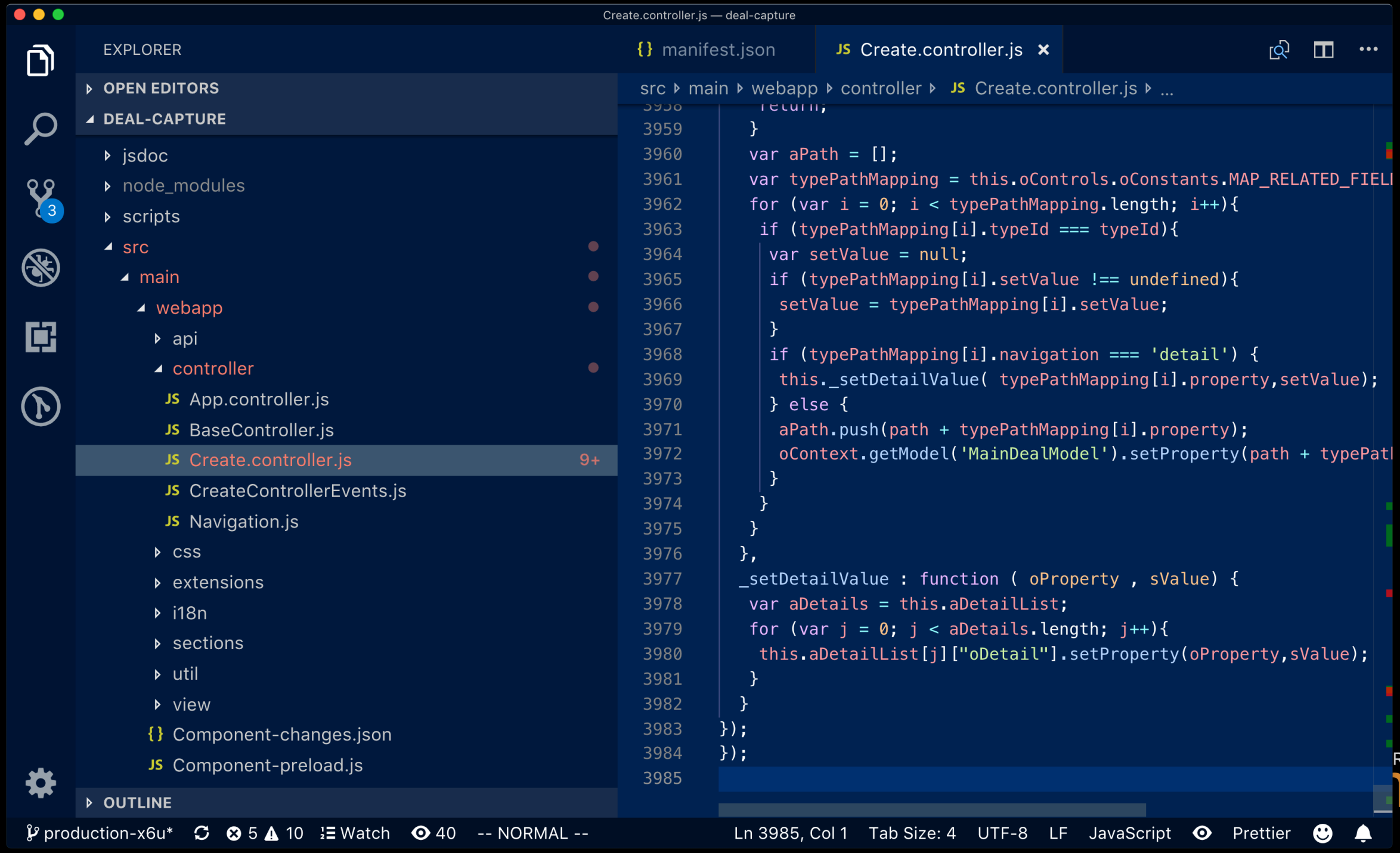
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Component-preload.js
OUTLINE
src ▸ main ▸ webapp ▸ controller ▸ Create.controller.js ▸ ...
3959 }
3960 var aPath = [];
3961 var typePathMapping = this.oControls.oConstants.MAP_RELATED_FIELI
3962 for (var i = 0; i < typePathMapping.length; i++){
3963 if (typePathMapping[i].typeId === typeId){
3964 var setValue = null;
3965 if (typePathMapping[i].setValue !== undefined){
3966 setValue = typePathMapping[i].setValue;
3967 }
3968 if (typePathMapping[i].navigation === 'detail') {
3969 this._setDetailValue(typePathMapping[i].property,setValue);
3970 } else {
3971 aPath.push(path + typePathMapping[i].property);
3972 oContext.getModel('MainDealModel').setProperty(path + typePat
3973 }
3974 }
3975 }
3976 },
3977 _setDetailValue : function (oProperty , sValue) {
3978 var aDetails = this.aDetailList;
3979 for (var j = 0; j < aDetails.length; j++){
3980 this.aDetailList[j]["oDetail"].setProperty(oProperty,sValue);
3981 }
3982 }
3983 });
3984 });
3985
production-x6u*
5 10
Watch
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-- NORMAL --
Ln 3985, Col 1
Tab Size: 4
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JavaScript
Prettier

```
3979                for (var j = 0
3980                    this.aDetailL
3981                }
3982            }
3983        });
3984    });
3985
```

Thank you

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UI5con ON AIR

Agenda:

Why does this happen?

How to fix it?

Some rules of thumb

Code

Final regards

Way too many codebases look like that in the wild.

- Controllers getting out of hand;
- Not a single line of testing;
- Missing deadlines ;
- Sprints failing;
- Projects canceled.

Why does this happen?


It boils down to state management.

Welcome to the MVC village

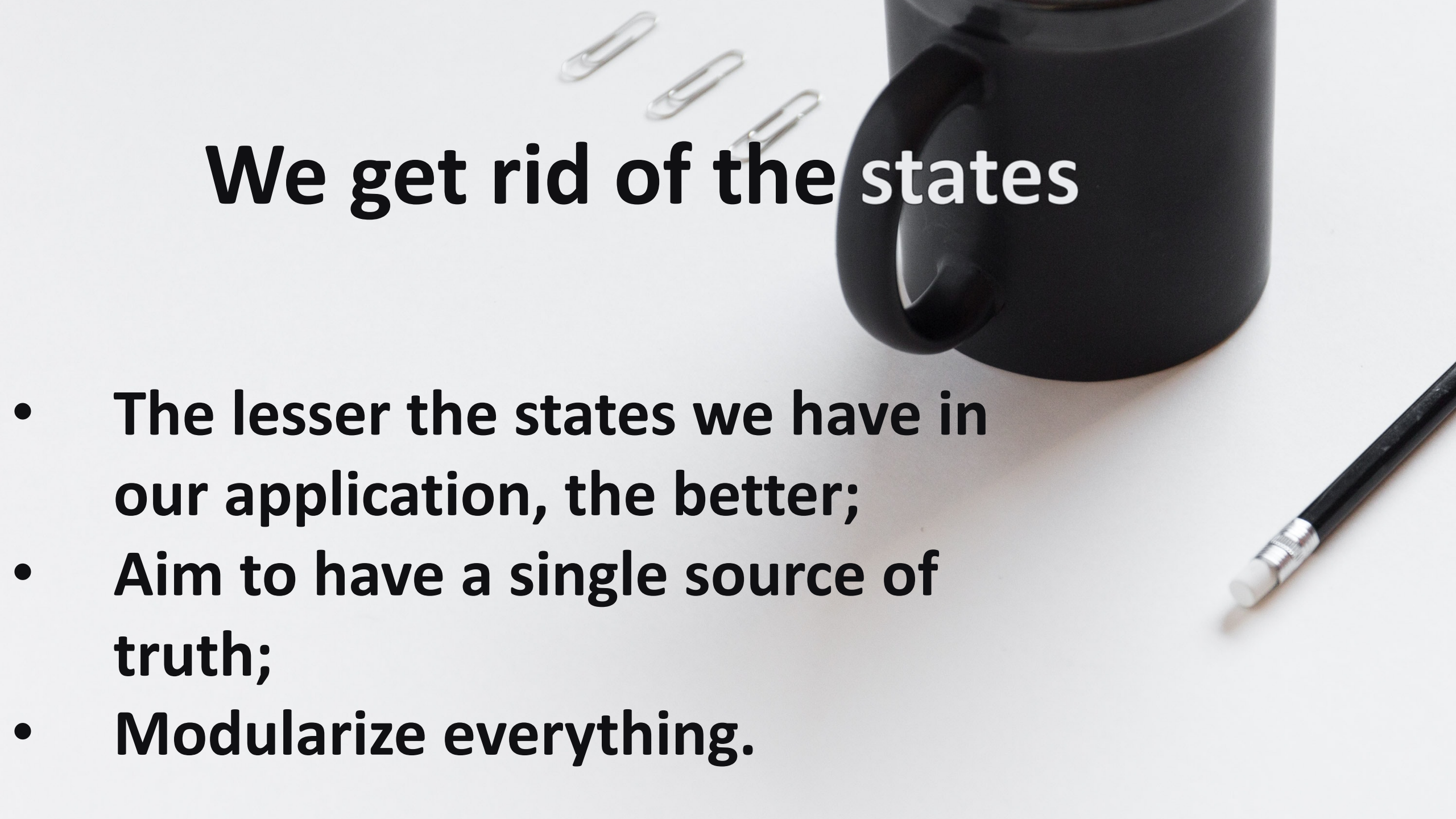

M
The Model is the state of the application

The View is responsible for displaying the state of the application, but has a state of its own as well

The Controller is responsible for changing the state of the application, but has a state of its own, and can change the state of the View as well


M
V
C

How to fix it?



We get rid of the states

- The lesser the states we have in our application, the better;
- Aim to have a single source of truth;
- Modularize everything.

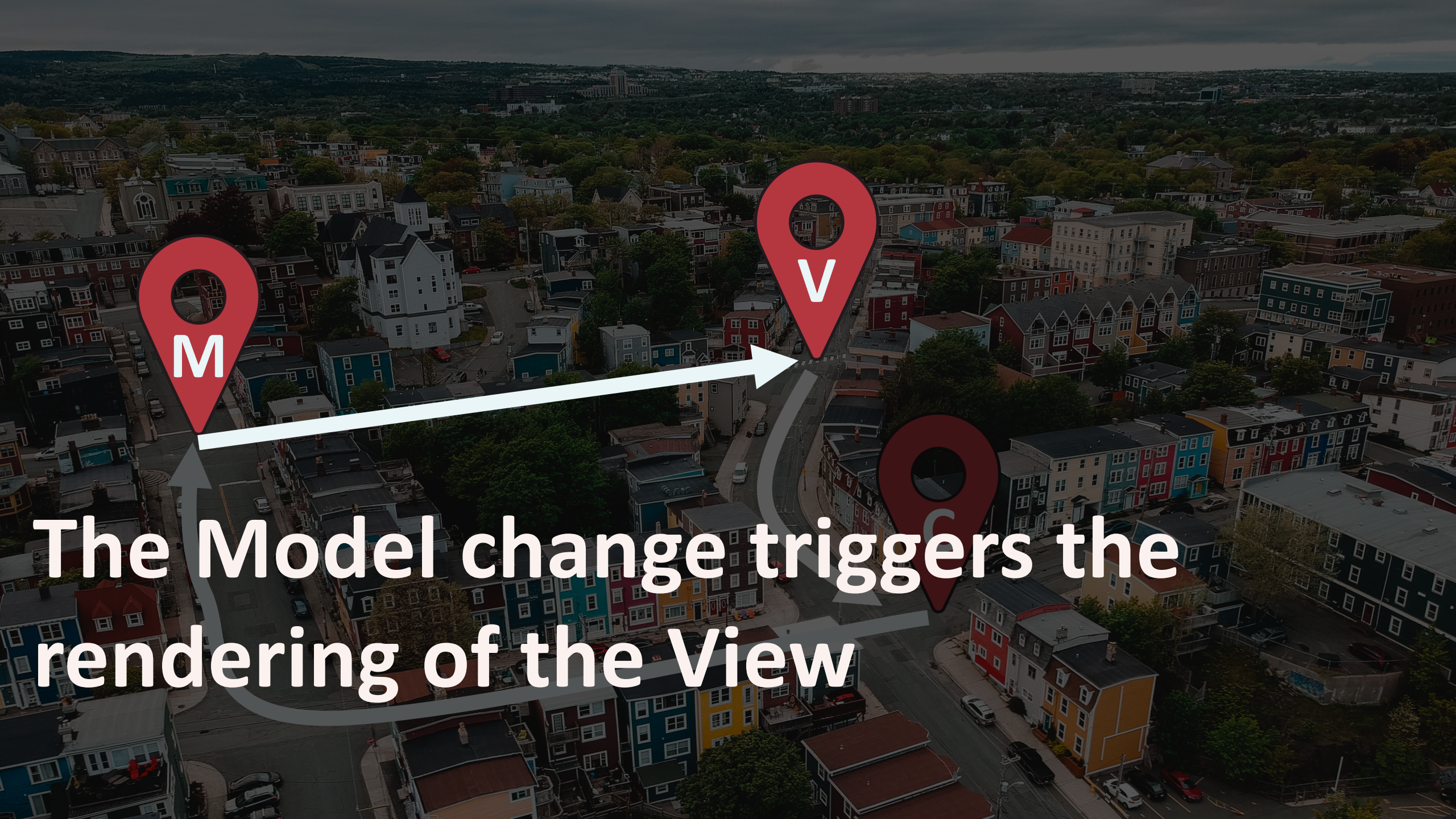
Redeveloping our village


M
V
C

The View can send events to the Controller, and we will avoid all internal states of the view

The controller is forbidden to access the internal state of the View

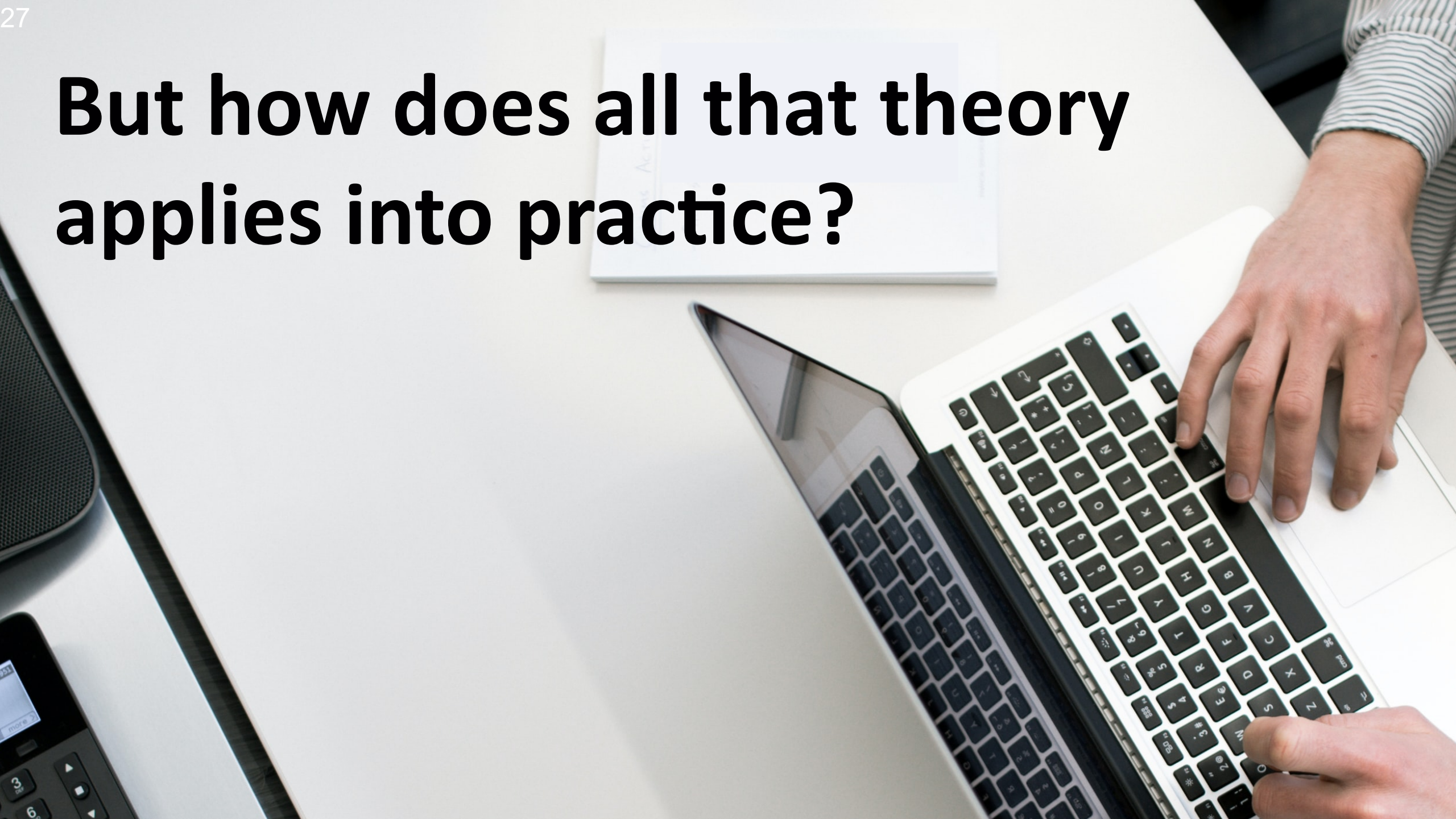

The Controller will read and write on the Model, and that is the only way to interact with the state of the application
M
C



The Model change triggers the rendering of the View

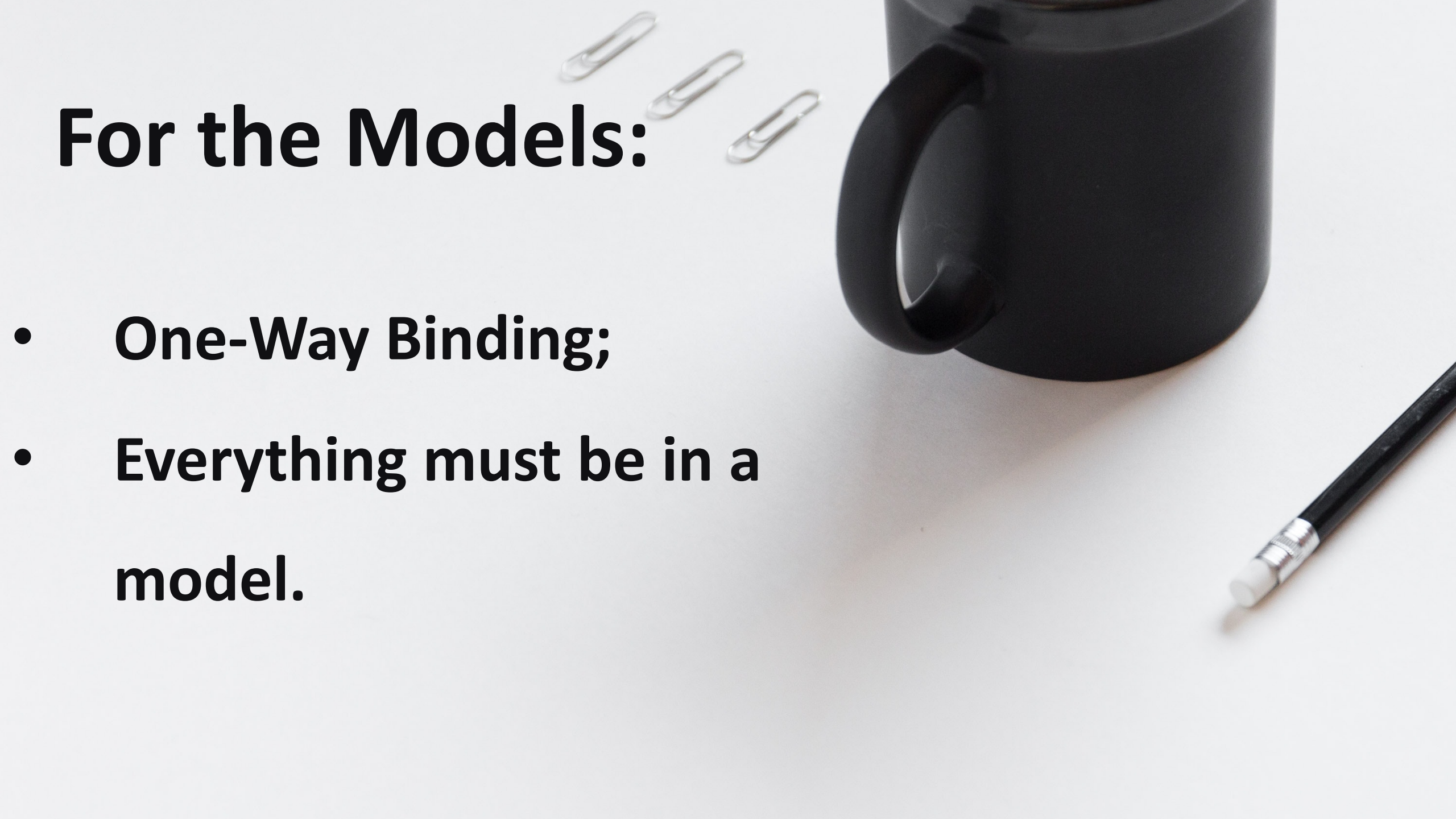

M
V
C

But how does all that theory applies into practice?



For the Models:

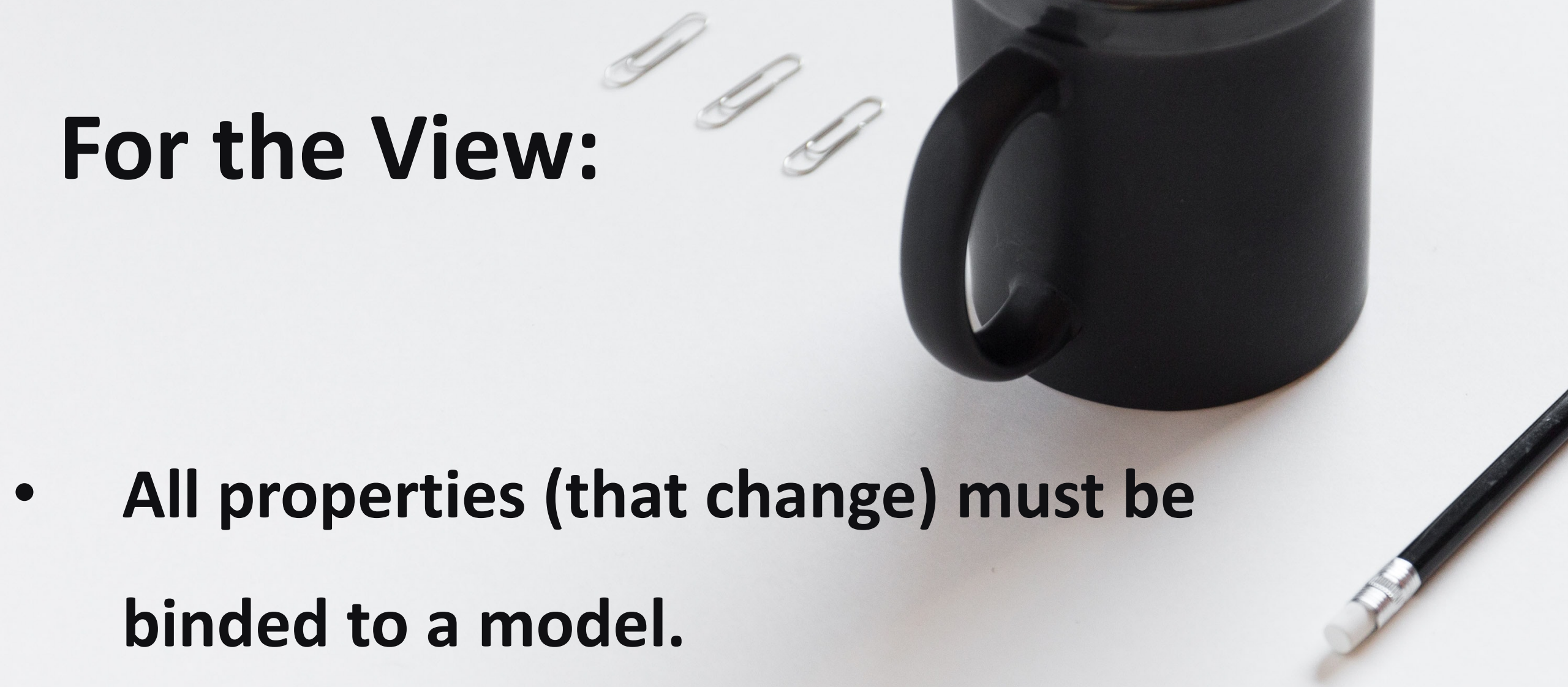
- One-Way Binding;
- Everything must be in a model.



For the Controller:

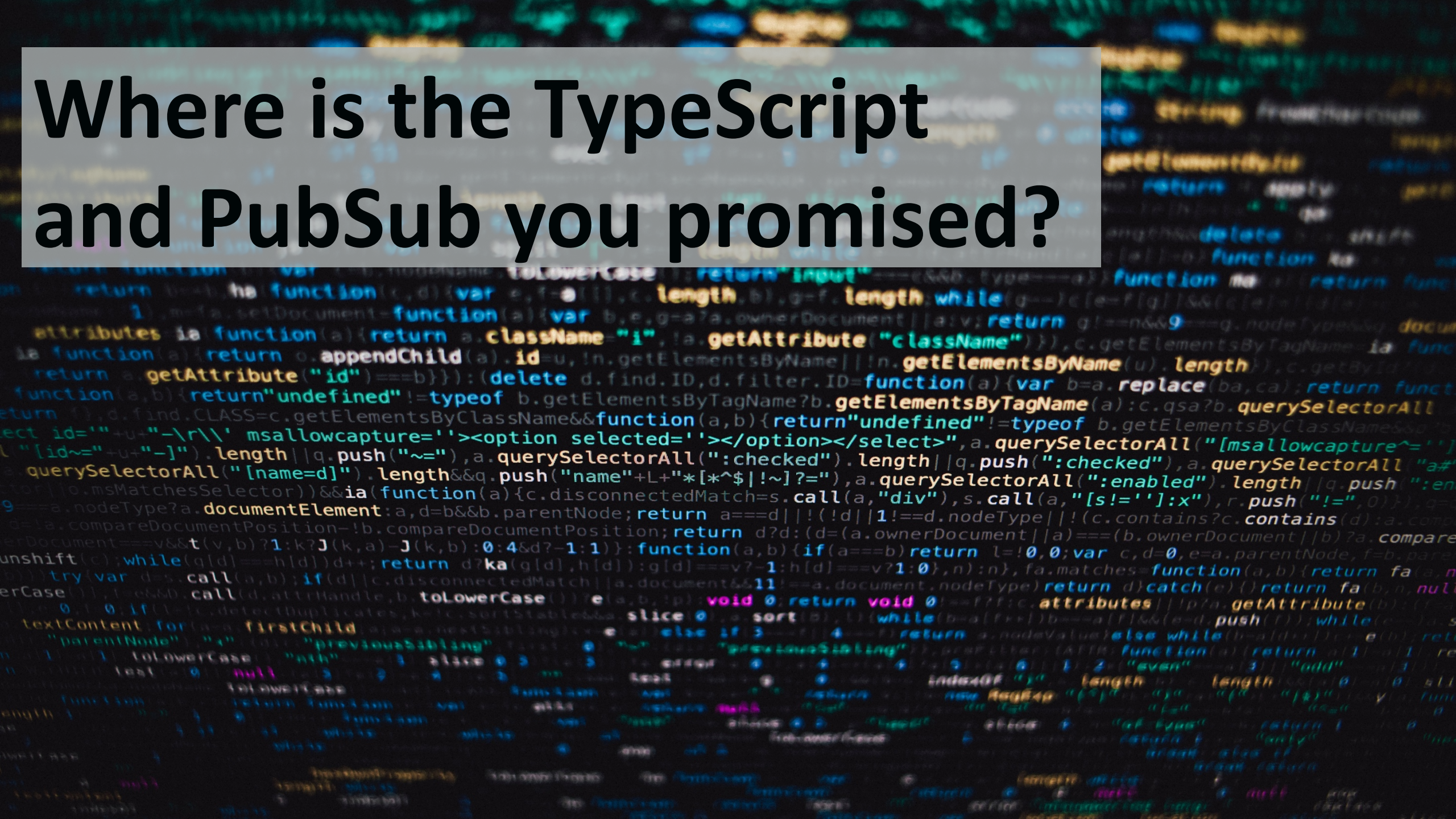
- `byId` is forbidden, to avoid touching the View's state;
- No reference to the View, or Controls, ever;
- Only for removing data from UI5 and sending to your classes.

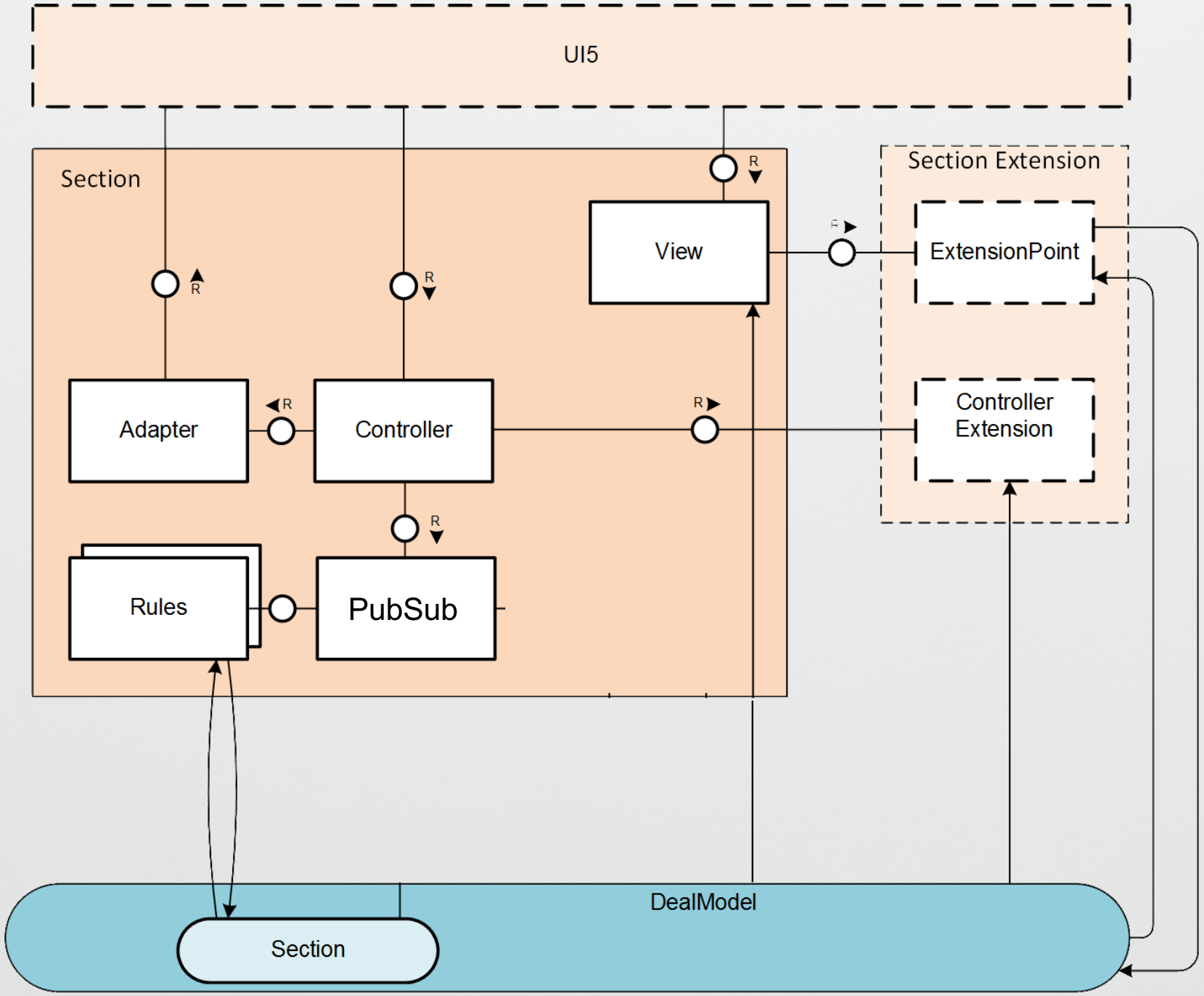
For the View:



- All properties (that change) must be binded to a model.

Where is the TypeScript and PubSub you promised?




UI5
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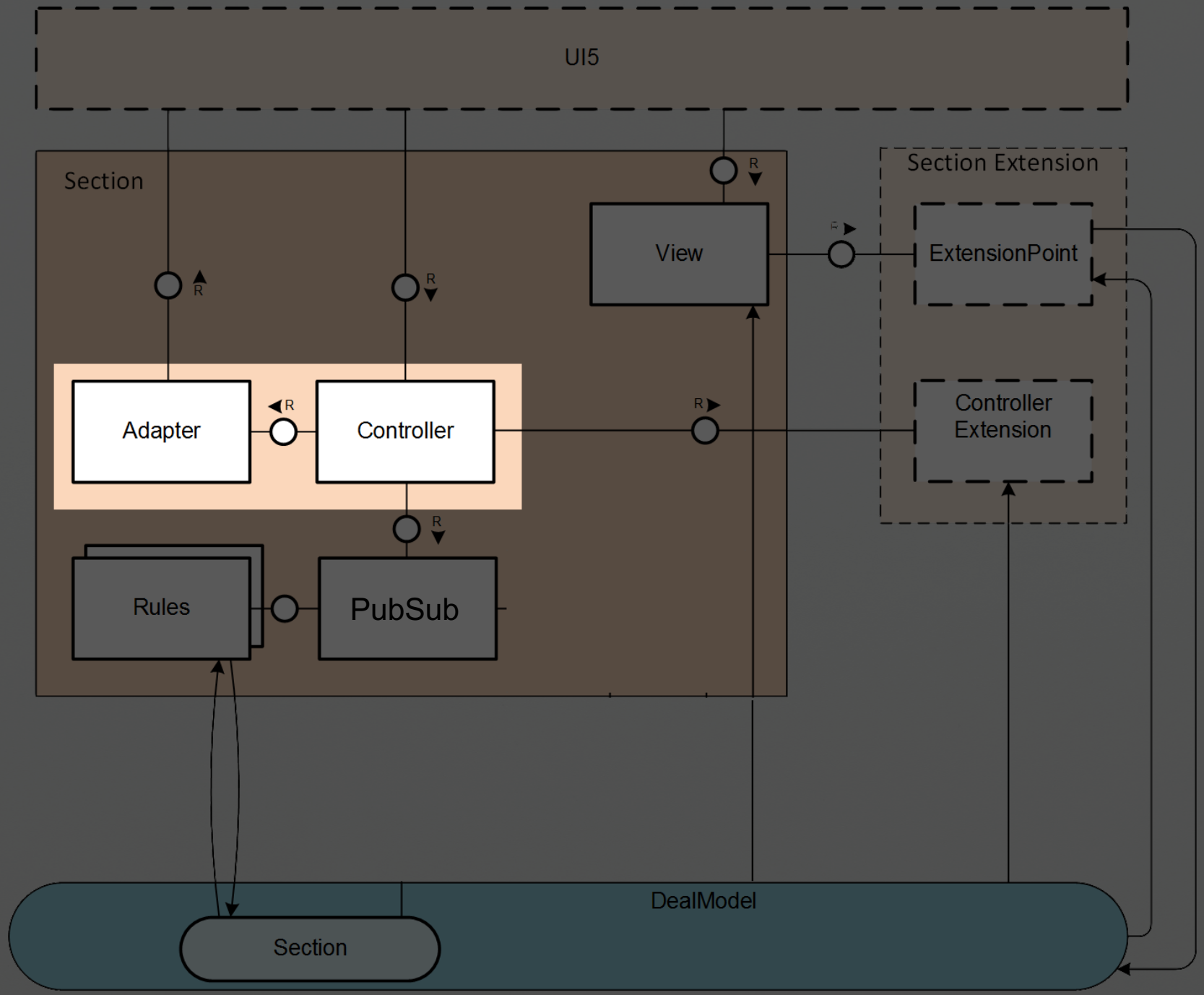
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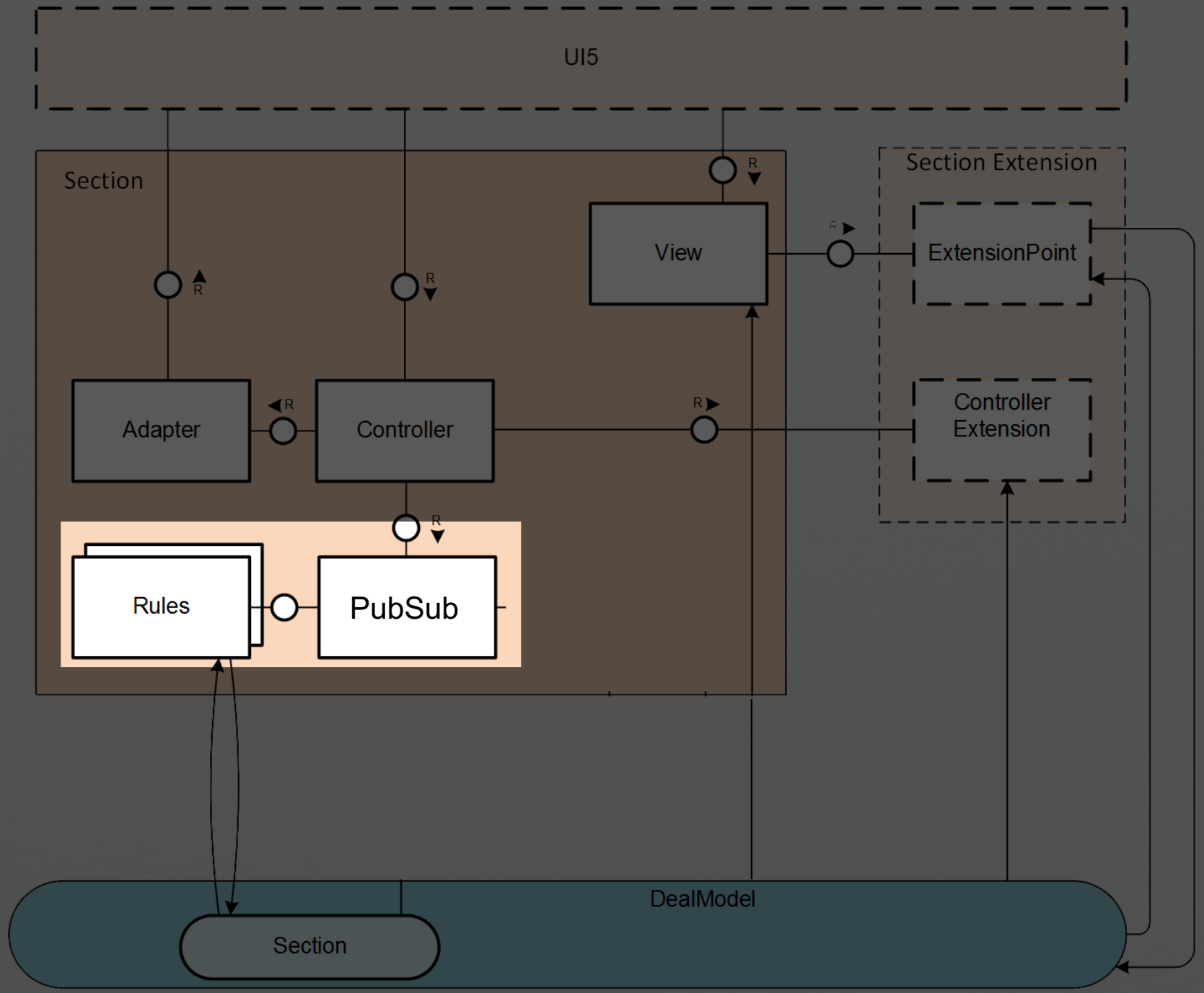
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R

TypeScript

- A Superset of JavaScript;
- Made by Microsoft;
- Imagine the power of typed languages allied with the versatility of JavaScript.

PubSub:

- Publish & Subscribe;
- Wrapper around SAPUI5’s EventBus;
- Optimized for TypeScript.

```
    .fromEvent("Detail.CreateDetailPressed")
    .publish({
      createDetailPressedParameters,
      detailComposite
    });
}

public onDealTransactionTypeChanged(): void {
  const headerComposite = this.adapter.getHeaderComposite();
  const transactionType = this.adapter.getDealTransactionType();
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Header.DealTransactionTypeChanged")
    .publish({
      transactionType,
      headerComposite
    });
}

public onErrorMessagePopoverItemSelected(target: Target): void {
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Capture.ErrorMessageClicked")
```

```
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Detail.CreateDetailPres
    .publish({
      createDetailPressedParameters,
      detailComposite
    });
}

public onDealTransactionTypeChanged():
  const headerComposite = this.adapter.
  const transactionType = this.adapter.getDealTransactionType();
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Header.DealTransactionTypeChanged")
    .publish({
      transactionType,
      headerComposite
    });
}

public onErrorMessagePopoverItemSelected(target: Target): void {
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Capture.ErrorMessageClicked")
```

```
public getDealTransactionType(): TransactionType {
  const headerAPI = this.getHeaderAPI();
  const dealTransactionType = String(
    headerAPI.getProperty("transactionType")
  ) as TransactionType;
  return dealTransactionType;
}
```

```
(method) MainAdapter.getDealTransactionType(): TransactionType
```

```
  );
  const createDetailPressedParameters = this.extractCreateDetailPressedParametersFromUI5();
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Detail.CreateDetailPressed")
    .publish({
      createDetailPressedParameters,
      detailComposite
    });
}

public
  cons
  cons
  if (transactionType === "RANDOM_STRING") {

  }
  ServiceLocator.getInstance()
    .locate(LocatableServices.EventBus)
    .fromEvent("Header.DealTransactionTypeChanged")
    .publish({
      transactionType,
      headerComposite
    });
}
```

This condition will always return 'false' since the types 'TransactionType' and '"RANDOM_STRING"' have no overlap. ts(2367)

Peek Problem (⌥F8) No quick fixes available

```
}

public onDealTransactionTypeChanged(): void {
  const headerComposite = this.adapter.getHeaderComposite();
  const transactionType = this.adapter.getDealTransactionType();
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    .locate(LocatableServices.EventBus)
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}

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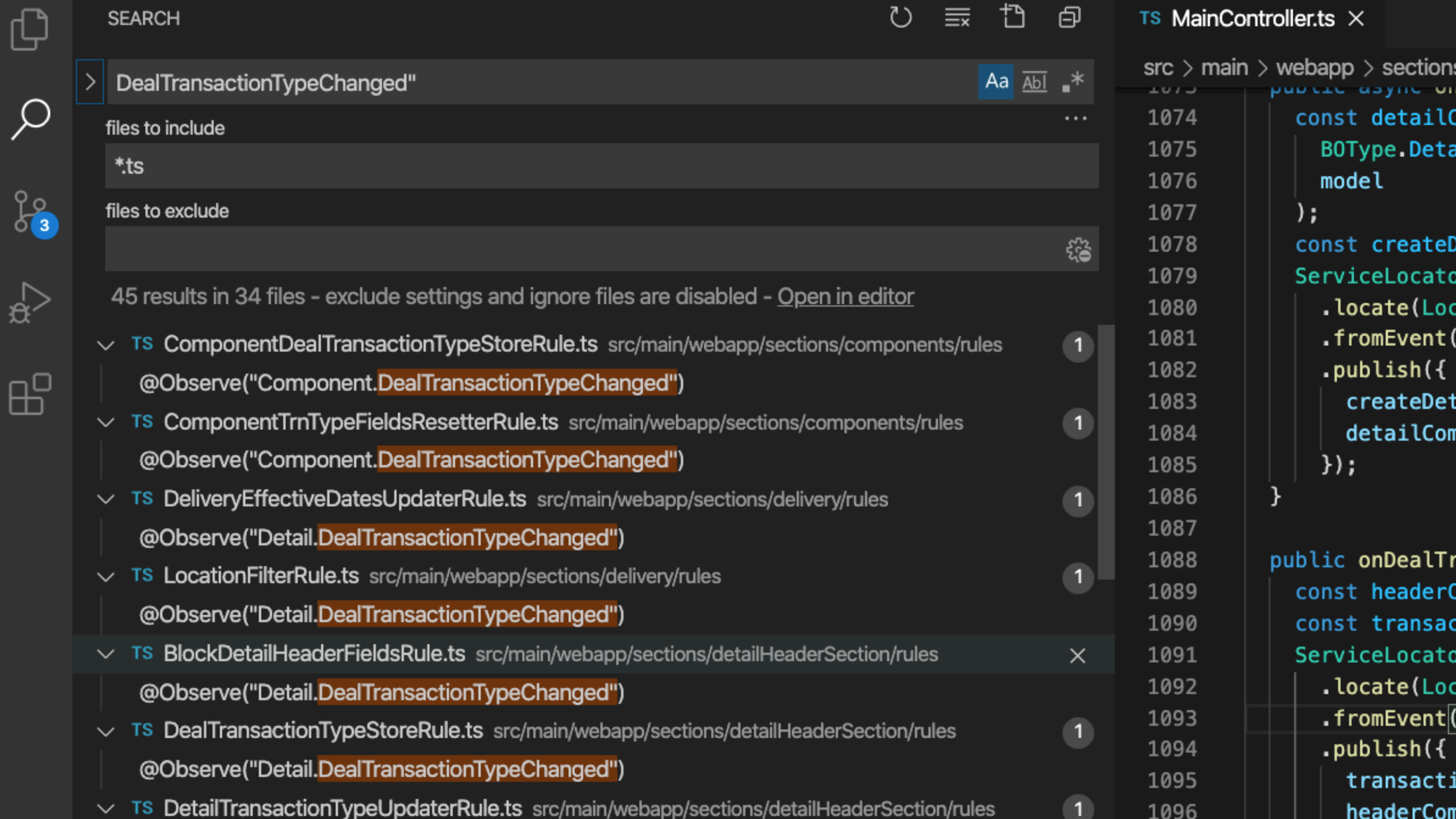
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DeliveryEffectiveDatesUpdaterRule.ts src/main/webapp/sections/delivery/rules 1
@Observe("Detail.DealTransactionTypeChanged")
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1094 .publish({
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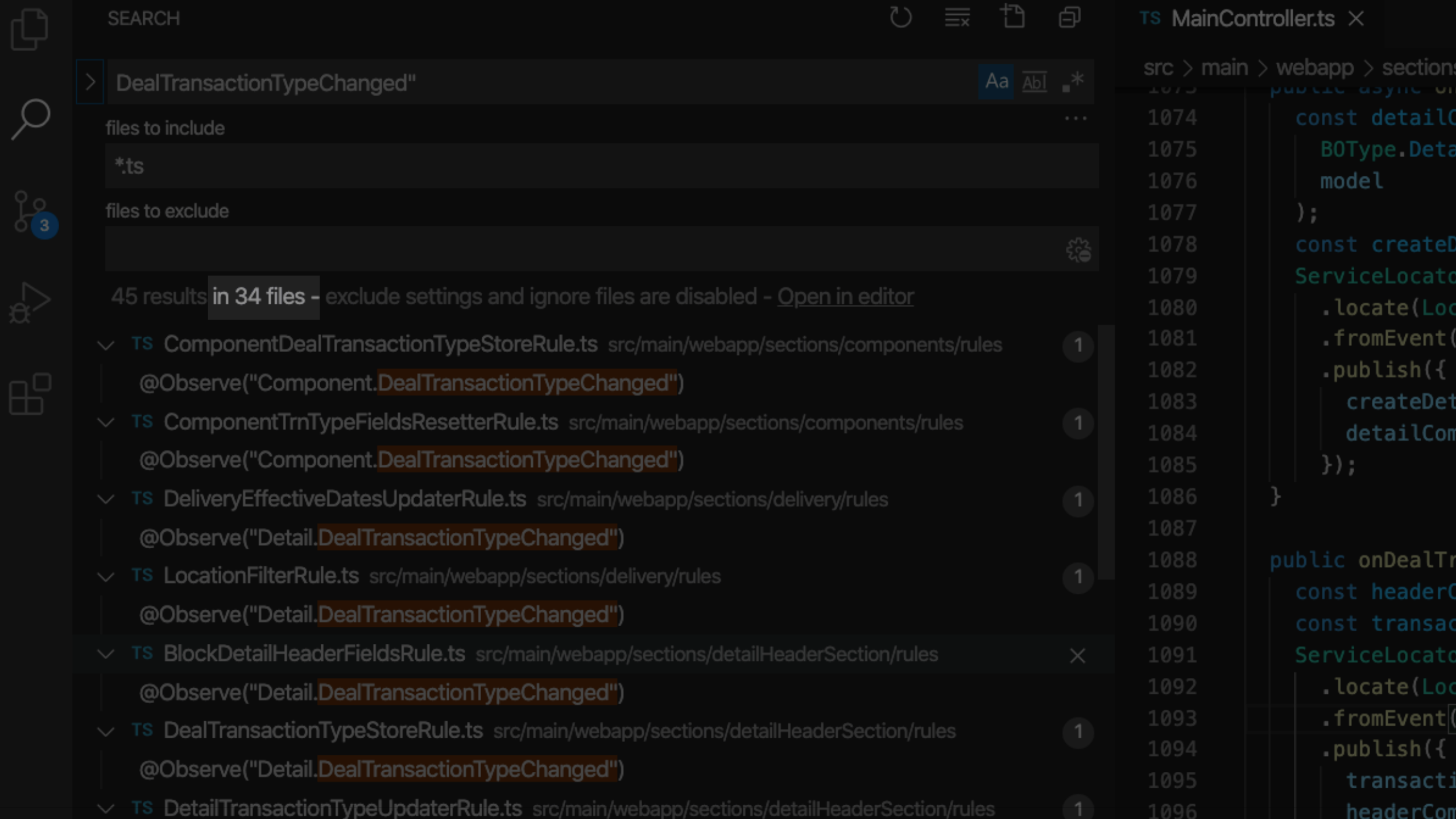
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.fromEvent(
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atesDefaultRule.ts src/main/webapp... 1
PricingItem.DealTransactionTypeChange...
TypeFieldsResetterRule.ts src/main/... 1
PricingHeader.DealTransactionTypeChan...

```
@Listener<DealHeaderEffectiveDatesReseter>()
export class DealHeaderEffectiveDatesReseter
  implements DealTypeChangedObserver {
  private header: Context;

  constructor(private dealTypeLoader: DealTypeLoader) {}

  @Observe("Header.DealTypeChanged")
  public async onDealTypeChanged({
    headerComposite
  }: DealTypeArgument & ApibHeaderEventArgument): Promise<void> {
    this.header = headerComposite.getContext();
    await this.resetDealHeaderEffectiveDates();
  }

  @Observe("Header.DealTransactionTypeChanged")
  public onDealTransactionTypeChanged({
    headerComposite
  }: DealTransactionTypeArgument & ApibHeaderEventArgument): Promise<void> {
    this.header = headerComposite.getContext();
    return this.resetDealHeaderEffectiveDates();
  }

  private async resetDealHeaderEffectiveDates(): Promise<void> {
    const isEvergreen = await this.isEvergreen();
    if (this.header && !isEvergreen && !this.isIntraStrategy()) {
      this.header.setProperty("effectiveTo", null);
      this.header.setProperty("effectiveFrom", null);
    }
  }

  private async isEvergreen(): Promise<boolean> {
    const dealTypeSelected = this.header.getProperty("dealType");
    const dealType = await this.dealTypeLoader.getDealType(dealTypeSelected);
    return Boolean(dealType && dealType.isEvergreen);
  }

  private isIntraStrategy(): boolean {
    const transactionType = this.header.getProperty("transactionType");
    return transactionType === TransactionType.INTRASTRATEGY;
  }
}
```

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  }

  @Observe("Header.DealTypeChanged")
  public async onDealTypeChanged({
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private async resetDealHeaderEffectiveDates(): Promise<void> {
  const isEvergreen = await this.isEvergreen();
  if (this.header && !isEvergreen && !this.isIntraStrategy()) {
    this.header.setProperty("effectiveTo", null);
    this.header.setProperty("effectiveFrom", null);
  }
}

private async isEvergreen(): Promise<boolean> {
  const dealTypeSelected = this.header.getProperty("dealType");
  const dealType = await this.dealTypeLoader.getDealType(dealTypeSelected);
  return Boolean(dealType && dealType.isEvergreen);
}

private isIntraStrategy(): boolean {
  const transactionType = this.header.getProperty("transactionType");
  return transactionType === TransactionType.INTRASTRATEGY;
}
```

Sadly, it’s time to go.
More information:

Boilerplate to start a new project following this style:

https://github.wdf.sap.corp/ASE-IBSO-Brazil/UI5-ts-pubsub-boilerplate

Soon to be open sourced!

Main takeaways

- Limit the MVC flow inside your application to have greater control;
- Prefer One-Way binding;
- Avoid calling methods in the View/Controls (byId/setVisible/setBusy);
- All View properties must binded to a Model;
- Use TypeScript if you can;
- Split your Controller into several classes;

Thank you (for real this time)

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UI5con ON AIR