Reactive Web Apps with Angular 2

Magdeburg Full Stack JavaScript

November 3rd, 2016

meetup.com/Magdeburg-Full-Stack-JavaScript

About

Web developer turned Java developer turned project manager turned co-founder.

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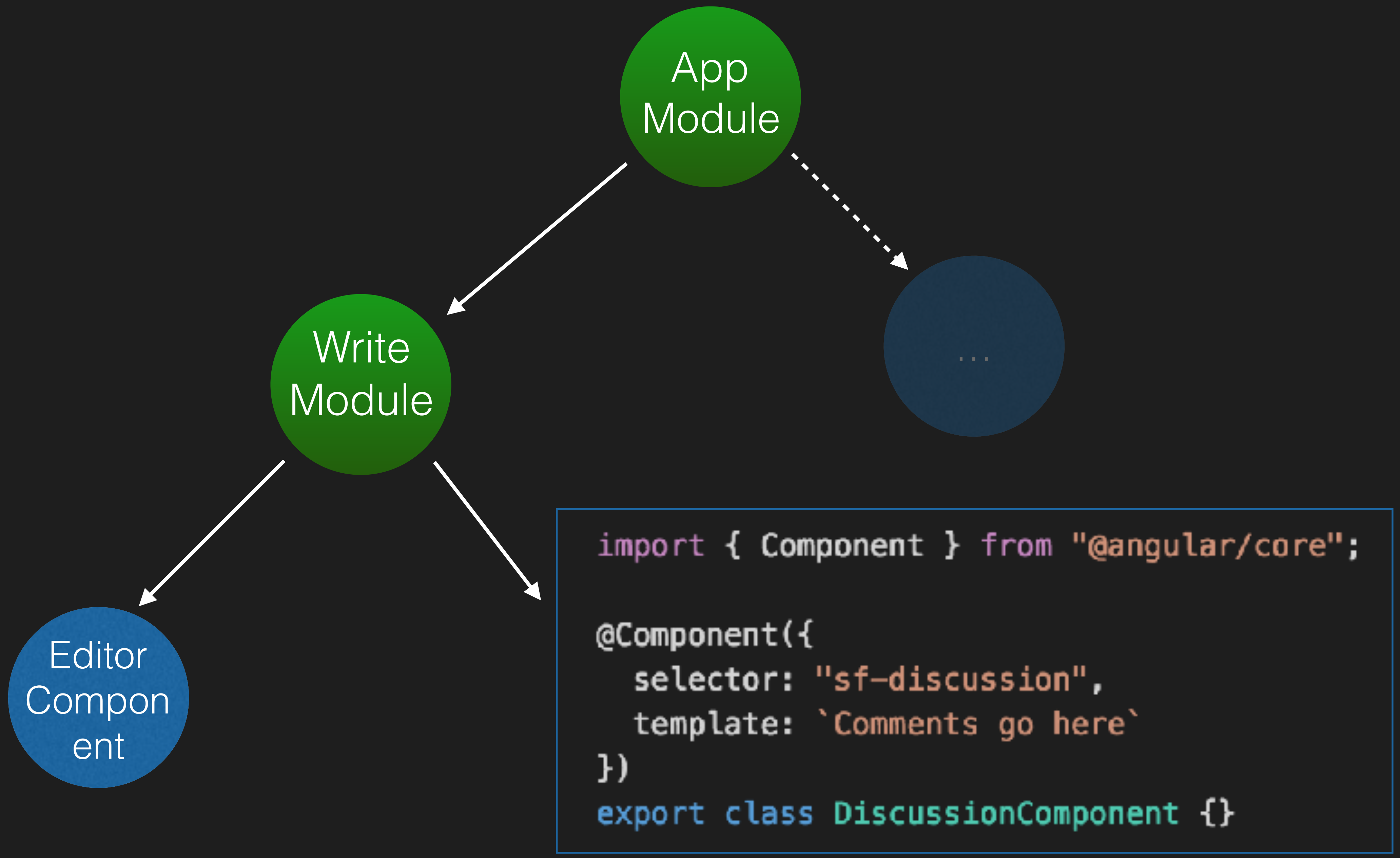
SciFlow makes writing and publishing research papers simpler and more productive.

What is Angular?

Development **platform** for building mobile and desktop applications.

- extends HTML <my-app />
- provides injectors and
- data binding
- Allows for tooling and performance optimizations

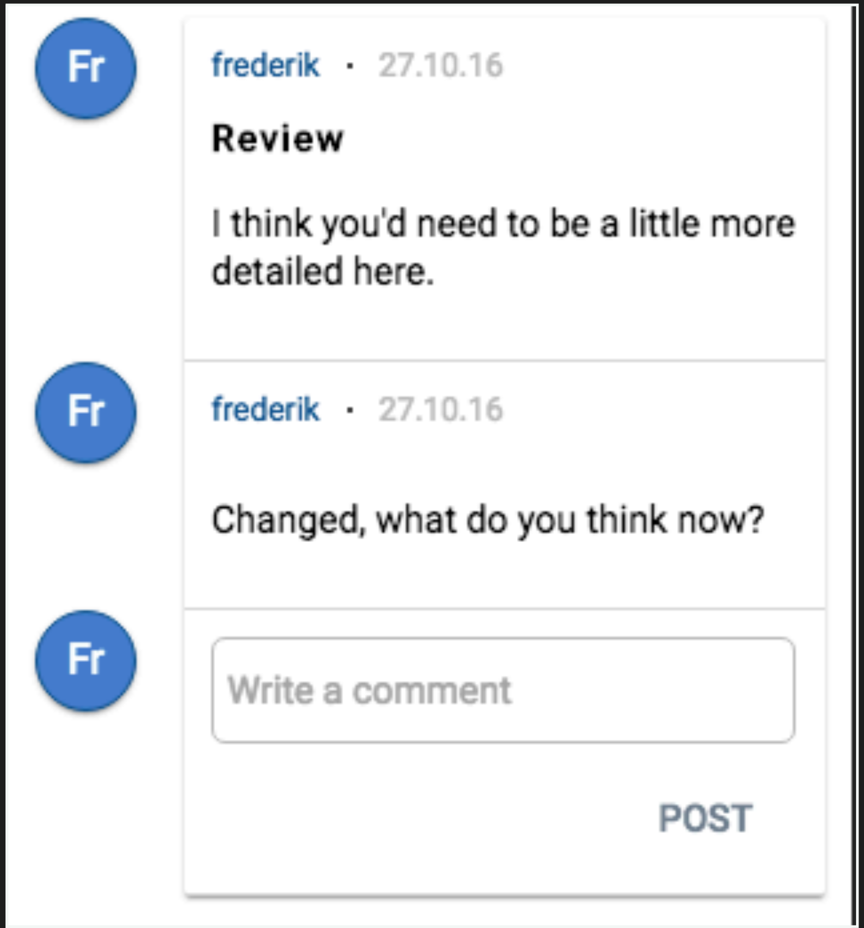
Angular App



```
import { Component } from "@angular/core";

@Component({
  selector: "sf-discussion",
  template: `Comments go here`
})
export class DiscussionComponent {}
```

Discussion Component



Fr frederik · 27.10.16

Review

I think you'd need to be a little more detailed here.

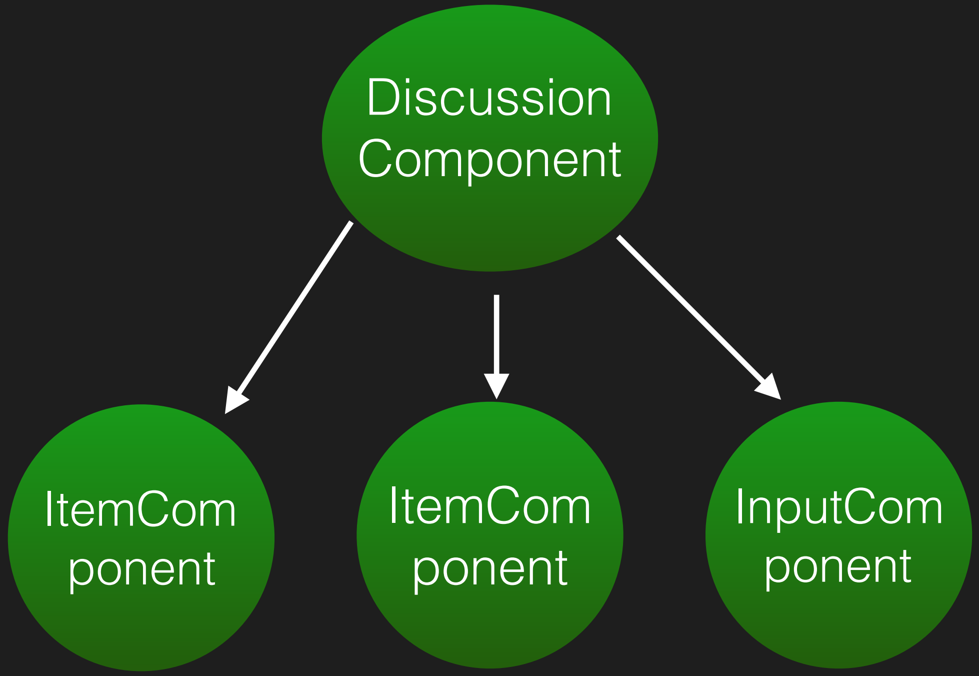
Fr frederik · 27.10.16

Changed, what do you think now?

Fr

Write a comment

POST



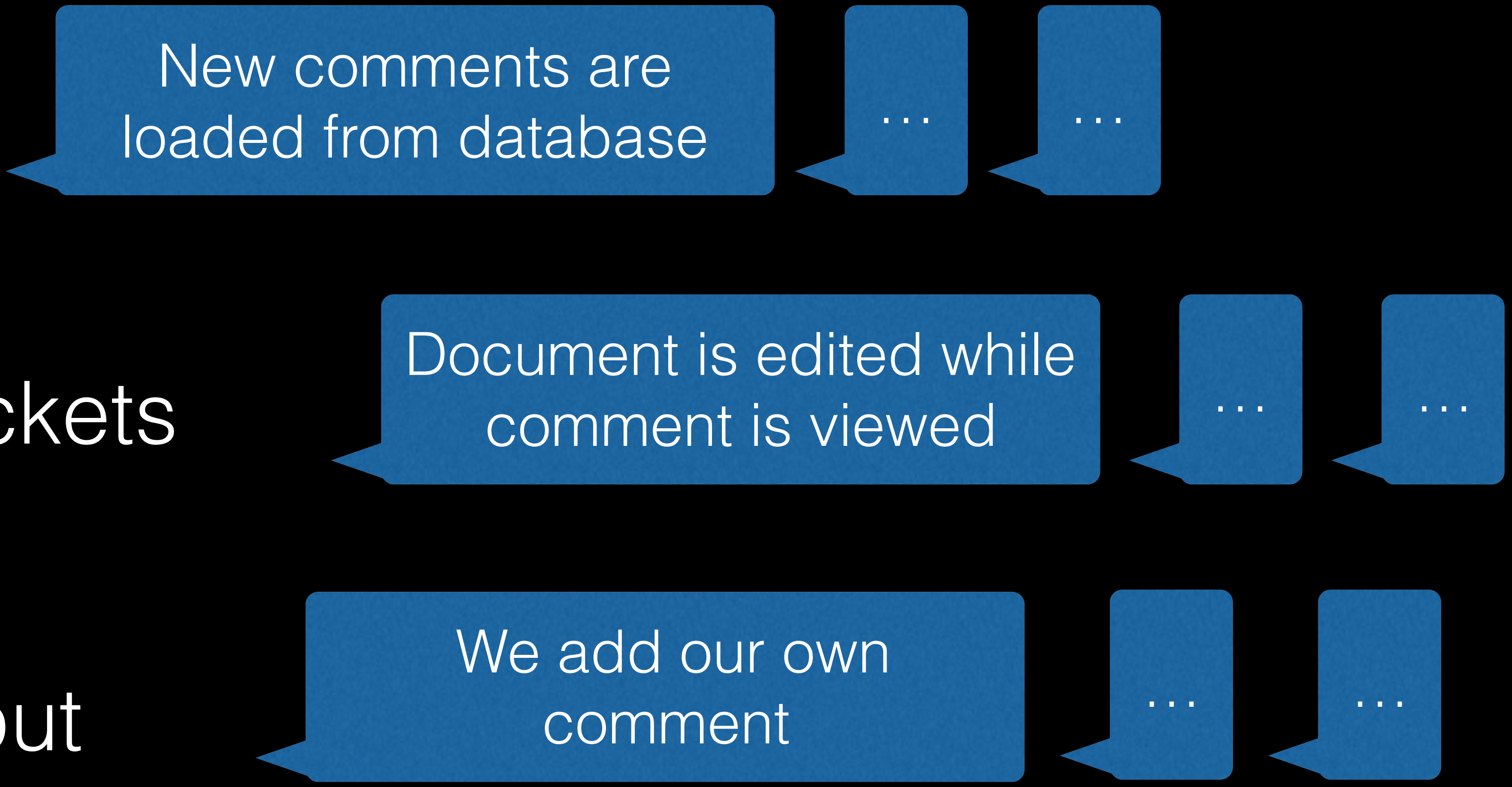
```
<sf-discussion id="discussion.id">
    <sf-discussion-item *ngFor=“let item of discussion.items” [item]="item" />
    <sf-discussion-input (submit)="addItem($event)"></sf-discussion-input>
</sf-discussion>
```

Why Angular 2* and not jQuery / Angular 1, …

*React, Elm, ..

Web apps handle a lot of real time data.

- APIs
- Web sockets
- User Input



New comments are loaded from database

…

…

Document is edited while comment is viewed

…

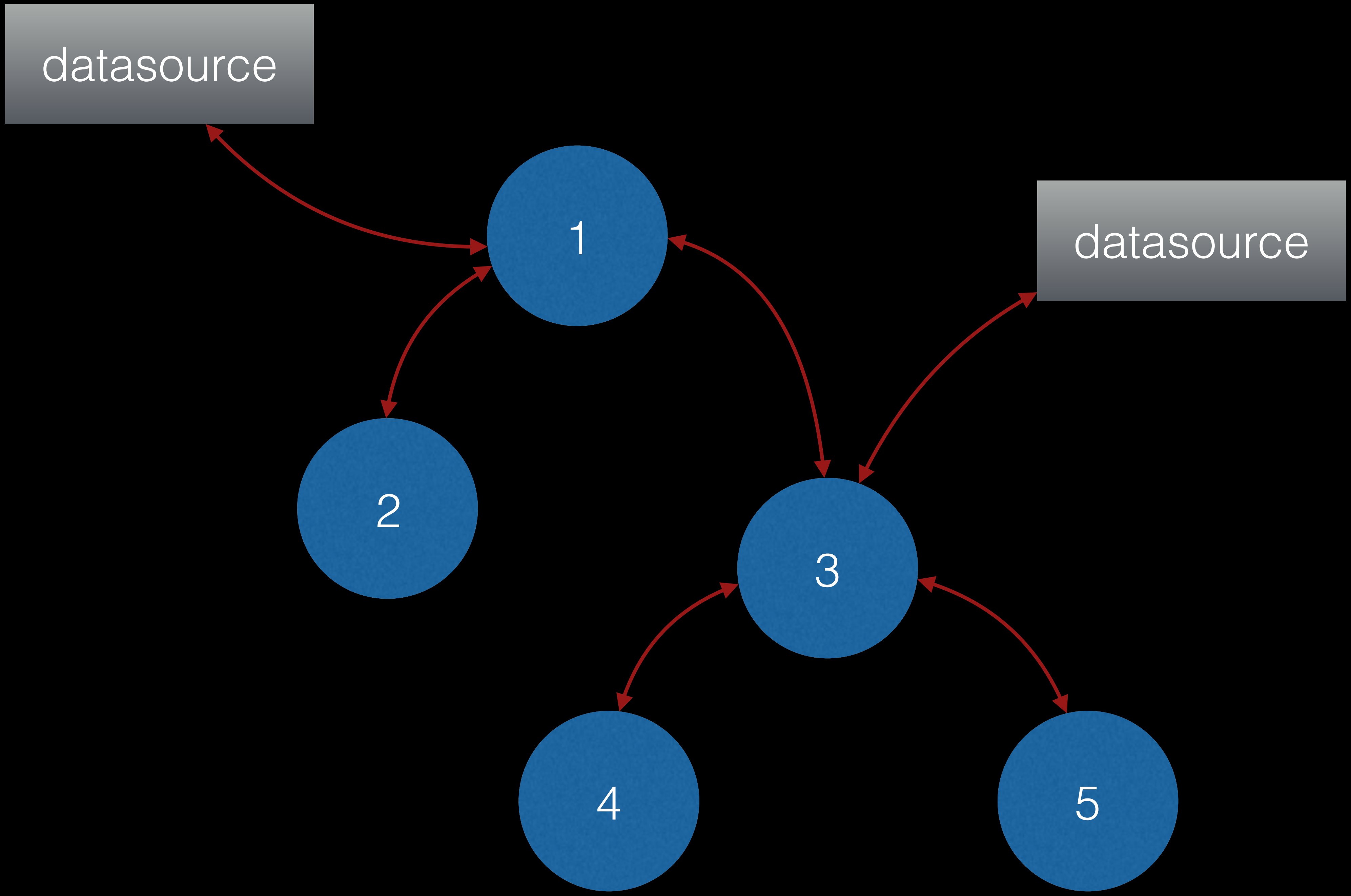
…

We add our own comment

…

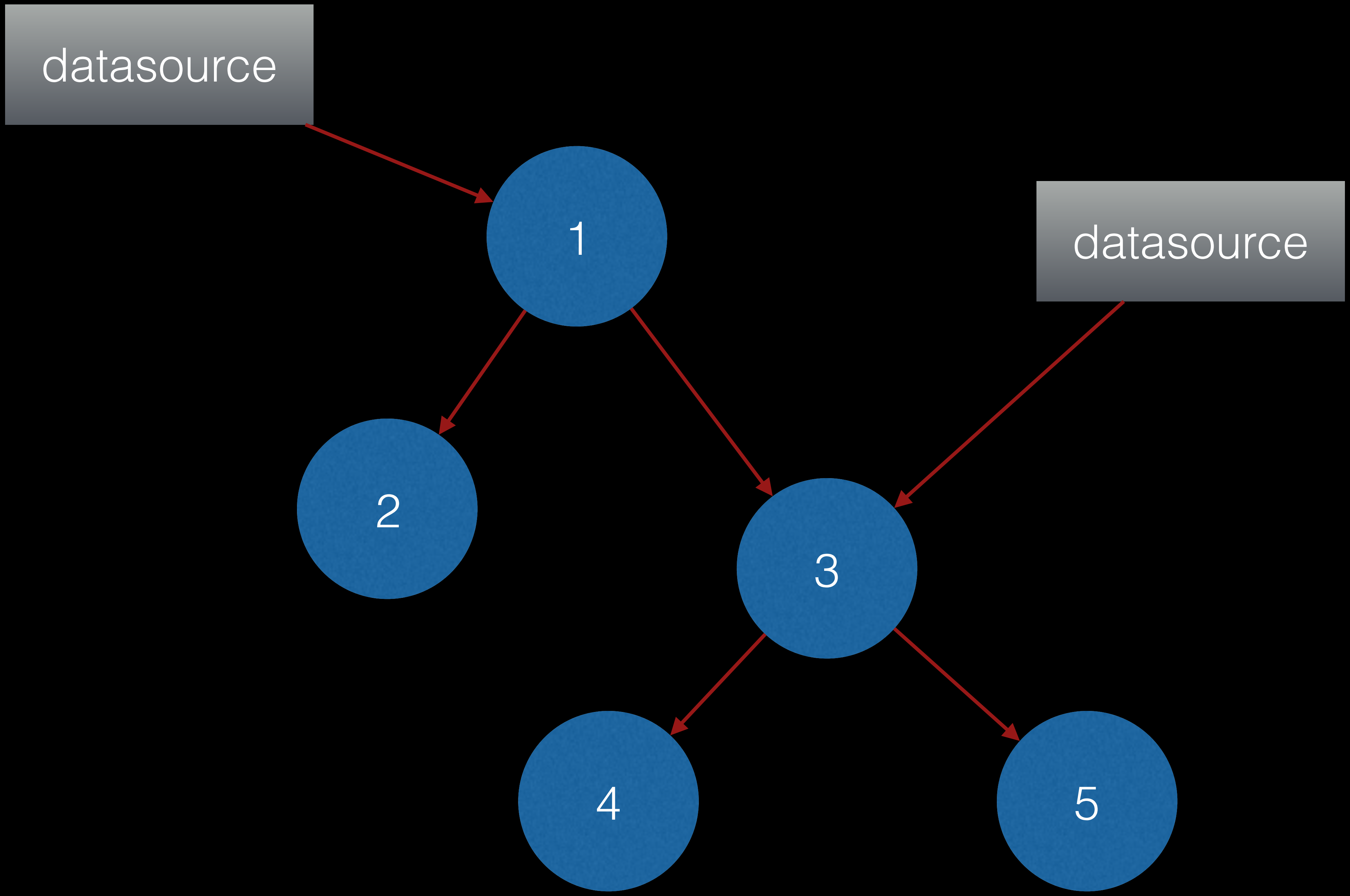
…

A web apps in 2016 are complex with many moving parts*.



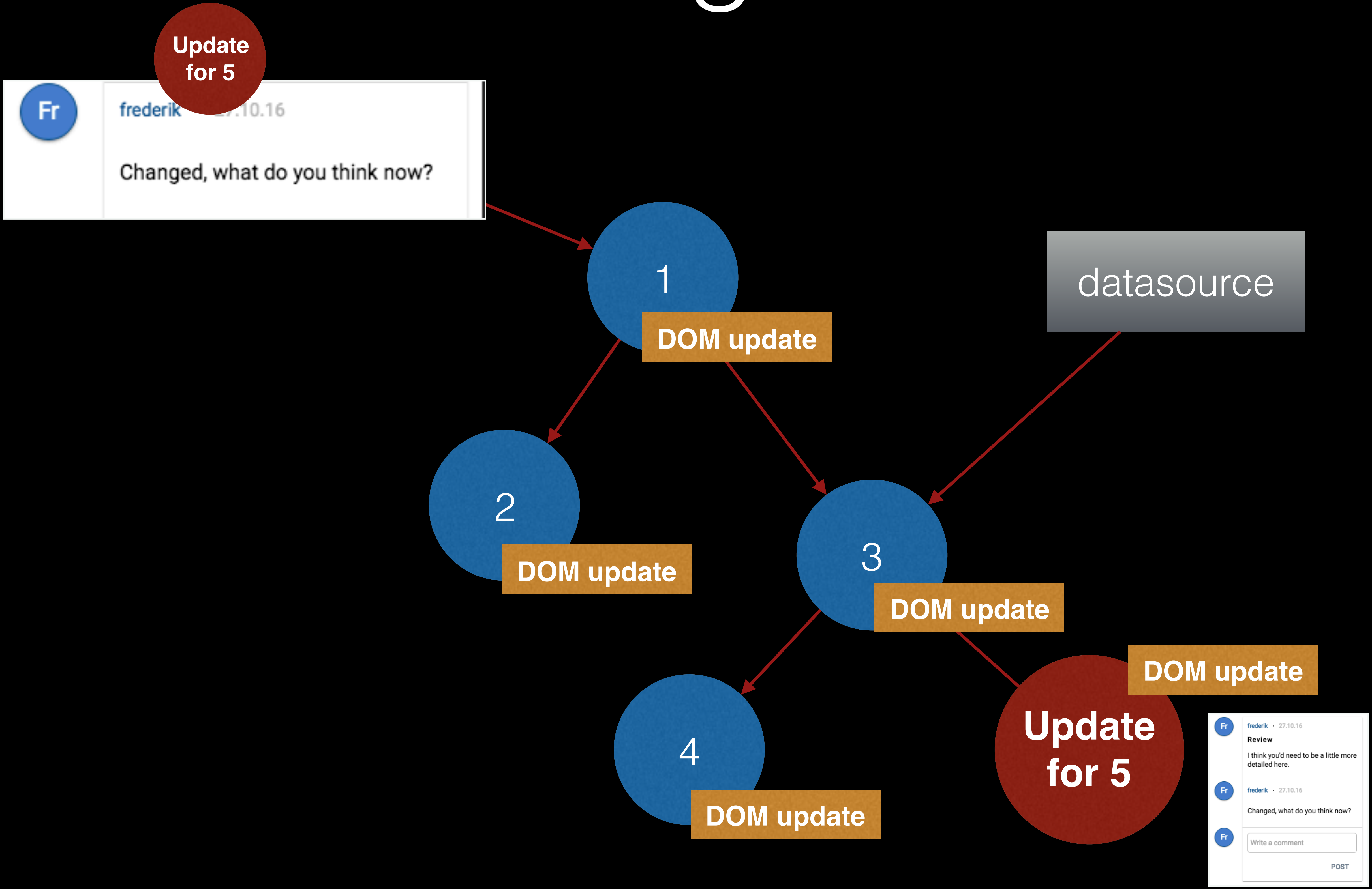
*Everyone talks to everyone

Step 1: Make reasoning easier*



*Uni-directional data flow

Naive change detection



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Changed, what do you think now?

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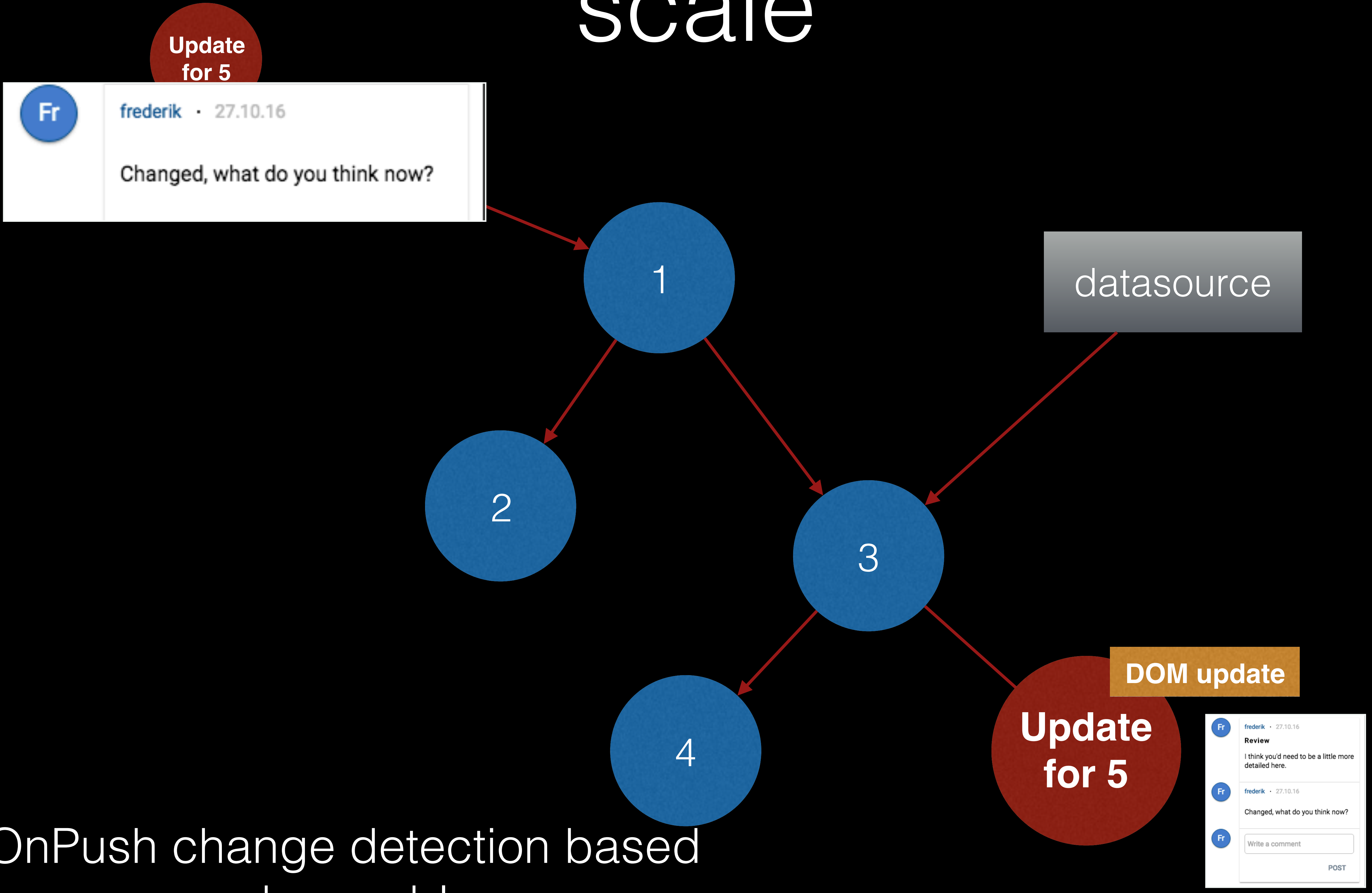
Fr frederik · 27.10.16

Changed, what do you think now?

Fr Write a comment

POST

Step 2: Make things fast at scale*



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Changed, what do you think now?

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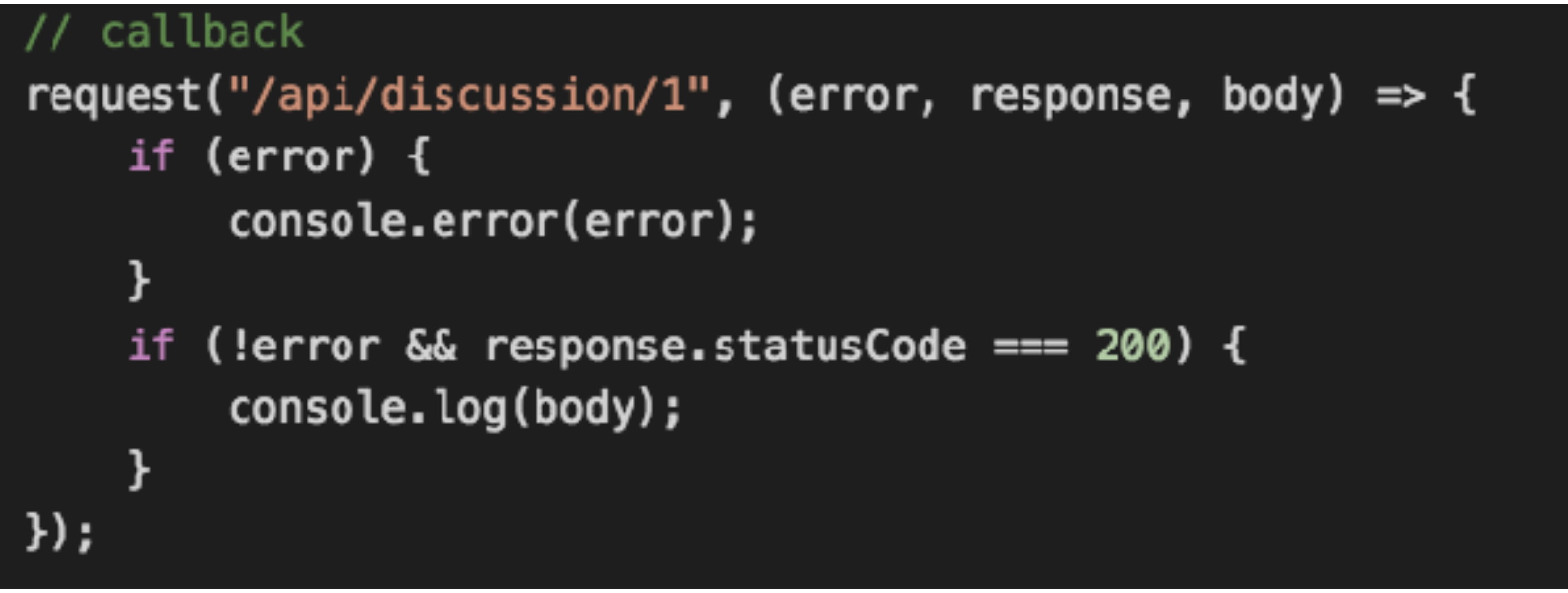
Changed, what do you think now?

*OnPush change detection based on observables

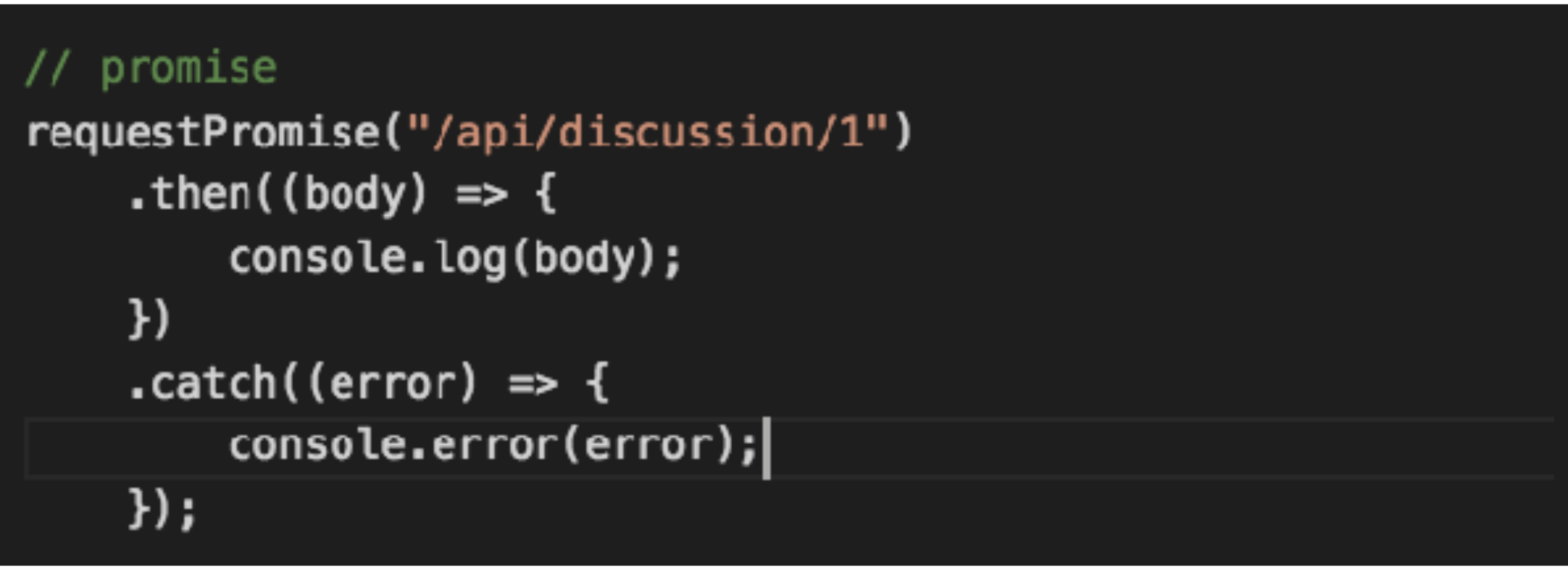
OnPush Magic through **Observables**

Ask once



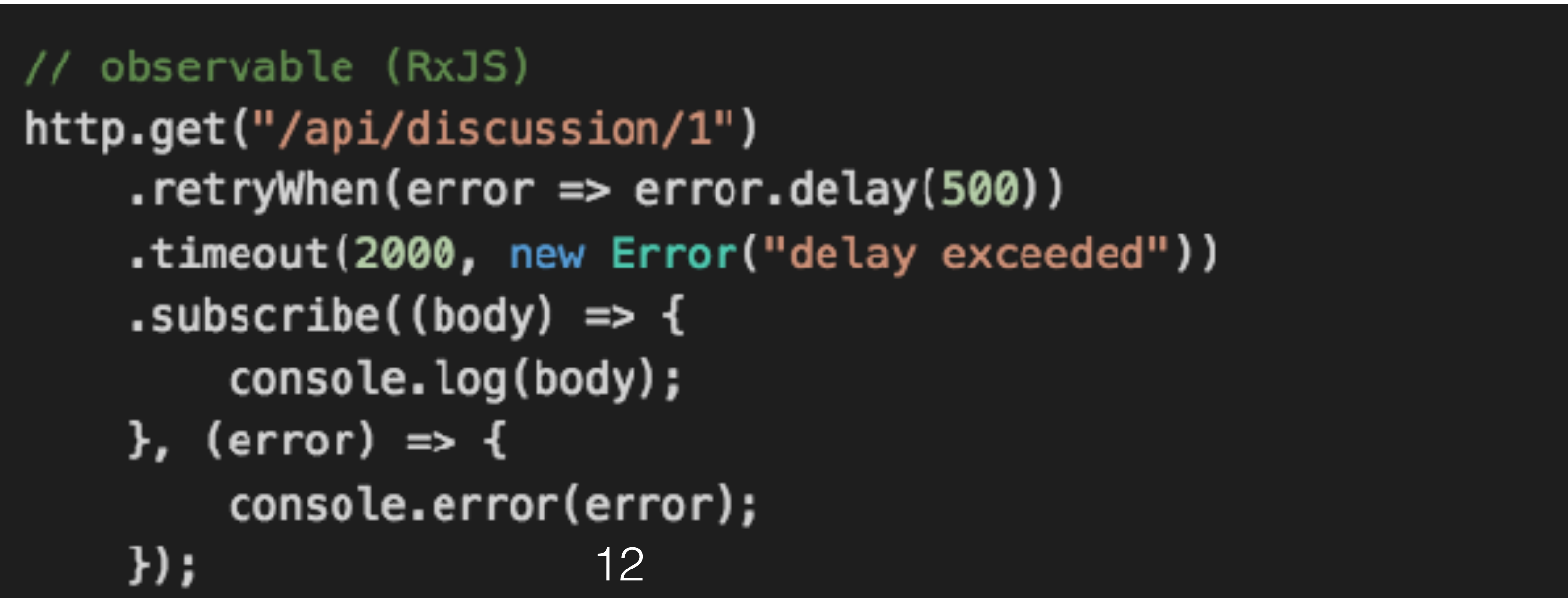
```
// callback
request("/api/discussion/1", (error, response, body) => {
    if (error) {
        console.error(error);
    }
    if (!error && response.statusCode === 200) {
        console.log(body);
    }
});
```

Ask once (but prettier)



```
// promise
requestPromise("/api/discussion/1")
    .then((body) => {
        console.log(body);
    })
    .catch((error) => {
        console.error(error);
    });
```

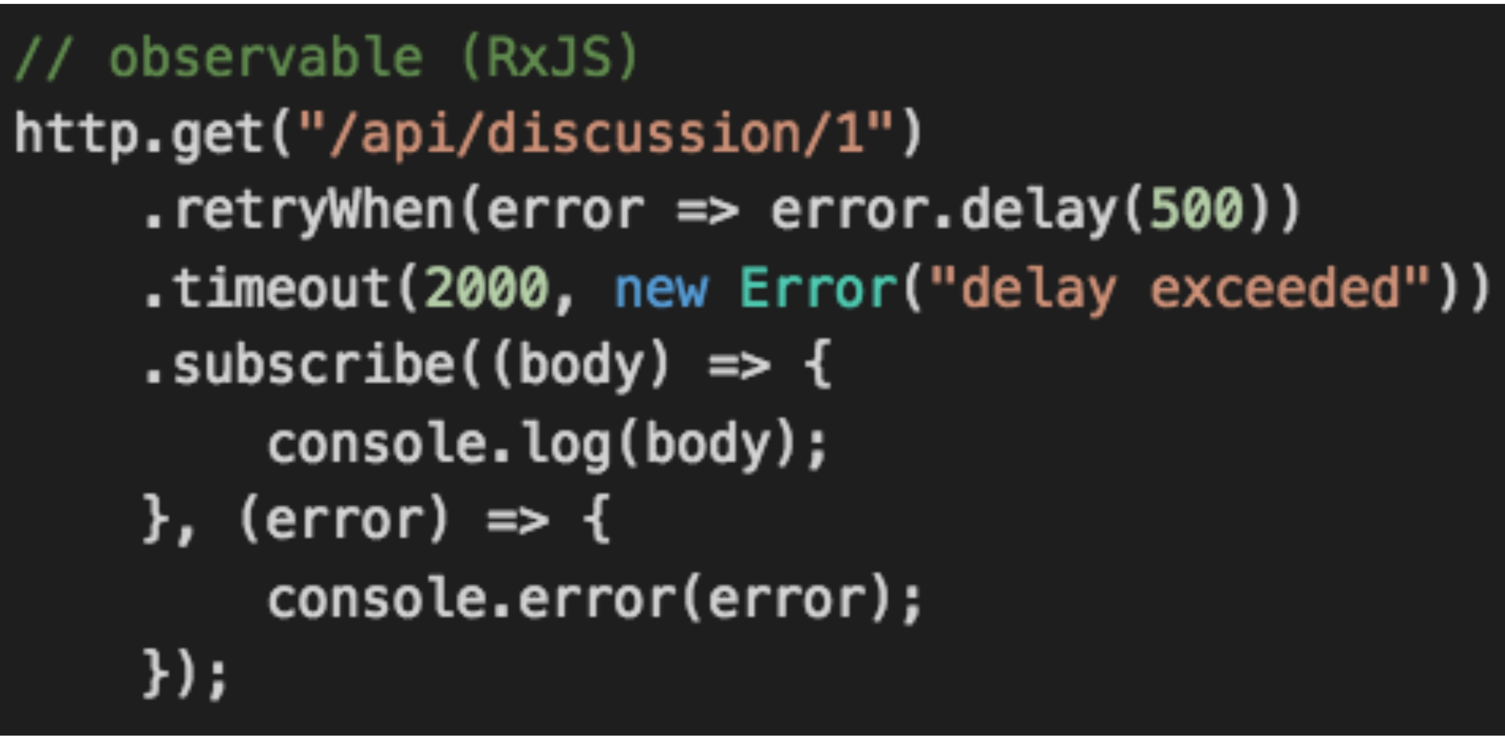
Ask until satisfied



```
// observable (RxJS)
http.get("/api/discussion/1")
    .retryWhen(error => error.delay(500))
    .timeout(2000, new Error("delay exceeded"))
    .subscribe((body) => {
        console.log(body);
    }, (error) => {
        console.error(error);
    });
```

Continuous updates of just what changed

Handle requests yourself



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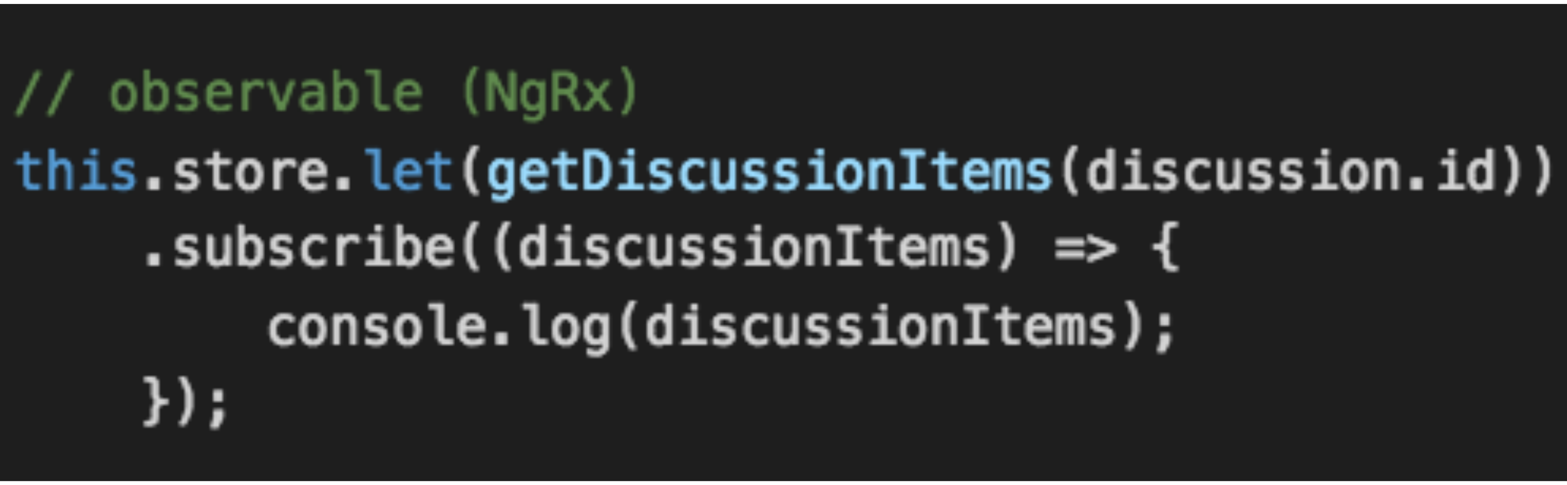
        console.error(error);
    });
```

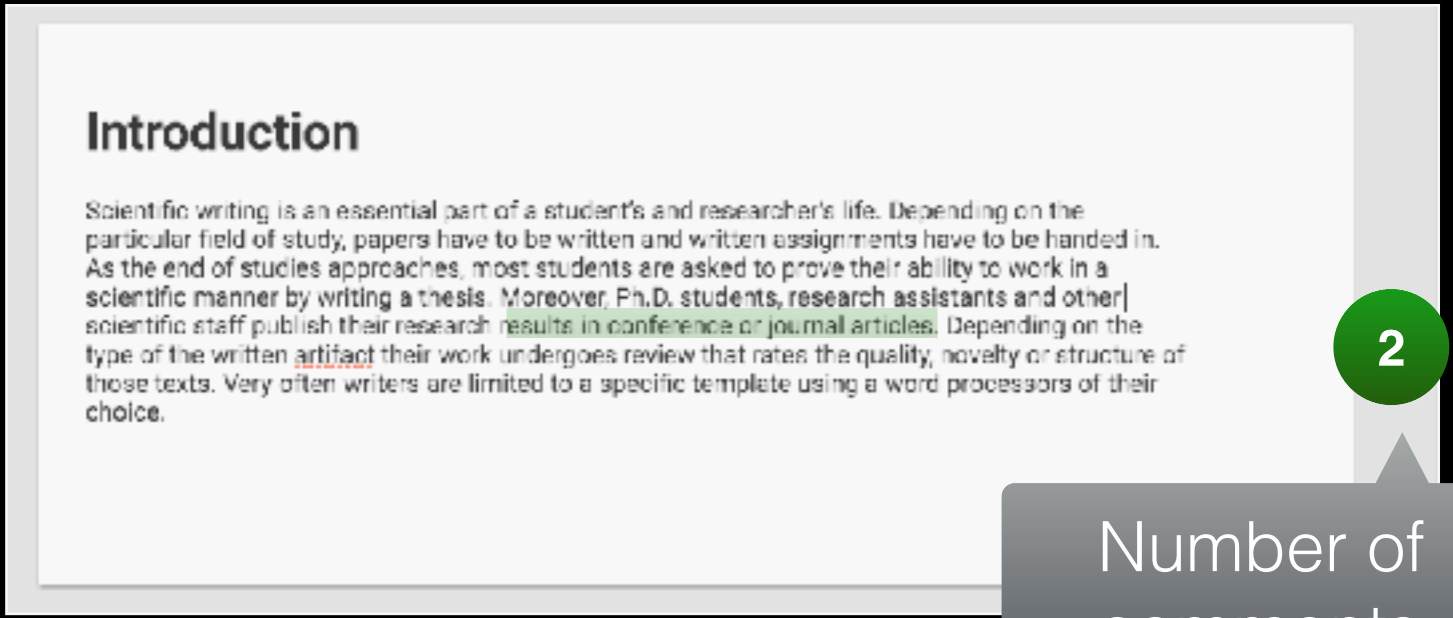
Ask the **store** for anything, it'll know*



```
// observable (NgRx)
this.store.let(getDiscussionItems(discussion.id))
    .subscribe((discussionItems) => {
        console.log(discussionItems);
    });
```

* using github.com/ngrx

How we use the store to display comments



Introduction

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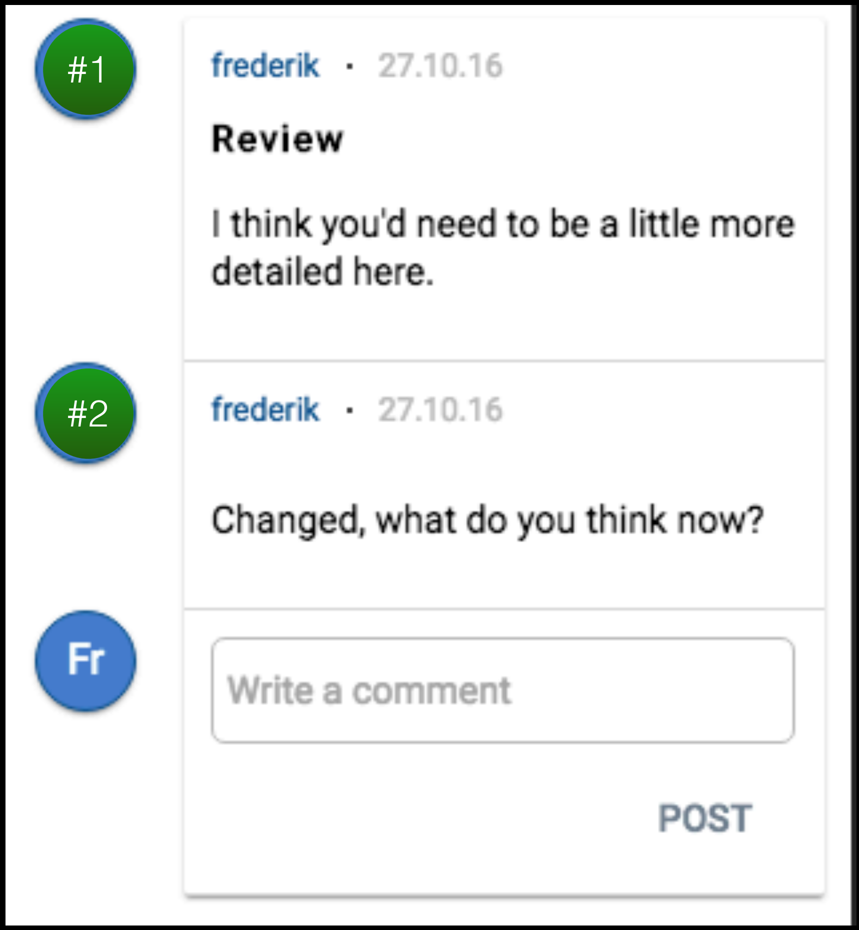
Number of comments

Discussion with 2 comments



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Review

I think you'd need to be a little more detailed here.

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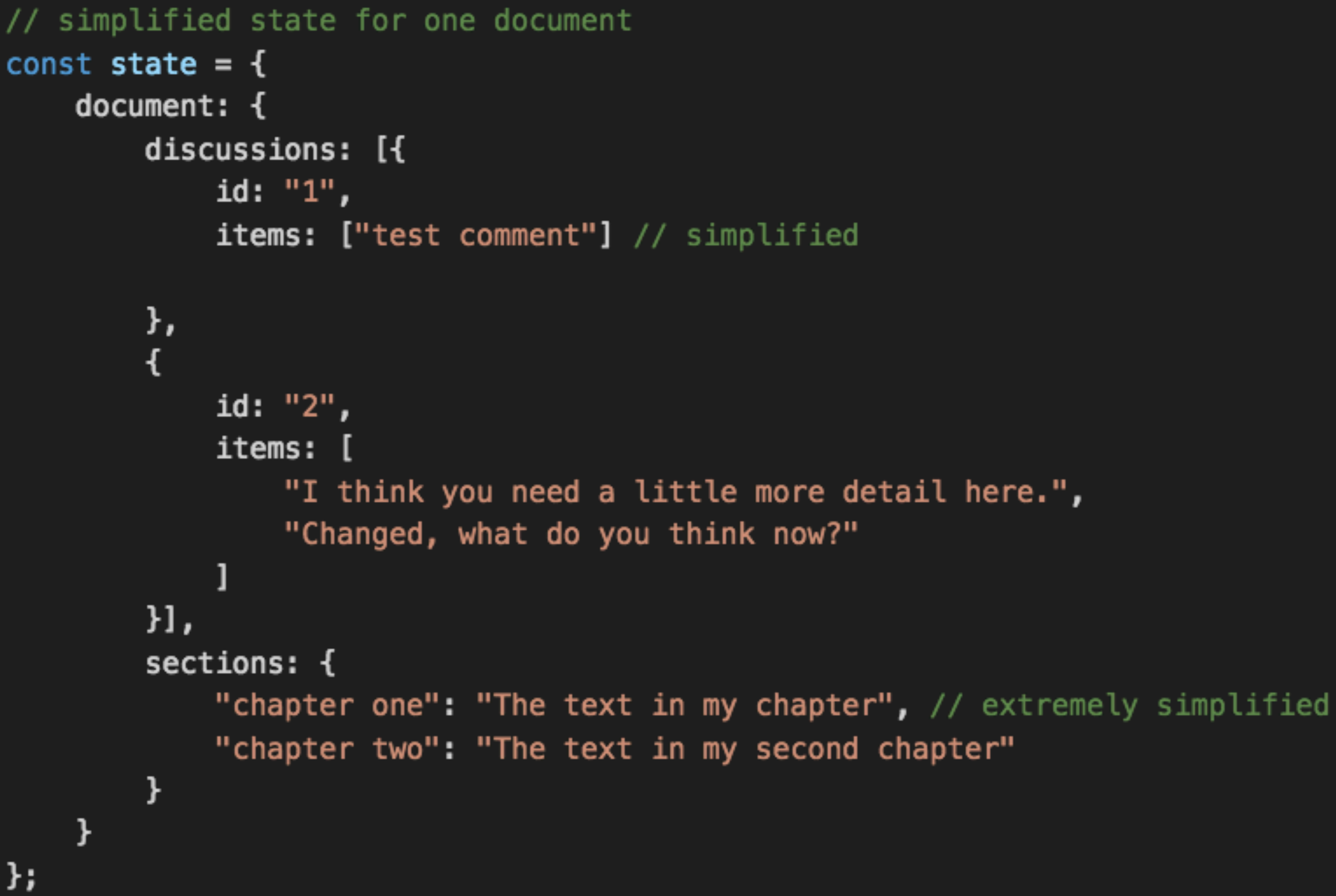
Changed, what do you think now?

State



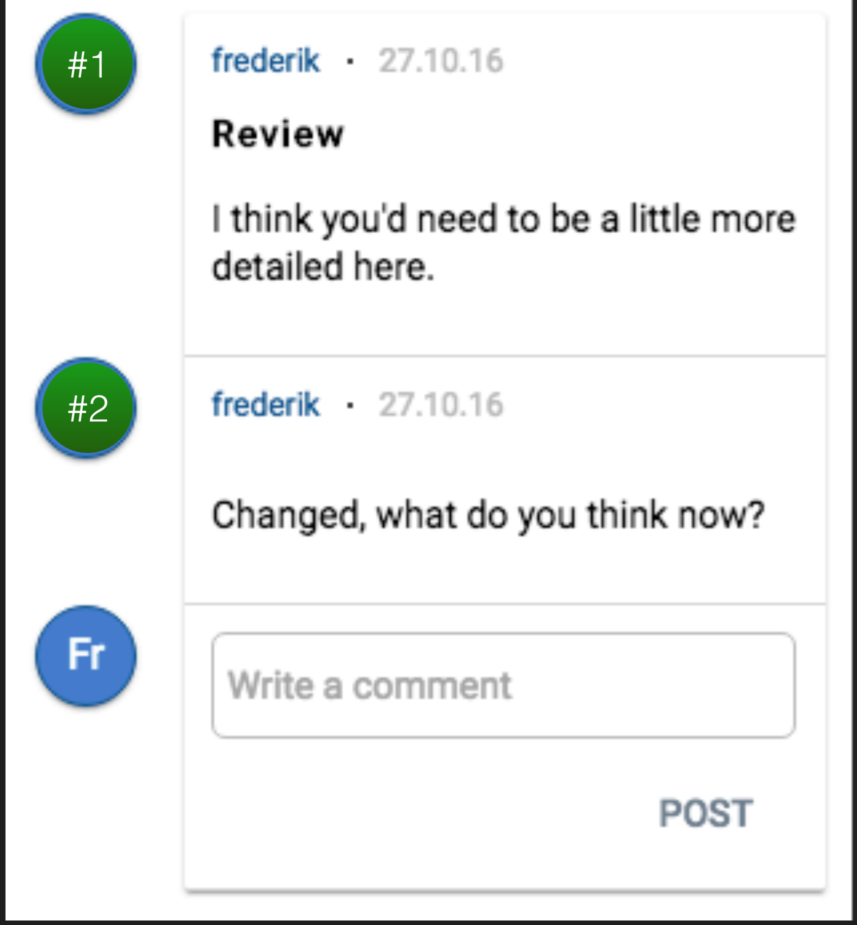
```
// simplified state for one document
const state = {
    document: {
        discussions: [{
            id: "1",
            items: ["test comment"] // simplified

        },
        {
            id: "2",
            items: [
                "I think you need a little more detail here.",
                "Changed, what do you think now?"
            ]
        }],
        sections: {
            "chapter one": "The text in my chapter", // extremely simplified
            "chapter two": "The text in my second chapter"
        }
    }
};
```

State for discussions

```
const discussion = this.store.let(getDiscussion(2));
```

```
{
    id: "2",
    items: [
        "I think you need a little more detail here.",
        "Changed, what do you think now?"
    ]
}],
```



frederik · 27.10.16

Review

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frederik · 27.10.16

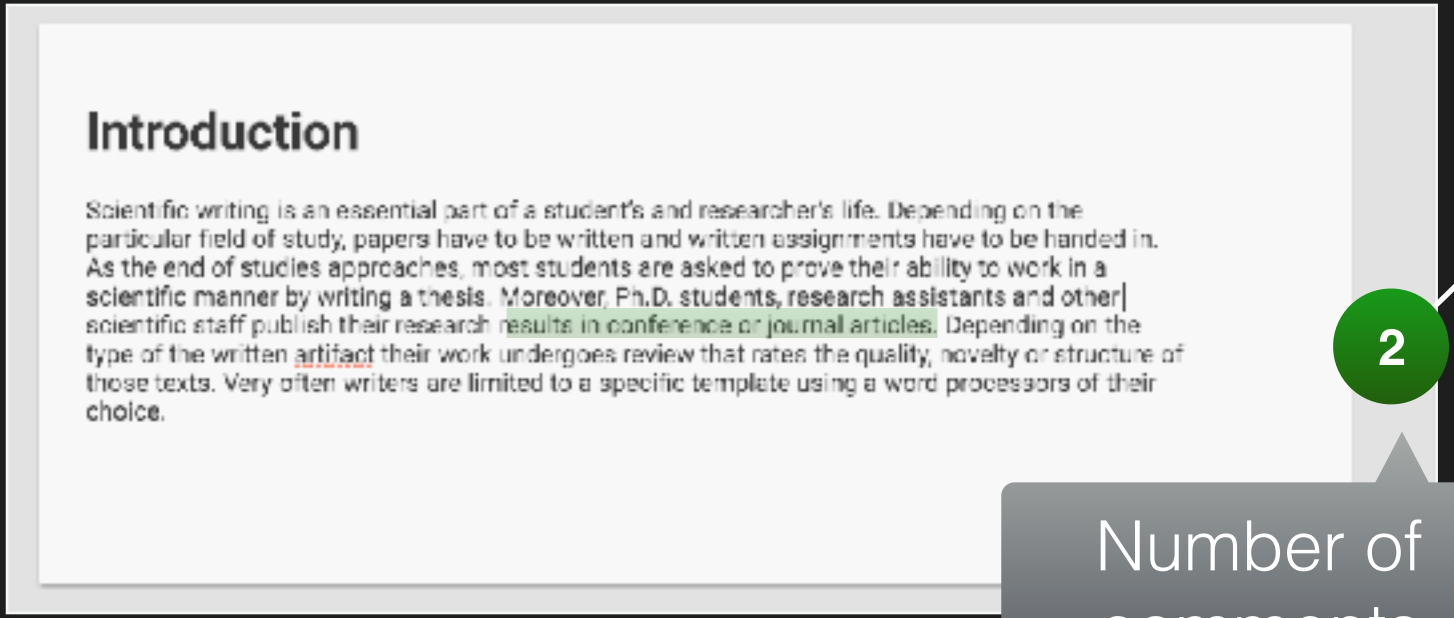
Changed, what do you think now?

State for comment count

```
const commentCount = this.store.let(getDiscussionItems(2)).map(discussion => {
    return discussion.items.length;
});
```

```
items: [
    "I think you need a little more detail here.",
    "Changed, what do you think now?"
]
```

```
discussion.items.length; // 2
```



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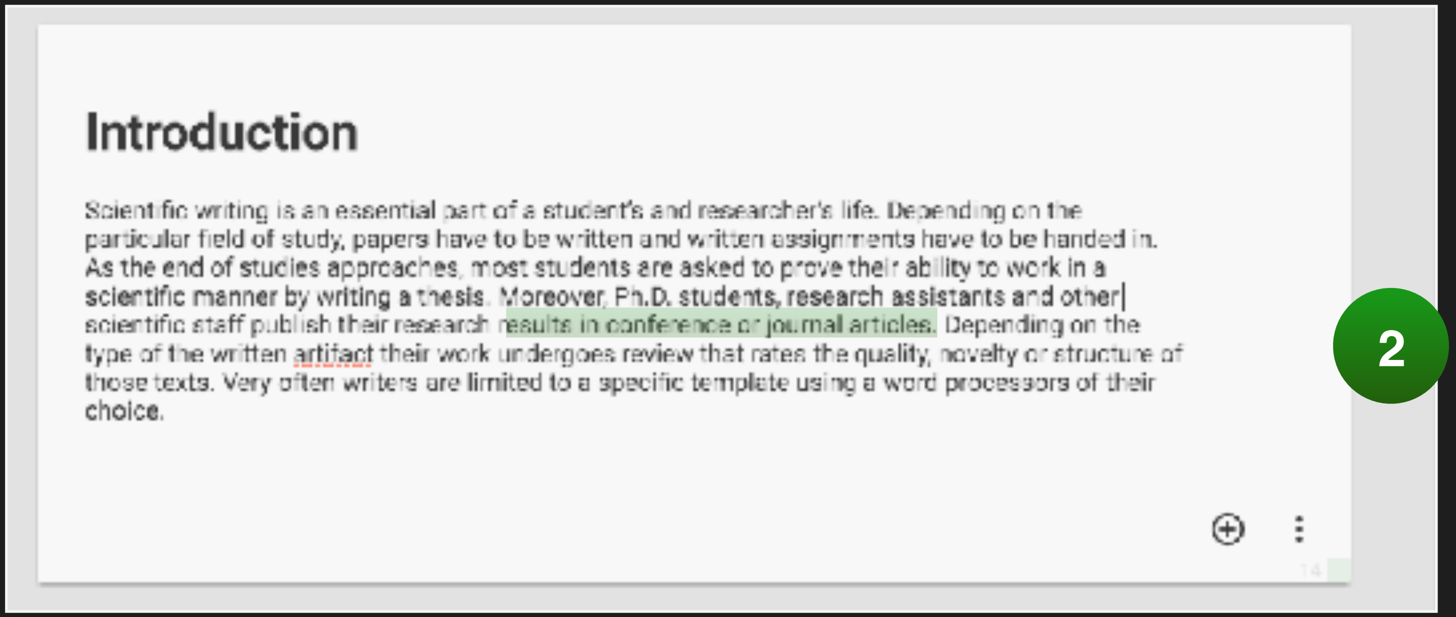
Number of comments

View for comment count



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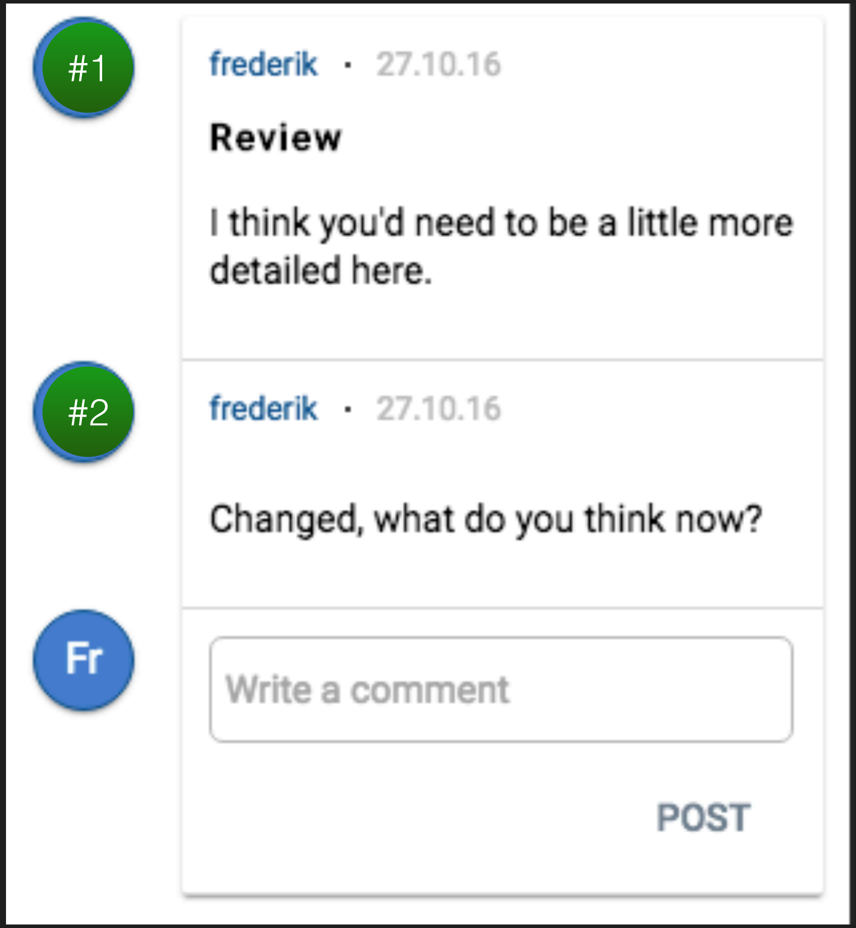
```
<div class="count">{{ commentCount | async }}</div>
```

View for discussion



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Changed, what do you think now?

```
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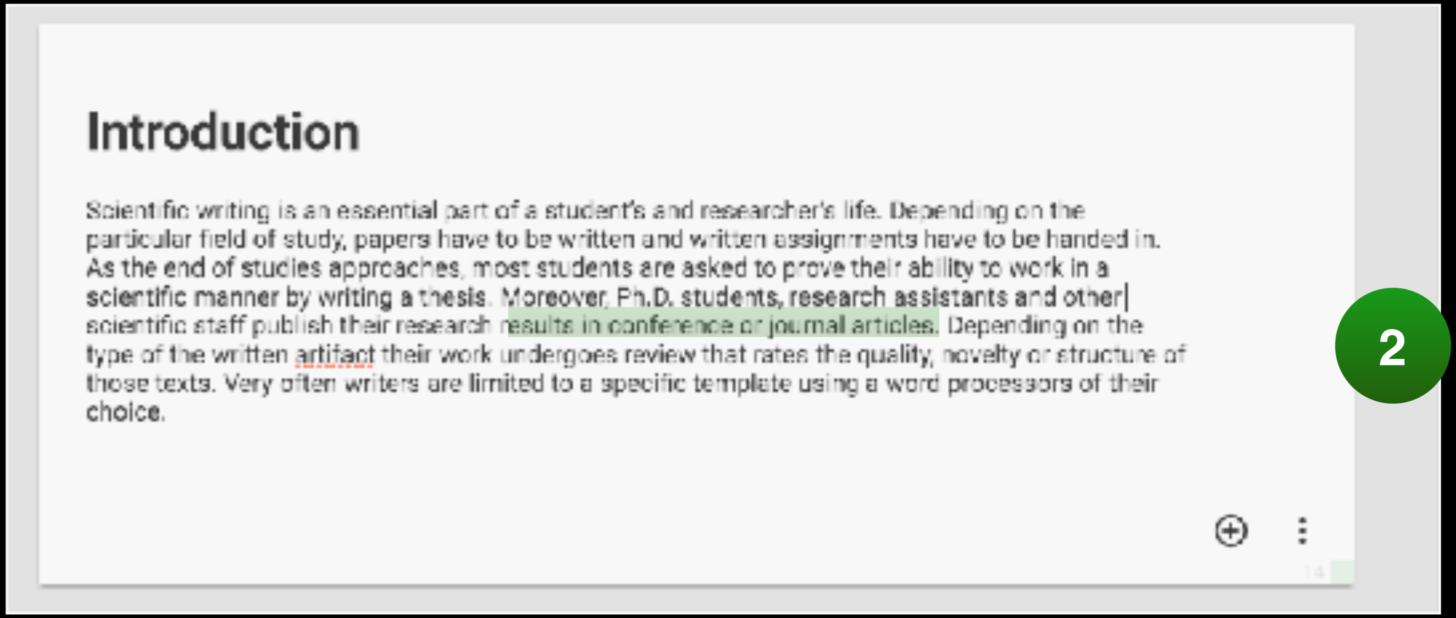
    <sf-discussion-item *ngFor="let item of (discussion | async).items" [item]="item" />
    <sf-discussion-input (submit)="addItem($event)"></sf-discussion-input>
</sf-discussion>
```

Hooray!



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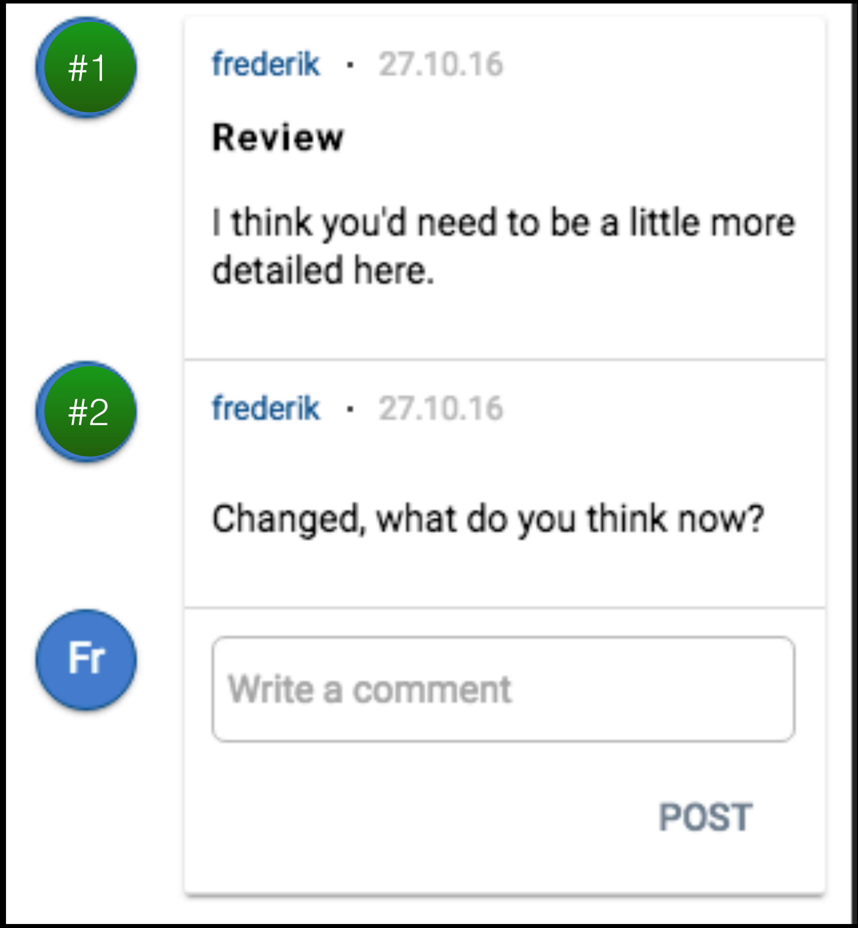

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Review

I think you'd need to be a little more detailed here.

frederik · 27.10.16

Changed, what do you think now?

Code is fast,
Easy to reason about
& easy to maintain / read in code

Fair warning: Not all is good

Developing with Angular 2 Alpha/ Betas for past 10 months was hard

- Build process more complex than framework
- Debugging needs getting used to
- Alpha updates (breaking changes*)
  - Stackoverflow.com is useless if the post is > 6 weeks
  - Documentation not always up to date

*that’s why its called alpha ;-)

Resources

Egghead.io

Angular 2, RxJS, NgRx, …

Angular 2 Starter Package

Angular 2 Starter

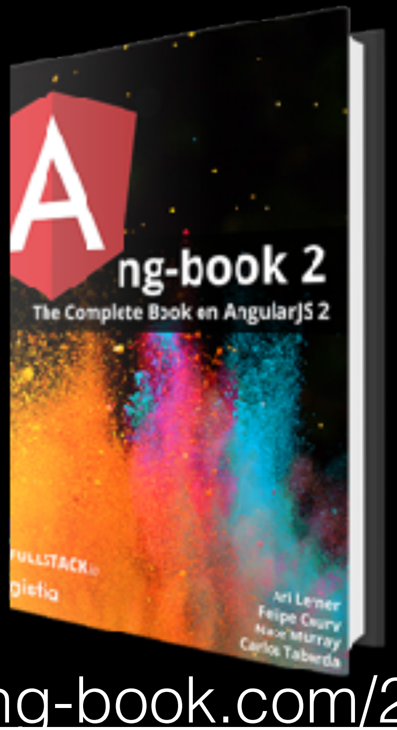
An Angular 2 Starter kit featuring Angular 2 (Router, Http, Forms, Services, Tests, E2E), Karma, Protractor, Jasmine, TypeScript, and Webpack by @AngularClass

http://bit.ly/2eX1ElJ

Angular.io

Step 4: Start up your application

ng-book



ng-book.com/2

Youtube

Learn Angular 2:
Building a simple YouTube player

Keith Hall

Learn Angular 2 (TypeScript) by building a simple YouTube player

AngularJS

10,304 views

youtu.be/mH4TpdwZP4A

More things to play with..

ELECTRON

NativeScript

ionic

NgRx Example App

Angular Material 2

Slides at sciflow.github.io/magdeburg-full-stack

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