

# Meteor

## Fullstack JavaScript Development

- Retro42: Our prototype application
- Why did we choose Meteor?
- What is Meteor?
- Show me some code!
- Comparing Meteor vs. MEAN
- More about Meteor

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# Meteor

## Fullstack JavaScript Development

The rate of innovation in the JavaScript space is still incredible. For a while, it seemed that Angular would emerge as a winner in the web application frontend wars. Now, with Meteor, there is a new contender, a full-stack development framework which promises "to allow you to build advanced apps quickly, with a small team – allowing even individuals to achieve things that used to be possible only at large companies like Google and Facebook."

We wanted to gain some experience with Meteor with a very small project (approx. 20d, two people) to form our own opinion on these promises. We were quite impressed, as our estimates of what we would be able to build were way off: We developed roughly 50% more functionality than we had estimated. Meteor seemed easy to learn, and we very quickly felt very productive with Meteor.

In this presentation, we give a short overview on Meteor (with its Distributed Data Protocol, Latency Compensation, and Reactivity) and its components for rendering (Blaze) and testing (Velocity) as well as its package system (atmosphere.js). In a "slide coding" session, we implement a "lessons learned" feature of our demo application, Retro42 ([retro42.herokuapp.com](http://retro42.herokuapp.com)) as a showcase for coding with Meteor.

# Meteor

## Fullstack JavaScript Development

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# Retro42: Our prototype application

## Our motivation for building Retro42

- Change begins with settings goals, and tracking how you do on them.
- Retro42 lets you define questionnaires, and you can schedule them for yourself, or for your team.
- Retro42 helps you track your answers, and visualizes them for you, grouping by answers by question, or charting them as time-series.

# Retro 42: Demo Screenshots

Start from an existing questionnaire template...

The screenshot displays the Retro42 web interface. At the top, a blue header bar contains the text "Retro42 Fragebogen erzeugen Offen: 34 Total: 52" and a user profile "admin de en". Below the header, a navigation bar shows four categories: "Persönlich 1", "Gruppen (Admin) 1", "Gruppen (Teilnehmer) 0", and "Vorlagen 7". The "Vorlagen 7" category is selected and highlighted. The main content area lists three questionnaire templates, each with a title, a description, and two buttons: "Anschauen" and "Für mich duplizieren".

**Daily Retrospective for a Software Engineer**  
A daily retrospective for a software engineer.

**Five minute journal (evening)**  
A daily journal inspired by fiveminutejournal.com

**Five minute journal (morning)**  
A daily journal inspired by fiveminutejournal.com



# Retro 42: Demo Screenshots

... or create a questionnaire from scratch.

Retro42 Fragebogen erzeugen Offen: 34 Total: 52 admin de en

## Fragebogen erstellen

**Titel**  
Five minute journal (evening)

**Beschreibung**  
A daily journal inspired by fiveminutejournal.com

**Fragen**

-	<b>Frage</b> Happy?
	<b>Erläuterung</b> Are you happy with today?
	<b>Typ</b> Ja / Nein ▼

# Retro 42: Demo Screenshots

Define your schedule for answering your questionnaire.

Retro42 Fragebogen erzeugen Offen: 34 Total: 52 admin - de en

How is your admin stress level? 14 32

A questionnaire regarding your admin stress level.

Zeitplan für diesen Fragebogen bearbeiten

Email Adresse

test@test.tld

Einträge

-

Wochentag

Dienstag

Stunde

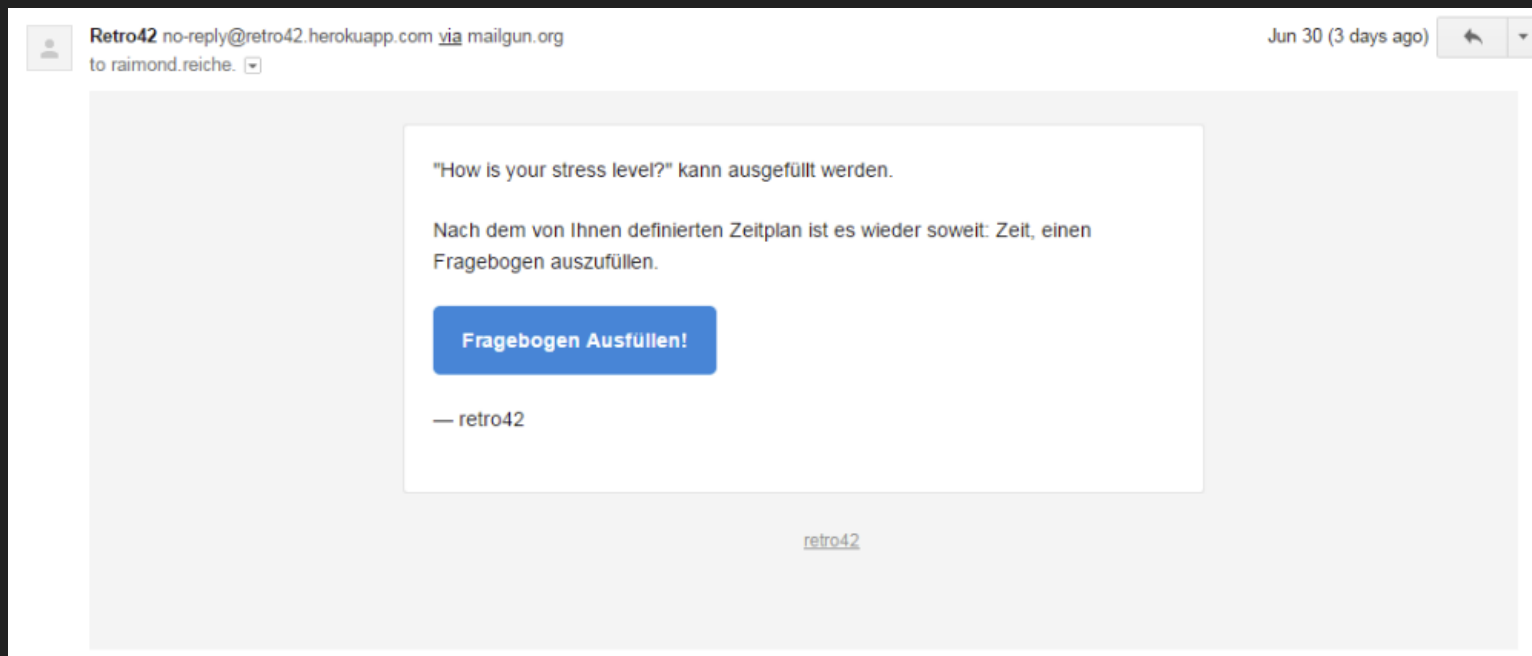
20

Minute

57

# Retro 42: Demo Screenshots

Retro42 will send you reminder mails according to the schedule





# Retro 42: Demo Screenshots

Submit answers to your questionnaire

Retro42 Fragebogen erzeugen Total: 10 five de en

## Five minute journal (evening) 10

A daily journal inspired by [fiveminutejournal.com](http://fiveminutejournal.com)

**Amazing things that happened today...**  
Significant events that happened today.

Ihre letzten Antworten:

- I did not have a single interrupt today.
- I got a lot of work done today.
- My best friends wedding was amazing.
- I got off work early.
- The project kickoff went smoothly.

**How could I have made today better?**  
If I could go back, what would I do differently?

Ihre letzten Antworten:

- I would schedule a lunch meeting so that I am not alone all day.
- I would check email less often.
- I would drink less.
- I should not yell at my boss...
- I would make we stay within the timebox.

# Retro 42: Demo Screenshots

Review all your answers to a questionnaire

Retro42 Fragebogen erzeugen Total: 10 five de en

## Five minute journal (evening) 10

A daily journal inspired by [fiveminutejournal.com](http://fiveminutejournal.com)

Frage	Beschreibung	
Amazing things that happened today...	Significant events that happened today.	Ansehen
How could I have made today better?	If I could go back, what would I do differently?	Ansehen
Your interactions?	Rate your interactions with others today. 1: Extremely tedious. 10: Extremely energizing.	Ansehen
Happy?	Are you happy with today?	Ansehen

Zurück Beantworten Frage hinzufügen Zeitplan erstellen Einladen Löschen

### Ausgefüllte Fragebogen

	Erstellt	↓↑	Your interactions?	Happy?	Aktionen
🕒	2015-08-11 20:43 · vor einem Tag		5	✓	Bearbeiten Ansehen
🕒	2015-08-10 20:43 · vor 2 Tagen		7	✓	Bearbeiten Ansehen

# Retro 42: Demo Screenshots

Review your answers to a textual question

Retro42 Fragebogen erzeugen Total: 10 five de en

## Five minute journal (evening) 10

A daily journal inspired by [fiveminutejournal.com](http://fiveminutejournal.com)

### Amazing things that happened today...

Significant events that happened today.

#### Antworten

Erstellt	Antwort
2015-08-11 20:43:41 - vor einem Tag	I did not have a single interrupt today.
2015-08-10 20:43:41 - vor 2 Tagen	I got a lot of work done today.
2015-08-09 20:43:41 - vor 3 Tagen	My best friends wedding was amazing.
2015-08-08 20:43:41 - vor 4 Tagen	I got off work early.
2015-08-07 20:43:41 - vor 5 Tagen	The project kickoff went smoothly.
2015-08-06 20:43:41 - vor 6 Tagen	I loved the lunch meal.
2015-08-05 20:43:41 - vor 7 Tagen	The first day of school of my youngest child went great.
2015-08-04 20:43:41 - vor 8 Tagen	The train was on time today.
2015-08-03 20:43:41 - vor 9 Tagen	My baby walked for the first time.
2015-08-02 20:43:41 - vor 10 Tagen	I scored five soccer goals today.

# Retro 42: Demo Screenshots

Review your answers to a numeric question

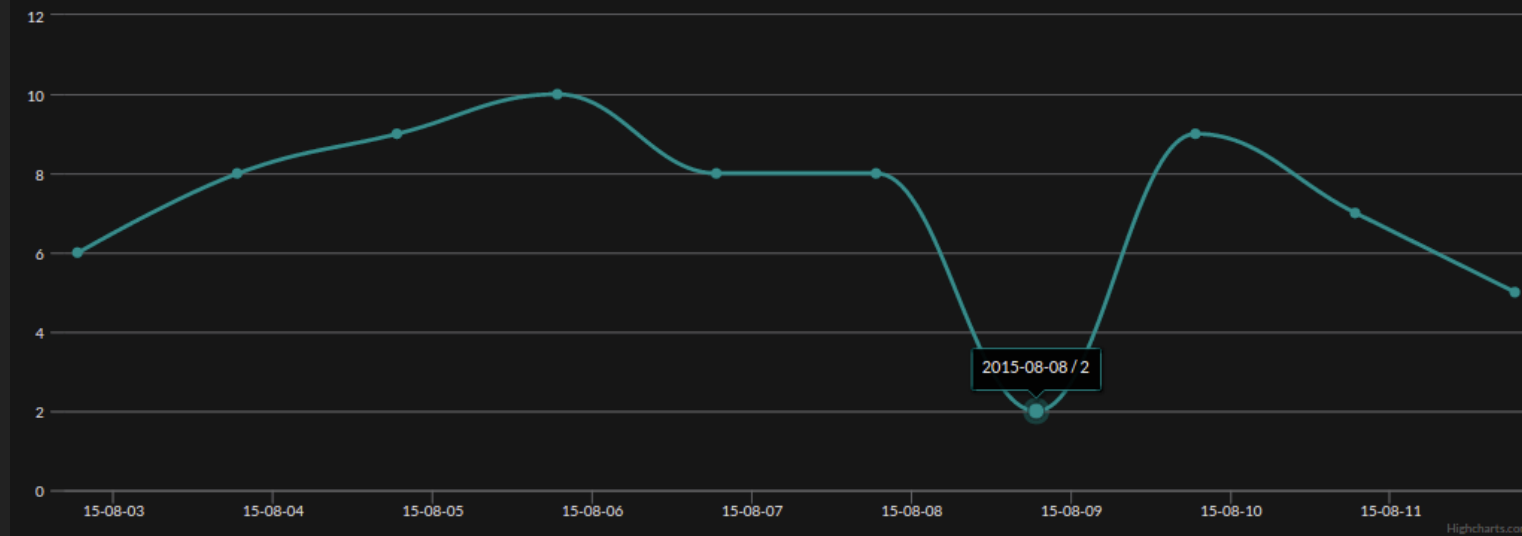
Five minute journal (evening) **10**

A daily journal inspired by [fiveminutejournal.com](http://fiveminutejournal.com)

Your interactions?

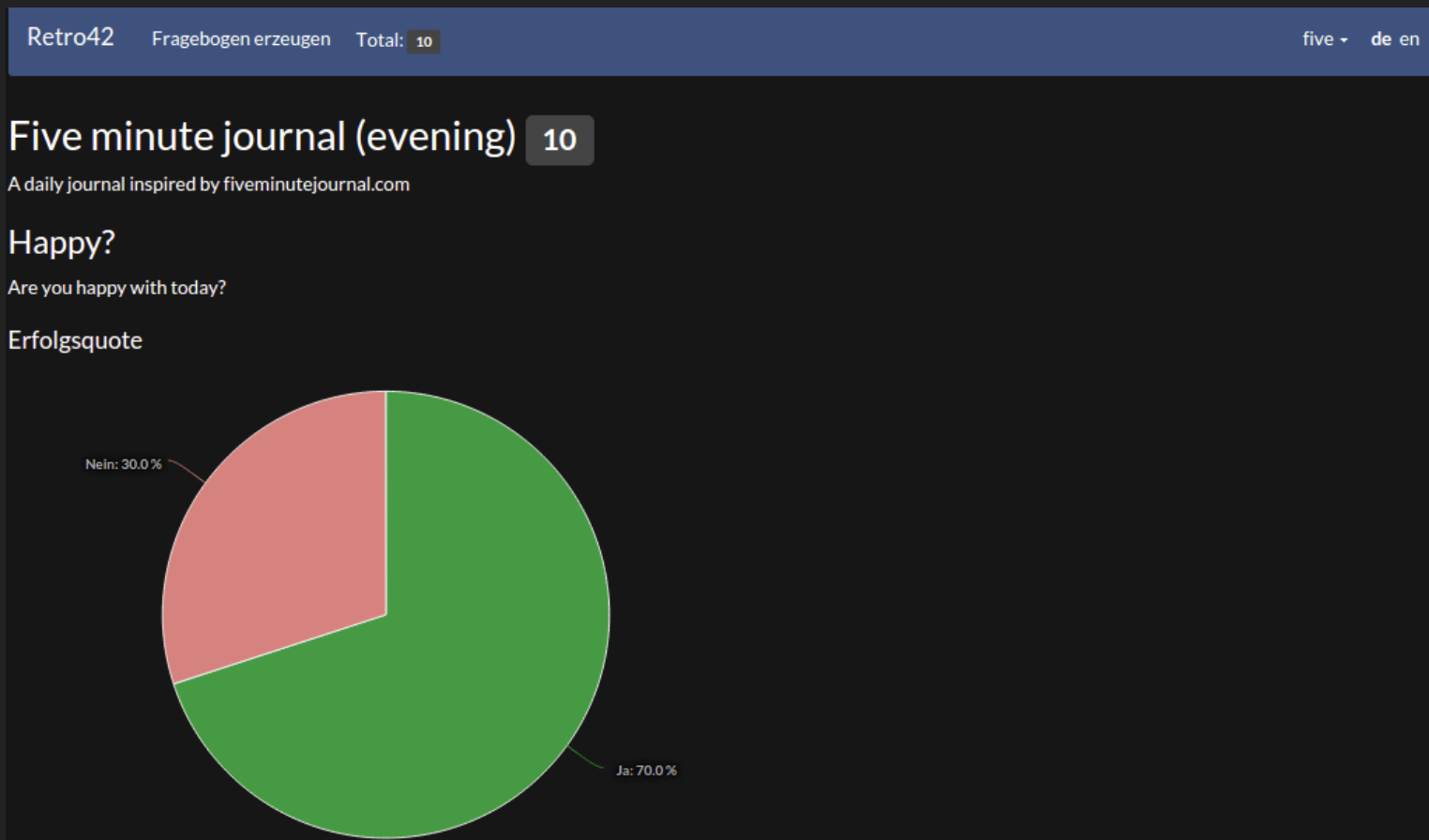
Rate your interactions with others today. 1: Extremely tedious. 10: Extremely energizing.

Statistische Werte



# Retro 42: Demo Screenshots

Review the percentage of positive answers to a yes/no question



# Retro 42: Demo Screenshots

Review a yes/no answers on a calendar



# Retro 42: Demo Screenshots

Invite others to participate on a questionnaire

Retro42 Fragebogen erzeugen Total: 10 se0 de en

## Weekly Retrospective for a Software Engineering Team 10

A weekly retrospective for a software engineer team.

### Einladung für diesen Fragebogen

Falls du diesen Fragebogen teilen willst, sende diesen Link:

<http://localhost:3000/questionnaires/HNedBbiv5aKHBPK7F/invite>

Zurück

# Retro 42: Demo Screenshots

Review a shared questionnaire and its participants

Retro42 Fragebogen erzeugen Total: 10 se0 de en

## Weekly Retrospective for a Software Engineering Team 10

A weekly retrospective for a software engineer team.

Frage	Beschreibung	
Describe the week in one word.	Just one word.	Ansehen
How is your motivation (1-10)?	1: No motivation at all. 10: Super motivated.	Ansehen
How is your stress level (1-10)?	1: Completely relaxed. 10: Super stressed out.	Ansehen
Ideas for improvements?	What could be done so that you can get your work done more efficiently?	Ansehen
Number one impediment?	What prevents you the most to get your work done?	Ansehen
Successful?	Do you consider the week to be successful?	Ansehen

### Teilnehmer

sam.zurcher+se1@gmail.com	Abmelden
sam.zurcher+se2@gmail.com	Abmelden
sam.zurcher+se3@gmail.com	Abmelden



# Retro 42: Demo Screenshots

Review your group's questionnaire passes

## Teilnehmer

sam.zurcher+se1@gmail.com	Abmelden
sam.zurcher+se2@gmail.com	Abmelden
sam.zurcher+se3@gmail.com	Abmelden
sam.zurcher+se4@gmail.com	Abmelden

Zurück






Frage hinzufügen

Zeitplan erstellen

Einladen

Löschen

## Ausgefüllte Fragebogen

% beantwortet	Erstellt	Bearbeiten	Ansehen
	2015-08-12 21:32 · vor 10 Stunden	Bearbeiten	Gruppe Meine
	2015-08-11 21:32 · vor einem Tag	Bearbeiten	Gruppe Meine
	2015-08-10 21:32 · vor 2 Tagen	Bearbeiten	Gruppe Meine
	2015-08-09 21:32 · vor 3 Tagen	Bearbeiten	Gruppe Meine
	2015-08-08 21:32 · vor 4 Tagen	Bearbeiten	Gruppe Meine

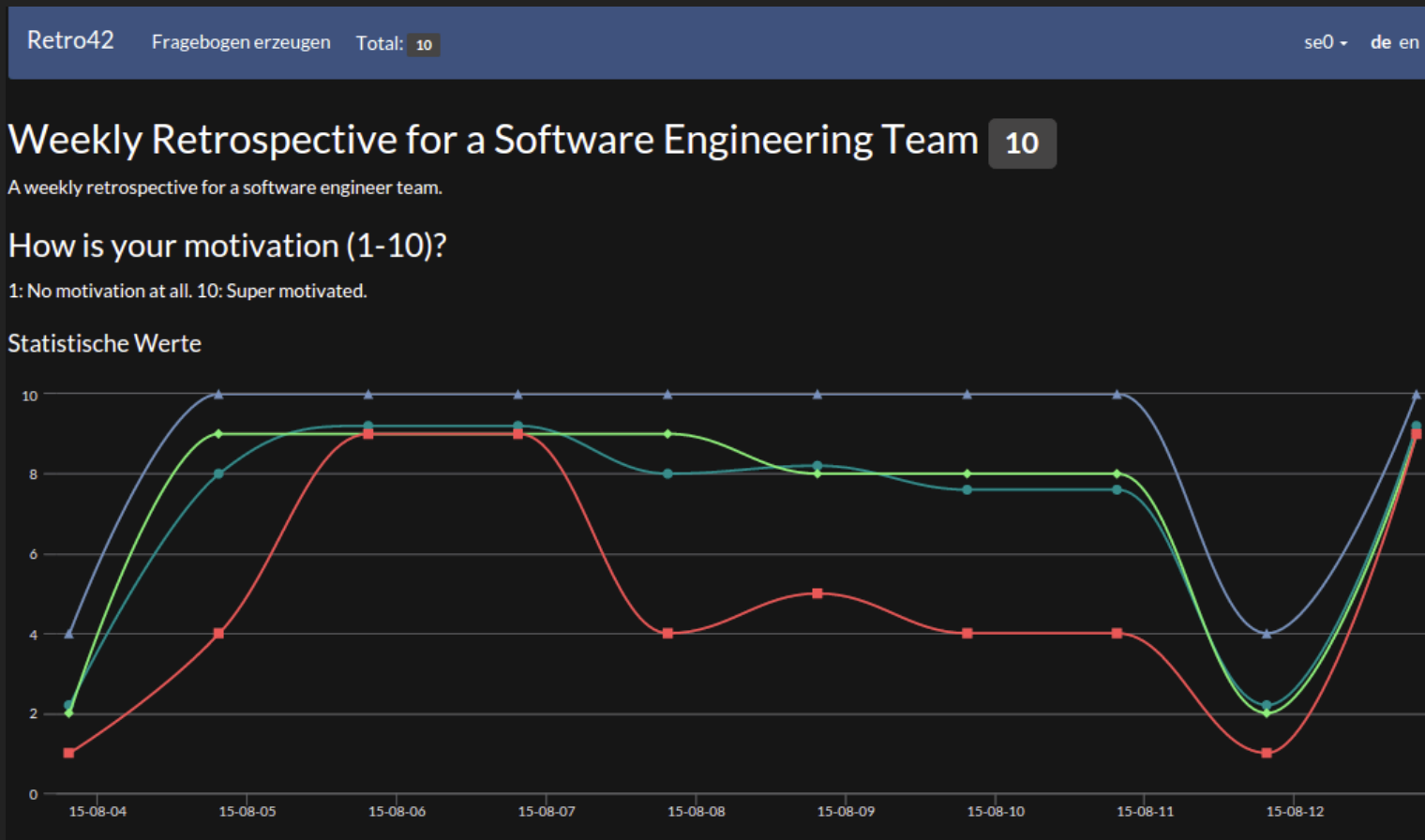
# Retro 42: Demo Screenshots

Review all answers in a group questionnaire pass

Frage	Beschreibung	Antworten
Describe the week in one word.	Just one word.	<ul style="list-style-type: none"><li>• Great</li><li>• Fantastic</li><li>• Superb</li><li>• Enjoyable</li><li>• Relaxing</li></ul>
How is your motivation (1-10)?	1: No motivation at all. 10: Super motivated.	Mittelwert 9.2, Median 9, Minimum 9, Maximum 10
How is your stress level (1-10)?	1: Completely relaxed. 10: Super stressed out.	Mittelwert 2, Median 2, Minimum 1, Maximum 3
Ideas for improvements?	What could be done so that you can get your work done more efficiently?	<ul style="list-style-type: none"><li>• Successful release!</li><li>• Successful retrospective!</li><li>• Successful planning!</li><li>• Successful project kickoff!</li><li>• Vacation time!</li></ul>
Number one impediment?	What prevents you the most to get your work done?	<ul style="list-style-type: none"><li>• Release more often!</li><li>• Use Retro42 more often!</li><li>• Use planning poker consistently!</li><li>• Start more smaller projects!</li><li>• No vacations when everyone else is on vacation:-)</li></ul>

# Retro 42: Demo Screenshots

Review all answers to a numeric question



# Retro 42: Demo Screenshots

Review all answers to a yes/no question

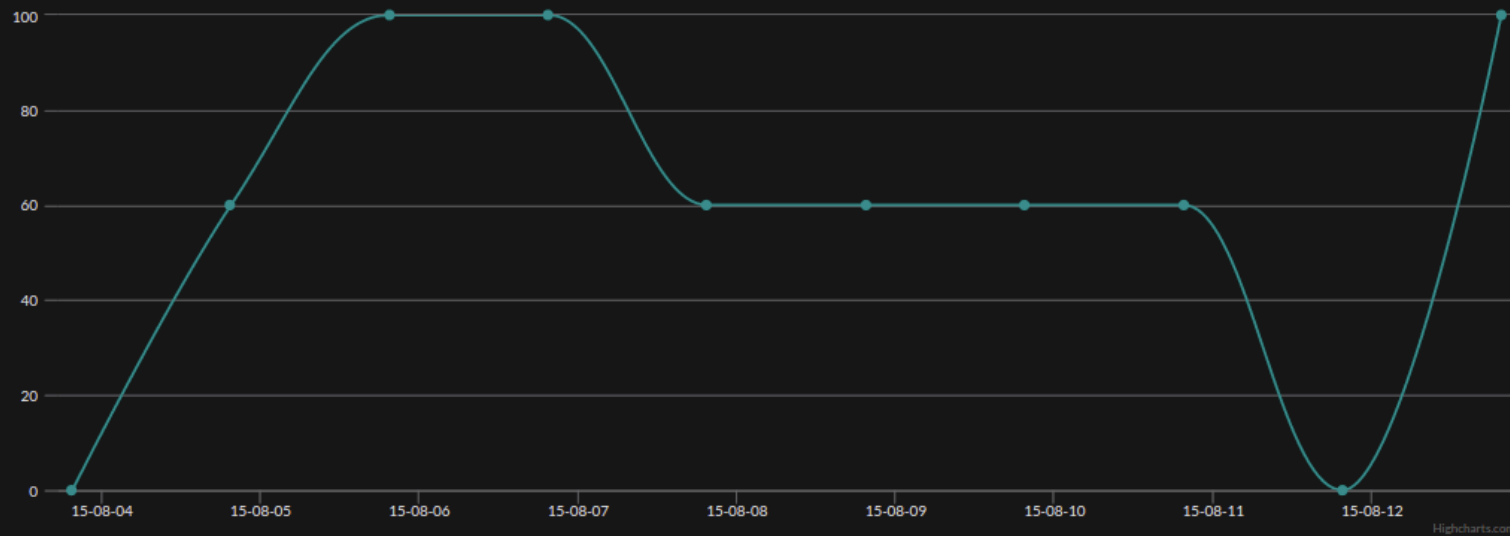
## Weekly Retrospective for a Software Engineering Team 10

A weekly retrospective for a software engineer team.

### Successful?

Do you consider the week to be successful?

### Erfolgsquote



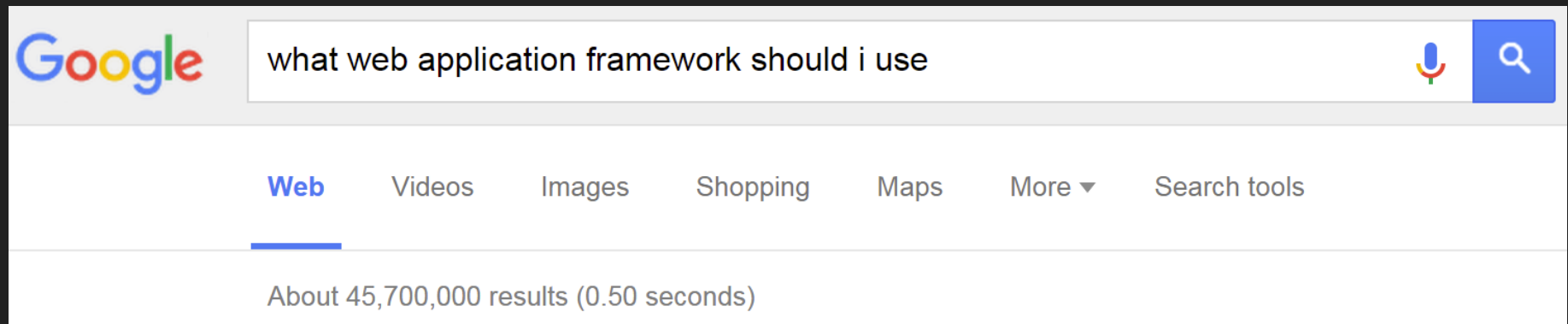
# Meteor

## Fullstack JavaScript Development

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Why did we choose Meteor?

# In 2015, what would you choose?

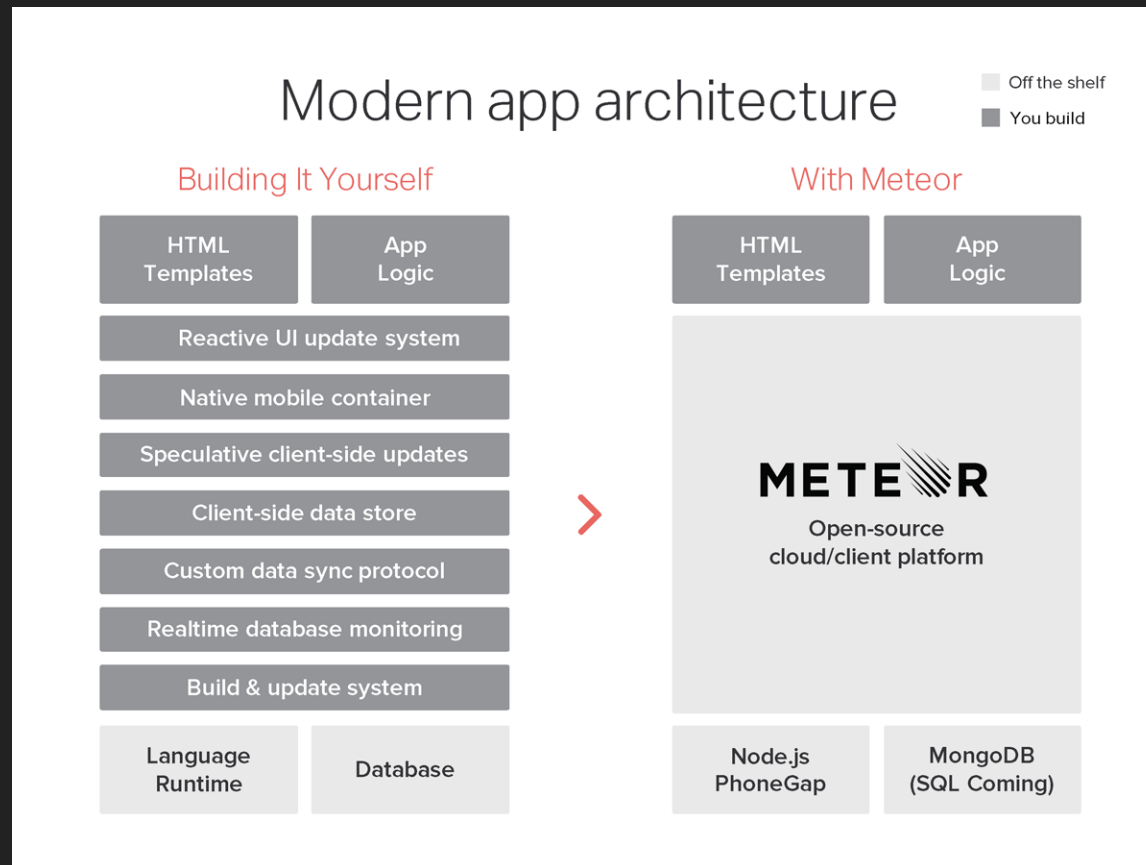


So many web and mobile app development options, yet still no clear winner emerges... making each option a risk with regards to long-term maintainability.

We chose Meteor because it implements an approach which is quite different from what we've gotten used to.

Why did we choose Meteor?

# Integrated development platform



from [www.forbes.com/sites/anthonykosner/2015/06/30/meteor-is-the-app-platform-for-the-new-world-of-cloud-client-computing](http://www.forbes.com/sites/anthonykosner/2015/06/30/meteor-is-the-app-platform-for-the-new-world-of-cloud-client-computing)



Why did we choose Meteor?

# Principles of particular interest

- Full-stack JavaScript (or CoffeeScript, for us), for both backend and frontend
- Meteor's **database everywhere** principle makes it easy to build apps on top of databases
- We wanted to see Meteor's **latency compensation** principle and reactivity in action.
- Meteor advertises **fast and fun development**, and who wouldn't like that:-)
- It promises one code base for web and mobile platforms. However, we did not look into Meteor's multi-platform capabilities in our project.



# Meteor

## Fullstack JavaScript Development

- Retro42: Our prototype application
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- **What is Meteor?**
- Show me some code!
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## What is Meteor?

# Command line tool

- **meteor add <package name>**  
Add a package to your Meteor project.
- **meteor run**  
Serve the current app at <http://localhost:3000> using Meteor's local development server.  
Also continuously runs tests if Velocity package has been added to your project.
- **meteor reset**  
Reset the current project to a fresh state.  
Removes all local data.

What is Meteor?

# Its own build system

- For example, `meteor add coffeescript` adds CoffeeScript support to your project – that's it
- Client and server: **Packages work seamlessly on both client and server.**
- Asset building and bundling: The package system integrates with Meteor's asset building/bundling system.
- "We feel strongly that every package in your app should be always pinned to a specific version, and those version pins should be checked into source control."

*see [quora.com/Node-js/Why-does-Meteor-use-its-own-package-system-rather-than-NPM](https://quora.com/Node-js/Why-does-Meteor-use-its-own-package-system-rather-than-NPM)*

# What is Meteor?

# Full-stack package system

The screenshot shows the Atmosphere website interface. At the top, there is a search bar with a magnifying glass icon and the text "Search". To the right of the search bar is the word "ATMOSPHERE" in all caps. Further right is a "Sign in" button with a user icon. The main heading is "Accounts Packages" in a large, light gray font, with "328 PACKAGES" in a smaller font below it. Below the heading is a grid of eight package cards, each with a title, description, and statistics (downloads and stars).

Package Name	Description	Downloads	Stars
ian:accounts-ui-bootstrap-3	Bootstrap-styled accounts-ui with multi-language support.	64.3K	143
accounts-password	Password support for accounts	349.1K	200
useraccounts:bootstrap	Accounts Templates styled for Twitter Bootstrap.	25.2K	80
accounts-ui	Simple templates to add login widgets to an app	155.7K	126
accounts-base	A user account system	99K	69
useraccounts:core	Meteor sign up and sign in templates core package.	12.6K	101
accounts-facebook	Login service for Facebook accounts	76K	69
accounts-google	Login service for Google accounts	62.6K	51

see [atmospherejs.com](http://atmospherejs.com)

What is Meteor?

# Integrated MongoDB support

The same database API works on both client and server.

The API is compatible with the Mongo database API.

```
# common code on client and server declares a DDP-managed mongo collection
Messages = new Mongo.Collection "messages"

# return array of my messages (here, in client code)
myMessages = Messages.find({userId: Meteor.userId()}).fetch()

# create a new message
Messages.insert {text: "Hello, world!"}

# mark my first message as "important"
Messages.update myMessages[0]._id, {$set: {important: true}}
```

see [docs.meteor.com/#/full/mongo\\_collection](https://docs.meteor.com/#/full/mongo_collection)



## What is Meteor?

# Integrated MongoDB support

- On the server, when you call methods on a collection, they translate directly into normal Mongo operations (after checking that they match your access control rules).
- On the client, Minimongo is essentially an in-memory, non-persistent implementation of Mongo in pure JavaScript. It serves as a local cache that stores just the subset of the database that this client is working with.
- When you write to the db on the client, the command is executed locally immediately, and, simultaneously, it's sent to the server and executed there too.

see [docs.meteor.com/#/full/mongo\\_collection](https://docs.meteor.com/#/full/mongo_collection)

What is Meteor?

## Mini-MongoDb limitations

In its current release, Minimongo has some limitations:

- \$pull in modifiers only accepts certain kinds of selectors.
- findAndModify, **aggregate functions, and map/reduce aren't supported.**
- Minimongo doesn't currently have indexes. It's rare for this to be an issue, since it's unusual for a client to have enough data that an index is worthwhile.

All of these will be addressed in a future release.

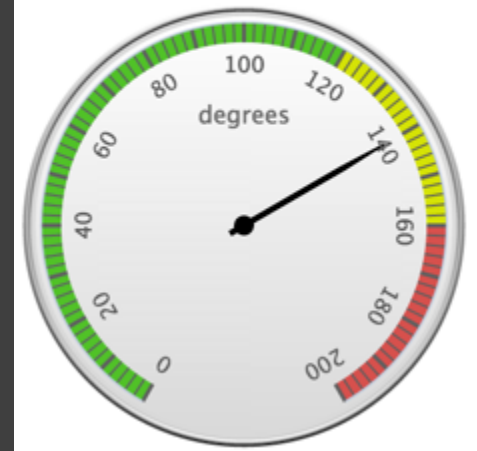
see [docs.meteor.com/#/full/mongo\\_collection](https://docs.meteor.com/#/full/mongo_collection)

## What is Meteor?

# From event-driven-programming...

```
var spaceship = {  
  
  _temperature: 0, _listeners: [],  
  
  getTemperature: function() {  
    return this._temperature;  
  },  
  
  setTemperature: function(value) {  
    this._temperature = value;  
    this.changed();  
  },  
  
  // to be continued  
};
```

Spaceship Temperature



from [stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming](http://stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming)



## What is Meteor?

# From event-driven-programming...

```
var spaceship = { // code from previous slide
  changed: function() {
    for (var i=0;i< this._listeners.length;i++) {
      this._listeners[i]();
    }
  },

  onChanged: function(func) {
    this._listeners.push(func);
  }
};
```

```
// observer updates dashboard when temperature changes
spaceship.onChanged(function() {
  var temp = spaceship.getTemperature();
  gauge.setValue(temp);
});
```

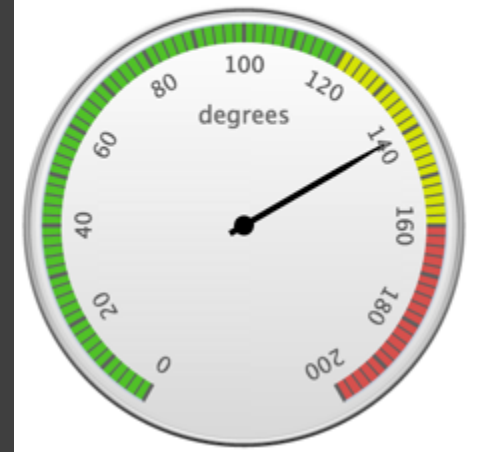
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## What is Meteor?

# ... towards reactive programming

```
var spaceship = {  
  
  _temperature: 0,  
  _temperatureDepend: new Tracker.Dependency,  
  
  getTemperature: function() {  
    this._temperatureDepend.depend();  
    return this._temperature;  
  },  
  
  setTemperature: function(value) {  
    this._temperature = value;  
    this._temperatureDepend.changed();  
  }  
};
```

Spaceship Temperature



from [stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming](http://stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming)

What is Meteor?

# ... towards reactive programming

```
// Tracker updates dashboard when temperature changes
Tracker.autorun(function() {
  var temp = spaceship.getTemperature();
  gauge.setValue(temp);
});
```

The function passed to `Tracker.autorun()` is rerun automatically whenever any of its dependencies change.

*from [stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming](http://stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming)*

What is Meteor?

# Meteor Reactivity is Transparent

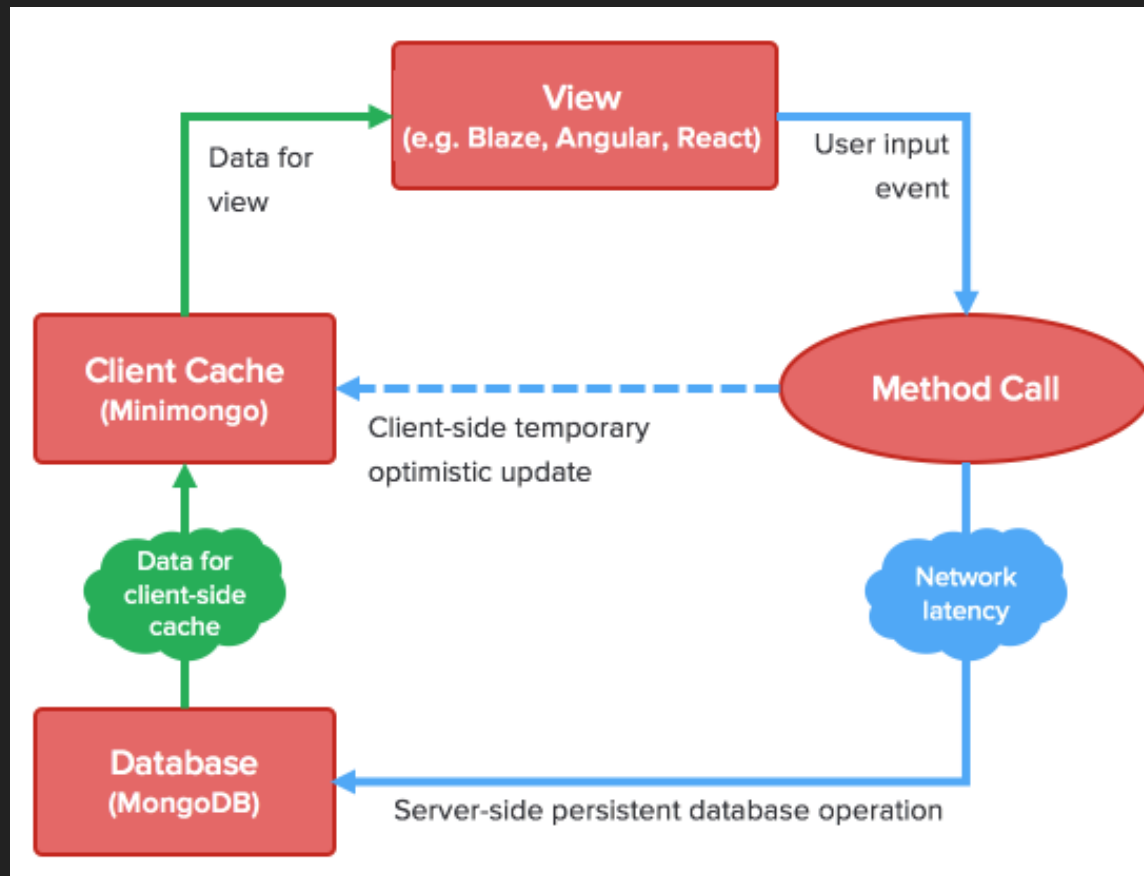
You rarely work with Tracker Dependency directly. Instead, you work with Meteor's reactive data sources such as:

- Session object
- Reactive variables
- Minimongo
- `Meteor.user()`, `Meteor.status()`

*from [stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming](http://stephenwalther.com/archive/2014/12/05/dont-do-react-understanding-meteor-reactive-programming)*

## What is Meteor?

# Livequery: Latency Compensation

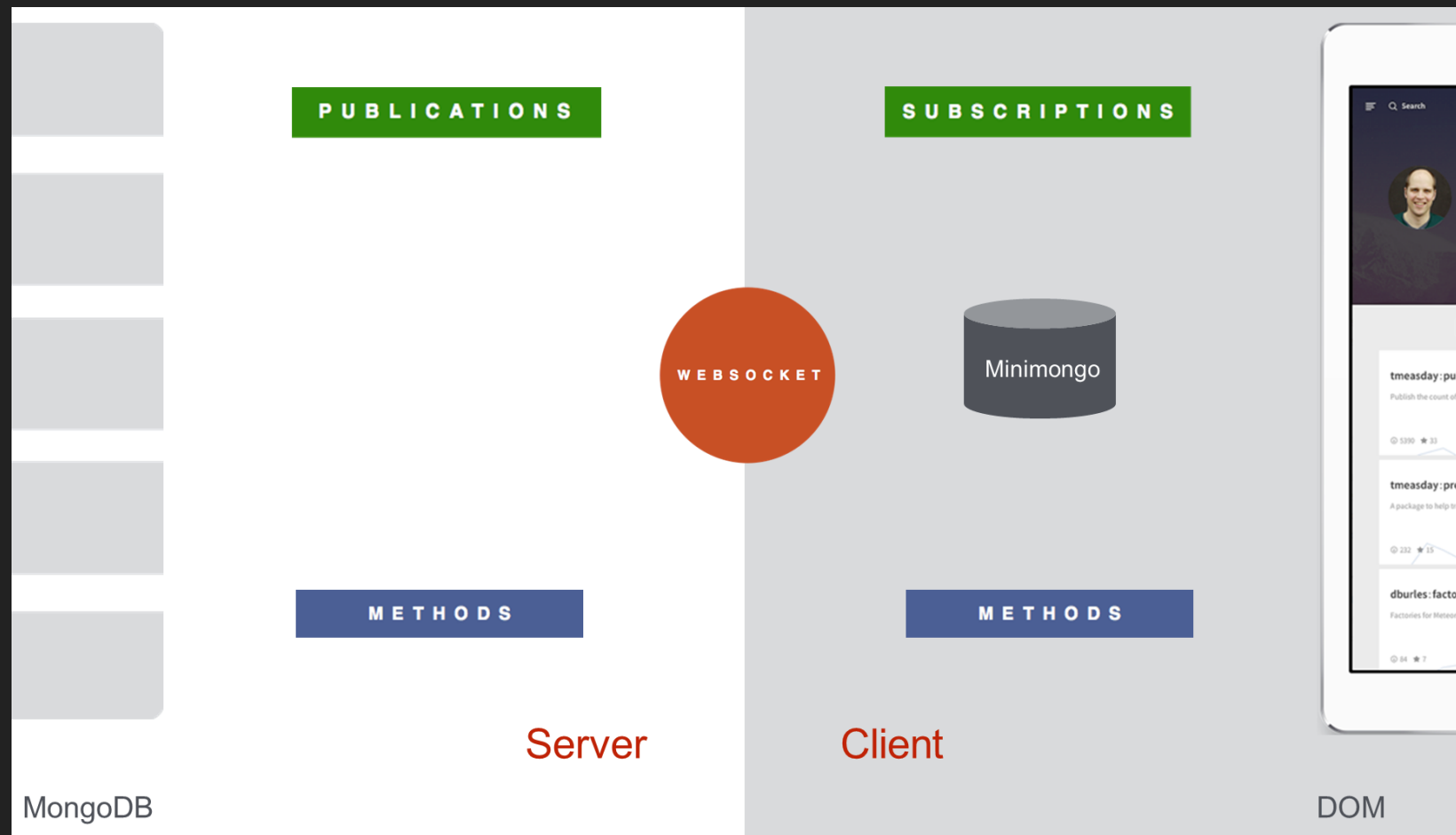


*from [info.meteor.com/blog/optimistic-ui-with-meteor-latency-compensation](http://info.meteor.com/blog/optimistic-ui-with-meteor-latency-compensation)*



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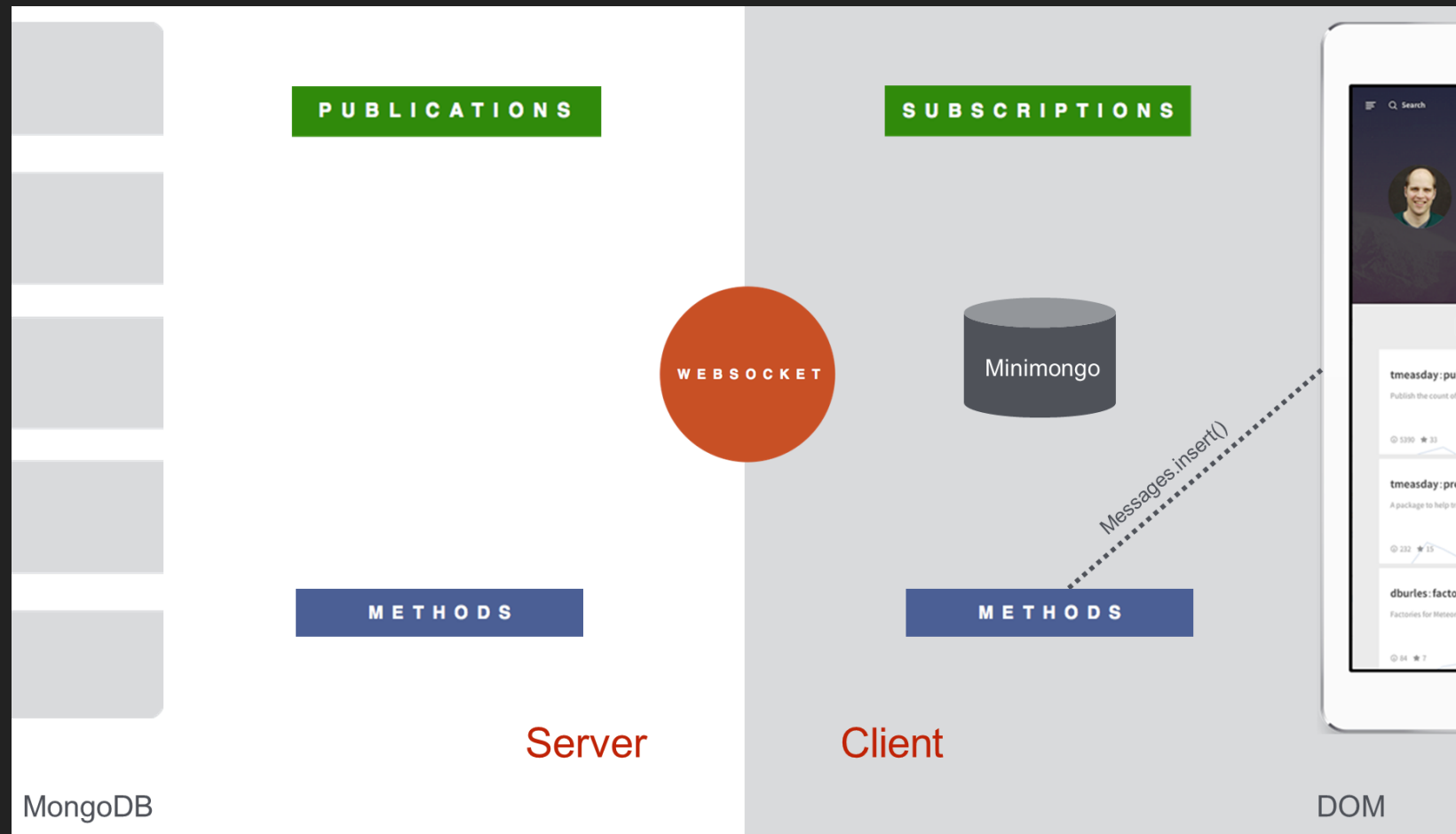
## Meteor Data Flows



from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](https://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)

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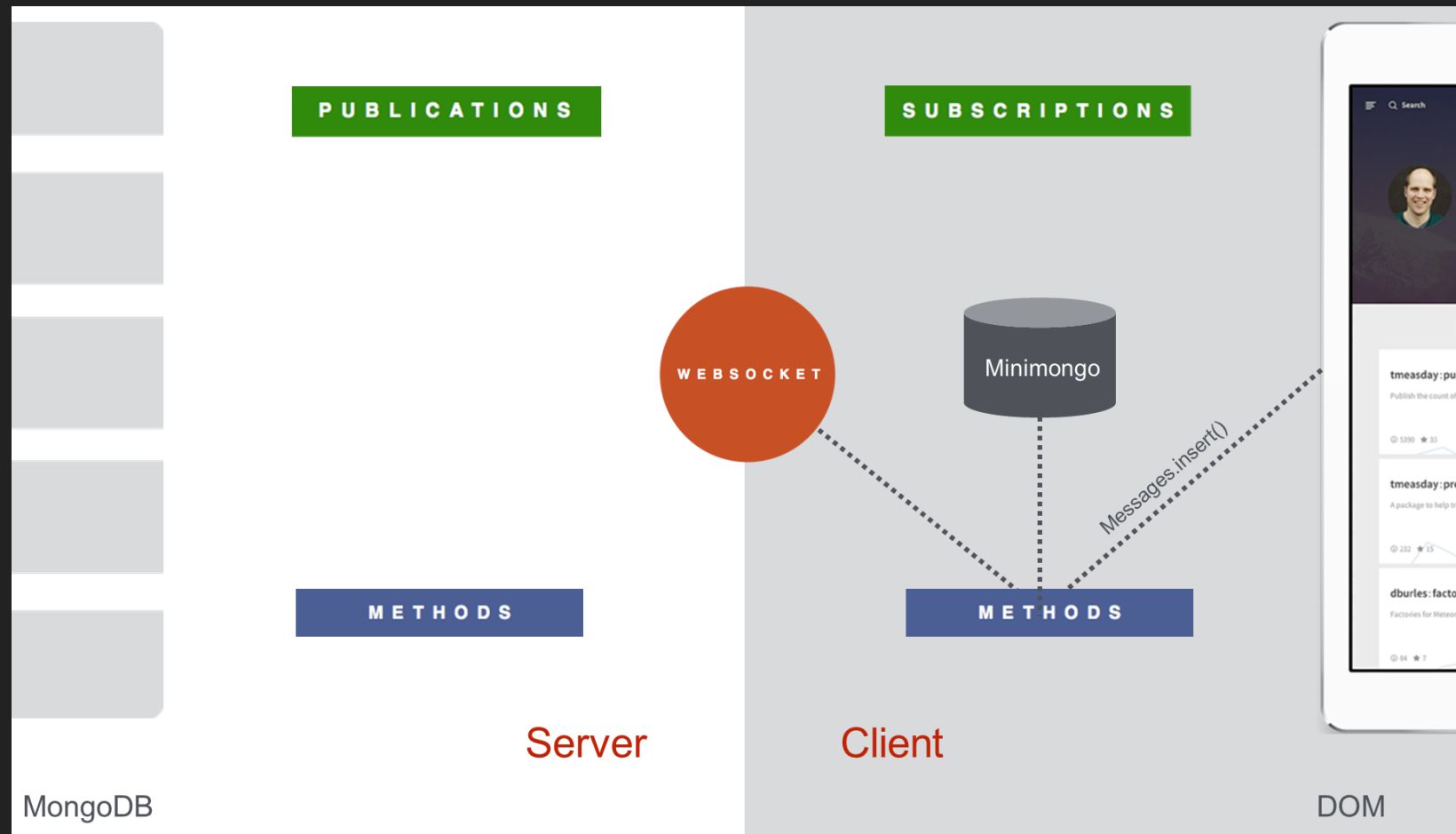
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# What is Meteor?

## Meteor Data Flows

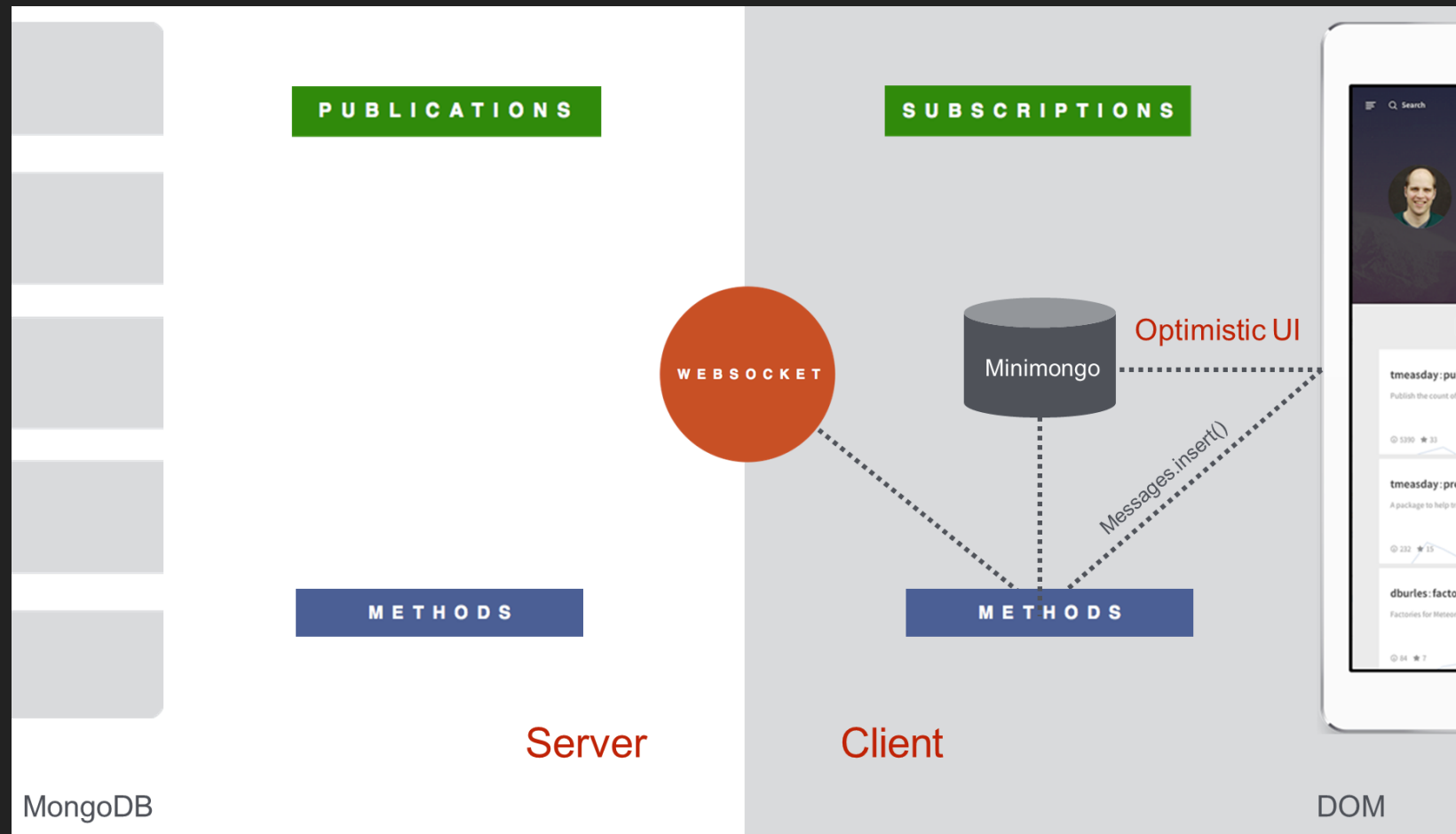


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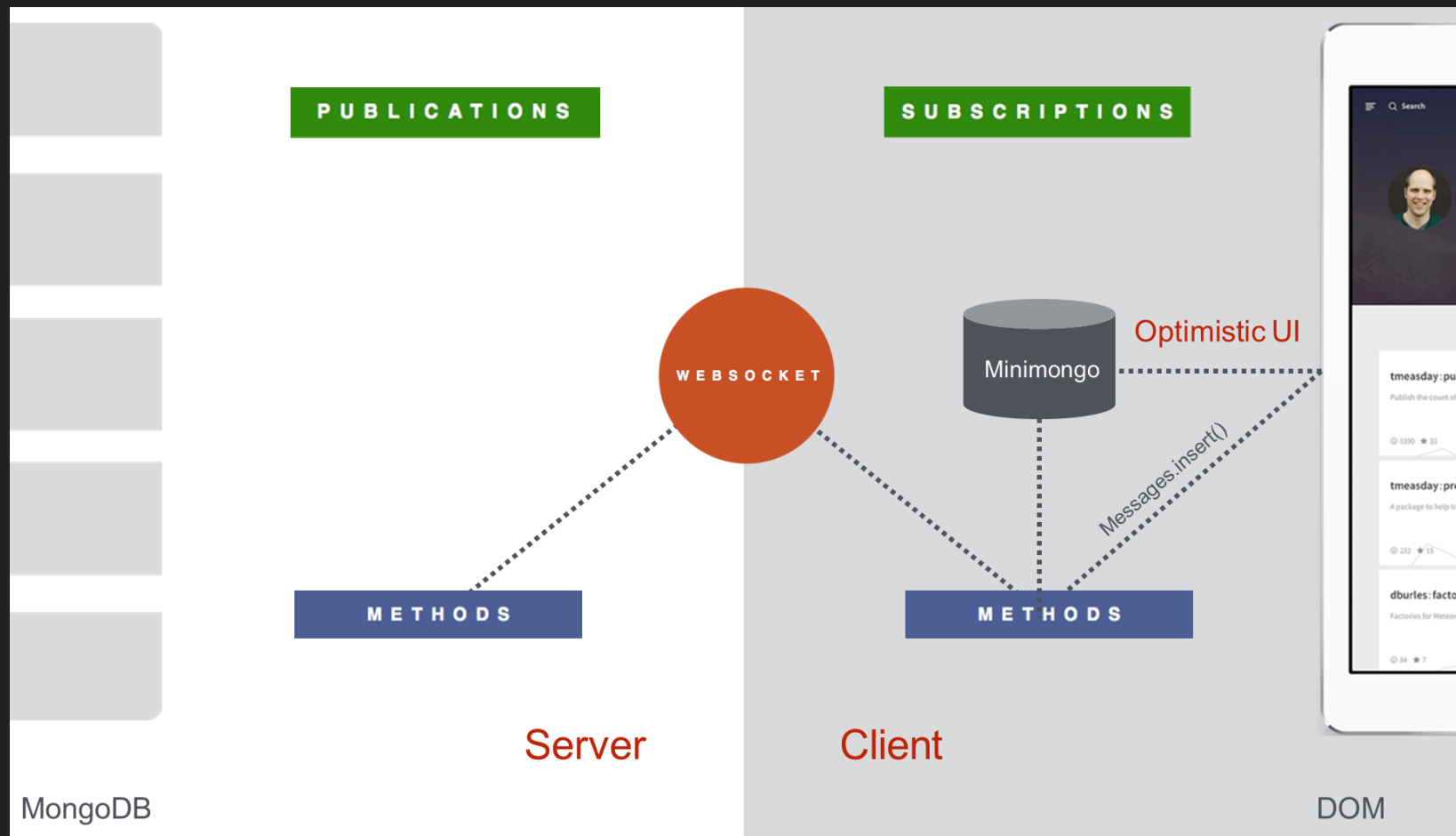
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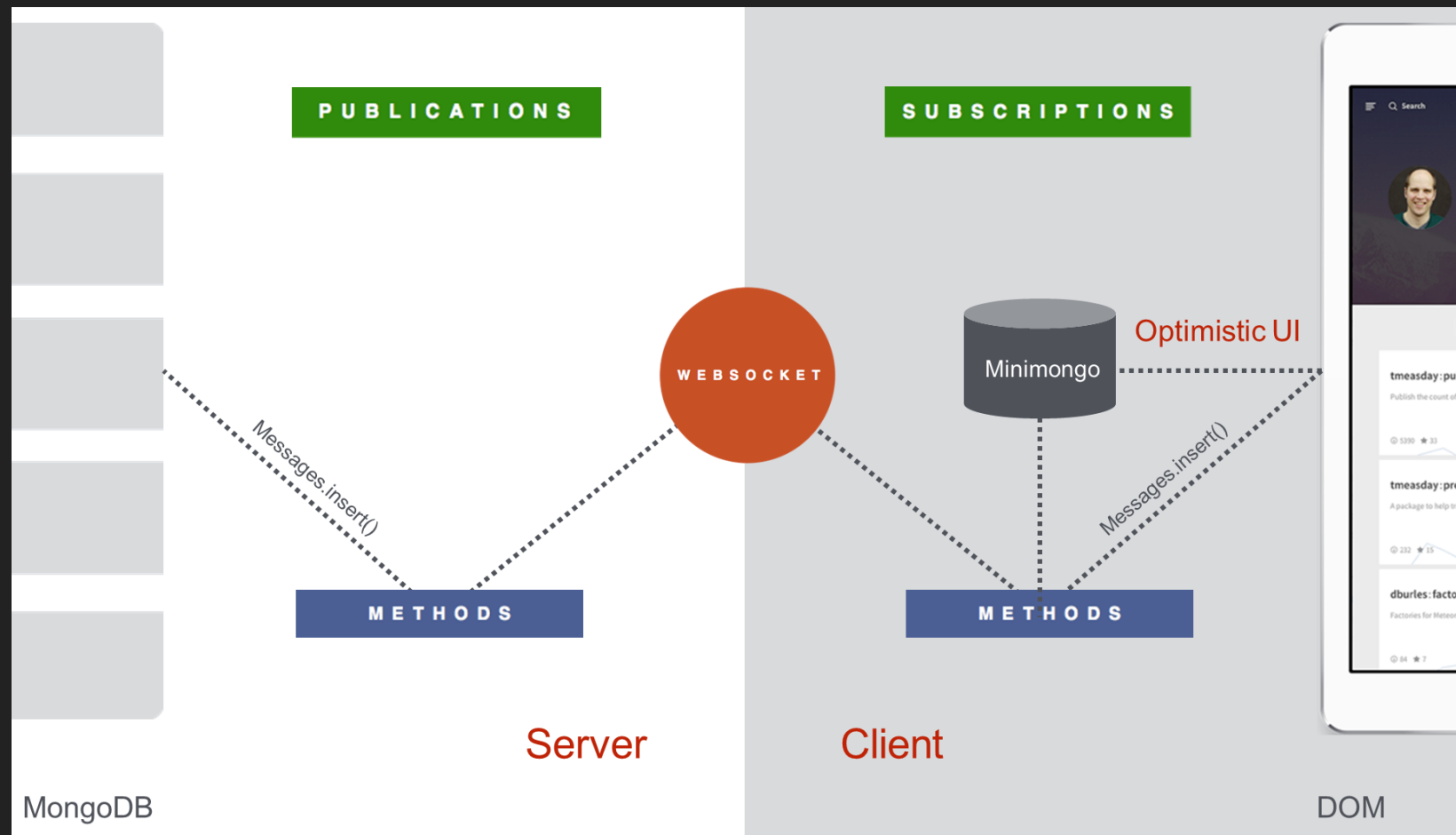
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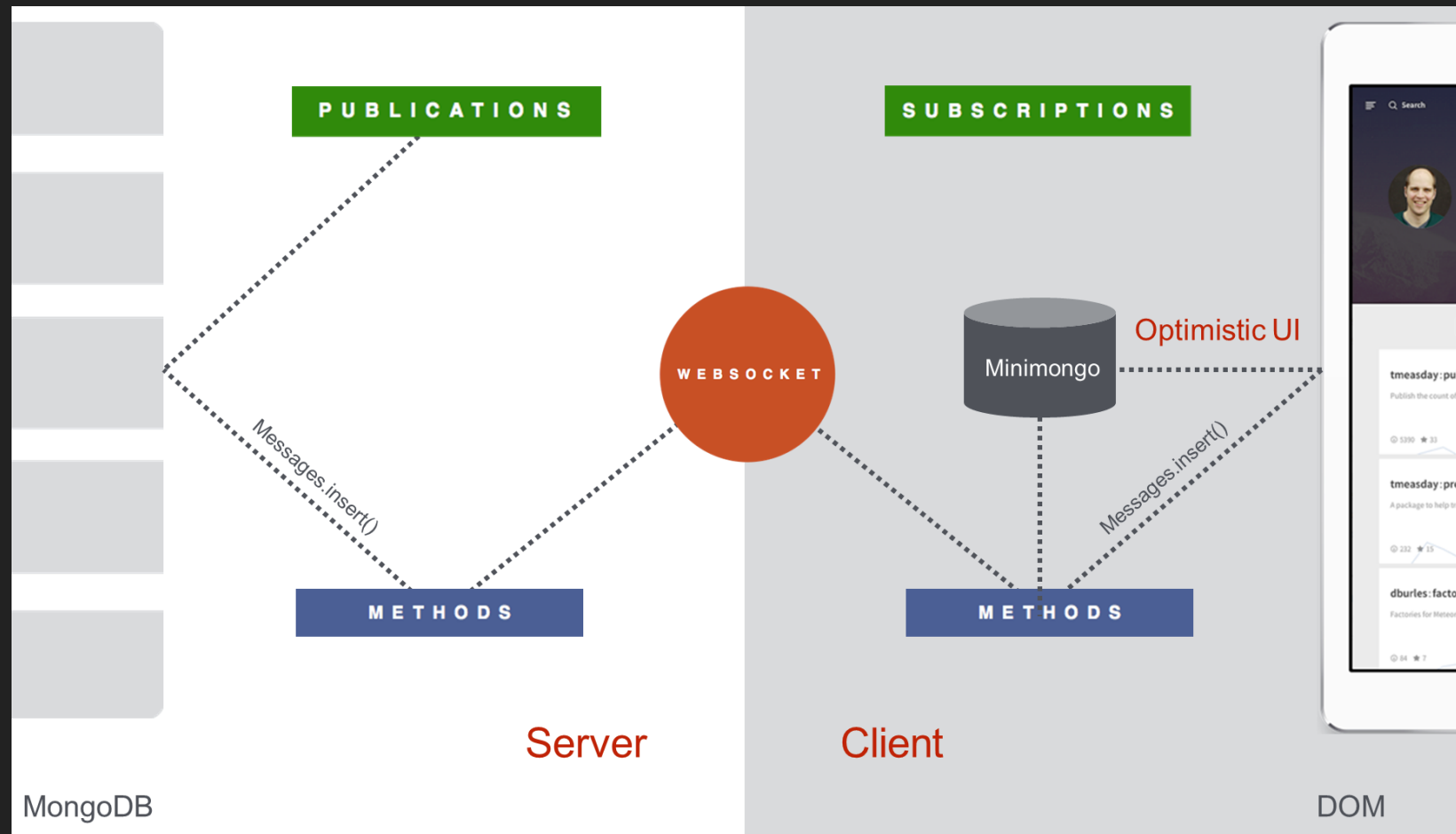
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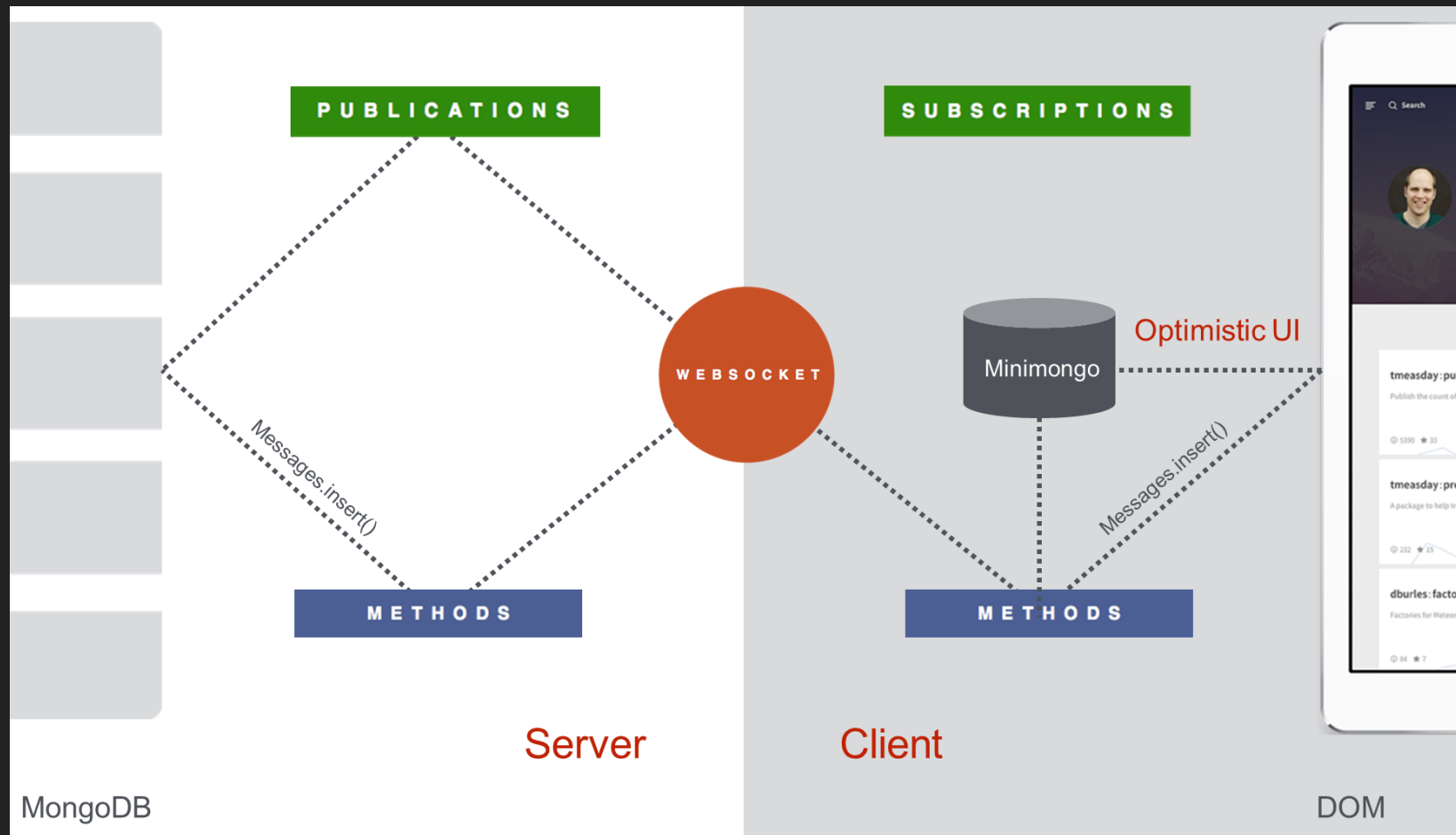
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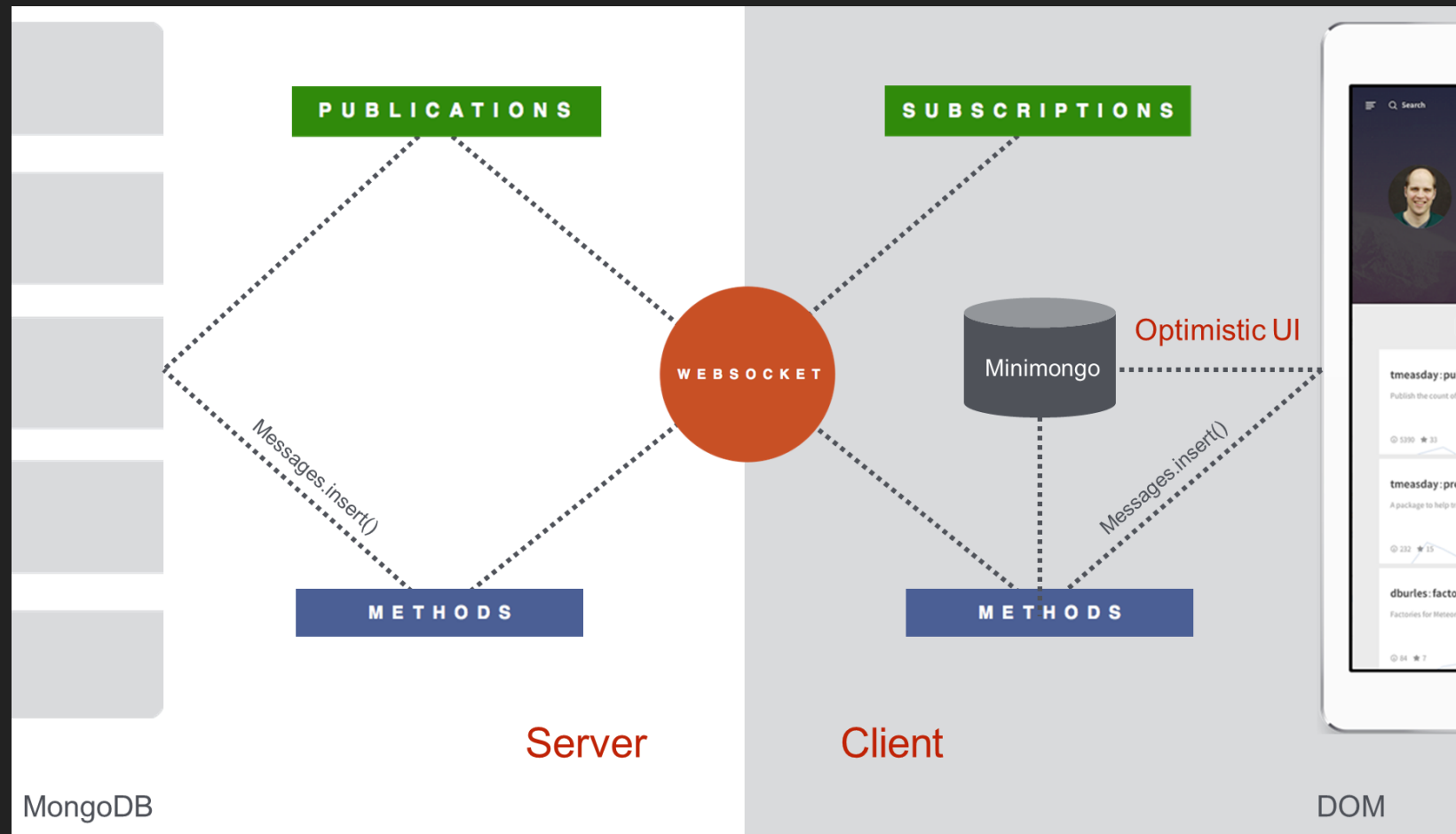
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from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](https://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)

# What is Meteor?

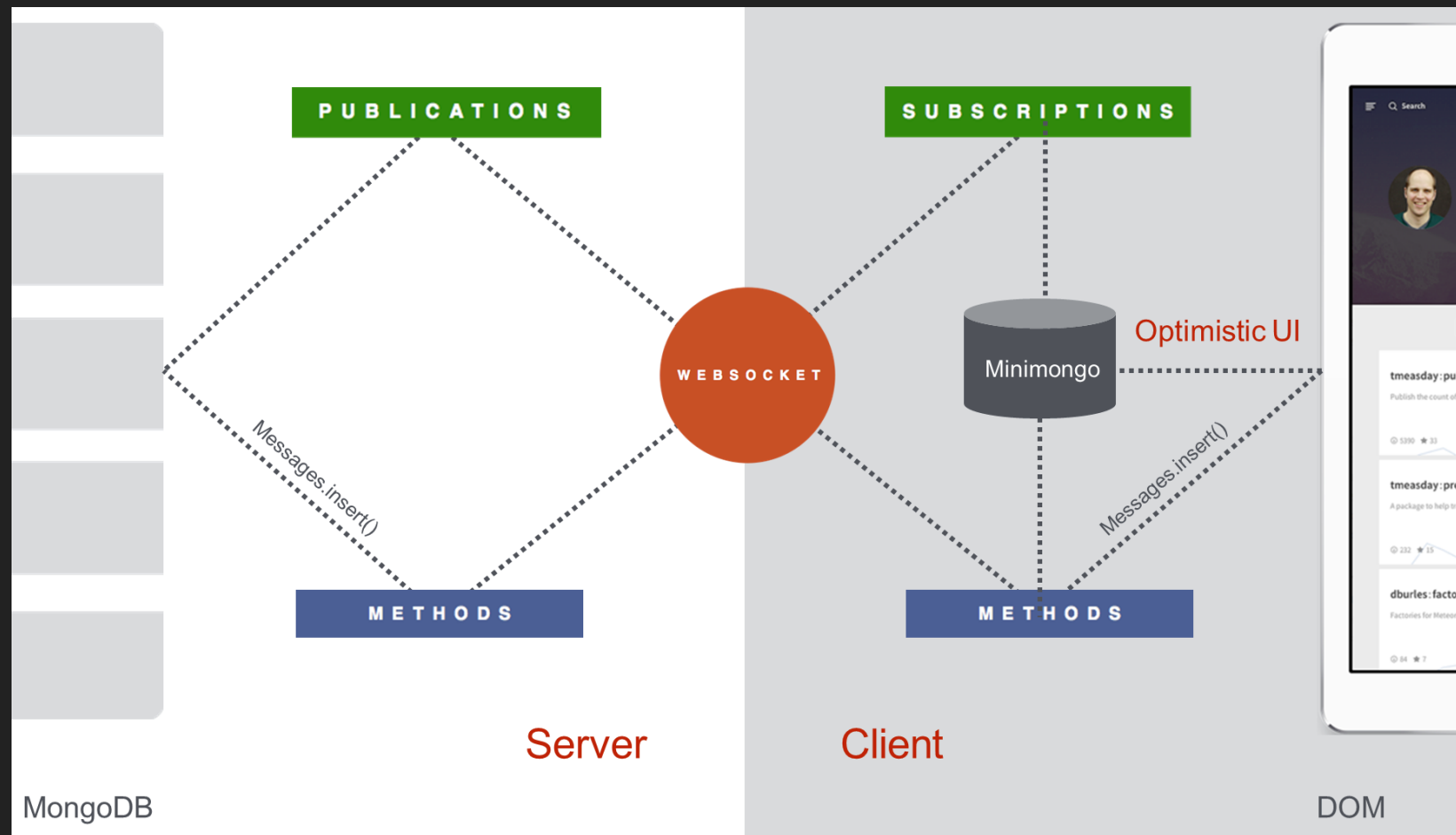
## Meteor Data Flows



from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](https://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)

# What is Meteor?

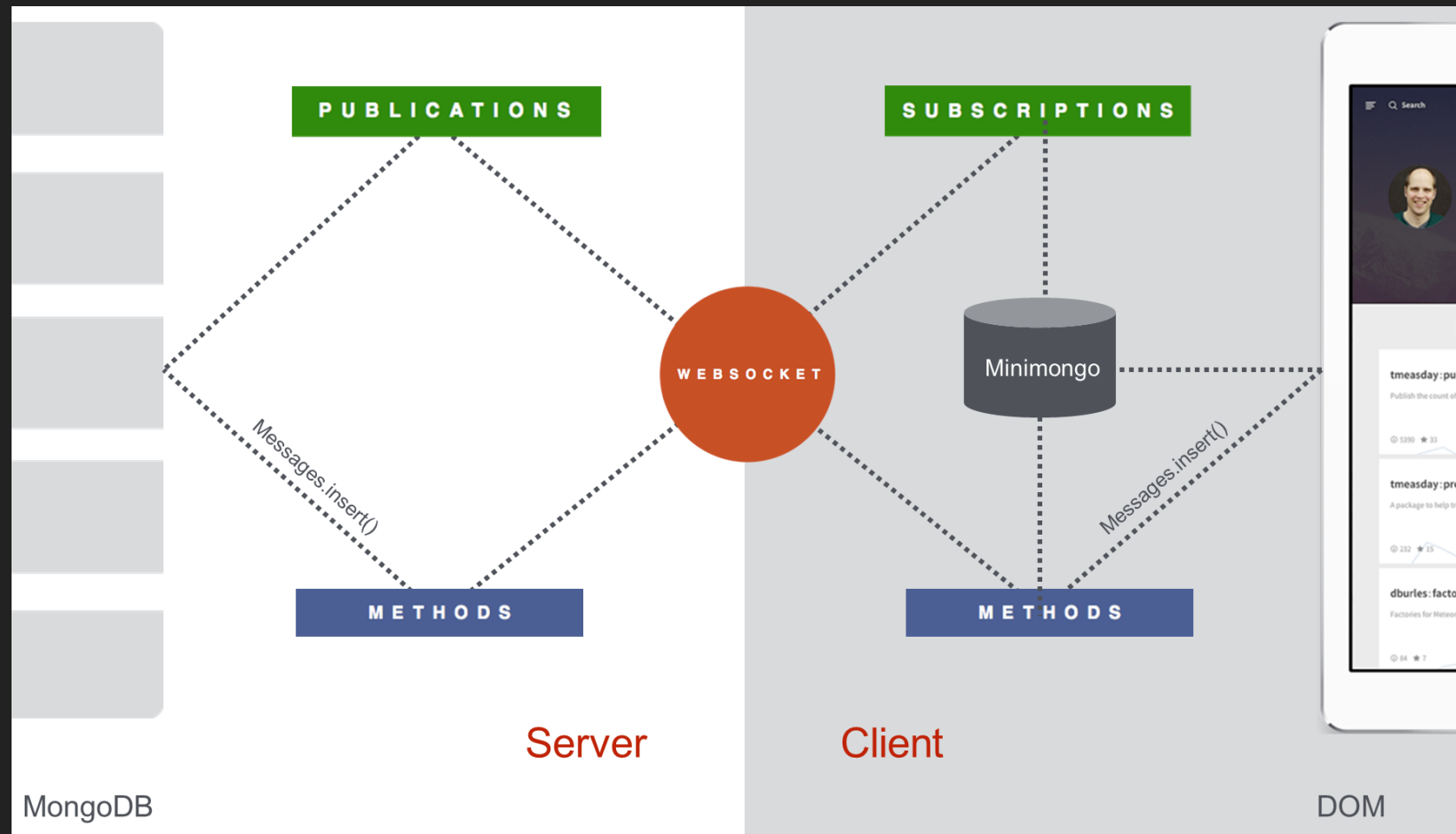
## Meteor Data Flows



from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](https://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)

# What is Meteor?

## Meteor Data Flows



from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](https://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)



# View with Blaze and Spacebars

Spacebars is simply HTML, with the addition of three things:

- **Inclusions** use the `{{> templateName}}` syntax, and simply tell Meteor to replace the inclusion with the template of the same name.
- **Expressions** such as `{{title}}` either call a property of the current object, or the return value of a template helper as defined in the current template's helper.
- **Template helpers** are special tags that control the flow of the template, such as `{{#each}} ... {{/each}}` or `{{#if}}...{{/if}}`.

## What is Meteor?

# View with Blaze and Spacebars

In this example, **url** and **title** come from a **post** object, whereas **domain** is a call to a template helper function:

```
<template name="postItem">
  <div class="post">
    <div class="post-content">
      <h3><a href="{{url}}">{{title}}</a><span>{{domain}}</span></h3>
    </div>
  </div>
</template>
```

```
Template.postItem.helpers
  domain: () ->
    a = _createLink this.url
    a.hostname
```



What is Meteor?

# View with Blaze and Spacebars

**Blaze is reactive:** The template will update automatically, with no additional work on your part. This works even if the template runs arbitrary JavaScript code to compute its data.

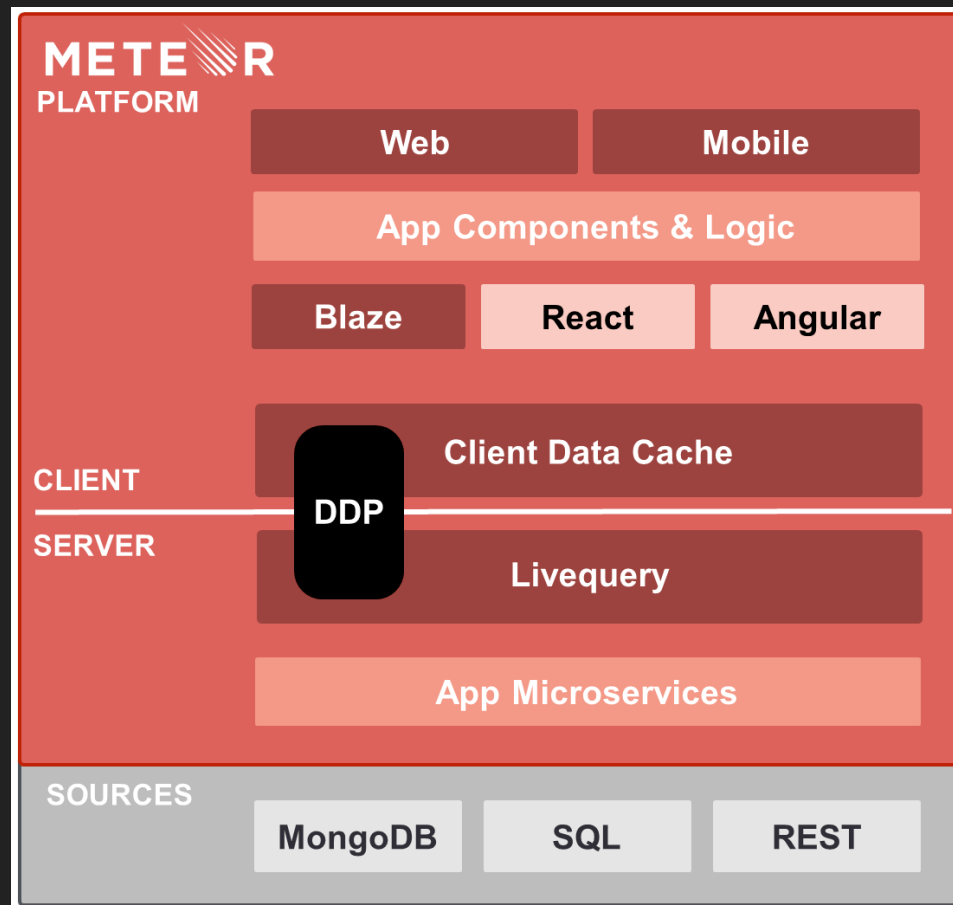
Blaze's simplicity is made possible by Tracker, an extremely lightweight (one kb) system for transparent reactivity.

By wiring all of this up for you, **Blaze removes an enormous amount of boilerplate from your app**, and allows you to say what you want once without repeating yourself.

*from [meteor.com/blaze](http://meteor.com/blaze)*

What is Meteor?

# Integrated development platform



from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](https://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)

# Meteor

## Fullstack JavaScript Development

- Retro42: Our prototype application
- Why did we choose Meteor?
- What is Meteor?
- **Show me some code!**
- Comparing Meteor vs. MEAN
- More about Meteor

Show me some code!

# Implementing "lessons learned"

Let user add lessons learned to a questionnaire:

## How is your admin stress level? 1

A questionnaire regarding your admin stress level.

Question	Explanation	
Stressed?	Something that stressed you out today.	<a href="#">View</a>
Relaxed?	Something that relaxed you today.	<a href="#">View</a>
Stress Level (1-10)	Numeric	<a href="#">View</a>
Are you less stressed today than yesterday?	Boolean	<a href="#">View</a>

[Back](#)[Answer](#)[Add Question](#)[Create Schedule](#)[Invite](#)[Remove](#)

### Lessons Learned

### Answered questionnaires

	Created at	Stress Level (1-10)	Are you less stressed today than ...	Actions
	2015-09-06 21:12 · 12 hours ago	2		<a href="#">Edit</a> <a href="#">View</a>

Show me some code!

# Implementing "lessons learned"

Display lessons learned of a questionnaire:

## How is your admin stress level? 1

A questionnaire regarding your admin stress level.

Question	Explanation	
Stressed?	Something that stressed you out today.	<a href="#">View</a>
Relaxed?	Something that relaxed you today.	<a href="#">View</a>
Stress Level (1-10)	Numeric	<a href="#">View</a>
Are you less stressed today than yesterday?	Boolean	<a href="#">View</a>

[Back](#)[Answer](#)[Add Question](#)[Create Schedule](#)[Invite](#)[Remove](#)

### Lessons Learned

Created at		
2015-09-07 09:03 · a few seconds ago	i should take more breaks	<a href="#">Delete</a>

### Answered questionnaires

	Created at	↓	Stress Level (1-10)	Are you less stressed today than ...	Actions
🕒	2015-09-06 21:12 · 12 hours ago		2	✖	<a href="#">Edit</a> <a href="#">View</a>

Show me some code!

# Include with Blaze, Spacebars

```
<template name="questionnairePasses">
  {{> _questionnaireTitleDescription}}
  <!-- left out: display questionnaire questions -->
  {{> _questionnaireButtons}}

  {{> lessonsLearnedTemplate questionnaireId=_id}}

  <!-- left out: display questionnaire passes -->
</template>
```

- We include the **lessonsLearnedTemplate** in the **questionnairePasses** template.
- We pass this questionnaire's **\_id** as **questionnaireId**.



Show me some code!

# Display with Blaze, Spacebars

```
<template name="lessonsLearnedTemplate">
  <h2>{{_ 'lessonsLearnedTemplate.title'}}</h2>
  {{#if lessonsLearned}}
    <table class="..." id="lessonsLearnedTable">
      <tbody>
        {{#each lessonsLearned}}
          <!-- next slide -->
        {{/each}}
      </tbody>
    </table>
  {{/if}}
</template>
```

- The template name **lessonsLearnedTemplate** is the key which we will use in our CoffeeScript code.
- `{{_ 'key'}}` is i18n with Meteor package `tap:i18n`.
- We left out some of the table markup (thead).

Show me some code!

# Display with Blaze, Spacebars

```
{{#each lessonsLearned}}
  <tr>
    <td class="createdAt">{{createdAtAbsolute}} {{createdAtRelative}}</td>
    <td class="text">{{text}}</td>
    <td class="actions">
      <a href="#"
        class="deleteLessonLearned btn btn-default btn-sm">
        {{_ 'lessonsLearnedTemplate.delete'}}
      </a>
    </td>
  </tr>
{{/each}}
```

- Examples of calling a template helper function: **lessonsLearned**, **createdAtAbsolute**.
- Example of looking up a value in current scope: **text**.
- Iterating with **{{#each lessonsLearned}}** creates a new **this** scope for each document in the collection.

Show me some code!

# Template helper functions

```
Template.lessonsLearnedTemplate.helpers
  lessonsLearned: () ->
    LessonsLearned.find({questionnaireId: this.questionnaireId},
      {sort: {createdAt: -1}}).fetch()

  createdAtAbsolute: () ->
    moment(this.createdAt).format('YYYY-MM-DD HH:mm')

  createdAtRelative: () ->
    moment(this.createdAt).fromNow()
```

- Get the questionnaire id for which to show lessons learned: **this.questionnaireId**.
- Use livequery to read from **LessonsLearned** collection.
- Note that the **this** scope for the helper functions **createdAt\*** is a lesson learned document.

Show me some code!

# Defining collections

```
@LessonsLearned = new Mongo.Collection 'lessons_learned'  
  
LessonsLearned.allow  
  insert: (userId) ->  
    userId is Meteor.userId()  
  remove: (userId, lessonLearned) ->  
    userId? and (userId is lessonLearned.userId)
```


- Create a new collection with **new Mongo.Collection 'lessons\_learned'**. On the server, this sets up a MongoDB collection called my-collection; on the client, this creates a cache connected to the server collection.
- Define conditions which allow insertion and removal of lessons learned documents.

Show me some code!

# Publishing / subscribe to data

```
# server-side only code
Meteor.publish 'lessons_learned', (questionnaireId) ->
  check questionnaireId, String
  LessonsLearned.find(
    {questionnaireId: questionnaireId, userId: this.userId},
    {sort: {createdAt: -1}}
```

```
# server- and client-side code
Router.route '/questionnaires/:_id/passes', {
  name: 'questionnairePasses'
  waitOn: () -> [
    Meteor.subscribe 'questionnaire', this.params._id
    Meteor.subscribe 'lessons_learned', this.params._id
    Meteor.subscribe 'questionnaire_passes', this.params._id
  ]
  data: () -> Questionnaires.findOne this.params._id
}
```



Show me some code!

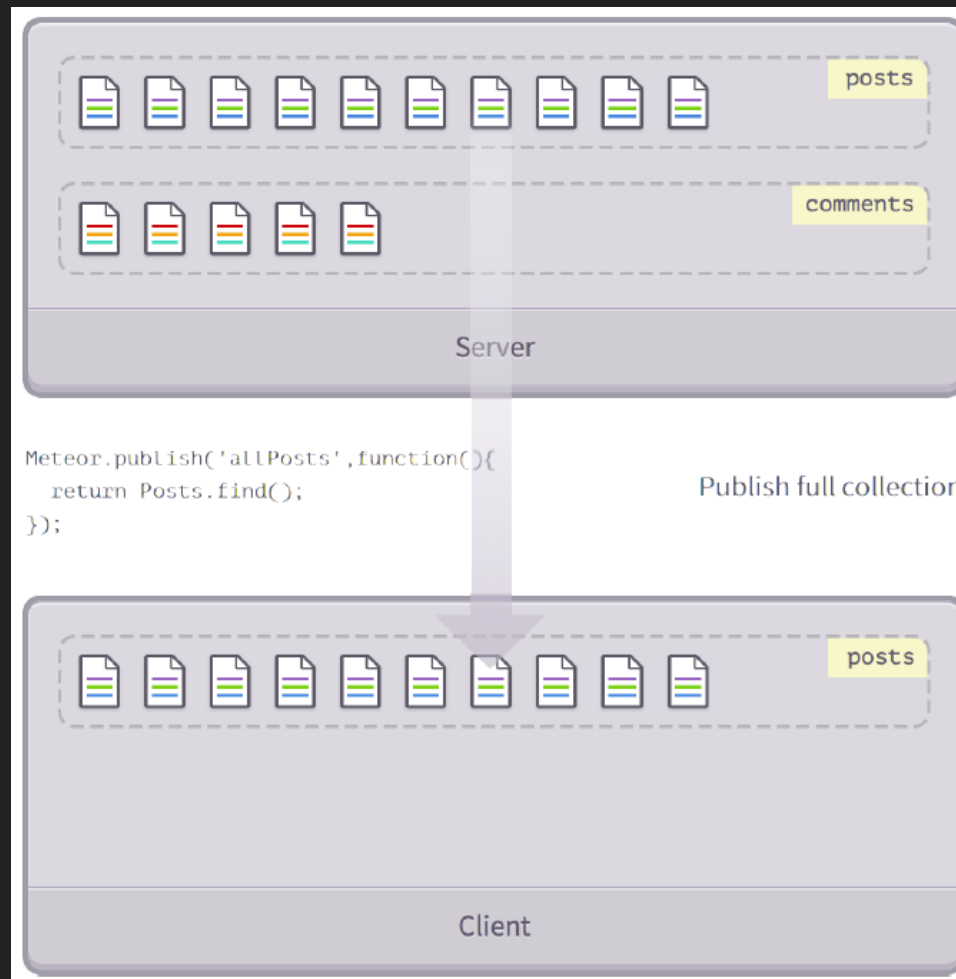
# Auto-publish: Turn it off!



*from Discover Meteor*

Show me some code!

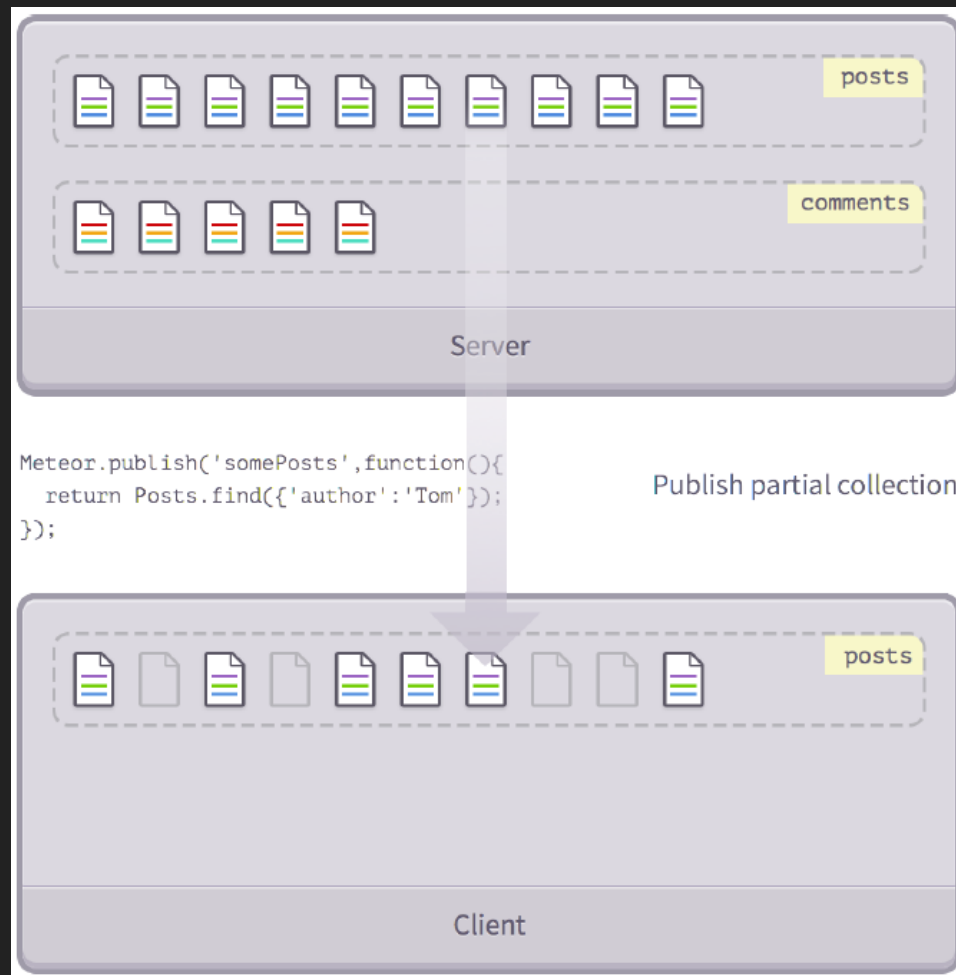
# Publish full collections



*from Discover Meteor*

Show me some code!

# Publish partial collections

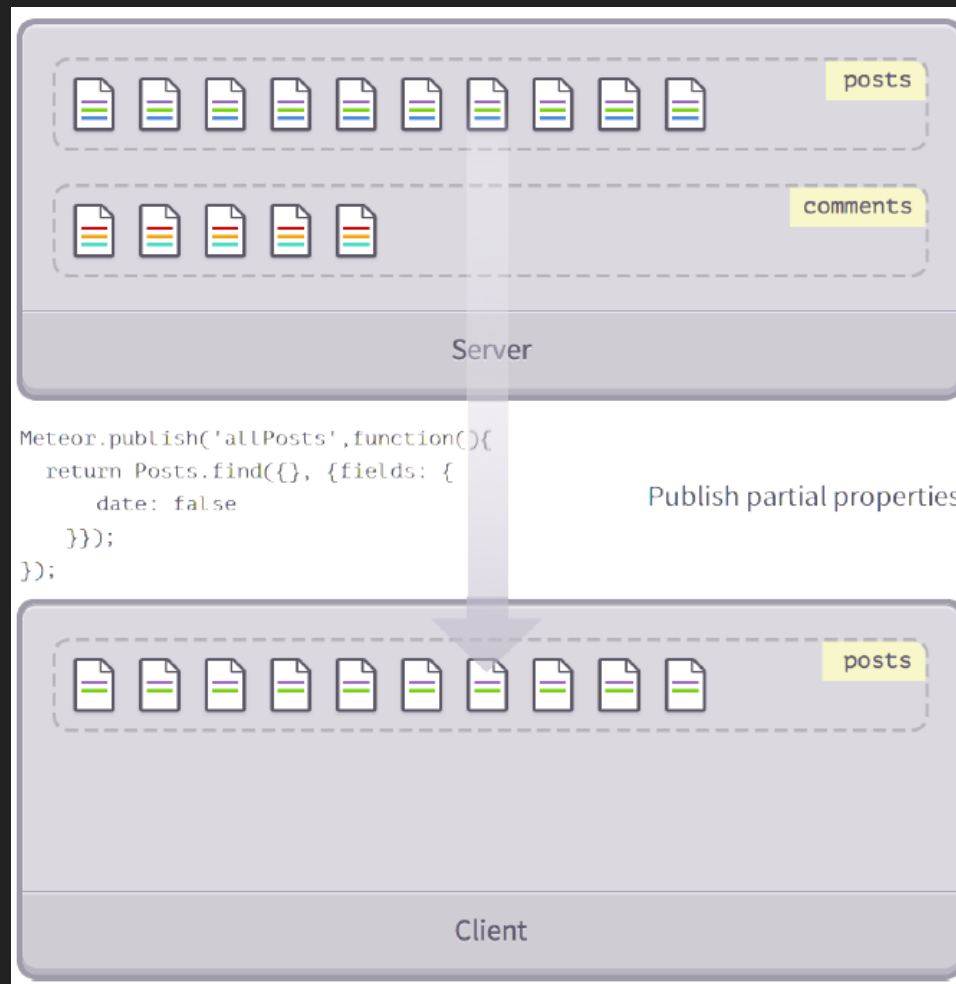


*from Discover Meteor*



Show me some code!

# Publish partial properties



Show me some code!

# Using events for adding, deleting

```
<template name="lessonsLearnedTemplate">
  <h2>{{_ 'lessonsLearnedTemplate.title'}}</h2>
  <!-- display code from previous slides -->
  <form id="addLessonLearned"> <!-- we left out some Bootstrap markup -->
    <input type="text" name="text">
  </form>
</template>
```

```
Template.lessonsLearnedTemplate.events
  'submit #addLessonLearned': (event) ->
    event.preventDefault()
    LessonsLearned.insert
      questionnaireId: this.questionnaireId
      userId: Meteor.userId()
      text: event.target.text.value
    event.target.text.value = ''

  'click .deleteLessonLearned': () ->
    LessonsLearned.remove this._id
```

# Show me some code!

## Using reactivity

Making our relative time stamps react to language change:

```
Template.lessonsLearnedTemplate.helpers
  createdAtRelative: () ->
    share.languageDependency.depend()
    # make this computation dependent on a shared dependency
    moment(this.createdAt).format('YYYY-MM-DD HH:mm')
```

```
# client/startup.coffee
Meteor.startup () ->
  share.languageDependency = new Deps.Dependency
```

```
# client/templates/header.coffee
Template.header.events
  'click .tap-i18n-buttons button': () ->
    newLanguage = TAPI18n.getLanguage()
    accountsUIBootstrap3.setLanguage newLanguage
    moment.locale newLanguage
    share.languageDependency.changed()
    # forces re-computation of all dependent computations
```

Show me some code!

## Did you notice? No callbacks!

We've implemented the "lessons learned" feature without any callbacks! In many cases, Meteor takes care of the asynchronicity and the callbacks necessary to deal with it.

If you need to explicitly call a server-side function, use **Meteor.call**. Using a **ReactiveVar**, it's easy to update the UI reactively.

In our project, we only used **Meteor.call** nine times, some due to Mini-MongoDb limitations (no aggregations).

Show me some code!

# Meteor.call, ReactiveVar example

```
_numericAnswersChartVar = new ReactiveVar null

Template.questionnaireQuestionView.helpers
  numericAnswersChart: () -> _numericAnswersChartVar.get()

Template.questionnaireQuestionView.onRendered () ->
  questionnaire = this.data
  Meteor.call 'questionnaireQuestionAnswers', Router.current().params._id,
    Router.current().params._questionUuid, (error, result) ->
    if error then return share.showErrorMessage error.reason
  question = share._question questionnaire
  if question.type is 'numeric'
    timeSeries = _.map result,
      (answer) -> [answer.createdAt.getTime(), parseFloat(answer.value)]
  numericChart = _numericChart timeSeries.reverse(), questionnaire
  _numericAnswersChartVar.set numericChart # update ReactiveVar
```

# Meteor

## Fullstack JavaScript Development

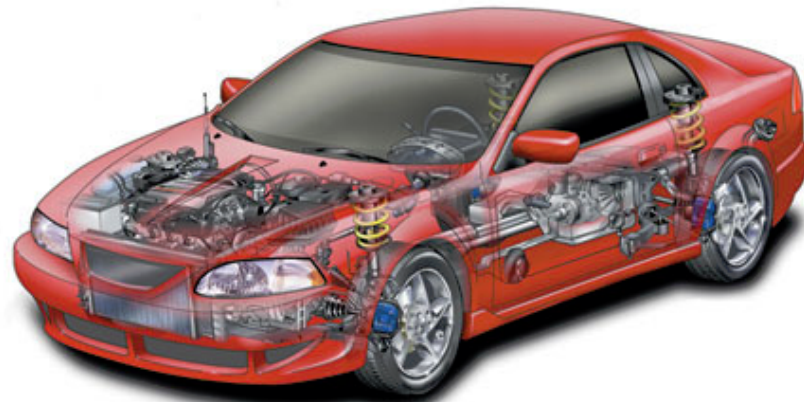
- Retro42: Our prototype application
- Why did we choose Meteor?
- What is Meteor?
- Show me some code!
- **Comparing Meteor vs. MEAN**
- More about Meteor

Comparing Meteor vs. MEAN

# All-inclusive vs. do-it-yourself



*The MEAN stack*



*Meteor.js*

Meteor = MEAN stack + Socket.IO + grunt/gulp + Cordova + hot code reload + a lot more.

from [wiki.dandascalescu.com/essays/meteor\\_js\\_vs\\_the\\_mean\\_stack](http://wiki.dandascalescu.com/essays/meteor_js_vs_the_mean_stack),  
see also [wiki.dandascalescu.com/essays/why\\_meteor](http://wiki.dandascalescu.com/essays/why_meteor)



## Comparing Meteor vs. MEAN

# What we liked better

- **Less code, more functionality**
- It took us much less preparation time to get productive with Meteor than with the MEAN stack
- It also felt like we were much **more productive** once we were up and running: we overestimated our effort by 50%
- Blaze **easier to learn**, whereas Angular can be overwhelming with all its concepts
- **More straight-forward code** because we rarely had to deal with keeping track of callbacks and/or promises.



## Comparing Meteor vs. MEAN

# What we liked better

- No time spent on **build system** (e.g. Grunt, Gulp)
- Simple **dependency management**, with versions always automatically fixed by Meteor
- Only one dependency management system, not two (i.e. npm, bower)
- **Much less boiler-plate code** to publish data to client
- Great and **easy to add packages**, e.g. to add authentication for platforms such as Google, Facebook, run `meteor add accounts-google`, then add `{{> loginButtons}}` in your template to show the login UI, and you're done.

# What we liked less

- Best practices on how to organize the code?
- Live reload in browser is slower because app must be assembled and precompiled by Meteor
- Testing framework Velocity was a late addition to Meteor, and there is little support from Meteor for writing tests
- For webtests, Velocity uses the Robot Framework which utilizes the keyword-driven testing approach: however, we would have preferred a more Protractor-like approach

Comparing Meteor vs. MEAN

## What others have to say

### "This isn't your daddy's JavaScript"

"Week 3: Tasks were being completed faster than ever before. We did struggle occasionally, but we were able to find plenty of documentation and support from our super smart lead developer who we call Google. **At the end of one week, we had completed more in Meteor than the entire previous month in .NET.**"

see [info.meteor.com/blog/from-.net-to-meteor-in-30-days](http://info.meteor.com/blog/from-.net-to-meteor-in-30-days) (2015-09-09)

# Meteor

## Fullstack JavaScript Development

- Retro42: Our prototype application
- Why did we choose Meteor?
- What is Meteor?
- Show me some code!
- Comparing Meteor vs. MEAN
- **More about Meteor**



More about Meteor

# Meteor Roadmap

- Meteor 1.2, Summer 2015
  - ES2015 (ES6)
  - 1st class Angular and React support
- Future Directions
  - Full-stack reactive SQL
  - REST and microservices
  - large app patterns
  - ES2015 modules, and more

see [info.meteor.com/blog/whats-coming-in-meteor-12-and-beyond](http://info.meteor.com/blog/whats-coming-in-meteor-12-and-beyond)

More about Meteor

# Who is behind Meteor?

- Funded: \$20 Million series B, May 2015
- Active development by full-time employees
- Revenue product: Galaxy, a high-availability / large scale Meteor hosting platform
- Meteor platform is MIT-licensed: host anywhere; you own the code

*from [meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z](http://meteor.hackpad.com/Meteor-speaker-kit-uaPe3zDDH8z)*

More about Meteor

# Learn Meteor



see [discovermeteor.com](http://discovermeteor.com), and [meteor.com](http://meteor.com)

## Conclusion

# What's great: Productivity

## Initial backlog

- At schedules intervals, send reminder mails
- Allow user to schedule his questionnaires
- When answering questions, show previous answers to the current question
- Allow yes/no questions
- For numeric questions, show graph of all answers to this question
- Show all answers for a selected question
- Show questions & answers for a selected session
- Show list of sessions for a selected questionnaire
- Answer questions for a selected questionnaire
- Configure questionnaire for current user
- Show questions (question-text only) for a selected questionnaire
- Show list of all questionnaires (user-independent) after login
- Simple application with Google auth
- Deployment Environment Setup
- VM Setup including Development Environment

## Additional backlog (extract!)

- Intro page for non-logged in users for-email UI
- Questionnaire Passes View: percentage answered groups
- Group Question View groups
- Group Pass View groups
- Add group users to questionnaire groups
- Questionnaire passes: Show some boolean and numeric answers in overview difficult duplicate UI
- Display questionnaire passes in a table
- Markdown Support for Text Questions
- Add demo data to fixture for-email
- Create questionnaire from scratch
- Show user notification on missed questionnaire passes
- Allow user to delete questionnaire (and its passes)
- Allow user to edit questionnaire
- Enhance list of sessions for a selected questionnaire with scheduling info

Meteor has been called "embarrassingly easy-to-learn":  
We definitively agree.



# Conclusion

# Should be improved: Test support

Retro42

## Retro42

Track. Reflect. Improve. Yourself. Your team.

Please log in.

Retro42 Fragebogen erzeugen Total: 10

### Weekly Retrospective for a Software Engineering Team 10

A weekly retrospective for a software engineer team.

#### Einladung für diesen Fragebogen

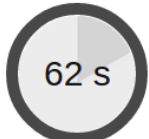
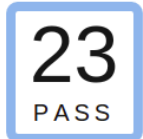

Falls du diesen Fragebogen teilen willst, sende diesen Link:

<http://localhost:3000/questionnaires/HNedBb1v5aKHBPK7F/invite>

Zurück

Invite others to participate on a questionnaire.

VELOCITY




## 23 tests passed in 62 s

robotframework

It appears that you don't have any tests for this framework. Would you like to add some?

Add robotframework sample tests

jasmine-server-integration



**questionnaires.cloning**

- questionnaires cloning should not clone when input is an object 1 ms
- questionnaires cloning should not clone when input is an invalid questionnaire id 1 ms
- questionnaires cloning should clone existing questionnaire 30 ms



## Conclusion

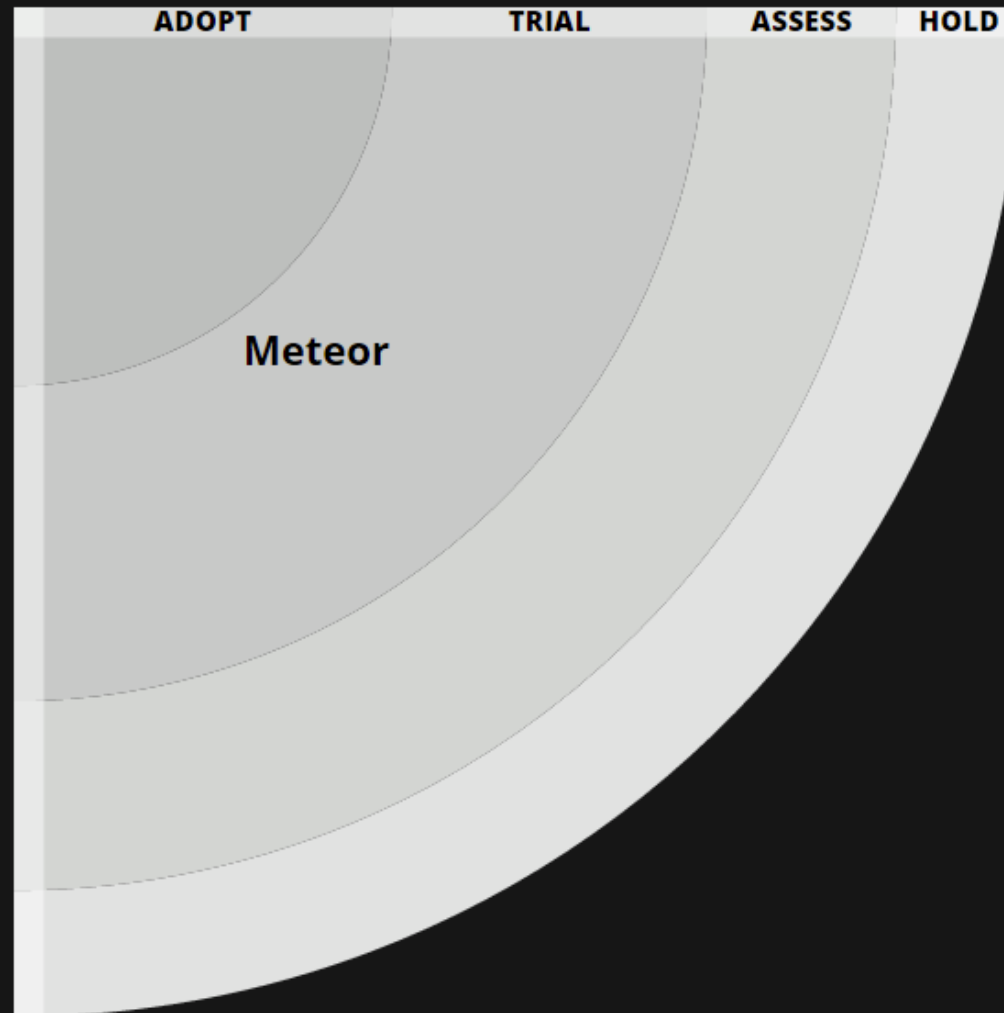
# Should be improved: Test support

What we missed most about Meteor was in-built support for unit and integration tests, client- and server-side.

Also, we would like to see alternatives to the Robot framework for web tests.

## Conclusion

On a tech radar, give it a "trial"



ANY  
QUESTIONS  
?

# Backup Slides

Backup Slides

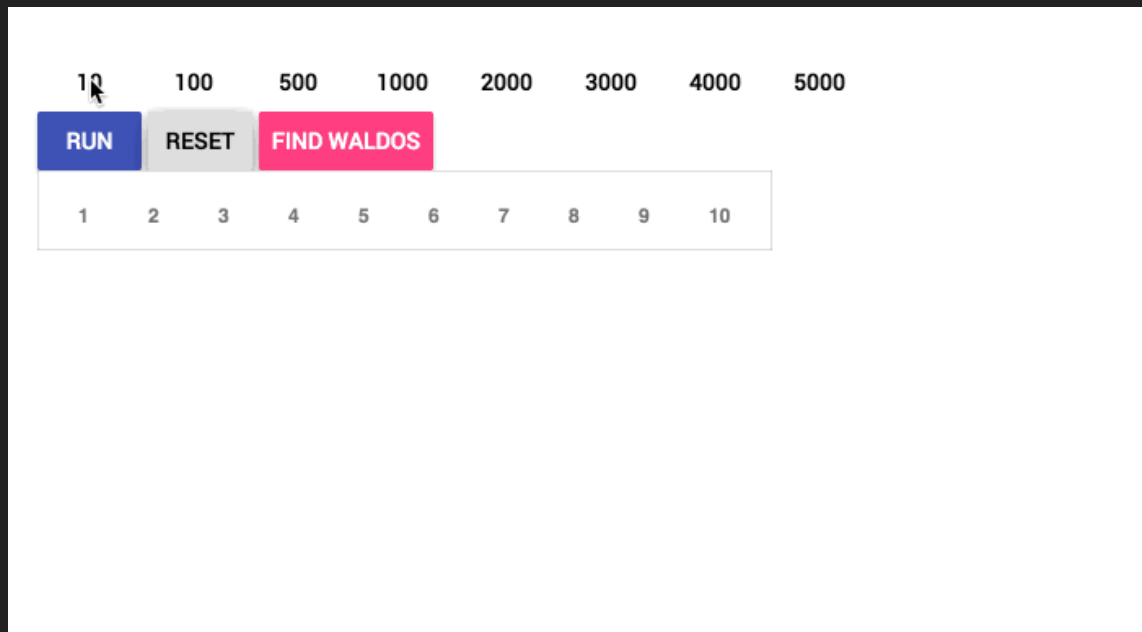
# Pair Programming Recommended



## Backup Slides

# What about Performance?

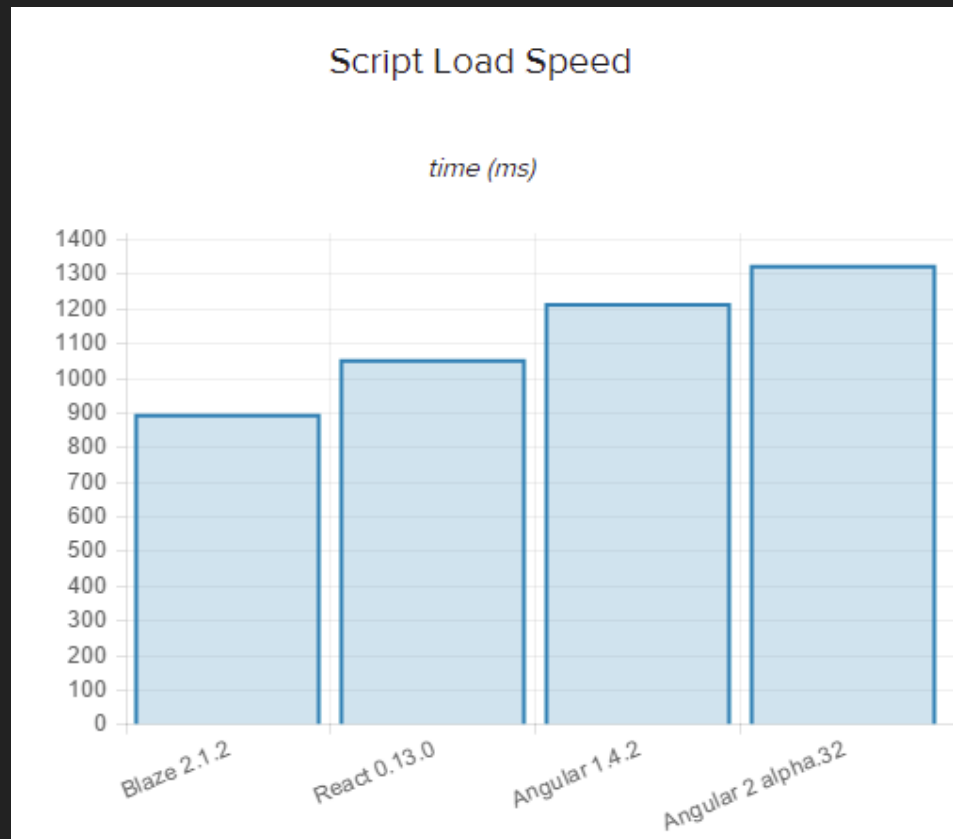
Comparing Blaze, React Meteor, Angular-Meteor, Angular 2 with Meteor, with "Waldo Finder".



see [info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor](http://info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor) ↓

## Backup Slides

# What about Performance?

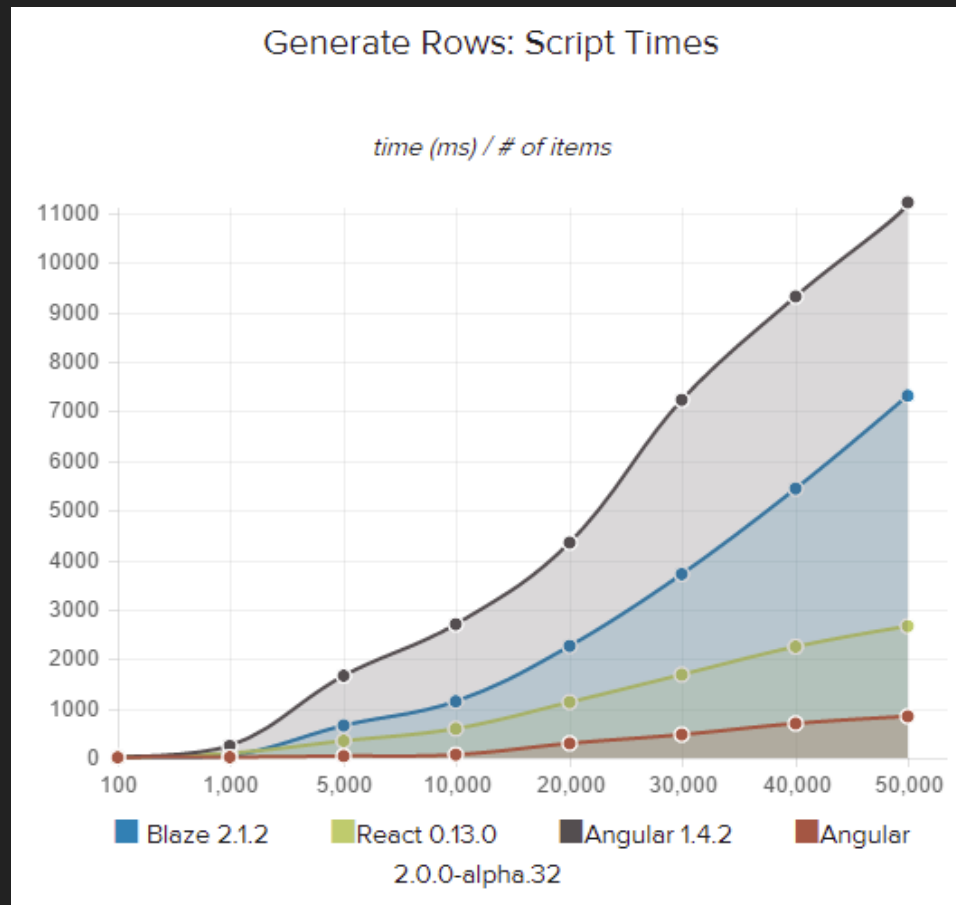


see [info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor](http://info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor)



## Backup Slides

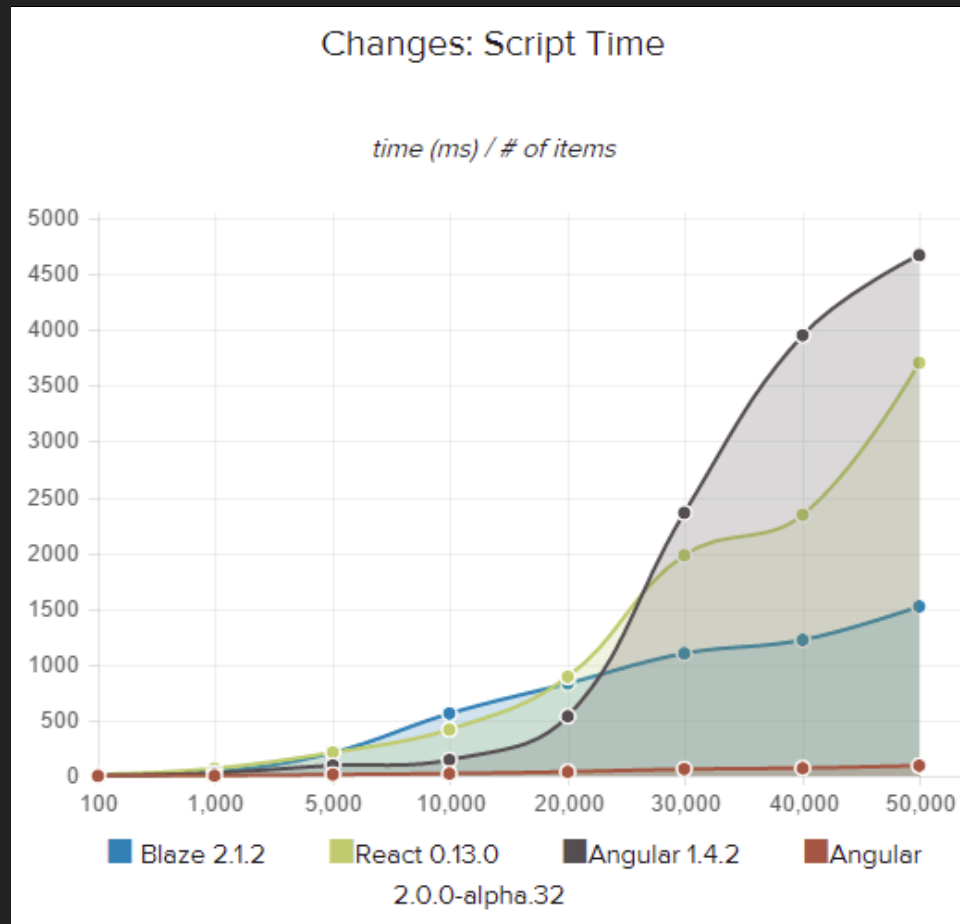
# What about Performance?



see [info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor](http://info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor)

## Backup Slides

# What about Performance?



see [info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor](http://info.meteor.com/blog/comparing-performance-of-blaze-react-angular-meteor-and-angular-2-with-meteor)

# JavaScript: Maintenance...?

Stefan Hanenberg et al. **An empirical study on the impact of static typing on software maintainability**. Empirical Software Engineering, Oct. 2014, Vol. 19, No. 5, pp 1335-1382.

- Static type systems help use a new set of classes – an effective form of self-documentation
- **We believe the most important result is that the static type systems showed a clear tendency in class identification tasks, and that we found a first indicator that this is caused by a reduced navigation effort.**
- Static type systems make it easier for humans and reduce the effort to fix type errors.
- For fixing semantic errors, we observed no difference with respect to development times, and static type systems may not be helpful in preventing semantic errors.

# JavaScript: Best Practices!

## 急がばまわれ

Isogaba maware: **When you are in hurry, take your time**

- Testing: Automated tests at all levels
- SOLID design, and remember the Law of Demeter
- Dependencies: Use a consistent namespaces scheme
- Documentation: Document your APIs
- Continuous Integration, ...