

A close-up, slightly blurred photograph of a person's hands typing on a silver laptop keyboard. The person has light-colored skin and bright orange-pink nail polish on their fingernails. The laptop is positioned in the lower-left foreground, with its screen angled towards the top right.

web and cloud computing – an insight into tooling



general introduction – Frank Blaauw



umcg

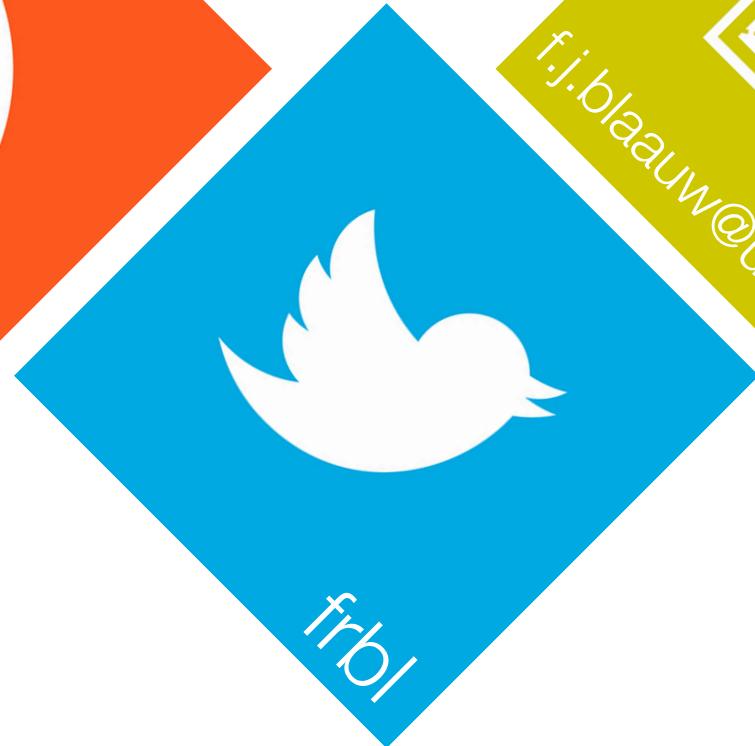


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Frank Blaauw



frbl.eu



frbl



f.j.blaauw@umcg.nl



frankblaauw

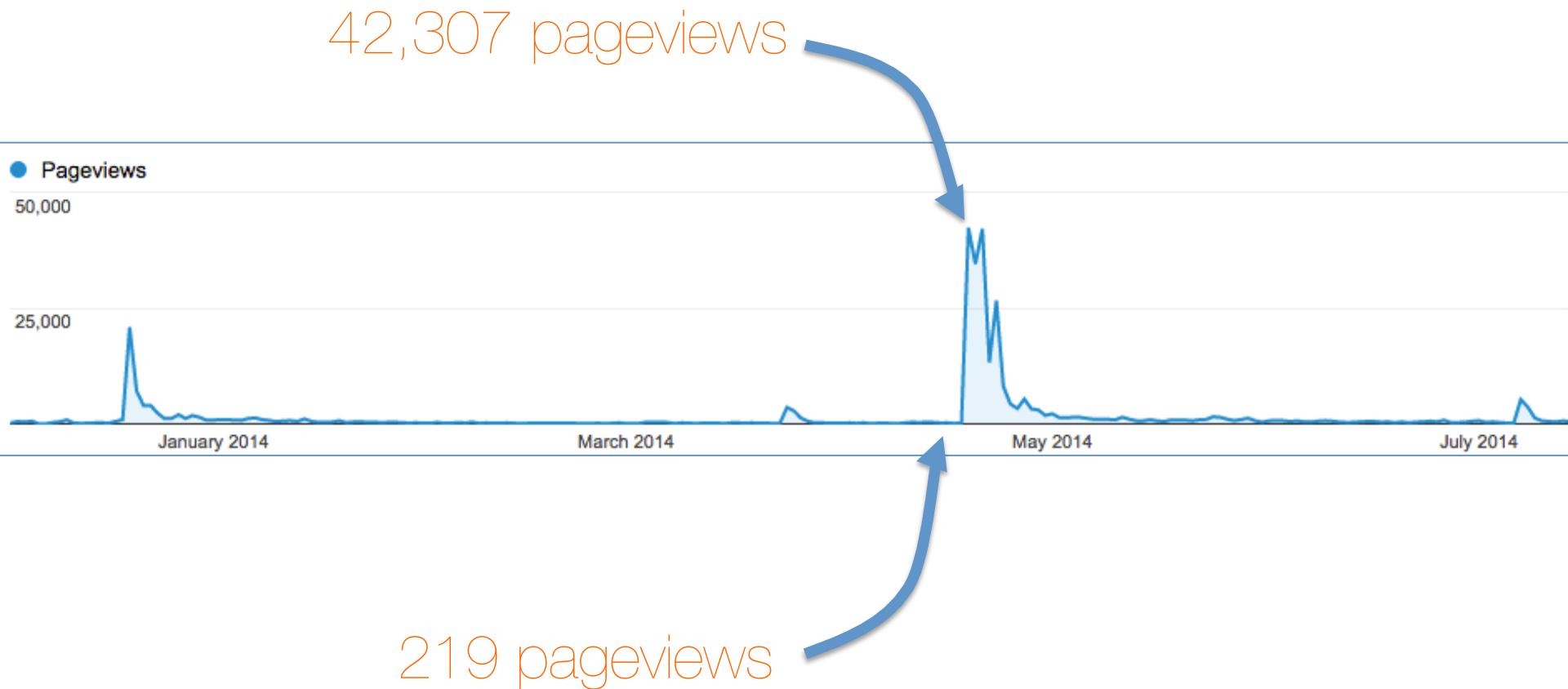
Outline

1. Why me?
2. Tooling overview
3. Websockets
4. Demonstration

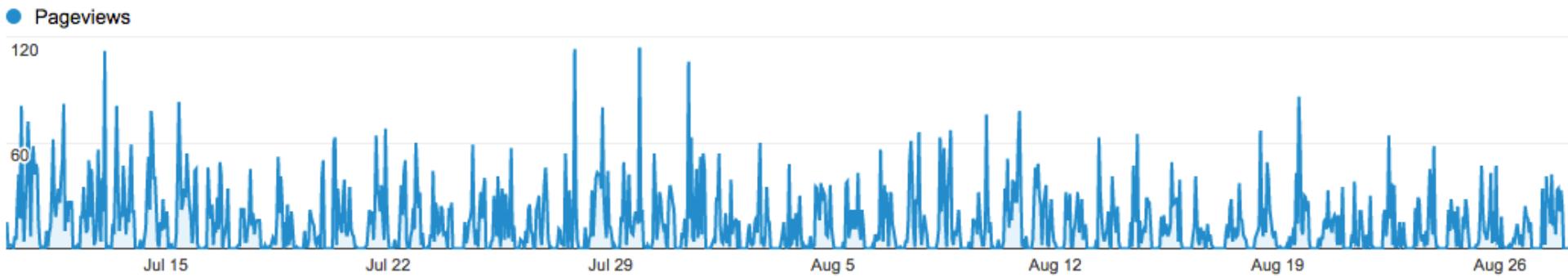


example project – HowNutsAreTheDutch?

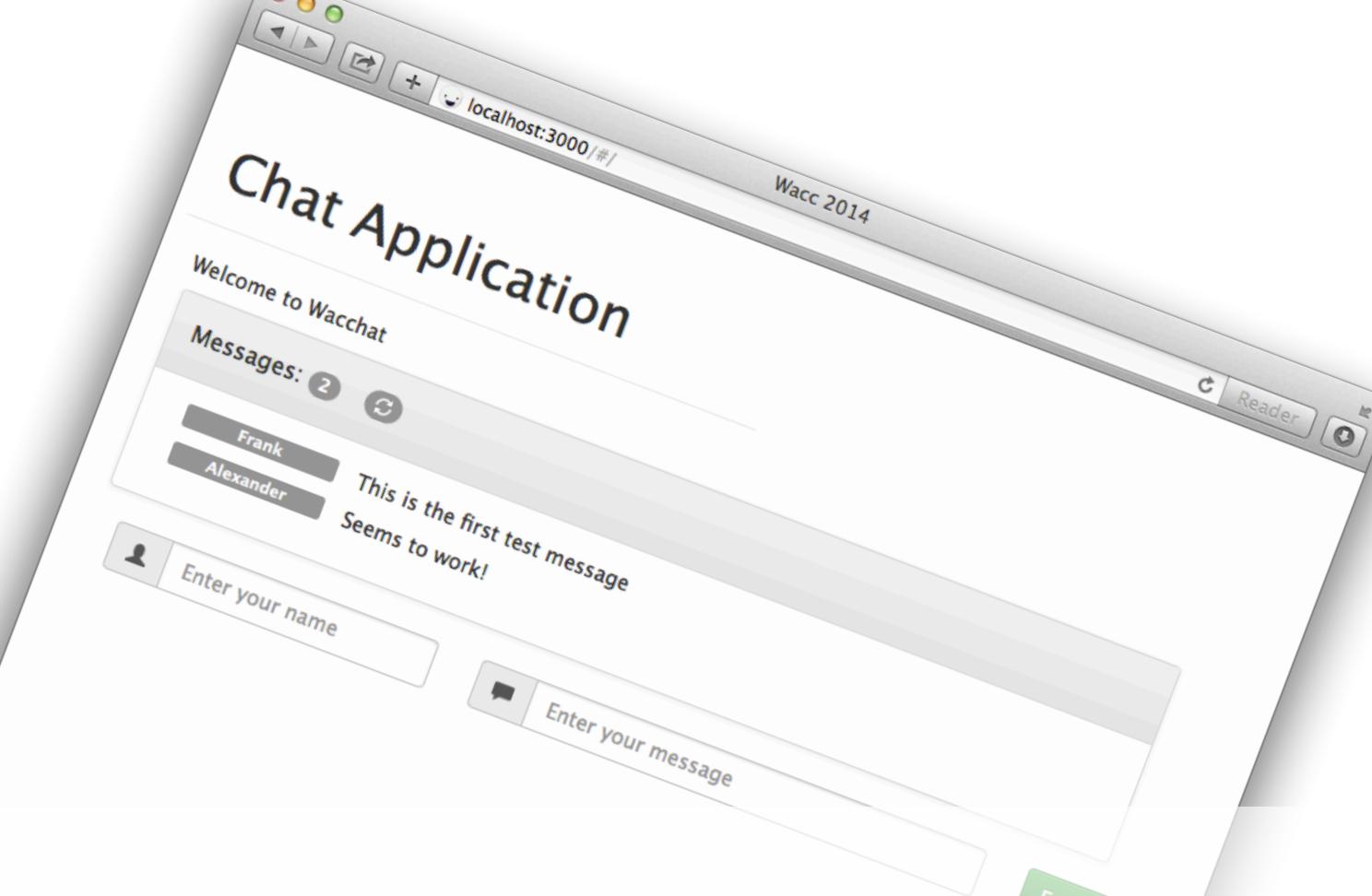
Scalability is key



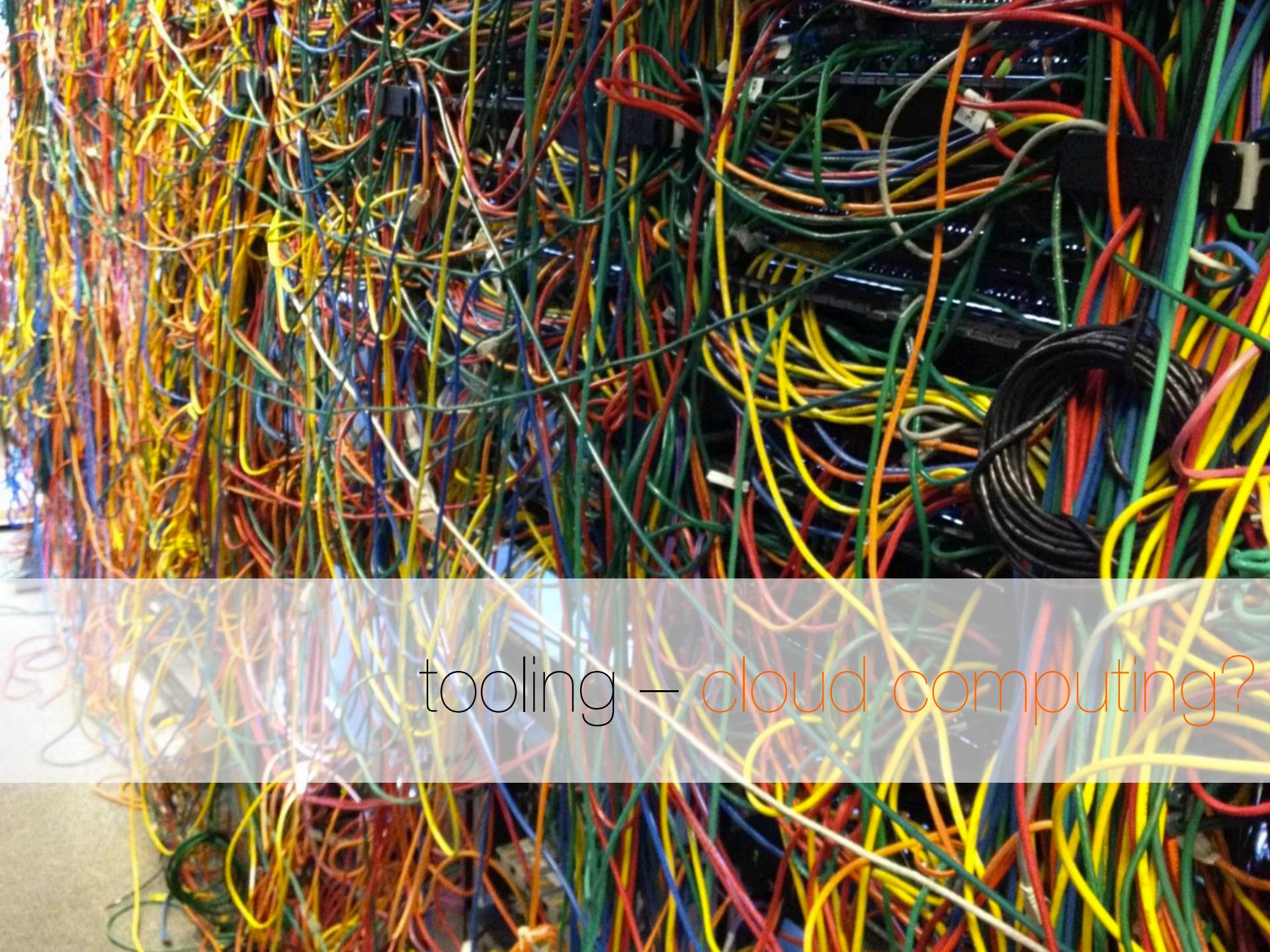
Uptime is key



$3 * 30 * 400 = 36000$
measurements



case study – WacChat



tooling – cloud computing?

Tooling – overview

- Version control
- Continuous integration
- Code analysis
- Hosting
- Monitoring



version control – github



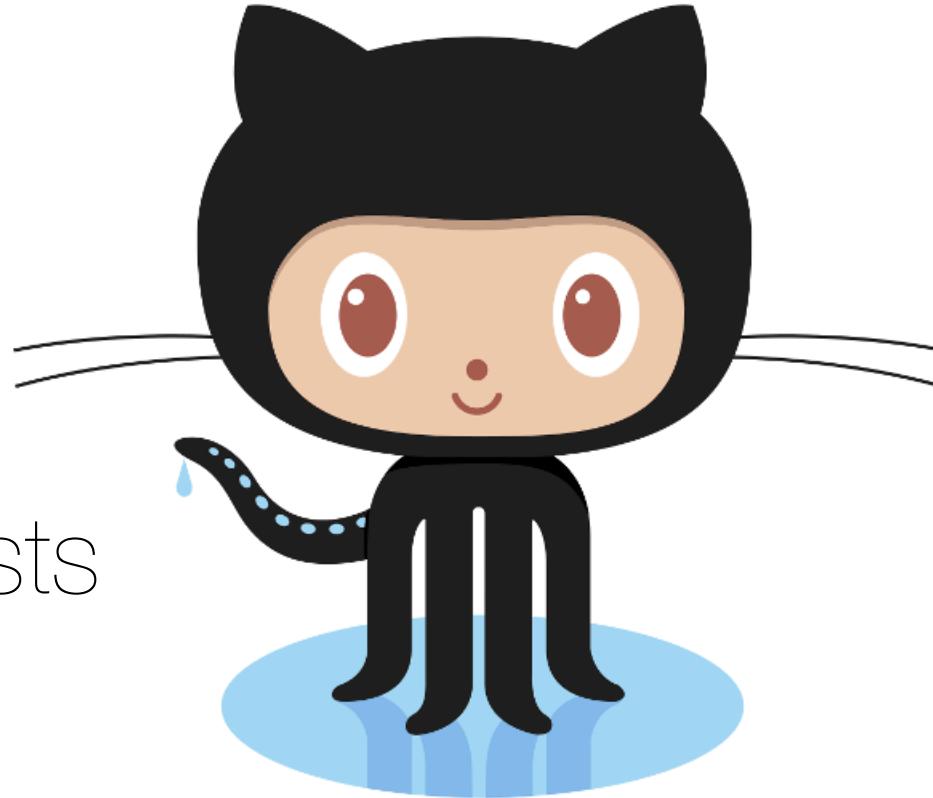
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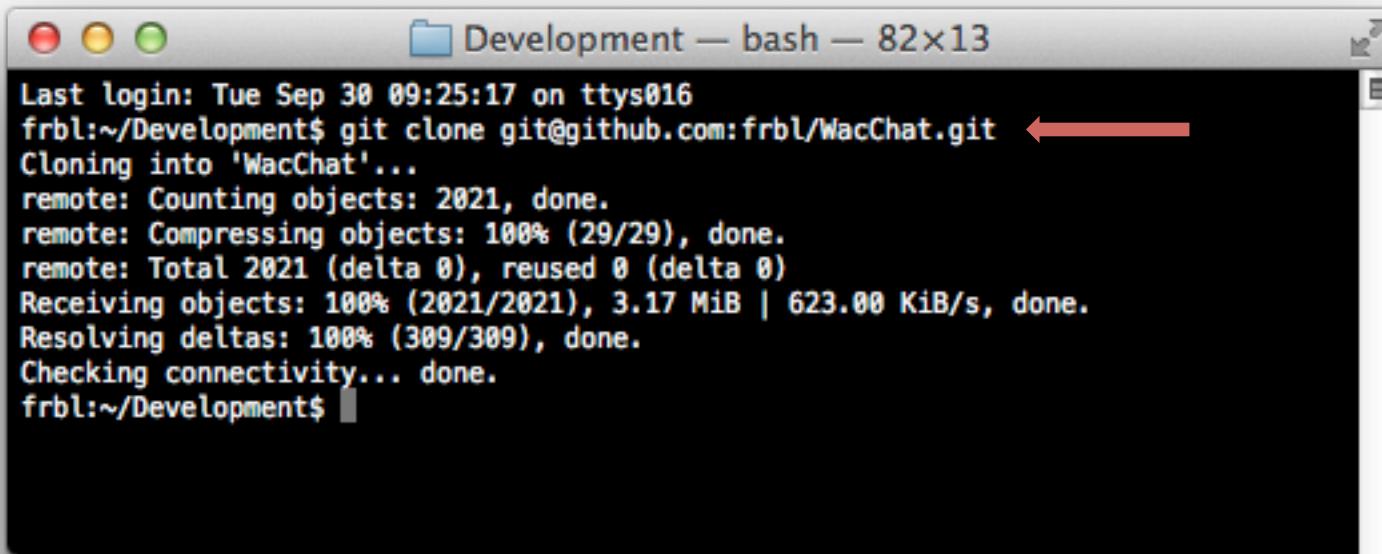
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Three important features of git(hub)

1. CPACP
2. Branching
3. Pull requests



CPACP – Cloning

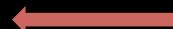


```
Last login: Tue Sep 30 09:25:17 on ttys016
frbl:~/Development$ git clone git@github.com:frbl/WacChat.git ←
Cloning into 'WacChat'...
remote: Counting objects: 2021, done.
remote: Compressing objects: 100% (29/29), done.
remote: Total 2021 (delta 0), reused 0 (delta 0)
Receiving objects: 100% (2021/2021), 3.17 MiB | 623.00 KiB/s, done.
Resolving deltas: 100% (309/309), done.
Checking connectivity... done.
frbl:~/Development$
```

CPACP – Pulling

```
Last login: Tue Sep 30 09:29:50 on ttys017
frbl:~/Development/WacChat$ git pull ←
remote: Counting objects: 3, done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0)
Unpacking objects: 100% (3/3), done.
From github.com:frbl/WacChat
  7c9ff2f..37c8a30  master    -> origin/master
Updating 7c9ff2f..37c8a30
Fast-forward
 README.md | 2 ++
 1 file changed, 2 insertions(+)
frbl:~/Development/WacChat$
```

CPACP – Adding



```
Last login: Tue Sep 30 09:32:49 on ttys017
frbl:~/Development/WacChat$ git add README.md
frbl:~/Development/WacChat$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)

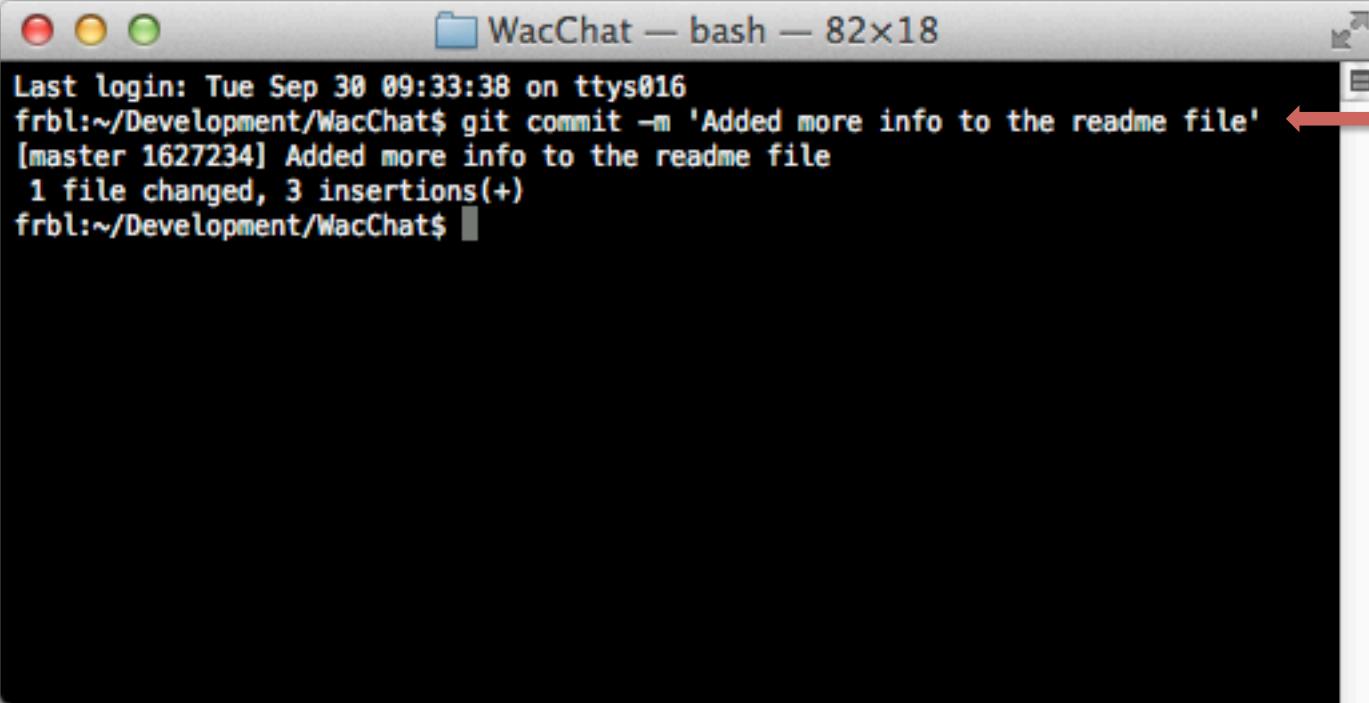
    modified:   README.md

Untracked files:
  (use "git add <file>..." to include in what will be committed)

    super_secret_config_vars

frbl:~/Development/WacChat$
```

CPACP – Committing

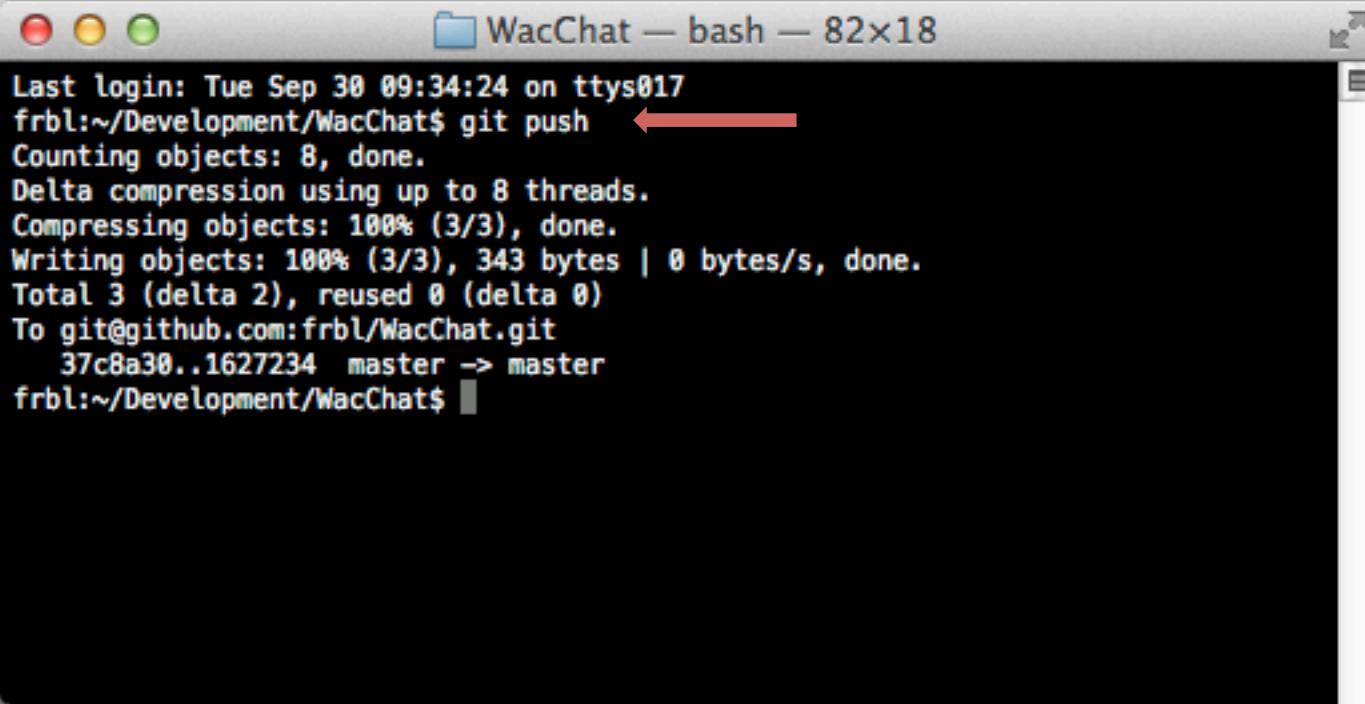


A screenshot of a terminal window titled "WacChat — bash — 82x18". The window shows the following command being run:

```
Last login: Tue Sep 30 09:33:38 on ttys016
frbl:~/Development/WacChat$ git commit -m 'Added more info to the readme file'
[master 1627234] Added more info to the readme file
 1 file changed, 3 insertions(+)
frbl:~/Development/WacChat$
```

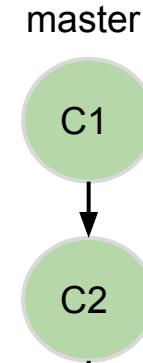
A red arrow points to the right from the end of the commit message line, highlighting the text "Added more info to the readme file".

CPACP – Pushing

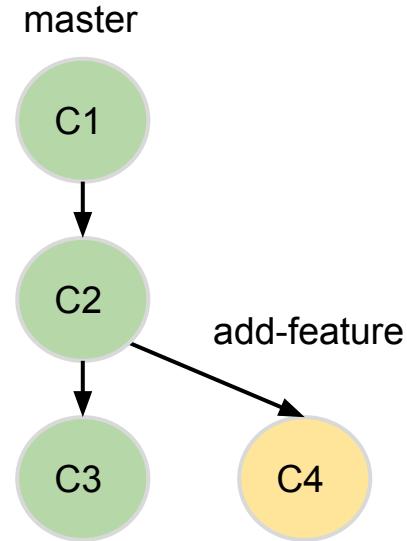


```
Last login: Tue Sep 30 09:34:24 on ttys017
frbl:~/Development/WacChat$ git push ←
Counting objects: 8, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 343 bytes | 0 bytes/s, done.
Total 3 (delta 2), reused 0 (delta 0)
To git@github.com:frbl/WacChat.git
  37c8a30..1627234  master -> master
frbl:~/Development/WacChat$
```

git – Branching

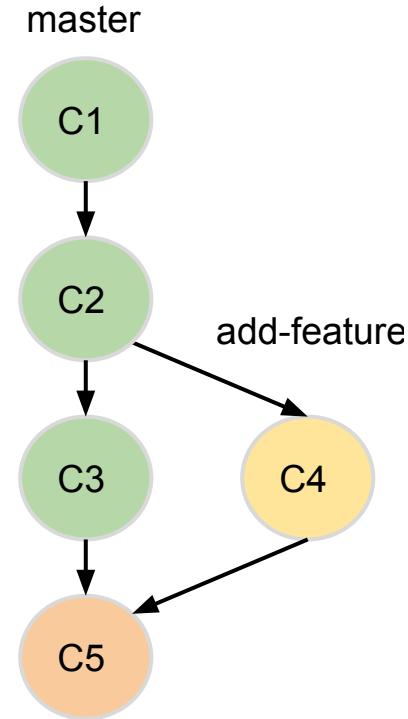


git – Branching



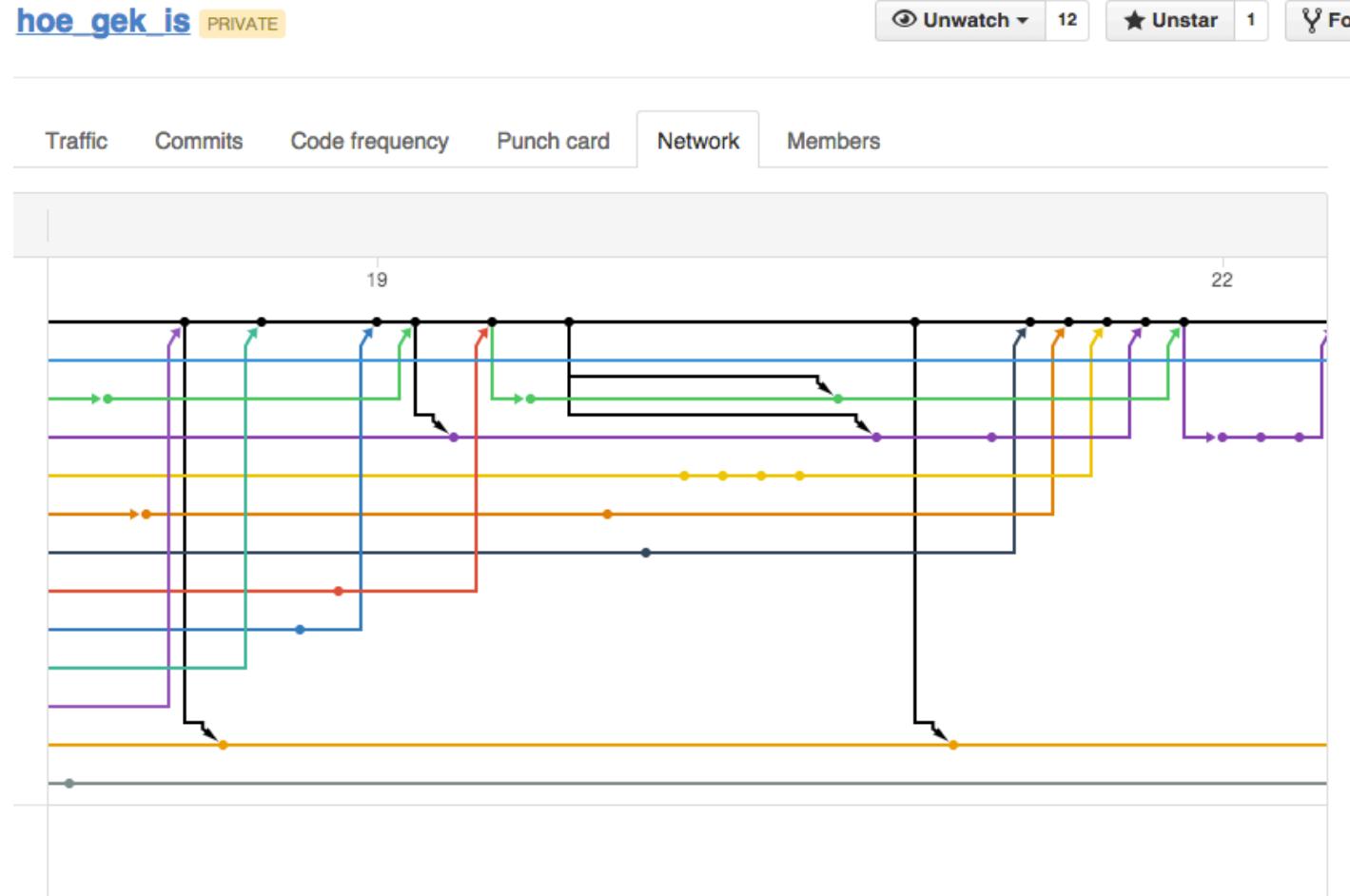
```
frbl:~/WacChat$ git checkout -b add-feature
```

git – Branching



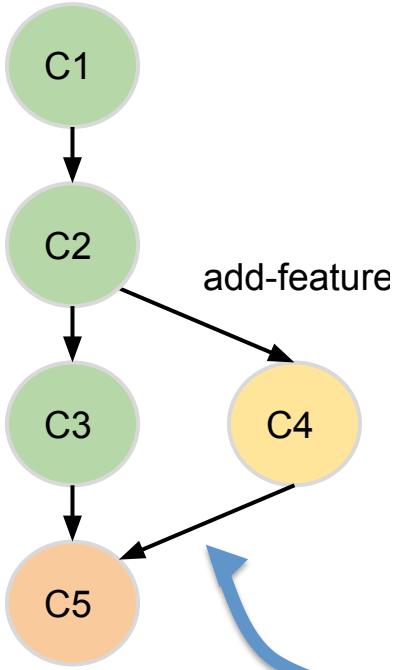
```
frbl:~/WacChat$ git checkout master  
frbl:~/WacChat$ git merge add-feature
```

GitHub – branching



GitHub – pull-requesting

master



Updated the readme #4

[Open](#) frbl wants to merge 1 commit into `master` from `add-feature`

Conversation 0 Commits 1 Files changed 1

frbl commented a minute ago

No description provided.

frbl Updated the readme 66244ae

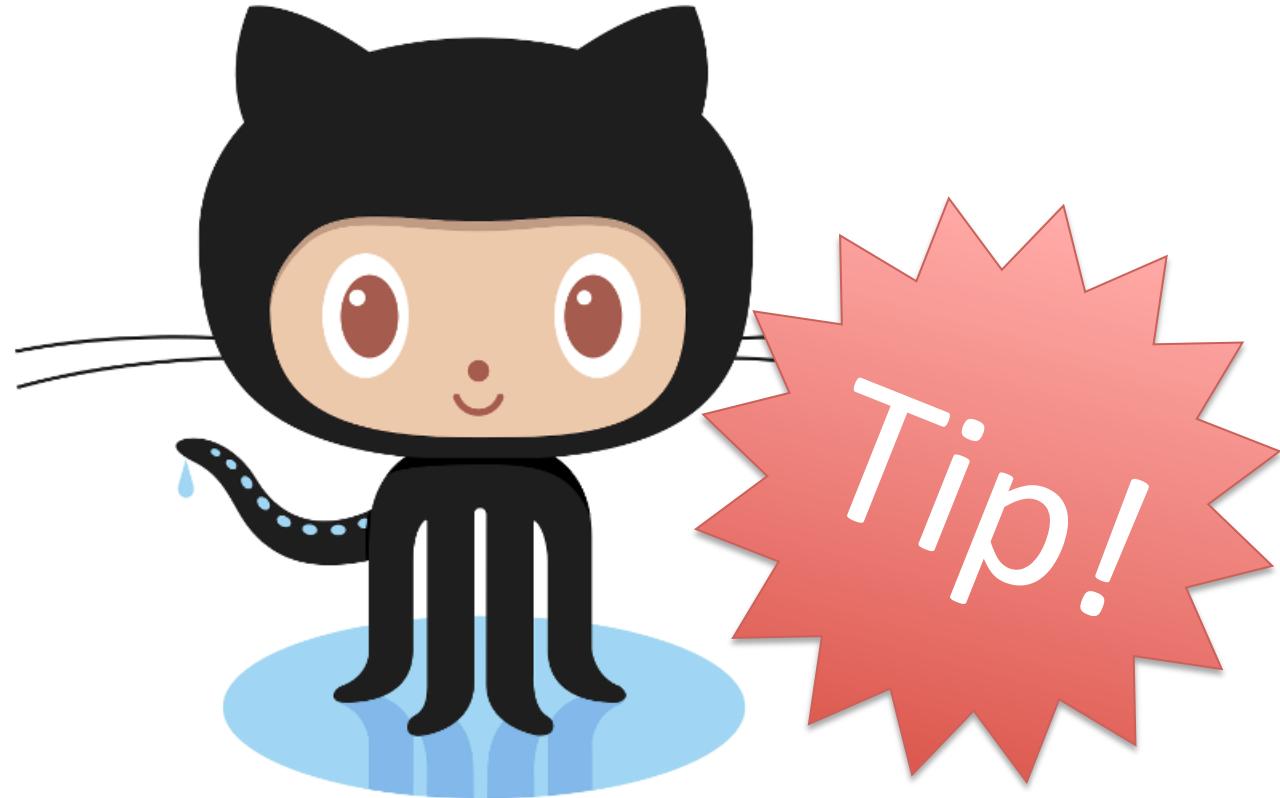
Add more commits by pushing to the `add-feature` branch on [frbl/WacChat](#).

All is well — The Travis CI build passed · Details

This pull request can be automatically merged.
You can also merge branches on the [command line](#).

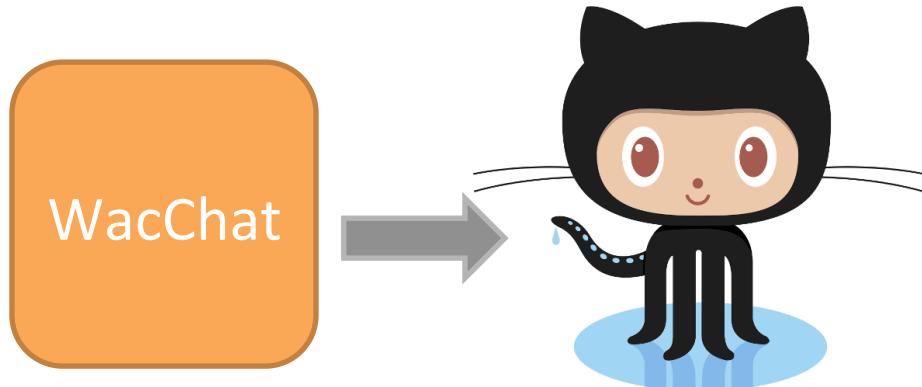
Merge pull request

Static web-hosting



<http://github.io>

Overview





continuous integration – **TravisCI**



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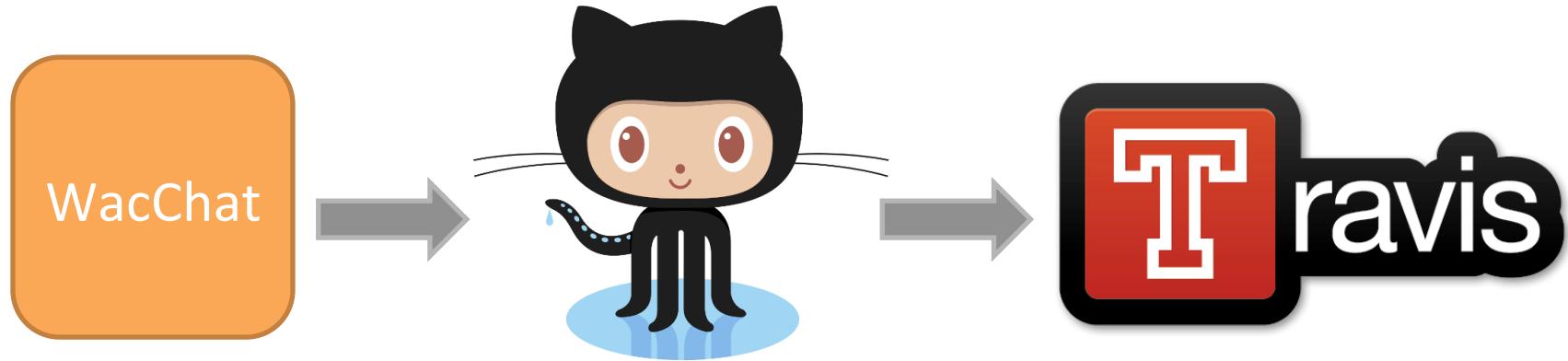
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(Travis) Continuous Integration

- Continuous integration tool
 - Build project & run tests
- Run analysis on all branches
- Deploy



Overview



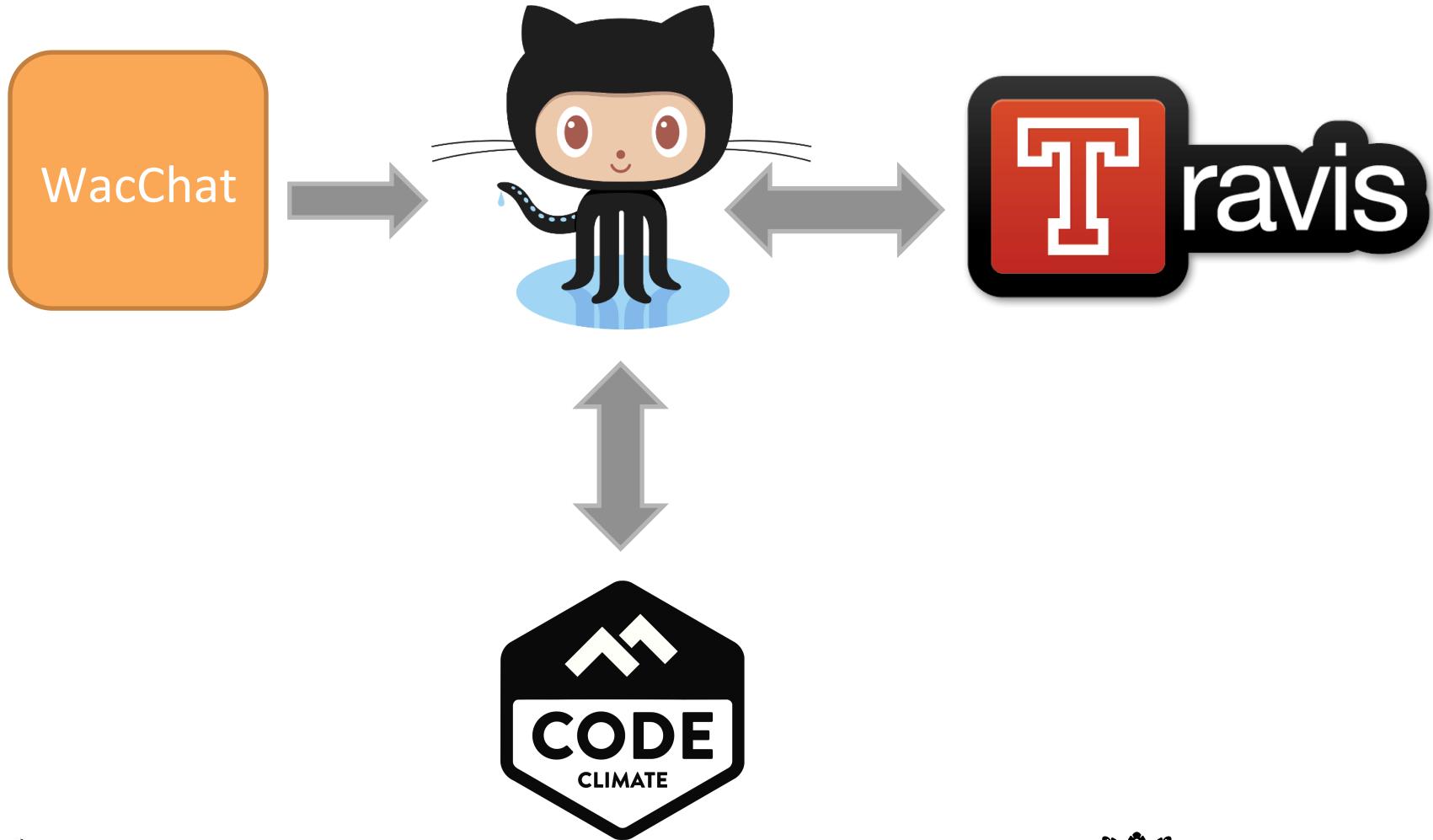


code analysis – CodeClimate

Code Climate

- Automatic code reviews
- Determine test coverage
- Determines code quality

Overview





Build, run, and scale apps.

Cloud computing designed and built for developers

hosting - heroku



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Heroku

- Platform as a Service
- Scaling for both web and computation
- Simple deployment



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Heroku

Add more:

<https://addons.heroku.com/>



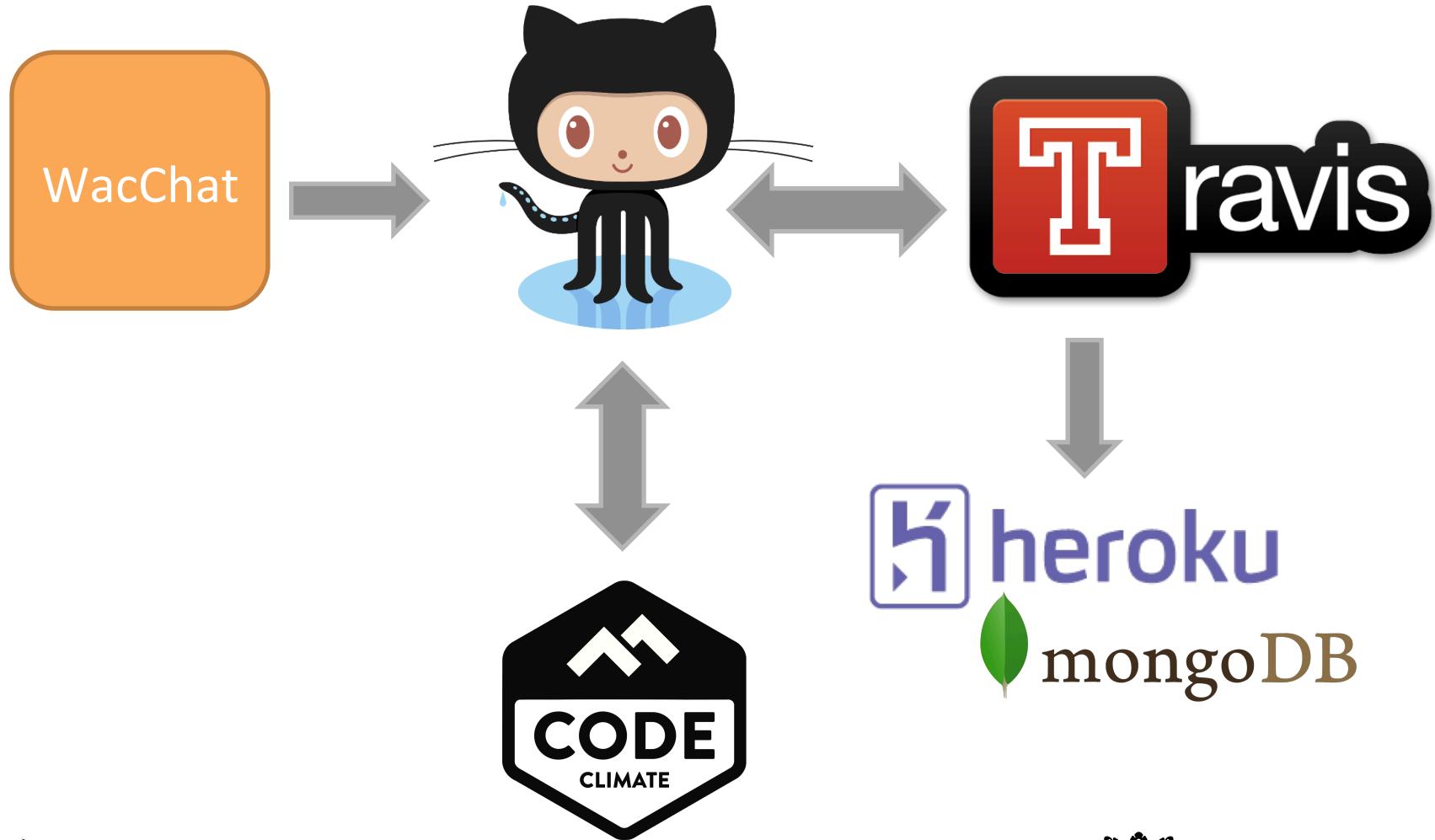
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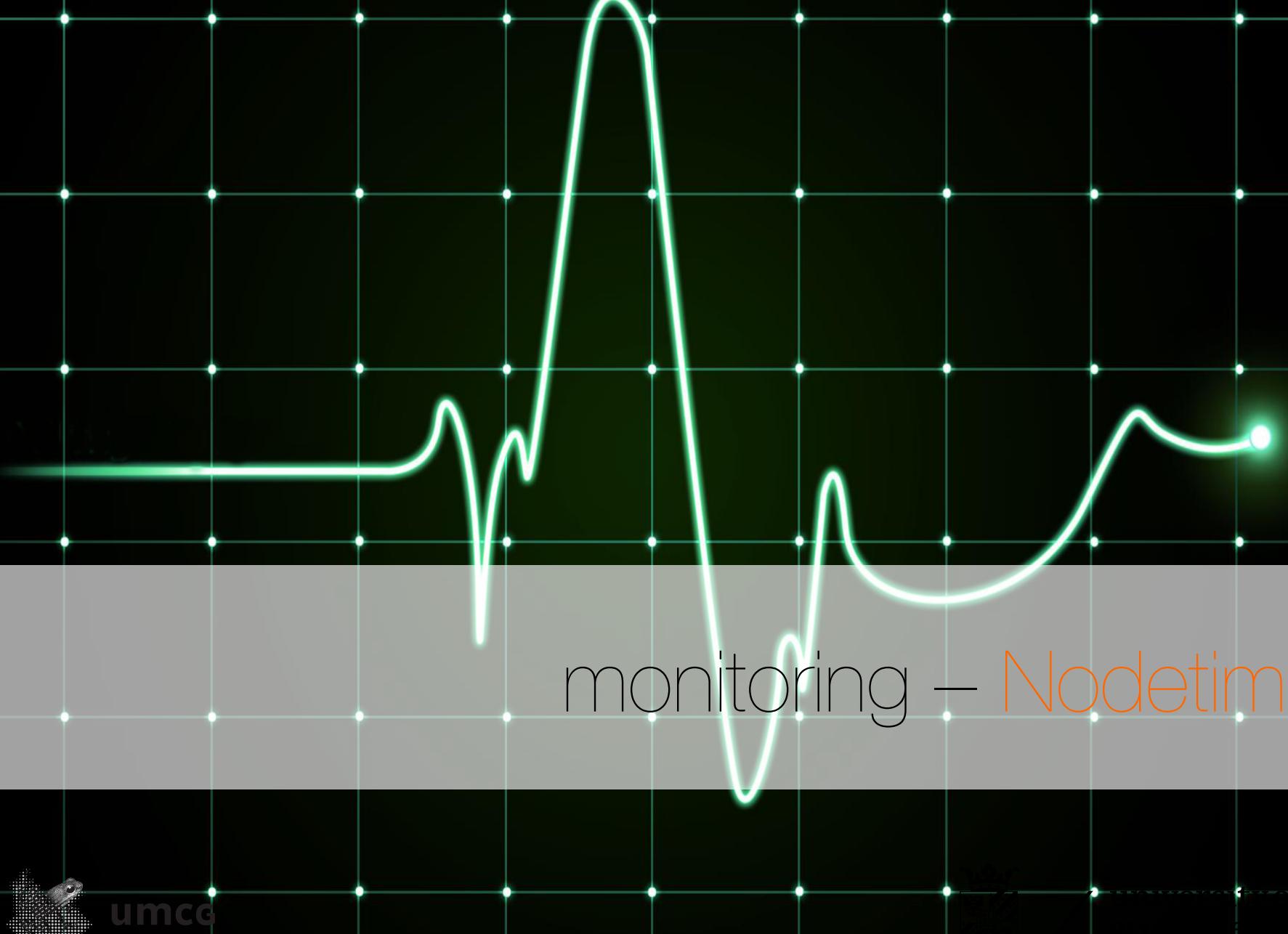
web and cloud computing – an insight into tooling



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Overview





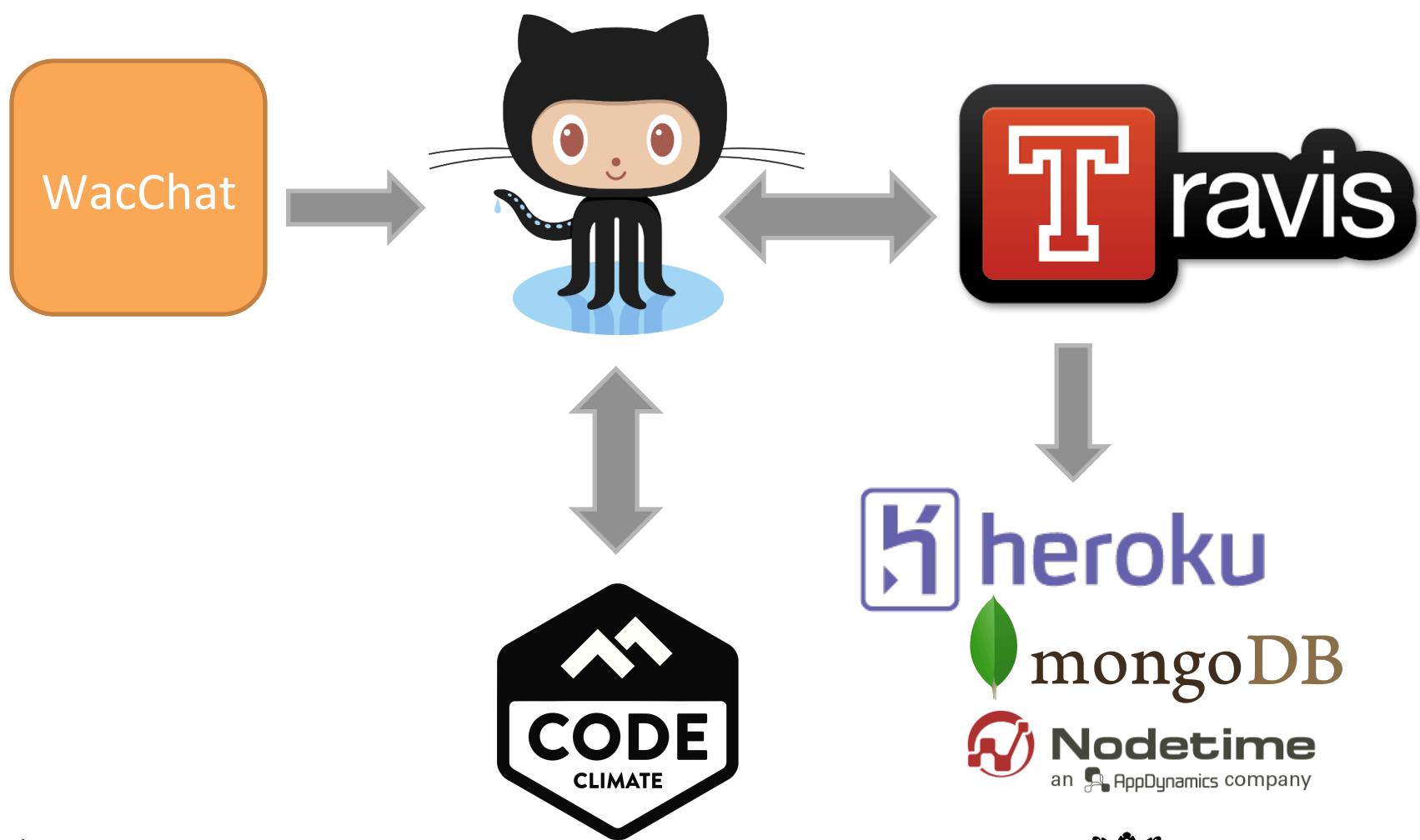
monitoring – Nodetime

Monitoring

- Servers
- Clients
- Errors



Overview



Overview

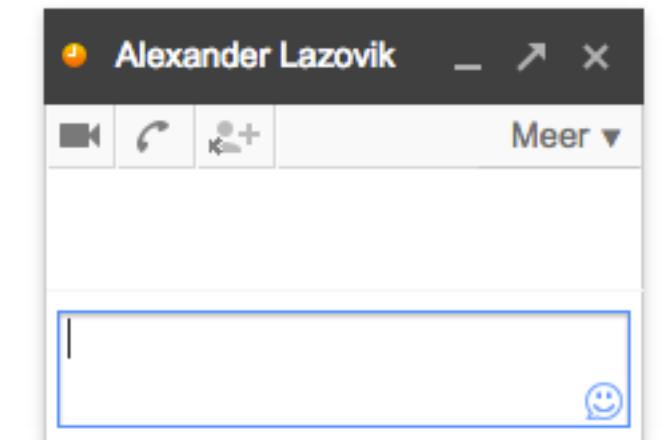




websockets – the real-time web

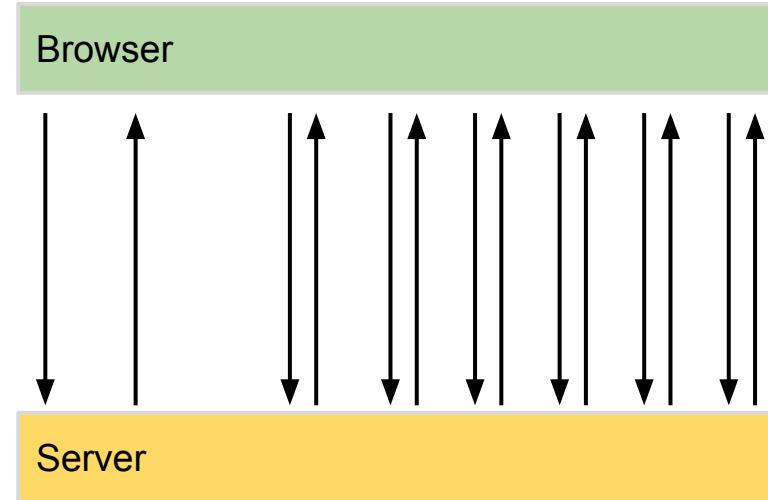
Websockets – why?

Many web applications have a real-time component



Websockets – why?

- AJAX polling?



Websockets – why?

HTTP is insufficient:

- Half duplex
- Overhead
- Latency



```
Last login: Tue Sep 30 14:49:43 on ttys016
frbl:~/Development/WacChat$ curl -I https://www.hoegekis.nl
HTTP/1.1 200 OK
Server: Cowboy
Connection: keep-alive
Date: Tue, 30 Sep 2014 12:50:53 GMT
Status: 200 OK
Strict-Transport-Security: max-age=31536000
X-Frame-Options: SAMEORIGIN
X-Xss-Protection: 1; mode=block
X-Content-Type-Options: nosniff
X-UA-Compatible: IE=Edge,chrome=1
Content-Type: text/html; charset=utf-8
Content-Length: 9939
Etag: "7e2bb74e90e99c4dc303f61315ca5043"
Cache-Control: max-age=0, private, must-revalidate
Set-Cookie: request_method=HEAD; path=/; secure
Set-Cookie: _hoe_gek_is_nl_session=RjhpmemZyMLJ0bERFNUNqWmVkcUFZUVA2bGR4dnpPemZhWxV
5VnF4cnRNa2RmR0tod0gzT2JXZmxVVUwvd1Evd0oyRmFuMw1SV0hBT2ZI0jJrcFd2MU41TDVZaGgxR2pTd
HNJTHdUaVlGOEFaTHJHaE1zbkxLYk5uYW9LajJwS0E4VTNPRGFZbnRIYis1RDVqclVNN5nPT0tLutEZVJ
GMjB6Wi9KwjFTdWo2cTJRRVE9P0%3D%3D---abdfbe2bdeb1bdhc211be87236f7a0633a17c2fc; path=
/; secure; HttpOnly
X-Request-Id: 3a91567b-d961-4098-90de-bb0727f58c5e
X-Runtime: 0.165108
Via: 1.1 vegur

frbl:~/Development/WacChat$
```

Websockets – why?

$$\frac{(42,000 \cdot 900)}{1} = 37,800,000 \text{ bytes}$$

$$37,800,000 \cdot 8 = 302,400,000 \text{ bits/sec} = 302 Mbps$$

Example from: <http://www.slideshare.net/ffdead/the-html5-websocket-api>

Websockets – what?

- Standardized protocol (W3C/IETF)
- Used in combination with HTTP(s)
- Full duplex connection

Websockets – what?

Clearly websockets should have overhead as well, right?

Sure, two bytes:

0x00hello world0xFF

Websockets – what?

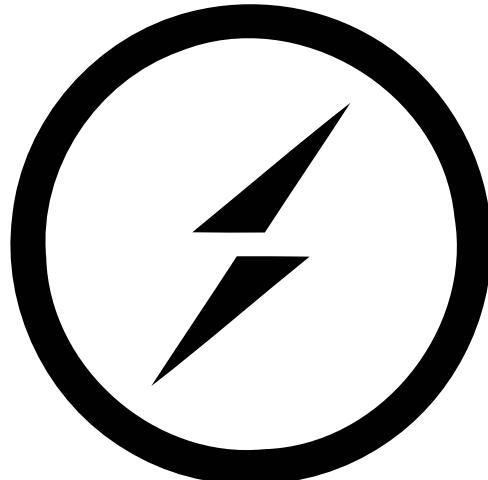
$$\frac{(42,000 \cdot 2)}{1} = 84,000 \text{ bytes}$$

$$84,000 \cdot 8 = 672,000 \text{ bits/sec} < 0.7 \text{ Mbps}$$

instead of
302Mbps (0.2%)

Example from: <http://www.slideshare.net/ffdead/the-html5-websocket-api>

Websockets – how?



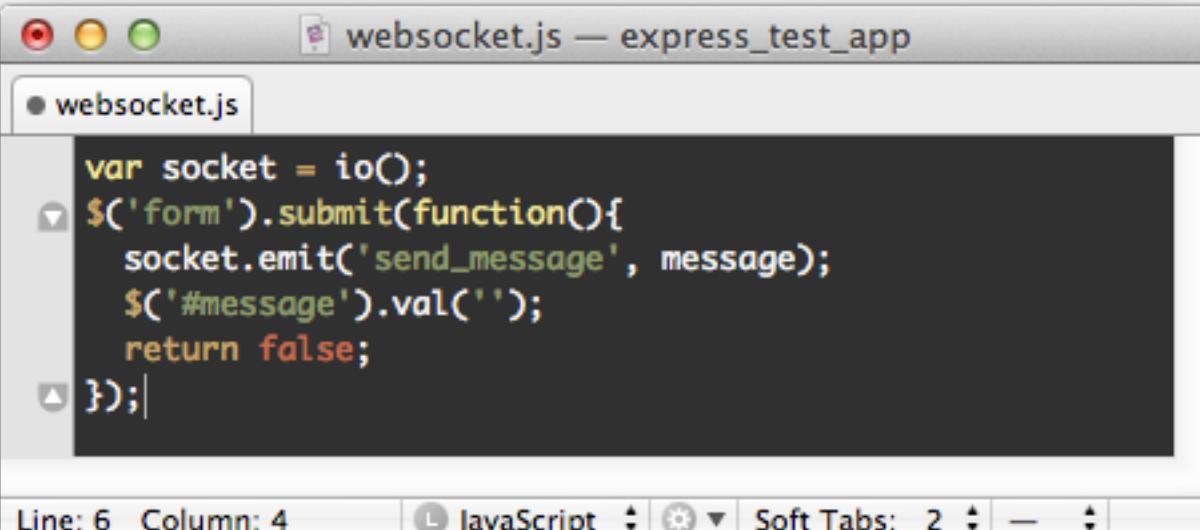
socket.io

Side by side comparison of websocket providers:

<https://github.com/grunnjs/slides/blob/master/24-Sep-2014/sweg.pdf>

Websockets – how?

Client:



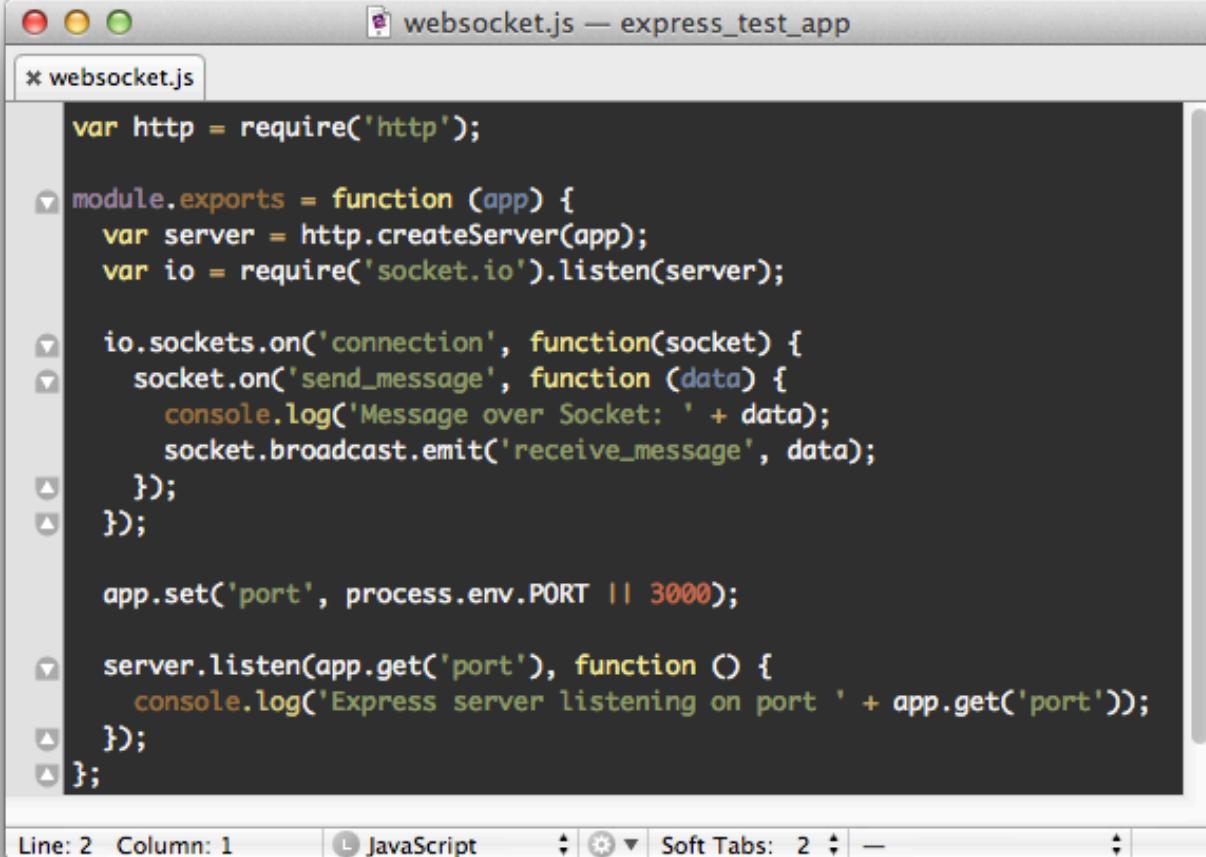
```
var socket = io();
$('form').submit(function(){
    socket.emit('send_message', message);
    $('#message').val('');
    return false;
});
```

Line: 6 Column: 4 JavaScript Soft Tabs: 2

```
<!-- Socket.io -->
<script src="https://cdn.socket.io/socket.io-1.1.0.js">
</script>
```

Websockets – how?

Server:



```
var http = require('http');

module.exports = function (app) {
  var server = http.createServer(app);
  var io = require('socket.io').listen(server);

  io.sockets.on('connection', function(socket) {
    socket.on('send_message', function (data) {
      console.log('Message over Socket: ' + data);
      socket.broadcast.emit('receive_message', data);
    });
  });

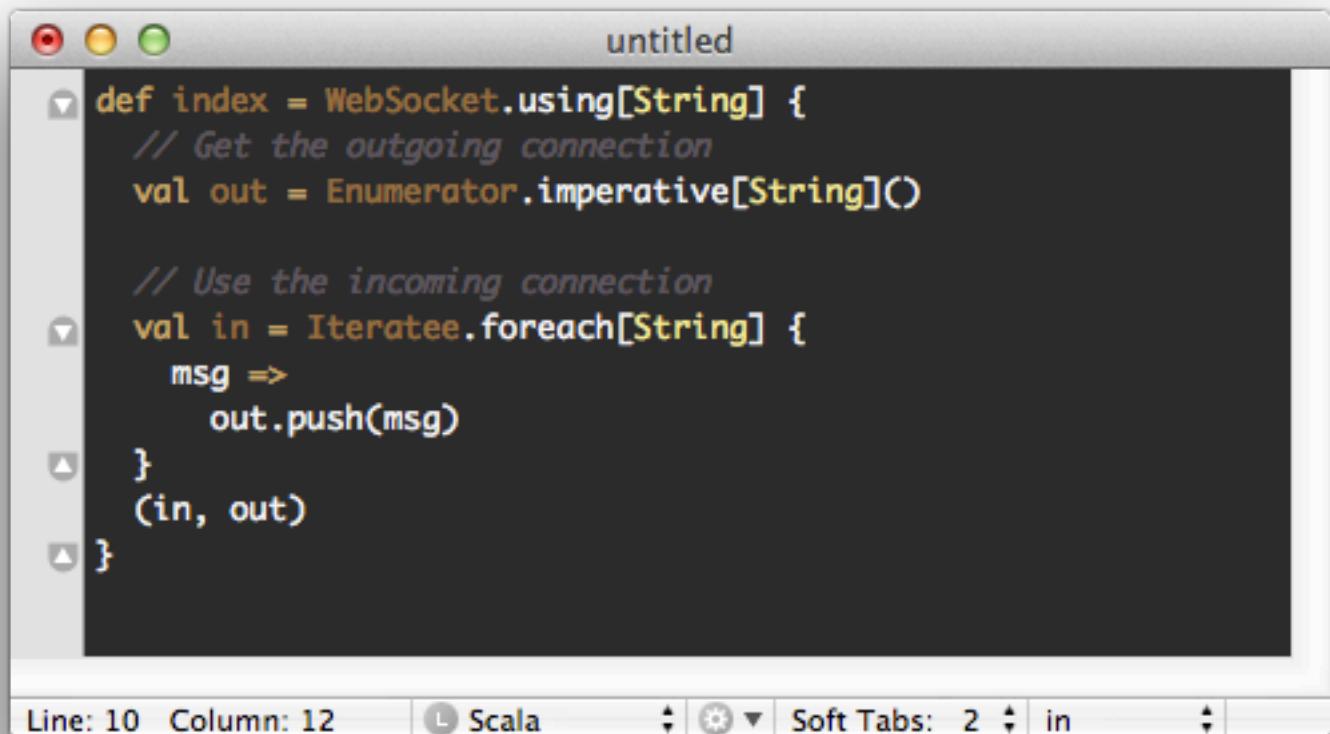
  app.set('port', process.env.PORT || 3000);

  server.listen(app.get('port'), function () {
    console.log('Express server listening on port ' + app.get('port'));
  });
};
```

Line: 2 Column: 1 JavaScript Soft Tabs: 2

Websockets – how?

Server:
(scala play)



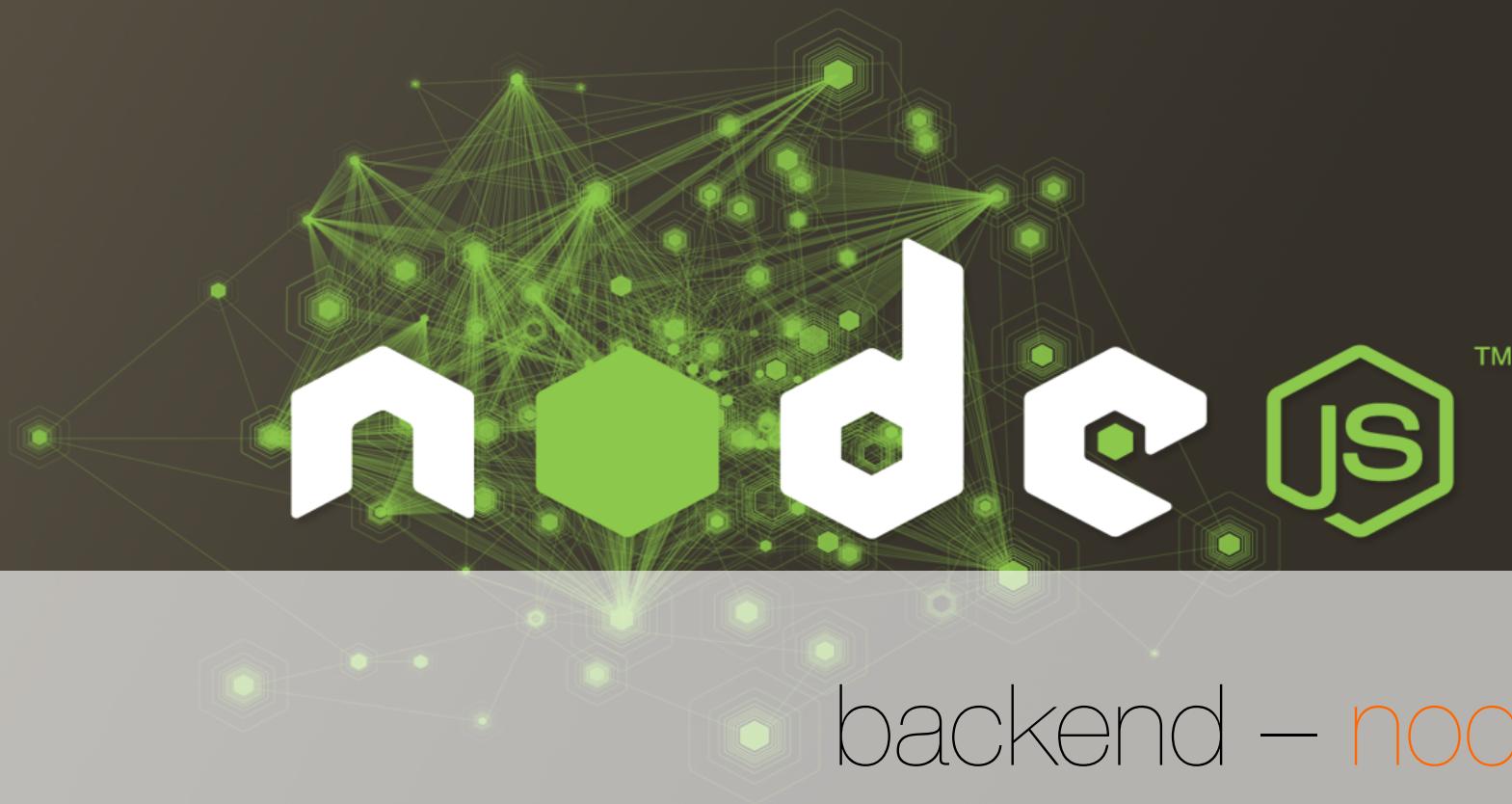
A screenshot of a Scala code editor window titled "untitled". The code implements a WebSocket server using the Play framework's Iteratee and Enumerator API. It defines a function "index" that creates a WebSocket connection, gets the outgoing connection, and creates an Enumerator. It then uses an Iteratee to handle incoming messages, pushing them to the Enumerator. Finally, it returns a tuple of the Iteratee and Enumerator.

```
def index = WebSocket.using[String] {
    // Get the outgoing connection
    val out = Enumerator.imperative[String]()
    // Use the incoming connection
    val in = Iteratee.foreach[String] {
        msg =>
        out.push(msg)
    }
    (in, out)
}
```

The editor interface includes a toolbar at the top with red, yellow, and green buttons, and a status bar at the bottom showing "Line: 10 Column: 12", "Scala", "Soft Tabs: 2", and file navigation buttons.

A close-up photograph of a dense field of green clover leaves. The leaves are trifoliate, with three heart-shaped leaflets each. Interspersed among the leaves are several small, delicate white flowers with five petals each. The lighting is soft, creating a natural and somewhat ethereal atmosphere.

demonstration – WacChat





ANGULARJS

by Google

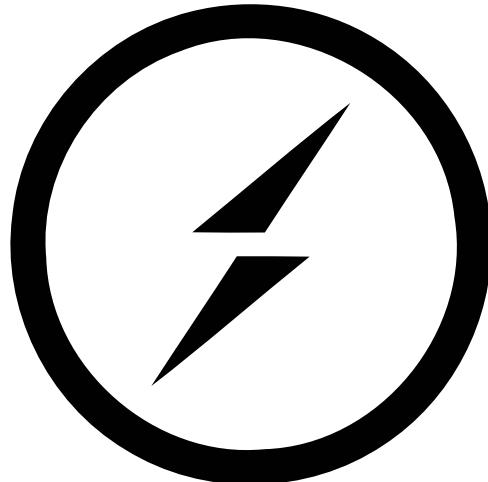
by Google

frontend – angularjs



mongoDB

database – MongoDB



socket.io

websockets – socket.io

References

- Images:
 - Death to the Stockphoto
 - Google Images
- Websockets
 - Website: [Socket.io](http://socket.io)
 - Slidedeck: <http://www.slideshare.net/ffdead/the-html5-websocket-api>
 - Slidedeck: <https://github.com/grunnis/slides/blob/master/24-Sep-2014/sweg.pdf>