# Introducing APIs

# Agenda

- Data Interchange Formats
  - CSV, Name/Value, YAML, XML, JSLN
- Web vs APIs
- API Exploration Tools
  - Chrome, Curl, Restlet Client

# CSV

http://en.wikipedia.org/wiki/Comma-separated_values

A **comma-separated values** (**CSV**) (also sometimes called *character-separated values,* because the separator character does not have to be a comma) file stores tabular data (numbers and text) in plain-text form. Plain text means that the file is a sequence of characters, with no data that has to be interpreted instead, as binary numbers. A CSV file consists of any number of records, separated by line breaks of some kind; each record consists of fields, separated by some other character or string, most commonly a literal comma or tab. Usually, all records have an identical sequence of fields.

```
“mocha”, “costa”, 2.0,  3.5,  0
“americano”, “costa”, 3.0, 4.5, 1
“cappucino”, “starbucks”, 4.0, 1.5, 0
```

coffees.csv

# Name/Value Pairs

http://en.wikipedia.org/wiki/Attribute-value_pair

A **name–value pair**, **key–value pair**, **field–value pair** or **attribute–value pair** is a fundamental data representation in computing systems and applications. Designers often desire an open-ended data structure that allows for future extension without modifying existing code or data. In such situations, all or part of the data model may be expressed as a collection of tuples <*attribute name*, *value*>; each element is an attribute–value pair. Depending on the particular application and the implementation chosen by programmers, attribute names may or may not be unique.

```
db.url=jdbc:cloudbees://pacemaker
db.driver=com.mysql.jdbc.Driver
db.user=pacemaker
db.pass=pacemaker
jpa.ddl=create
```

application .conf

```
name="mocha"
shop="costa"
rating=3.5
price=2.0
favourite=0
id=1
```

coffees.conf

# YAML

http://en.wikipedia.org/wiki/YAML

**YAML** (/ˈjæməl/, rhymes with *camel*) is a human-readable data serialization format that takes concepts from programming languages such as C, Perl, and Python, and ideas from XML and the data format of electronic mail (RFC 2822). YAML was first proposed by Clark Evans in 2001,[1] who designed it together with Ingy döt Net[2] and Oren Ben-Kiki.[2] It is available for several programming languages.

*YAML* is a recursive acronym for "YAML Ain't Markup Language". Early in its development, *YAML* was said to mean "Yet Another Markup Language",[3] but it was then reinterpreted (backronyming the original acronym) to distinguish its purpose as data-oriented, rather than document markup.

```
Coffee(c1):
    name       : mocha
    shop       : costa
    price      : 2.0
    rating     : 3.5
    favourite  : 0

Coffee(c2):
    name       : americano
    shop       : costa
    price      : 3.0
    rating     : 4.5
    favourite  : 1


Coffee(c3):
    name       : cappucino
    shop       : starbucks
    price      : 4.0
    rating     : 1.5
    favourite  : 0
```

data.yaml

# XML

http://en.wikipedia.org/wiki/XML

**Extensible Markup Language** (**XML**) is a markup language that defines a set of rules for encoding documents in aformat that is both human-readable and machine-readable. It is defined in the XML 1.0 Specification[3] produced by theW3C, and several other related specifications,[4] all free open standards.[5]

The design goals of XML emphasize simplicity, generality, and usability over the Internet.[6] It is a textual data format with strong support via Unicode for the languages of the world. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services.

Many application programming interfaces (APIs) have been developed to aid software developers with processing XML data, and several schema systems exist to aid in the definition of XML-based languages.

```xml
<?xml version="1.0" encoding="UTF-8"?>

<coffee objname="c1">
    <name> mocha </name>
    <shop> costa </shop>
    <price> 2.0 </price>
    <rating> 3.5</rating>
    <favourite> 0 </favourite>
</coffee>

<coffee objname="c1">
    <name> americano </name>
    <shop> costa </shop>
    <price> 3.0 </price>
    <rating> 4.5 </rating>
    <favourite> 1 </favourite>
</coffee>

<coffee objname="c1">
    <name> cappucino </name>
    <shop> starbucks </shop>
    <price> 4.0 </price>
    <rating> 1.5 </rating>
    <favourite> 0 </favourite>
</coffee>
```

data.xml

# JSON

http://en.wikipedia.org/wiki/JSON

**JSON** (/ˈdʒeɪsɒn/ ***jay**-sawn*, /ˈdʒeɪsən/ ***jay**-sun*), or **JavaScript Object Notation**, is a text-based open standard designed for human-readable data interchange. Derived from the JavaScript scripting language, JSON is a language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, JSON is language-independent, with parsers available for many languages.

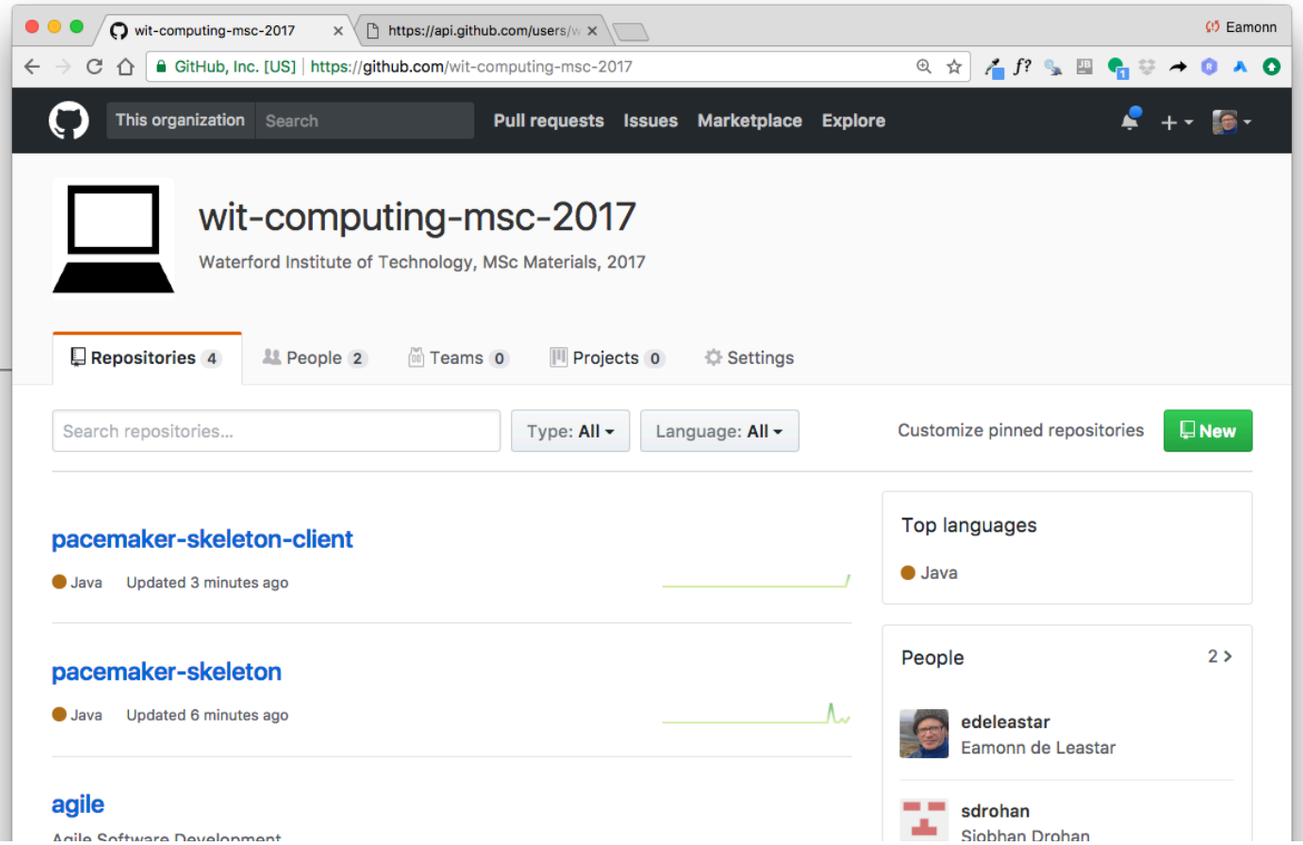
The JSON format was originally specified by Douglas Crockford, and is described in RFC 4627. The official Internet media type for JSON is `application/json`. The JSON filename extension is `.json`.

The JSON format is often used for serializing and transmitting structured data over a network connection. It is used primarily to transmit data between a server and web application, serving as an alternative to XML.

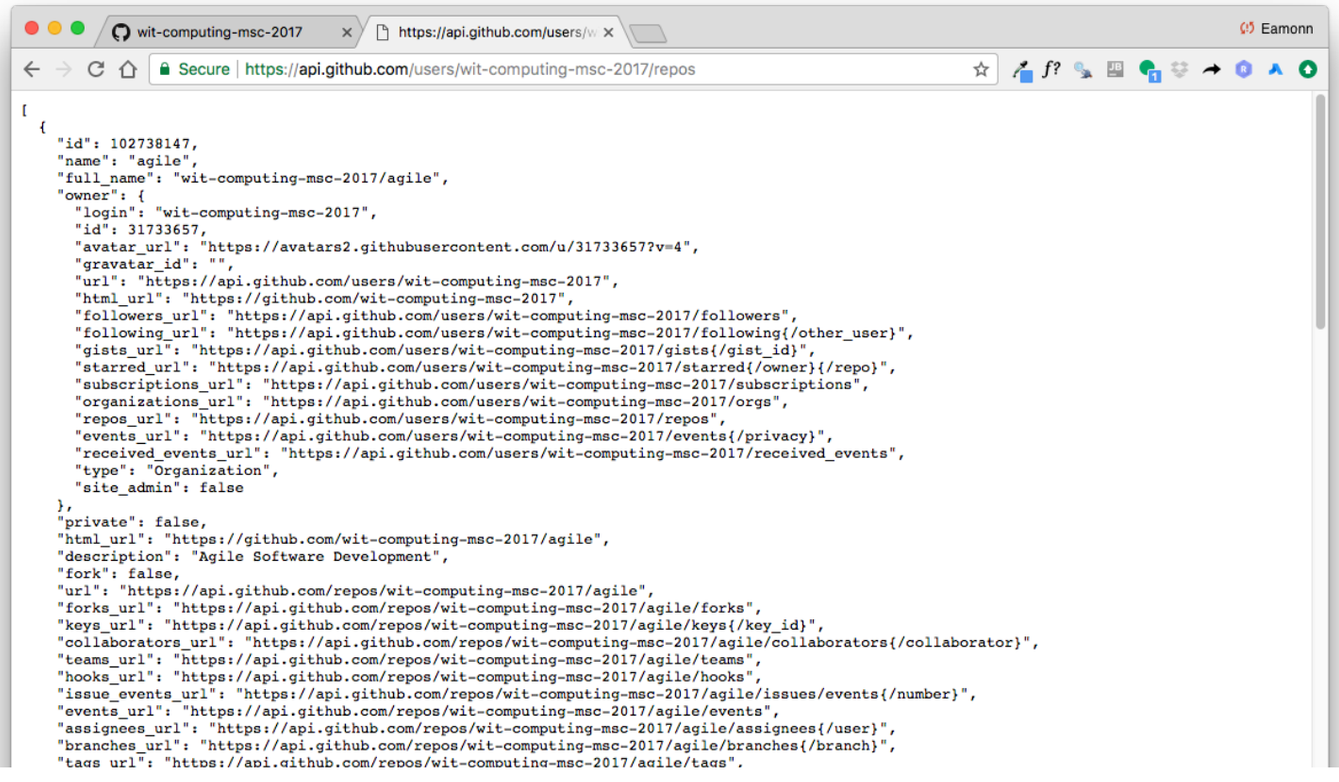
```
{
  "name":"mocha",
  "shop":"costa",
  "rating":3.5,
  "price":2.0,
  "favourite":0,
  "id":1
},
{
  "name":"americano",
  "shop":"costa",
  "rating":4.5,
  "price":3.0,
  "favourite":1,
  "id":2
},
{
  "name":"cappuccino lite",
  "shop":"starbucks",
  "rating":1.5,
  "price":4.0,
  "favourite":1,
  "id":3
}
```

# Web vs API

- *Both use HTTP:*
  - GET, PUT, POST, DELETE etc…
- *Web*
  - request formulated by browser
  - HTML response
- *API*
  - request formulated by program (typically)
  - JSON response (typically)



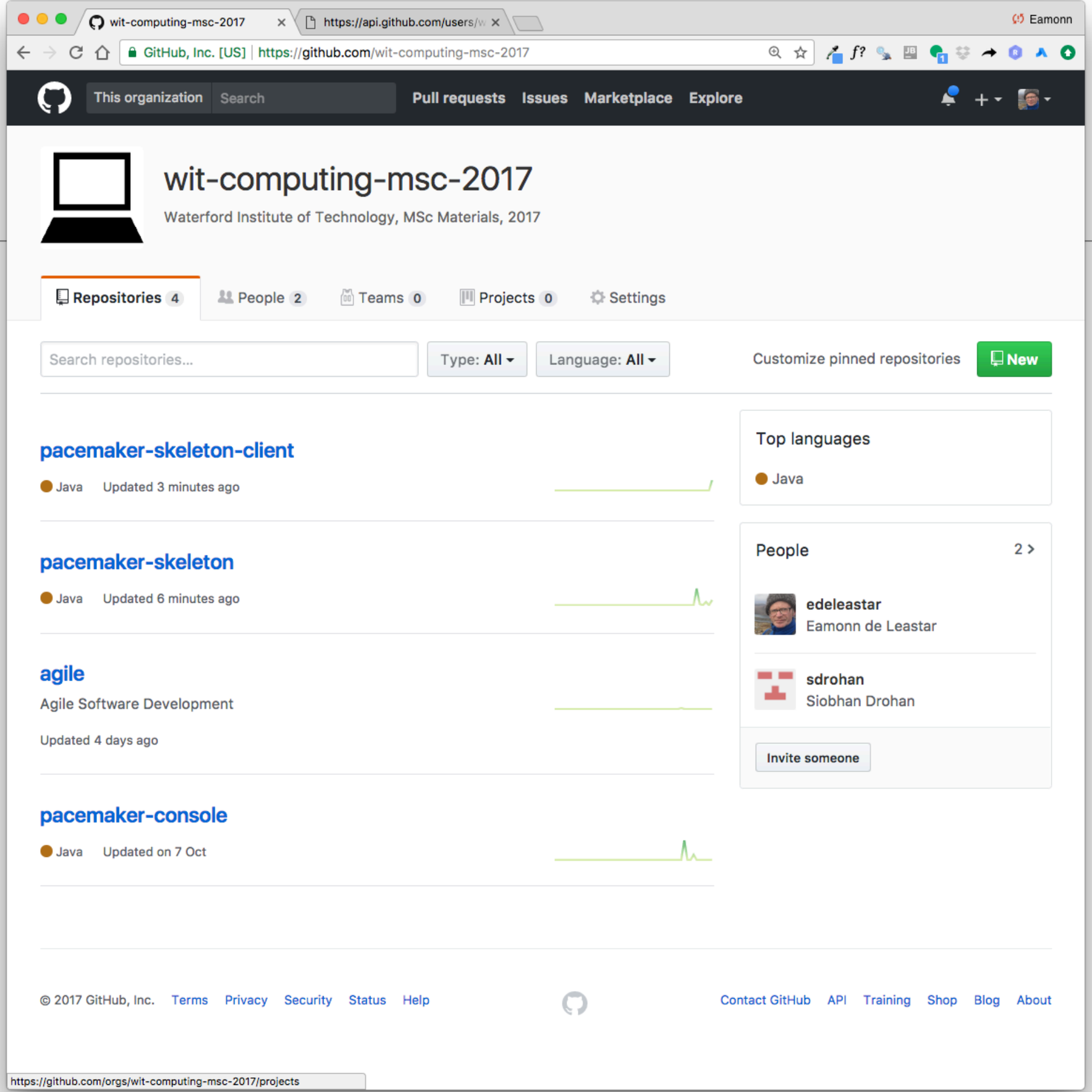

Web




API

# Web

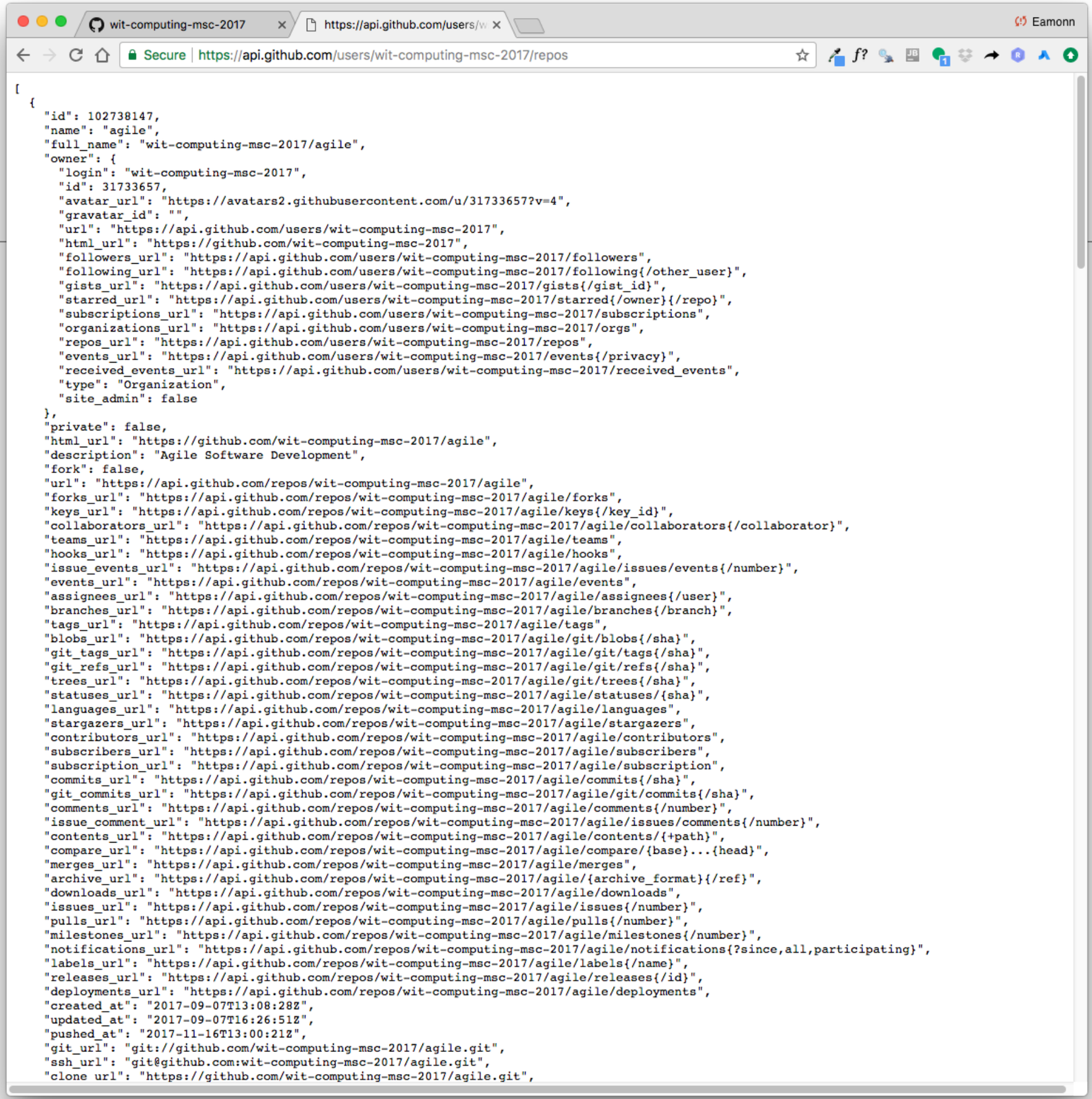
## Chrome




https://github.com/wit-computing-msc-2017

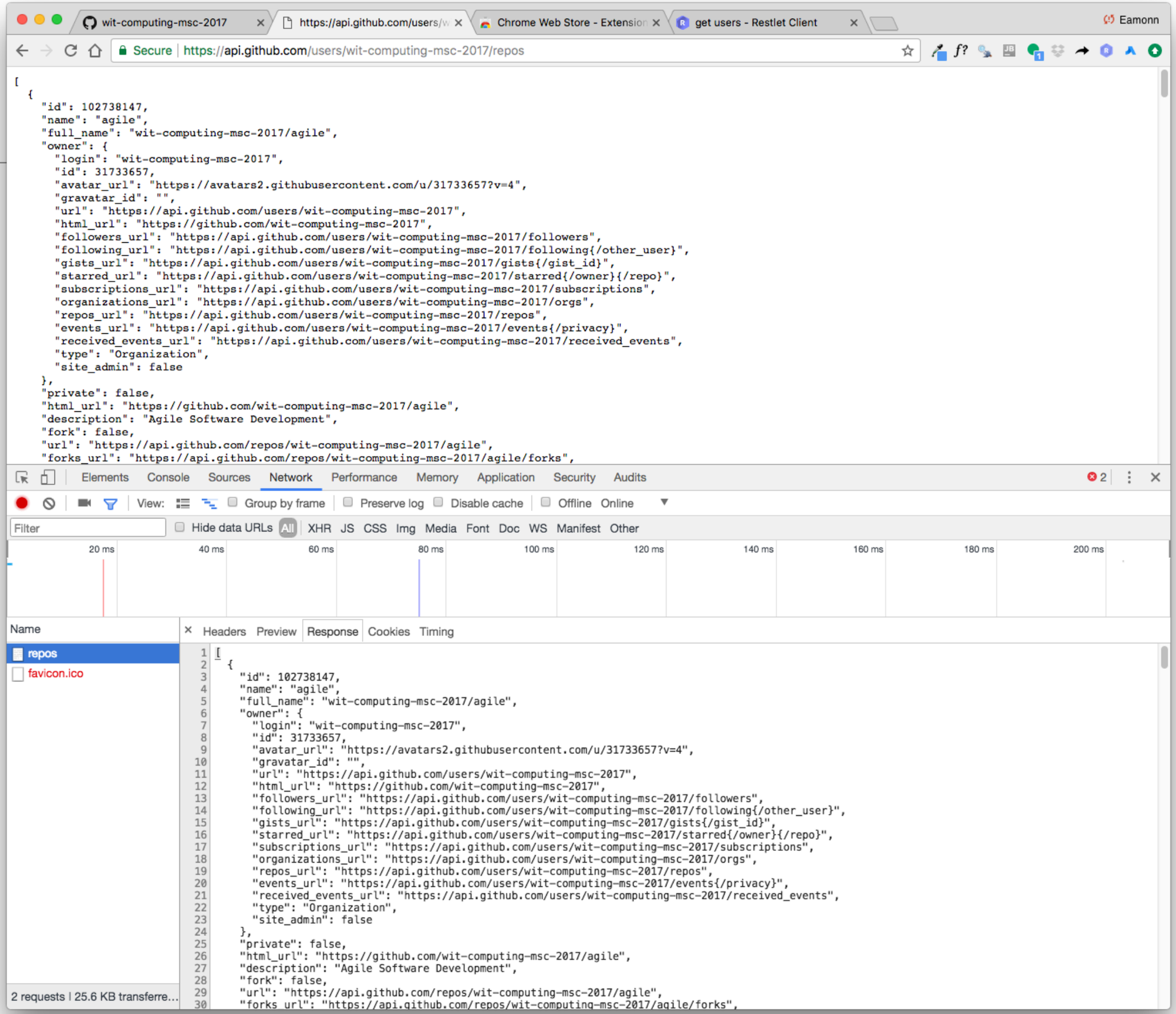
# API

Chrome




https://api.github.com/users/wit-computing-msc-2017/repos

# Chrome Developer tools





```
[
  {
    "id": 102738147,
    "name": "agile",
    "full_name": "wit-computing-msc-2017/agile",
    "owner": {
      "login": "wit-computing-msc-2017",
      "id": 31733657,
      "avatar_url": "https://avatars2.githubusercontent.com/u/31733657?v=4",
      "gravatar_id": "",
      "url": "https://api.github.com/users/wit-computing-msc-2017",
      "html_url": "https://github.com/wit-computing-msc-2017",
      "followers_url": "https://api.github.com/users/wit-computing-msc-2017/followers",
      "following_url": "https://api.github.com/users/wit-computing-msc-2017/following{/other_user}",
      "gists_url": "https://api.github.com/users/wit-computing-msc-2017/gists{/gist_id}",
      "starred_url": "https://api.github.com/users/wit-computing-msc-2017/starred{/owner}{/repo}",
      "subscriptions_url": "https://api.github.com/users/wit-computing-msc-2017/subscriptions",
      "organizations_url": "https://api.github.com/users/wit-computing-msc-2017/orgs",
      "repos_url": "https://api.github.com/users/wit-computing-msc-2017/repos",
      "events_url": "https://api.github.com/users/wit-computing-msc-2017/events{/privacy}",
      "received_events_url": "https://api.github.com/users/wit-computing-msc-2017/received_events",
      "type": "Organization",
      "site_admin": false
    },
    "private": false,
    "html_url": "https://github.com/wit-computing-msc-2017/agile",
    "description": "Agile Software Development",
    "fork": false,
    "url": "https://api.github.com/repos/wit-computing-msc-2017/agile",
    "forks_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/forks",
```

# Curl: https://curl.haxx.se/

Command Line Application

curl://

**command line tool and library**
for transferring data with URLs

**Supports...**

DICT, FILE, FTP, FTPS, Gopher, HTTP, HTTPS, IMAP, IMAPS, LDAP, LDAPS, POP3, POP3S, RTMP, RTSP, SCP, SFTP, SMB, SMTP, SMTPS, Telnet and TFTP. curl supports SSL certificates, HTTP POST, HTTP PUT, FTP uploading, HTTP form based upload, proxies, HTTP/2, cookies, user+password authentication (Basic, Plain, Digest, CRAM-MD5, NTLM, Negotiate and Kerberos), file transfer resume, proxy tunneling and more.

**What's curl used for?**

curl is used in command lines or scripts to transfer data. It is also used in cars, television sets, routers, printers, audio equipment, mobile phones, tablets, settop boxes, media players and is the internet transfer backbone for thousands of software applications affecting *billions of humans* daily.

**Who makes curl?**

curl is free and open source software and exists thanks to thousands of contributors. The curl project follows well established open source best practises.

**What's the latest curl?**

The most recent stable version is **7.50.2**, released on 7th of September 2016. Currently, 87 of the listed downloads are of the latest version.

**Where's the code?**

Check out the latest source code from github.

$ curl https://api.github.com/users/wit-computing-msc-2017/repos

# $ curl https://api.github.com/users/wit-computing-msc-2017/repos

1. bash


```
Last login: Fri Nov 17 08:24:22 on ttys000
mainimac:~ edeleastar$ curl https://api.github.com/users/wit-computing-msc-2017/repos
[
  {
    "id": 102738147,
    "name": "agile",
    "full_name": "wit-computing-msc-2017/agile",
    "owner": {
      "login": "wit-computing-msc-2017",
      "id": 31733657,
      "avatar_url": "https://avatars2.githubusercontent.com/u/31733657?v=4",
      "gravatar_id": "",
      "url": "https://api.github.com/users/wit-computing-msc-2017",
      "html_url": "https://github.com/wit-computing-msc-2017",
      "followers_url": "https://api.github.com/users/wit-computing-msc-2017/followers",
      "following_url": "https://api.github.com/users/wit-computing-msc-2017/following{/other_user}",
      "gists_url": "https://api.github.com/users/wit-computing-msc-2017/gists{/gist_id}",
      "starred_url": "https://api.github.com/users/wit-computing-msc-2017/starred{/owner}{/repo}",
      "subscriptions_url": "https://api.github.com/users/wit-computing-msc-2017/subscriptions",
      "organizations_url": "https://api.github.com/users/wit-computing-msc-2017/orgs",
      "repos_url": "https://api.github.com/users/wit-computing-msc-2017/repos",
      "events_url": "https://api.github.com/users/wit-computing-msc-2017/events{/privacy}",
      "received_events_url": "https://api.github.com/users/wit-computing-msc-2017/received_events",
      "type": "Organization",
      "site_admin": false
    },
    "private": false,
    "html_url": "https://github.com/wit-computing-msc-2017/agile",
    "description": "Agile Software Development",
    "fork": false,
    "url": "https://api.github.com/repos/wit-computing-msc-2017/agile",
    "forks_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/forks",
    "keys_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/keys{/key_id}",
    "collaborators_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/collaborators{/collaborator}",
    "teams_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/teams",
    "hooks_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/hooks",
    "issue_events_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/issues/events{/number}",
    "events_url": "https://api.github.com/repos/wit-computing-msc-2017/agile/events",
```

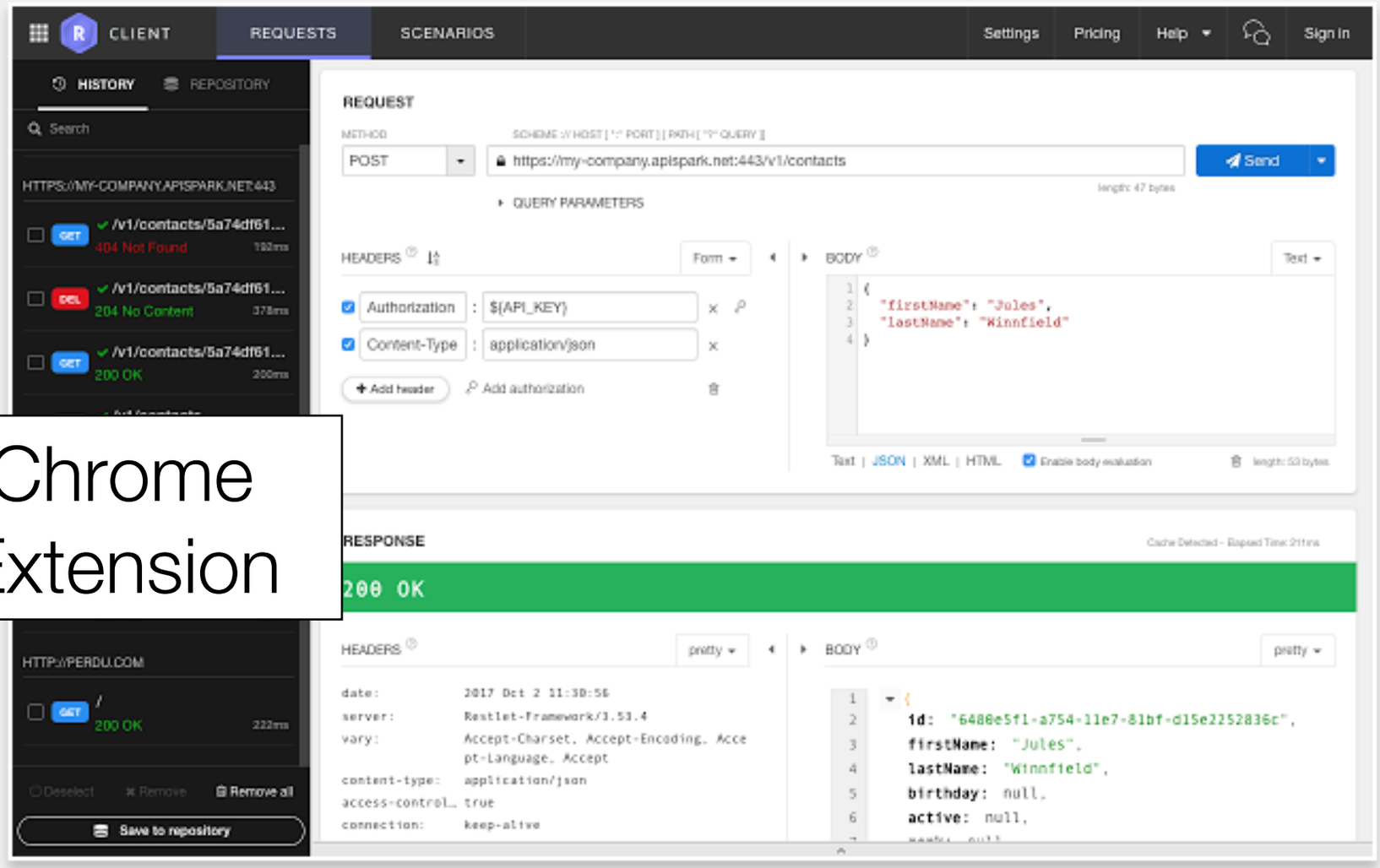
# Restlet Client - REST API Testing

offered by Restlet

★★★★★ (2353) | Developer Tools | *294,021 users*

ADDED TO CHROME

OVERVIEW | REVIEWS | SUPPORT | RELATED




Chrome Extension

Runs Offline

Compatible with your device

Visually create and run single HTTP requests as well as complex scenarios. Automate your API tests with our CI/CD plugin.

[Please scroll down for permissions explanation]

Restlet Client is designed and developed by developers for developers to make direct HTTP / REST resource discovery, testing and test automation easier. Restlet Client's main functions include:

Website

Report Abuse

### Additional Information

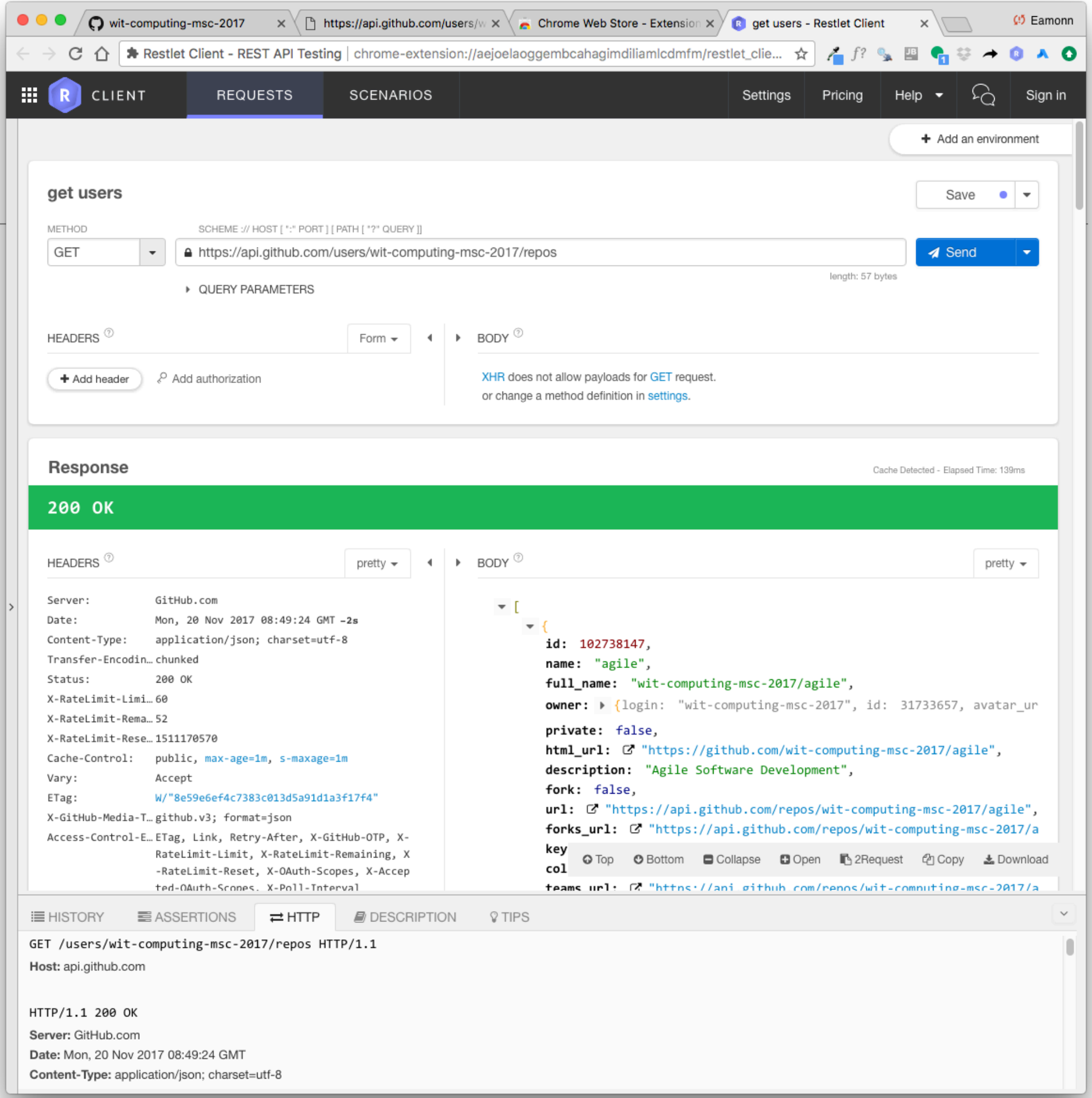
Version: 2.11.2

Updated: November 14, 2017

Size: 4.67MiB

Language: English

## RELATED

- HTTP Spy ★★★★☆ (55)
- User-Agent Switcher ★★★★☆ (329)
- New Tab Redirect ★★★★☆ (3119)
- Custom New Tab & Google™ Background ★★★★½ (57344)

# Chrome Extension