

REST APIs in R



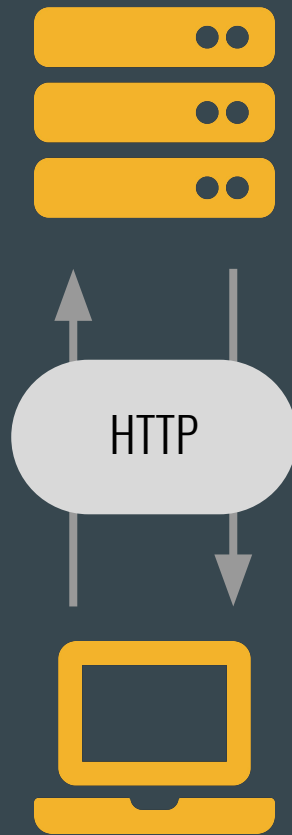
James Blair (@Blair09M)
RStudio
SLC RUG • August 9, 2018

Overview

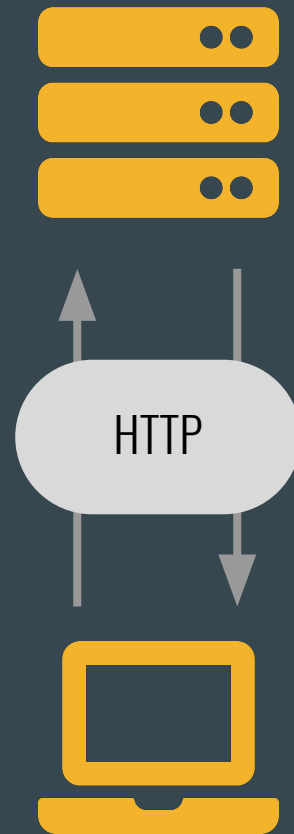
- What is an API?
- Why do I care?
- Plumber intro
- Plumber example
- Deployment
- Additional Resources

What is an API?

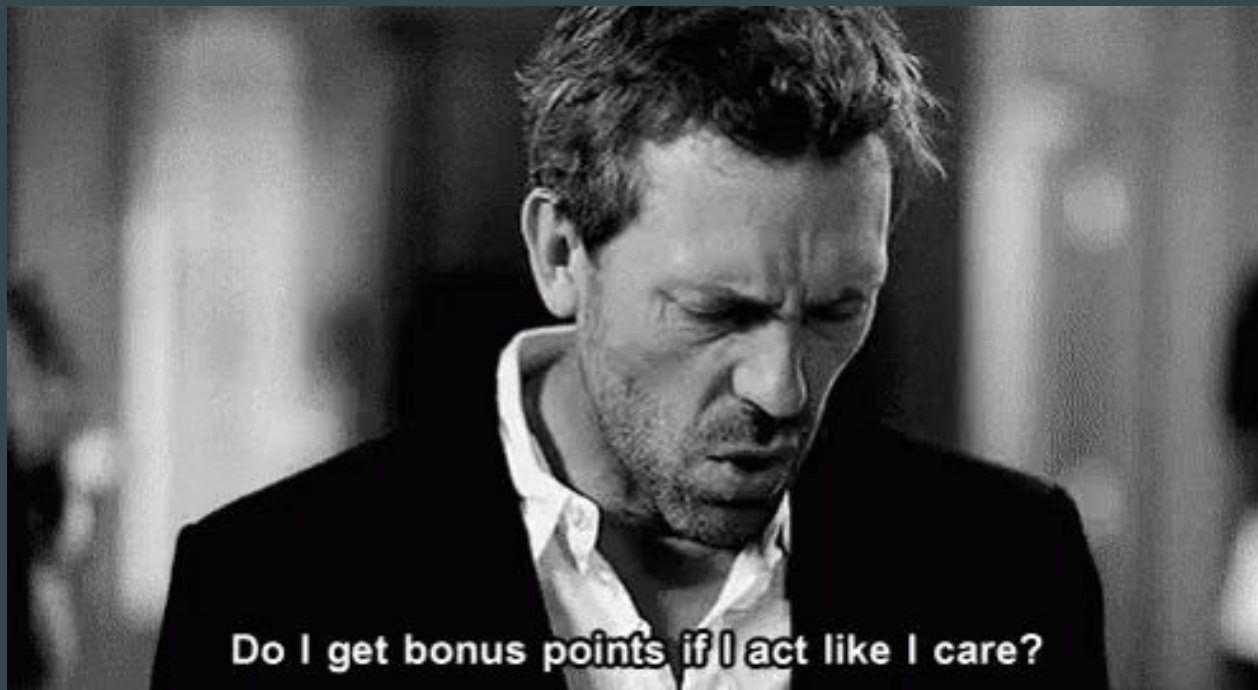
- Application Programming Interface
- Web APIs
 - HTTP
- Representational State Transfer (REST)
 - 6 guiding constraints for building web services.
 - Focus on performance and scalability



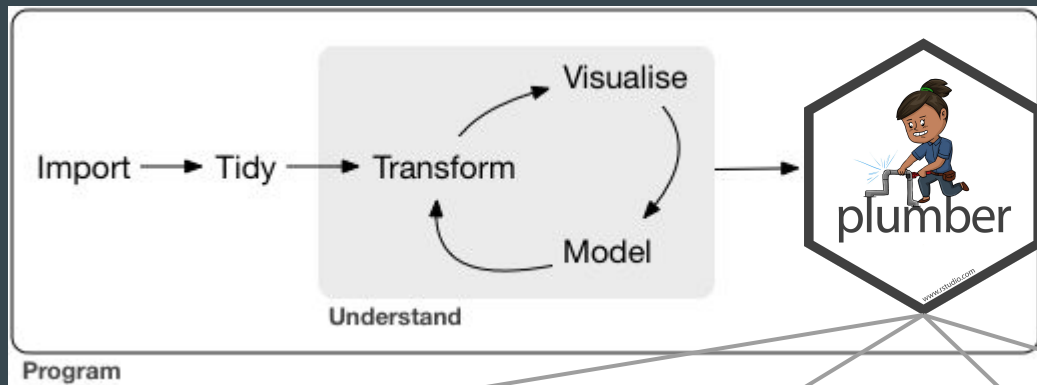
```
jamesblair@James-MBP:~|⇒ curl -v "http://httpbin.org/get"
* Trying 52.72.80.190...
* TCP_NODELAY set
* Connected to httpbin.org (52.72.80.190) port 80 (#0)
> GET /get HTTP/1.1
> Host: httpbin.org
> User-Agent: curl/7.55.1
> Accept: */*
>
< HTTP/1.1 200 OK
< Connection: keep-alive
< Server: gunicorn/19.9.0
< Date: Wed, 08 Aug 2018 04:20:02 GMT
< Content-Type: application/json
< Content-Length: 214
< Access-Control-Allow-Origin: *
< Access-Control-Allow-Credentials: true
< Via: 1.1 vegur
<
{
  "args": {},
  "headers": {
    "Accept": "*/*",
    "Connection": "close",
    "Host": "httpbin.org",
    "User-Agent": "curl/7.55.1"
  },
  "origin": "71.199.44.171",
  "url": "http://httpbin.org/get"
}
* Connection #0 to host httpbin.org left intact
jamesblair@James-MBP:~|⇒
```



Why do I care?



Why do I care?



\Rightarrow GO



Why do I care?

YOUR CODE LOOKS LIKE
SONG LYRICS WRITTEN
USING ONLY THE STUFF
THAT COMES AFTER THE
QUESTION MARK IN A URL.

SORRY.



IT'S LIKE A JSON
TABLE OF MODEL
NUMBERS FOR
FLASHLIGHTS
WITH "TACTICAL"
IN THEIR NAMES.



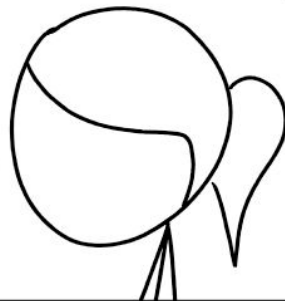
LIKE YOU READ TURING'S
1936 PAPER ON COMPUTING
AND A PAGE OF JAVASCRIPT
EXAMPLE CODE AND GUESSED
AT EVERYTHING IN BETWEEN.



IT'S LIKE A LEET-SPEAK TRANSLATION
OF A MANIFESTO BY A SURVIVALIST CULT
LEADER WHO'S FOR SOME REASON
OBSESSED WITH MEMORY ALLOCATION.

I CAN GET SOMEONE
ELSE TO REVIEW MY CODE.

NOT MORE THAN
ONCE, I BET.

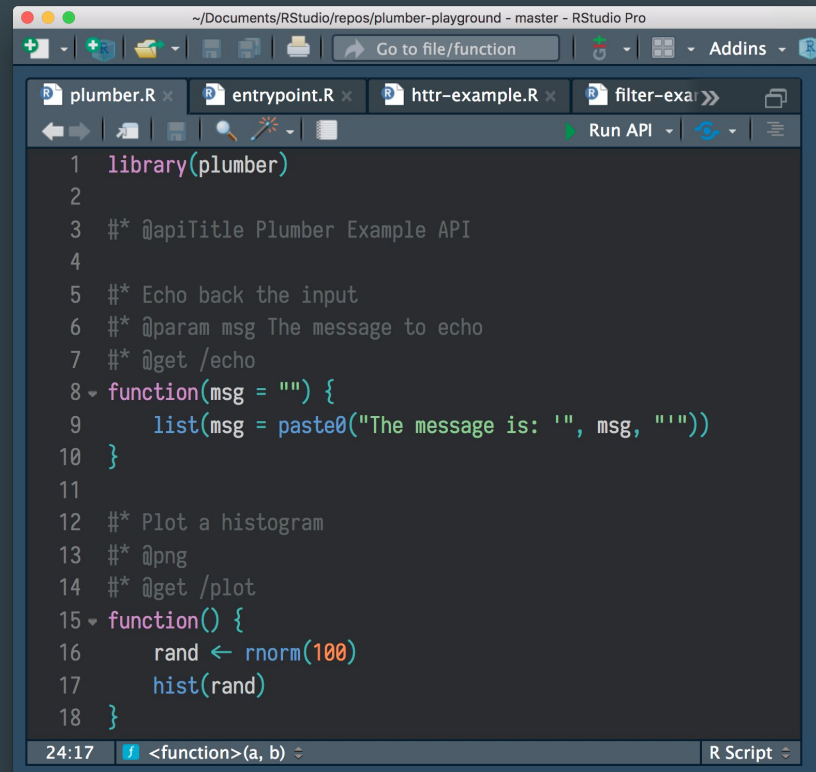


Plumber



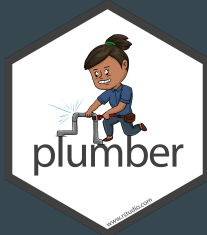
- Turn R functions into REST API endpoints
- Use special comments and decorators
 - `#*` - plumber comments
 - `@` - endpoint attributes / details

Minimal overhead to create working API



```
~/Documents/RStudio/repos/plumber-playground - master - RStudio Pro
Go to file/function
Addins
plumber.R x endpoint.R x http-example.R x filter-exa
Run API
1 library(plumber)
2
3 /* @apiTitle Plumber Example API
4
5 /* Echo back the input
6 /* @param msg The message to echo
7 /* @get /echo
8 function(msg = "") {
9   list(msg = paste0("The message is: ", msg, ""))
10 }
11
12 /* Plot a histogram
13 /* @png
14 /* @get /plot
15 function() {
16   rand <- rnorm(100)
17   hist(rand)
18 }
24:17 <function>(a, b) R Script
```


Plumber



- Turn R functions into REST endpoints
- Use special comments and decorators
 - `#*` - plumber comments
 - `@` - endpoint attributes / details

Minimal overhead to create working API

Load plumber package

Swagger annotations

Parameter descriptions

HTTP Method

Serializer

Endpoint description

Path

```
1 library(plumber)
2
3 #* @apiTitle Plumber Example API
4
5 #* Echo back the input
6 #* @param msg The message to echo
7 #* @get /echo
8 function(msg = "") {
9   list(msg = paste0("The message is: '", msg, "'"))
10 }
11
12 #* Plot a histogram
13 #* @png
14 #* @get /plot
15 function() {
16   rand <- rnorm(100)
17   hist(rand)
18 }
```

```
## @apiTitle mtcars model API
## @apiDescription Endpoints for working with mtcars dataset model

## Log some information about the incoming request
## @filter logger

function(req){
  cat(as.character(Sys.time()), "
    req$REQUEST_METHOD, req$PATH_INFO, "-",
    req$HTTP_USER_AGENT, "@", req$REMOTE_ADDR, "\n")

  # Forward the request
  forward()
}
```

Demo

Plumber

Easily *productionalize* R assets
through REST APIs



PM2

Deployment



Additional Resources

Plumber Documentation: <https://www.rplumber.io/docs/>

Plumber Webinar: <https://www.rstudio.com/resources/videos/plumbing-apis-with-plumber/>

RViews Blog Post: <https://rviews.rstudio.com/2018/07/23/rest-apis-and-plumber/>

GitHub: <https://github.com/trestletech/plumber>

Talk Repository: <https://github.com/blairj09/slc-rug-plumber>

Postman: <https://www.getpostman.com/>