Test API connection to FAIRDOMHub

A. Blejec andrej.blejec@nib.si | National Institute of Biology | Ljubljana, Slovenia

10 junij 2018

Contents

Introduction **1**

Package `RCurl` **1**
Check existence 1
Get personal information 2

Package `httr` **2**
Get personal information 2

Conclusion **12**
Wrapper functions for `GET` and `content` 12
Use of wrapper functions 13

Available at RPubs

Introduction

I will try to connect to the FAIRDOM SEEK with the collection of their APIs.

The API description with examples is available here.

My final goal is to enable upload/download from pISA-tree to FAIRDOMHub. This feature will be a part of the R package `pISAR` that will enable use of pISA structure and metafile information for reproducible statistical analyses.

Package `RCurl`

My first attempt will be the RCurl package avaialbe at CRAN. Additional description is a part of Omegahat project.

```
library(RCurl)
```

```
## Loading required package: bitops
```

Check existence

First check if the base URL exists

```
(FAIRDOMExists = url.exists("https://www.fairdomhub.org/"))
```

```
## [1] TRUE
```

Get personal information

For this I will use the `GET \people\{id}` from documentation and my ID {808}.

```
person <- getURL("https://www.fairdomhub.org/people/808")
str(person)
```

```
##  chr "<!doctype html>\n\n<html lang=\"en\">\n<head>\n  <meta http-equiv=\"content-type\" content=\"t
```

It returns the HTML content and might not be the optimal way.

Package `httr`

The use is described in LockeData blog.

This solution uses packages `httr` and `jsonlite` and is based on `libcurl` (the same is used by RCurl). Package `httr` has useful vignettes that were a good guide for the example below.

```
library(httr)
library(jsonlite)
```

Get personal information

```
r <- GET("https://www.fairdomhub.org/people/808",
         add_headers(Accept="application/json"))
names(r)
```

```
##  [1] "url"         "status_code" "headers"     "all_headers" "cookies"
##  [6] "content"     "date"        "times"       "request"     "handle"
```

```
r
```

```
## Response [https://www.fairdomhub.org/people/808]
##   Date: 2018-06-11 22:38
##   Status: 200
##   Content-Type: application/vnd.api+json; charset=utf-8
##   Size: 1.49 kB
## <BINARY BODY>
```

The response is structured and can be investigated with the helper functions. The response has three important parts: status, headers, and body.

Status

Check status

```
http_status(r)
```

```
## $category
## [1] "Success"
##
## $reason
## [1] "OK"
##
## $message
```

```
## [1] "Success: (200) OK"
```

or just a status code

```
r$status_code
```

```
## [1] 200
```

Body

Body can be accessed with the function `content`

```
cont <- content(r,"text")
cont
```

```
## [1] "{\"data\":{\"id\":\"808\",\"type\":\"people\",\"attributes\":{\"avatar\":\"/people/808/avatars/4
```

```
length(cont)
```

```
## [1] 1
```

This gives us a text version of the JSON object. We can use built-in parsers to get other forms of data. We can parse the content into the R list object

```
cont <- content(r,"parsed",type="application/json")
cont
```

```
## $data
## $data$id
## [1] "808"
##
## $data$type
## [1] "people"
##
## $data$attributes
## $data$attributes$avatar
## [1] "/people/808/avatars/473"
##
## $data$attributes$title
## [1] "Andrej Blejec"
##
## $data$attributes$description
## NULL
##
## $data$attributes$first_name
## [1] "Andrej"
##
## $data$attributes$last_name
## [1] "Blejec"
##
## $data$attributes$web_page
## [1] "http://ablejec.nib.si"
##
## $data$attributes$orcid
## [1] "http://orcid.org/0000-0001-7484-6031"
##
## $data$attributes$mbox_sha1sum
## [1] "e37350ada8b1af0c7fe7a6cb61a6a5d35d20f8bd"
```

```
##
## $data$attributes$phone
## [1] "+38659232789"
##
## $data$attributes$skype_name
## [1] "ablejec"
##
## $data$attributes$expertise
## $data$attributes$expertise[[1]]
## [1] "Bioinformatics"
##
## $data$attributes$expertise[[2]]
## [1] "Computational Statistics"
##
## $data$attributes$expertise[[3]]
## [1] "Mathematical and statistical modeling"
##
## $data$attributes$expertise[[4]]
## [1] "Programming"
##
## $data$attributes$expertise[[5]]
## [1] "R"
##
## $data$attributes$expertise[[6]]
## [1] "Statistics"
##
## $data$attributes$expertise[[7]]
## [1] "Visualization"
##
##
## $data$attributes$tools
## $data$attributes$tools[[1]]
## [1] "Computational Systems Biology"
##
## $data$attributes$tools[[2]]
## [1] "Data Management"
##
## $data$attributes$tools[[3]]
## [1] "Data integration"
##
## $data$attributes$tools[[4]]
## [1] "R"
##
## $data$attributes$tools[[5]]
## [1] "Statistical tools"
##
## $data$attributes$tools[[6]]
## [1] "Statistics"
##
##
## $data$attributes$project_positions
## $data$attributes$project_positions[[1]]
## $data$attributes$project_positions[[1]]$project_id
## [1] "57"
```

```
##
## $data$attributes$project_positions[[1]]$position_id
## [1] "3"
##
## $data$attributes$project_positions[[1]]$position_name
## [1] "Project Coordinator"
##
##
##
##
## $data$relationships
## $data$relationships$projects
## $data$relationships$projects$data
## $data$relationships$projects$data[[1]]
## $data$relationships$projects$data[[1]]$id
## [1] "56"
##
## $data$relationships$projects$data[[1]]$type
## [1] "projects"
##
##
## $data$relationships$projects$data[[2]]
## $data$relationships$projects$data[[2]]$id
## [1] "57"
##
## $data$relationships$projects$data[[2]]$type
## [1] "projects"
##
##
##
##
## $data$relationships$institutions
## $data$relationships$institutions$data
## $data$relationships$institutions$data[[1]]
## $data$relationships$institutions$data[[1]]$id
## [1] "189"
##
## $data$relationships$institutions$data[[1]]$type
## [1] "institutions"
##
##
##
##
## $data$relationships$investigations
## $data$relationships$investigations$data
## $data$relationships$investigations$data[[1]]
## $data$relationships$investigations$data[[1]]$id
## [1] "190"
##
## $data$relationships$investigations$data[[1]]$type
## [1] "investigations"
##
##
##
```

```
##
## $data$relationships$studies
## $data$relationships$studies$data
## $data$relationships$studies$data[[1]]
## $data$relationships$studies$data[[1]]$id
## [1] "365"
##
## $data$relationships$studies$data[[1]]$type
## [1] "studies"
##
##
##
##
## $data$relationships$assays
## $data$relationships$assays$data
## $data$relationships$assays$data[[1]]
## $data$relationships$assays$data[[1]]$id
## [1] "655"
##
## $data$relationships$assays$data[[1]]$type
## [1] "assays"
##
##
##
##
## $data$relationships$data_files
## $data$relationships$data_files$data
## $data$relationships$data_files$data[[1]]
## $data$relationships$data_files$data[[1]]$id
## [1] "2165"
##
## $data$relationships$data_files$data[[1]]$type
## [1] "data_files"
##
##
##
##
## $data$relationships$models
## $data$relationships$models$data
## list()
##
##
## $data$relationships$sops
## $data$relationships$sops$data
## list()
##
##
## $data$relationships$publications
## $data$relationships$publications$data
## list()
##
##
## $data$relationships$presentations
## $data$relationships$presentations$data
```

```
## list()
##
##
## $data$relationships$events
## $data$relationships$events$data
## list()
##
##
## $data$relationships$documents
## $data$relationships$documents$data
## list()
##
##
##
## $data$links
## $data$links$self
## [1] "/people/808"
##
##
## $data$meta
## $data$meta$created
## [1] "2016-11-07T22:17:49.000Z"
##
## $data$meta$modified
## [1] "2017-08-01T08:28:42.000Z"
##
## $data$meta$api_version
## [1] "0.1"
##
## $data$meta$uuid
## [1] "f1427a00-8765-0134-769f-549f350973c0"
##
## $data$meta$base_url
## [1] "https://fairdomhub.org"
##
##
##
## $jsonapi
## $jsonapi$version
## [1] "1.0"
```

The structure of the parsed response

```
names(cont)
```

```
## [1] "data"    "jsonapi"
```

```
cont$jsonapi
```

```
## $version
## [1] "1.0"
```

```
names(cont$data)
```

```
## [1] "id"            "type"          "attributes"    "relationships"
```

```
## [5] "links"         "meta"
```

Response elements

```
cont$data$id
```

```
## [1] "808"
```

List the response content

```
d <- cont$data
for (nm in names(d)) {
  cat("\n",nm,"--------------\n\n")
  print(d[[nm]])
}
```

```
##
##  id --------------
##
## [1] "808"
##
##  type --------------
##
## [1] "people"
##
##  attributes --------------
##
## $avatar
## [1] "/people/808/avatars/473"
##
## $title
## [1] "Andrej Blejec"
##
## $description
## NULL
##
## $first_name
## [1] "Andrej"
##
## $last_name
## [1] "Blejec"
##
## $web_page
## [1] "http://ablejec.nib.si"
##
## $orcid
## [1] "http://orcid.org/0000-0001-7484-6031"
##
## $mbox_sha1sum
## [1] "e37350ada8b1af0c7fe7a6cb61a6a5d35d20f8bd"
##
## $phone
## [1] "+38659232789"
##
## $skype_name
## [1] "ablejec"
##
```

```
## $expertise
## $expertise[[1]]
## [1] "Bioinformatics"
##
## $expertise[[2]]
## [1] "Computational Statistics"
##
## $expertise[[3]]
## [1] "Mathematical and statistical modeling"
##
## $expertise[[4]]
## [1] "Programming"
##
## $expertise[[5]]
## [1] "R"
##
## $expertise[[6]]
## [1] "Statistics"
##
## $expertise[[7]]
## [1] "Visualization"
##
##
## $tools
## $tools[[1]]
## [1] "Computational Systems Biology"
##
## $tools[[2]]
## [1] "Data Management"
##
## $tools[[3]]
## [1] "Data integration"
##
## $tools[[4]]
## [1] "R"
##
## $tools[[5]]
## [1] "Statistical tools"
##
## $tools[[6]]
## [1] "Statistics"
##
##
## $project_positions
## $project_positions[[1]]
## $project_positions[[1]]$project_id
## [1] "57"
##
## $project_positions[[1]]$position_id
## [1] "3"
##
## $project_positions[[1]]$position_name
## [1] "Project Coordinator"
##
```

```
##
##
##
##  relationships --------------
##
## $projects
## $projects$data
## $projects$data[[1]]
## $projects$data[[1]]$id
## [1] "56"
##
## $projects$data[[1]]$type
## [1] "projects"
##
##
## $projects$data[[2]]
## $projects$data[[2]]$id
## [1] "57"
##
## $projects$data[[2]]$type
## [1] "projects"
##
##
##
##
## $institutions
## $institutions$data
## $institutions$data[[1]]
## $institutions$data[[1]]$id
## [1] "189"
##
## $institutions$data[[1]]$type
## [1] "institutions"
##
##
##
##
## $investigations
## $investigations$data
## $investigations$data[[1]]
## $investigations$data[[1]]$id
## [1] "190"
##
## $investigations$data[[1]]$type
## [1] "investigations"
##
##
##
##
## $studies
## $studies$data
## $studies$data[[1]]
## $studies$data[[1]]$id
## [1] "365"
```

```
##
## $studies$data[[1]]$type
## [1] "studies"
##
##
##
##
## $assays
## $assays$data
## $assays$data[[1]]
## $assays$data[[1]]$id
## [1] "655"
##
## $assays$data[[1]]$type
## [1] "assays"
##
##
##
##
## $data_files
## $data_files$data
## $data_files$data[[1]]
## $data_files$data[[1]]$id
## [1] "2165"
##
## $data_files$data[[1]]$type
## [1] "data_files"
##
##
##
##
## $models
## $models$data
## list()
##
##
## $sops
## $sops$data
## list()
##
##
## $publications
## $publications$data
## list()
##
##
## $presentations
## $presentations$data
## list()
##
##
## $events
## $events$data
## list()
```

```
##
##
## $documents
## $documents$data
## list()
##
##
##
##  links --------------
##
## $self
## [1] "/people/808"
##
##
##  meta --------------
##
## $created
## [1] "2016-11-07T22:17:49.000Z"
##
## $modified
## [1] "2017-08-01T08:28:42.000Z"
##
## $api_version
## [1] "0.1"
##
## $uuid
## [1] "f1427a00-8765-0134-769f-549f350973c0"
##
## $base_url
## [1] "https://fairdomhub.org"
```

Person data are in the *attributes* part

Here is the first name of the person with id 808:

```
cont$data$attributes$first_name
```

```
## [1] "Andrej"
```

Conclusion

The rudimetary R read connection with FAIRDOMHub can be established using the package `httr`. From here it should be fairly possible to write the wrapper functions for easier usage.

Wrapper functions for `GET` and `content`

```
# this function is equivaalent to a call:
# curl -X GET "https://www.fairdomhub.org/what/id" -H  "accept: application/json"
#
myGET <- function(what, id,
                  uri="https://www.fairdomhub.org", ... ){
  if(!missing(what)) uri <- paste0(uri,"/",what)
  if(!missing(id)) uri <- paste0(uri,"/",id)
```

```
  r <- GET(uri,
         add_headers(Accept="application/json"))
  cat("Status code:",r$status_code,"\n")
  invisible(r)
}

myData <- function(r,
                   part="attributes",
                   type="application/json",  ...){
  invisible(content(r,"parsed",type=type)$data[[part]])
}
```

Use of wrapper functions

Get data for person 808

```
# https://www.fairdomhub.org/people/808
r <- myGET("people","808")
```

```
## Status code: 200
```

```
r$status_code
```

```
## [1] 200
```

Get the person 808 last name and tools

```
myData(r)$last_name
```

```
## [1] "Blejec"
```

```
myData(r)$tools
```

```
## [[1]]
## [1] "Computational Systems Biology"
##
## [[2]]
## [1] "Data Management"
##
## [[3]]
## [1] "Data integration"
##
## [[4]]
## [1] "R"
##
## [[5]]
## [1] "Statistical tools"
##
## [[6]]
## [1] "Statistics"
```

Get person 808 institution id

```
myData(r,"relationships")$institutions
```

```
## $data
## $data[[1]]
```

```
## $data[[1]]$id
## [1] "189"
##
## $data[[1]]$type
## [1] "institutions"
```

```
instID <- myData(r, "relationships")$institutions$data[[1]]$id
instID
```

```
## [1] "189"
```

Get institution ůinstID‘ name. The details are in the *institutions* part.

```
# https://www.fairdomhub.org/institutions/189
rinst <- myGET("institutions",instID)
```

```
## Status code: 200
```

```
myData(rinst)$title
```

```
## [1] "National Institute of Biology"
```

Full institution description

```
catln <- function(...) cat(...,"\n")
d <- sapply(myData(rinst),catln)
```

```
## /institutions/189/avatars/568
## National Institute of Biology
## SI
##
## Ljubljana
## Vecna pot 111
## SI-1000 Ljubljana
## Slovenia
## http://www.nib.si
```