So, I wrote a small R function wrapper for the dig command using {processx}. Folks on the legacy Windows operating system are on your own for getting a copy of dig installed but users of proper, modern operating systems like Linux or macOS should have it installed by-default (or will be an easy package manager grab away).

**Wrapping dig**

The R-wrapper for the dig command is pretty straightforward:

library(stringi) # string processing

library(processx) # system processes orchestration

library(tidyverse) # good data wrangling idioms

dig <- function(..., cat = TRUE) {

processx::run(

command = unname(Sys.which("dig")),

args = unlist(list(...)),

) -> out

if (cat) message(out$stdout)

invisible(out)

}

We expand the ellipses into command arguments, run the command, return the output and optionally display the output via message().

Let’s see if it works by getting the dig help:

dig("-h")

## Usage: dig [[@global](http://twitter.com/global)-server] [domain] [q-type] [q-class] {q-opt}

## {global-d-opt} host [[@local](http://twitter.com/local)-server] {local-d-opt}

## [ host [[@local](http://twitter.com/local)-server] {local-d-opt} [...]]

## Where: domain is in the Domain Name System

## q-class is one of (in,hs,ch,...) [default: in]

## q-type is one of (a,any,mx,ns,soa,hinfo,axfr,txt,...) [default:a]

## (Use ixfr=version for type ixfr)

## q-opt is one of:

## -4 (use IPv4 query transport only)

## -6 (use IPv6 query transport only)

## -b address[#port] (bind to source address/port)

## -c class (specify query class)

## -f filename (batch mode)

## -i (use [IP6.INT](http://IP6.INT) for IPv6 reverse lookups)

## -k keyfile (specify tsig key file)

## -m (enable memory usage debugging)

## -p port (specify port number)

## -q name (specify query name)

## -t type (specify query type)

## -u (display times in usec instead of msec)

## -x dot-notation (shortcut for reverse lookups)

## -y [hmac:]name:key (specify named base64 tsig key)

## d-opt is of the form +keyword[=value], where keyword is:

## +[no]aaonly (Set AA flag in query (+[no]aaflag))

## +[no]additional (Control display of additional section)

## +[no]adflag (Set AD flag in query (default on))

## +[no]all (Set or clear all display flags)

## +[no]answer (Control display of answer section)

## +[no]authority (Control display of authority section)

## +[no]besteffort (Try to parse even illegal messages)

## +bufsize=### (Set EDNS0 Max UDP packet size)

## +[no]cdflag (Set checking disabled flag in query)

## +[no]cl (Control display of class in records)

## +[no]cmd (Control display of command line)

## +[no]comments (Control display of comment lines)

## +[no]crypto (Control display of cryptographic fields in records)

## +[no]defname (Use search list (+[no]search))

## +[no]dnssec (Request DNSSEC records)

## +domain=### (Set default domainname)

## +[no]edns[=###] (Set EDNS version) [0]

## +ednsflags=### (Set EDNS flag bits)

## +[no]ednsnegotiation (Set EDNS version negotiation)

## +ednsopt=###[:value] (Send specified EDNS option)

## +noednsopt (Clear list of +ednsopt options)

## +[no]expire (Request time to expire)

## +[no]fail (Don't try next server on SERVFAIL)

## +[no]identify (ID responders in short answers)

## +[no]idnout (convert IDN response)

## +[no]ignore (Don't revert to TCP for TC responses.)

## +[no]keepopen (Keep the TCP socket open between queries)

## +[no]multiline (Print records in an expanded format)

## +ndots=### (Set search NDOTS value)

## +[no]nsid (Request Name Server ID)

## +[no]nssearch (Search all authoritative nameservers)

## +[no]onesoa (AXFR prints only one soa record)

## +[no]opcode=### (Set the opcode of the request)

## +[no]qr (Print question before sending)

## +[no]question (Control display of question section)

## +[no]recurse (Recursive mode)

## +retry=### (Set number of UDP retries) [2]

## +[no]rrcomments (Control display of per-record comments)

## +[no]search (Set whether to use searchlist)

## +[no]short (Display nothing except short

## form of answer)

## +[no]showsearch (Search with intermediate results)

## +[no]split=## (Split hex/base64 fields into chunks)

## +[no]stats (Control display of statistics)

## +subnet=addr (Set edns-client-subnet option)

## +[no]tcp (TCP mode (+[no]vc))

## +time=### (Set query timeout) [5]

## +[no]trace (Trace delegation down from root [+dnssec])

## +tries=### (Set number of UDP attempts) [3]

## +[no]ttlid (Control display of ttls in records)

## +[no]vc (TCP mode (+[no]tcp))

## global d-opts and servers (before host name) affect all queries.

## local d-opts and servers (after host name) affect only that lookup.

## -h (print help and exit)

## -v (print version and exit)

To get the DNS records of r-project.org DNS we need to find the nameservers, which we can do via:

ns <- dig("+short", "NS", "[@9](http://twitter.com/9).9.9.9", "r-project.org")

## ns1.wu-wien.ac.at.

## ns2.urbanek.info.

## ns1.urbanek.info.

## ns3.urbanek.info.

## ns4.urbanek.info.

## ns2.wu-wien.ac.at.

There are six of them (which IIRC is a few more than they had earlier this week). I wanted to see if any supported zone transfers. Here’s one way to do that:

stri\_split\_lines(ns$stdout, omit\_empty = TRUE) %>% # split the response in stdout into lines

flatten\_chr() %>% # turn the list into a character vector

map\_df(~{ # make a data frame out of the following

tibble(

ns = .x, # the nameserver we are probing

res = dig("+noall", "+answer", "AXFR", glue::glue("@{.x}"), "r-project.org", cat = FALSE) %>% # the dig zone transfer request

pluck("stdout") # we only want the `stdout` element of the {processx} return value

)

}) -> xdf

xdf

## # A tibble: 6 x 2

## ns res

##

## 1 ns1.wu-wien.ac… "; Transfer failed.\n"

## 2 ns2.urbanek.in… "R-project.org.\t\t7200\tIN\tSOA\tns0.wu-wien.ac.at.…

## 3 ns1.urbanek.in… "R-project.org.\t\t7200\tIN\tSOA\tns0.wu-wien.ac.at.…

## 4 ns3.urbanek.in… "R-project.org.\t\t7200\tIN\tSOA\tns0.wu-wien.ac.at.…

## 5 ns4.urbanek.in… "R-project.org.\t\t7200\tIN\tSOA\tns0.wu-wien.ac.at.…

## 6 ns2.wu-wien.ac… "; Transfer failed.\n"

(NOTE: You may not get things in the same order if you try this at home due to the way DNS queries and responses work.)

So, two servers did not accept our request but four did. Let’s see what a set of zone transfer records looks like:

cat(xdf[["res"]][[2]])

## R-project.org. 7200 IN SOA [ns0.wu-wien.ac.at](http://ns0.wu-wien.ac.at). [postmaster.wu-wien.ac.at](http://postmaster.wu-wien.ac.at). 2019040400 3600 1800 604800 3600

## R-project.org. 7200 IN NS [ns1.urbanek.info](http://ns1.urbanek.info).

## R-project.org. 7200 IN NS [ns1.wu-wien.ac.at](http://ns1.wu-wien.ac.at).

## R-project.org. 7200 IN NS [ns2.urbanek.info](http://ns2.urbanek.info).

## R-project.org. 7200 IN NS [ns2.wu-wien.ac.at](http://ns2.wu-wien.ac.at).

## R-project.org. 7200 IN NS [ns3.urbanek.info](http://ns3.urbanek.info).

## R-project.org. 7200 IN NS [ns4.urbanek.info](http://ns4.urbanek.info).

## R-project.org. 7200 IN A 137.208.57.37

## R-project.org. 7200 IN MX 5 [mc1.ethz.ch](http://mc1.ethz.ch).

## R-project.org. 7200 IN MX 5 [mc2.ethz.ch](http://mc2.ethz.ch).

## R-project.org. 7200 IN MX 5 [mc3.ethz.ch](http://mc3.ethz.ch).

## R-project.org. 7200 IN MX 5 [mc4.ethz.ch](http://mc4.ethz.ch).

## R-project.org. 7200 IN TXT "v=spf1 ip4:[129.132.119.208/32](http://129.132.119.208/32) ~all"

## [cran.at.R-project.org](http://cran.at.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [beta.R-project.org](http://beta.R-project.org). 7200 IN A 137.208.57.37

## [bugs.R-project.org](http://bugs.R-project.org). 7200 IN CNAME [rbugs.urbanek.info](http://rbugs.urbanek.info).

## [cran.ch.R-project.org](http://cran.ch.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [cloud.R-project.org](http://cloud.R-project.org). 7200 IN CNAME [d3caqzu56oq2n9.cloudfront.net](http://d3caqzu56oq2n9.cloudfront.net).

## [cran.R-project.org](http://cran.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [ftp.cran.R-project.org](http://ftp.cran.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [www.cran.R-project.org](http://www.cran.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [cran-archive.R-project.org](http://cran-archive.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [developer.R-project.org](http://developer.R-project.org). 7200 IN CNAME [rdevel.urbanek.info](http://rdevel.urbanek.info).

## [cran.es.R-project.org](http://cran.es.R-project.org). 7200 IN A 137.208.57.37

## [ess.R-project.org](http://ess.R-project.org). 7200 IN CNAME [ess.math.ethz.ch](http://ess.math.ethz.ch).

## [journal.R-project.org](http://journal.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [mac.R-project.org](http://mac.R-project.org). 7200 IN CNAME [r.research.att.com](http://r.research.att.com).

## [portal.R-project.org](http://portal.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [r-forge.R-project.org](http://r-forge.R-project.org). 7200 IN CNAME [r-forge.wu-wien.ac.at](http://r-forge.wu-wien.ac.at).

## \*.[r-forge.R-project.org](http://r-forge.R-project.org). 7200 IN CNAME [r-forge.wu-wien.ac.at](http://r-forge.wu-wien.ac.at).

## [search.R-project.org](http://search.R-project.org). 7200 IN CNAME [finzi.psych.upenn.edu](http://finzi.psych.upenn.edu).

## [svn.R-project.org](http://svn.R-project.org). 7200 IN CNAME [svn-stat.math.ethz.ch](http://svn-stat.math.ethz.ch).

## [translation.R-project.org](http://translation.R-project.org). 7200 IN CNAME [translation.r-project.kr](http://translation.r-project.kr).

## [cran.uk.R-project.org](http://cran.uk.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [cran.us.R-project.org](http://cran.us.R-project.org). 7200 IN A 137.208.57.37

## [user2004.R-project.org](http://user2004.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2006.R-project.org](http://useR2006.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [user2007.R-project.org](http://user2007.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2008.R-project.org](http://useR2008.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2009.R-project.org](http://useR2009.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [user2010.R-project.org](http://user2010.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2011.R-project.org](http://useR2011.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2012.R-project.org](http://useR2012.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2013.R-project.org](http://useR2013.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [user2014.R-project.org](http://user2014.R-project.org). 7200 IN CNAME [user2014.github.io](http://user2014.github.io).

## [useR2015.R-project.org](http://useR2015.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2016.R-project.org](http://useR2016.R-project.org). 7200 IN CNAME [user2016.github.io](http://user2016.github.io).

## [useR2017.R-project.org](http://useR2017.R-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## [useR2018.R-project.org](http://useR2018.R-project.org). 7200 IN CNAME [user-2018.netlify.com](http://user-2018.netlify.com).

## [useR2019.R-project.org](http://useR2019.R-project.org). 7200 IN A 5.135.185.16

## [wiki.R-project.org](http://wiki.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## [win-builder.R-project.org](http://win-builder.R-project.org). 7200 IN A 129.217.207.166

## [win-builder.R-project.org](http://win-builder.R-project.org). 7200 IN MX 0 [rdevel.urbanek.info](http://rdevel.urbanek.info).

## [www.R-project.org](http://www.R-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## R-project.org. 7200 IN SOA [ns0.wu-wien.ac.at](http://ns0.wu-wien.ac.at). [postmaster.wu-wien.ac.at](http://postmaster.wu-wien.ac.at). 2019040400 3600 1800 604800 3600

That’s not pretty, but it’s wrangle-able. Let’s turn it into a data frame:

xdf[["res"]][[2]] %>% # get the response text

stri\_split\_lines(omit\_empty = TRUE) %>% # split it into lines

flatten\_chr() %>% # turn it into a character vector

stri\_split\_regex("[[:space:]]+", n = 5, simplify = TRUE) %>% # split at whitespace, limiting to five fields

as\_tibble(.name\_repair = "unique") %>% # make it a tibble

set\_names(c("host", "ttl", "class", "record\_type", "value")) %>% # better colnames

mutate(host = stri\_trans\_tolower(host)) %>% # case matters not in DNS names

print(n=nrow(.)) # see our results

## # A tibble: 55 x 5

## host ttl class record\_type value

##

## 1 [r-project.org](http://r-project.org). 7200 IN SOA [ns0.wu-wien.ac.at](http://ns0.wu-wien.ac.at). [postmaster.wu-wien.ac.at](http://postmaster.wu-wien.ac.at). 2019040400 3600 1800 …

## 2 [r-project.org](http://r-project.org). 7200 IN NS [ns1.urbanek.info](http://ns1.urbanek.info).

## 3 [r-project.org](http://r-project.org). 7200 IN NS [ns1.wu-wien.ac.at](http://ns1.wu-wien.ac.at).

## 4 [r-project.org](http://r-project.org). 7200 IN NS [ns2.urbanek.info](http://ns2.urbanek.info).

## 5 [r-project.org](http://r-project.org). 7200 IN NS [ns2.wu-wien.ac.at](http://ns2.wu-wien.ac.at).

## 6 [r-project.org](http://r-project.org). 7200 IN NS [ns3.urbanek.info](http://ns3.urbanek.info).

## 7 [r-project.org](http://r-project.org). 7200 IN NS [ns4.urbanek.info](http://ns4.urbanek.info).

## 8 [r-project.org](http://r-project.org). 7200 IN A 137.208.57.37

## 9 [r-project.org](http://r-project.org). 7200 IN MX 5 [mc1.ethz.ch](http://mc1.ethz.ch).

## 10 [r-project.org](http://r-project.org). 7200 IN MX 5 [mc2.ethz.ch](http://mc2.ethz.ch).

## 11 [r-project.org](http://r-project.org). 7200 IN MX 5 [mc3.ethz.ch](http://mc3.ethz.ch).

## 12 [r-project.org](http://r-project.org). 7200 IN MX 5 [mc4.ethz.ch](http://mc4.ethz.ch).

## 13 [r-project.org](http://r-project.org). 7200 IN TXT "\"v=spf1 ip4:[129.132.119.208/32](http://129.132.119.208/32) ~all\""

## 14 [cran.at.r-project.org](http://cran.at.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 15 [beta.r-project.org](http://beta.r-project.org). 7200 IN A 137.208.57.37

## 16 [bugs.r-project.org](http://bugs.r-project.org). 7200 IN CNAME [rbugs.urbanek.info](http://rbugs.urbanek.info).

## 17 [cran.ch.r-project.org](http://cran.ch.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 18 [cloud.r-project.org](http://cloud.r-project.org). 7200 IN CNAME [d3caqzu56oq2n9.cloudfront.net](http://d3caqzu56oq2n9.cloudfront.net).

## 19 [cran.r-project.org](http://cran.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 20 [ftp.cran.r-project.org](http://ftp.cran.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 21 [www.cran.r-project.org](http://www.cran.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 22 cran-archive.r-project.… 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 23 [developer.r-project.org](http://developer.r-project.org). 7200 IN CNAME [rdevel.urbanek.info](http://rdevel.urbanek.info).

## 24 [cran.es.r-project.org](http://cran.es.r-project.org). 7200 IN A 137.208.57.37

## 25 [ess.r-project.org](http://ess.r-project.org). 7200 IN CNAME [ess.math.ethz.ch](http://ess.math.ethz.ch).

## 26 [journal.r-project.org](http://journal.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 27 [mac.r-project.org](http://mac.r-project.org). 7200 IN CNAME [r.research.att.com](http://r.research.att.com).

## 28 [portal.r-project.org](http://portal.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 29 [r-forge.r-project.org](http://r-forge.r-project.org). 7200 IN CNAME [r-forge.wu-wien.ac.at](http://r-forge.wu-wien.ac.at).

## 30 \*.[r-forge.r-project.org](http://r-forge.r-project.org). 7200 IN CNAME [r-forge.wu-wien.ac.at](http://r-forge.wu-wien.ac.at).

## 31 [search.r-project.org](http://search.r-project.org). 7200 IN CNAME [finzi.psych.upenn.edu](http://finzi.psych.upenn.edu).

## 32 [svn.r-project.org](http://svn.r-project.org). 7200 IN CNAME [svn-stat.math.ethz.ch](http://svn-stat.math.ethz.ch).

## 33 translation.r-project.o… 7200 IN CNAME [translation.r-project.kr](http://translation.r-project.kr).

## 34 [cran.uk.r-project.org](http://cran.uk.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 35 [cran.us.r-project.org](http://cran.us.r-project.org). 7200 IN A 137.208.57.37

## 36 [user2004.r-project.org](http://user2004.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 37 [user2006.r-project.org](http://user2006.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 38 [user2007.r-project.org](http://user2007.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 39 [user2008.r-project.org](http://user2008.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 40 [user2009.r-project.org](http://user2009.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 41 [user2010.r-project.org](http://user2010.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 42 [user2011.r-project.org](http://user2011.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 43 [user2012.r-project.org](http://user2012.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 44 [user2013.r-project.org](http://user2013.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 45 [user2014.r-project.org](http://user2014.r-project.org). 7200 IN CNAME [user2014.github.io](http://user2014.github.io).

## 46 [user2015.r-project.org](http://user2015.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 47 [user2016.r-project.org](http://user2016.r-project.org). 7200 IN CNAME [user2016.github.io](http://user2016.github.io).

## 48 [user2017.r-project.org](http://user2017.r-project.org). 7200 IN CNAME [r-project.org](http://r-project.org).

## 49 [user2018.r-project.org](http://user2018.r-project.org). 7200 IN CNAME [user-2018.netlify.com](http://user-2018.netlify.com).

## 50 [user2019.r-project.org](http://user2019.r-project.org). 7200 IN A 5.135.185.16

## 51 [wiki.r-project.org](http://wiki.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 52 win-builder.r-project.o… 7200 IN A 129.217.207.166

## 53 win-builder.r-project.o… 7200 IN MX 0 [rdevel.urbanek.info](http://rdevel.urbanek.info).

## 54 [www.r-project.org](http://www.r-project.org). 7200 IN CNAME [cran.wu-wien.ac.at](http://cran.wu-wien.ac.at).

## 55 [r-project.org](http://r-project.org). 7200 IN SOA [ns0.wu-wien.ac.at](http://ns0.wu-wien.ac.at). [postmaster.wu-wien.ac.at](http://postmaster.wu-wien.ac.at). 2019040400 3600 1800

**FIN**

Zone transfers are a quick way to get all the DNS information for a site. As such, it isn’t generally recommended to allow zone transfers from just anyone (though trying to keep anything secret in public DNS is a path generally fraught with peril given how easy it is to brute-force record lookups).