RStudio Background Jobs

Offload your work and unblock your console

James Blair
Solutions Engineer @ RStudio
2019-08-07

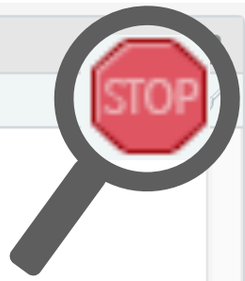
rstd.io/background-jobs

The waiting game

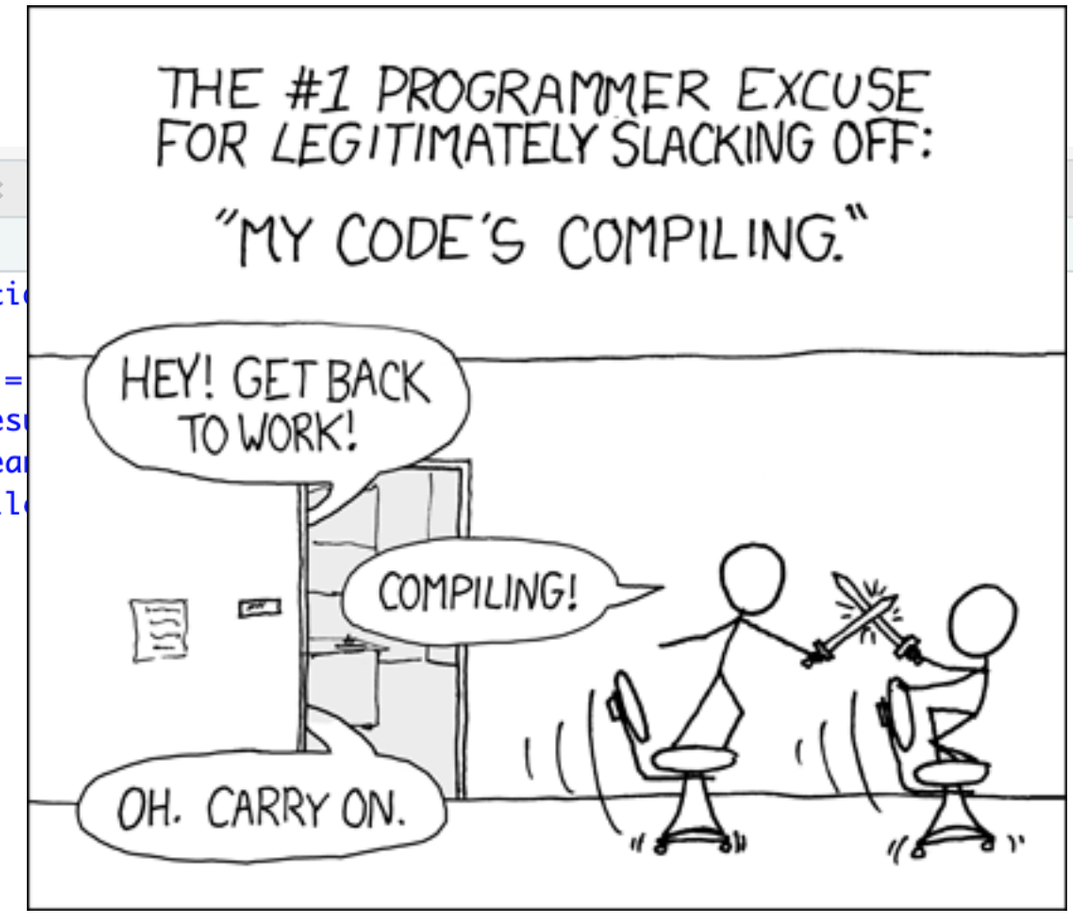
Console | Terminal × | Jobs × | Launcher ×

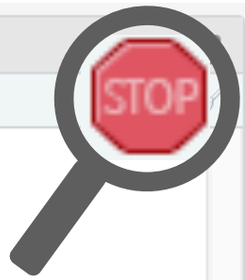
~/projects/background-jobs/

```
+   # Save out results every 25 iterations
+   if (i %% 25 == 0) {
+     print(paste0("Saving results (i = ", i, ")"))
+     save_results <- results[apply(results, 1, function(x) !all(is.na(x))),]
+     print(paste0("Pi estimate: ", mean((save_results[,1]^2 + save_results[,2]^2) <= 1) * 4))
+     saveRDS(save_results, results_file)
+   }
+ }
[1] "Saving results (i = 25)"
[1] "Pi estimate: 2.56"
[1] "Saving results (i = 50)"
[1] "Pi estimate: 2.96"
[1] "Saving results (i = 75)"
[1] "Pi estimate: 3.14666666666667"
[1] "Saving results (i = 100)"
[1] "Pi estimate: 3.24"
[1] "Saving results (i = 125)"
[1] "Pi estimate: 3.072"
[1] "Saving results (i = 150)"
```



The waiting game





Console | Terminal | Jobs | Launcher

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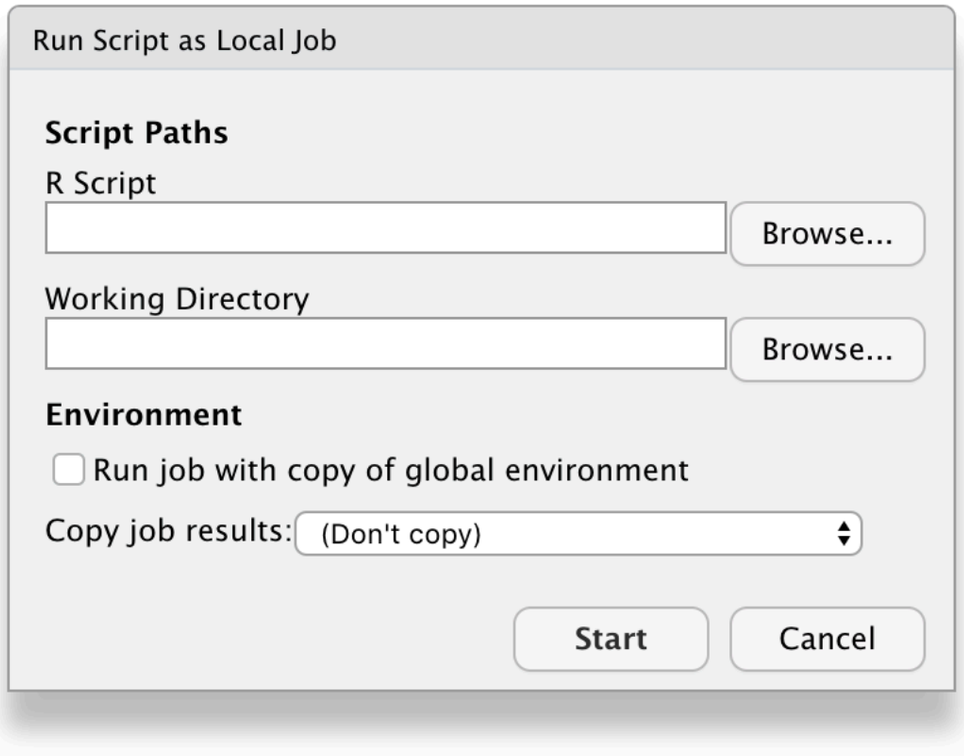
[1] "Pi estimate: 3.24"
[1] "Saving results (i = 125)"
[1] "Pi estimate: 3.072"
[1] "Saving results (i = 150)"
```

https://xkcd.com/303/

Background Jobs

- IDE Features
  - Local Jobs
  - Launcher Jobs
- General Guidelines
- Use Cases
  - ETL
  - Simulations
  - Shiny
  - Plumber



IDE Features

RStudio Server Pro Only

Local Background Jobs

- Ad hoc, long running scripts (ETL, model fitting, etc)
- Background Shiny applications
- Background Plumber APIs

Interactive Launcher Sessions

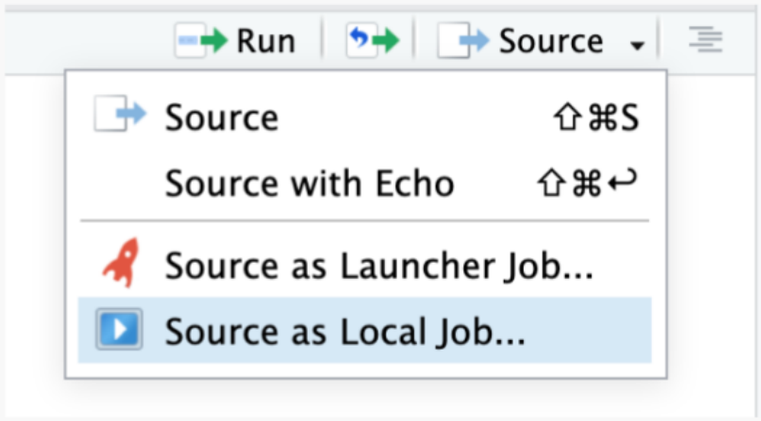
- Sessions with unique compute / environment requirements
- Large compute jobs
- Sessions can run without interfering with other's work

Launcher Jobs

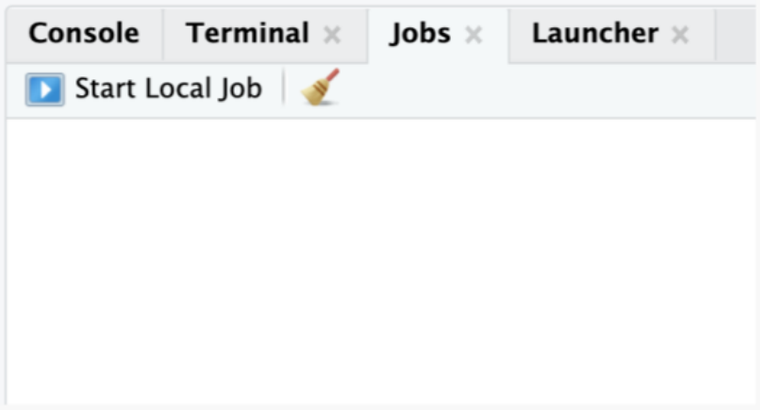
- Ad hoc, long running scripts (ETL, model fitting, etc)
- Concurrent, computationally intensive jobs
- Scripts with unique compute / environment requirements

IDE Features

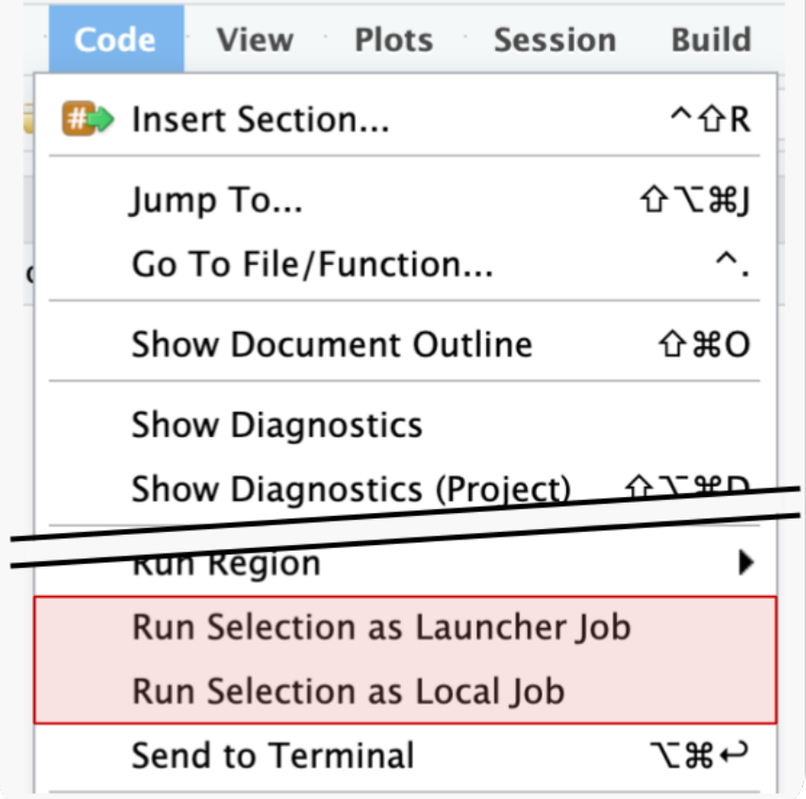
Source dropdown

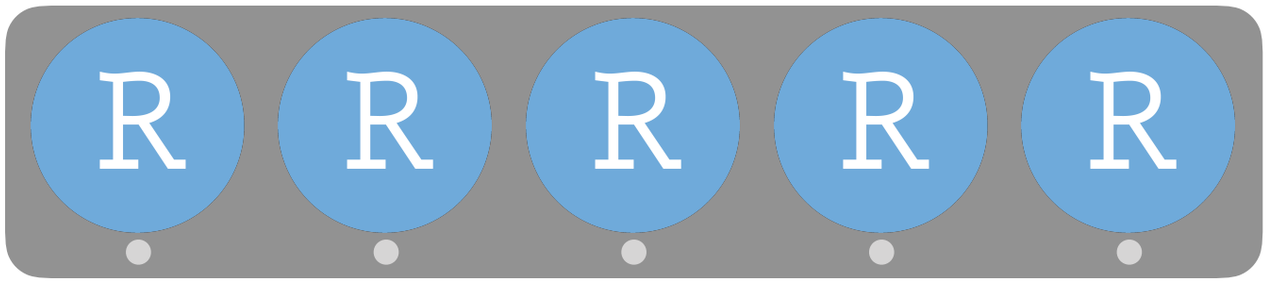


Jobs / Launcher pane



Code menu




R
R
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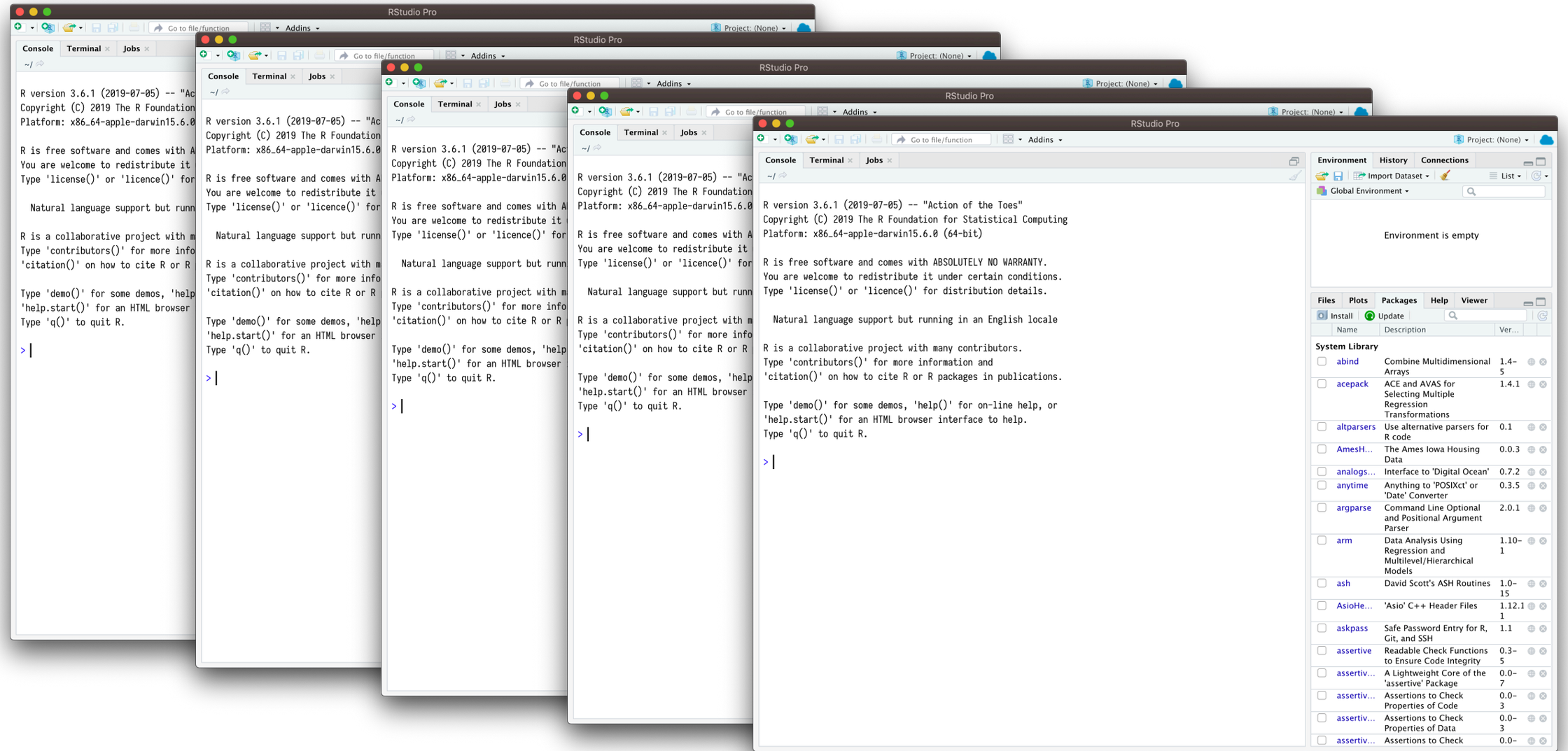
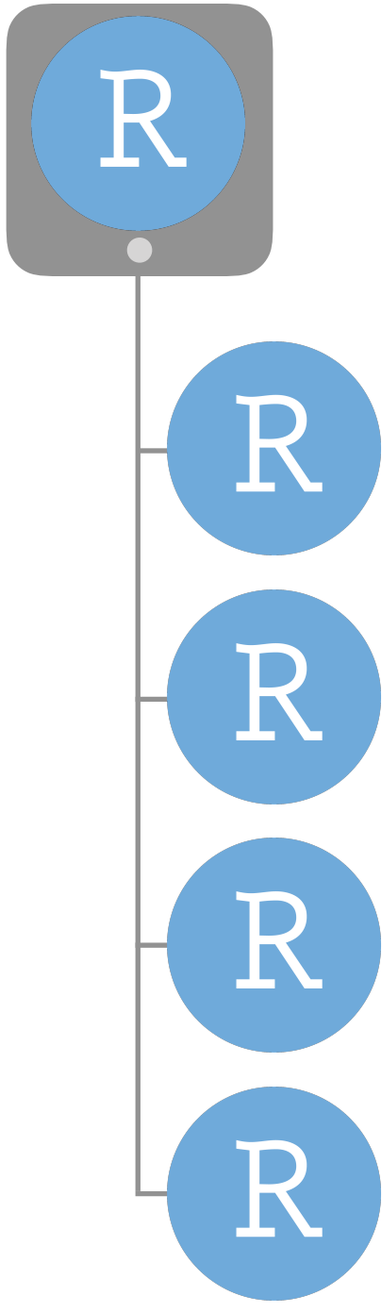
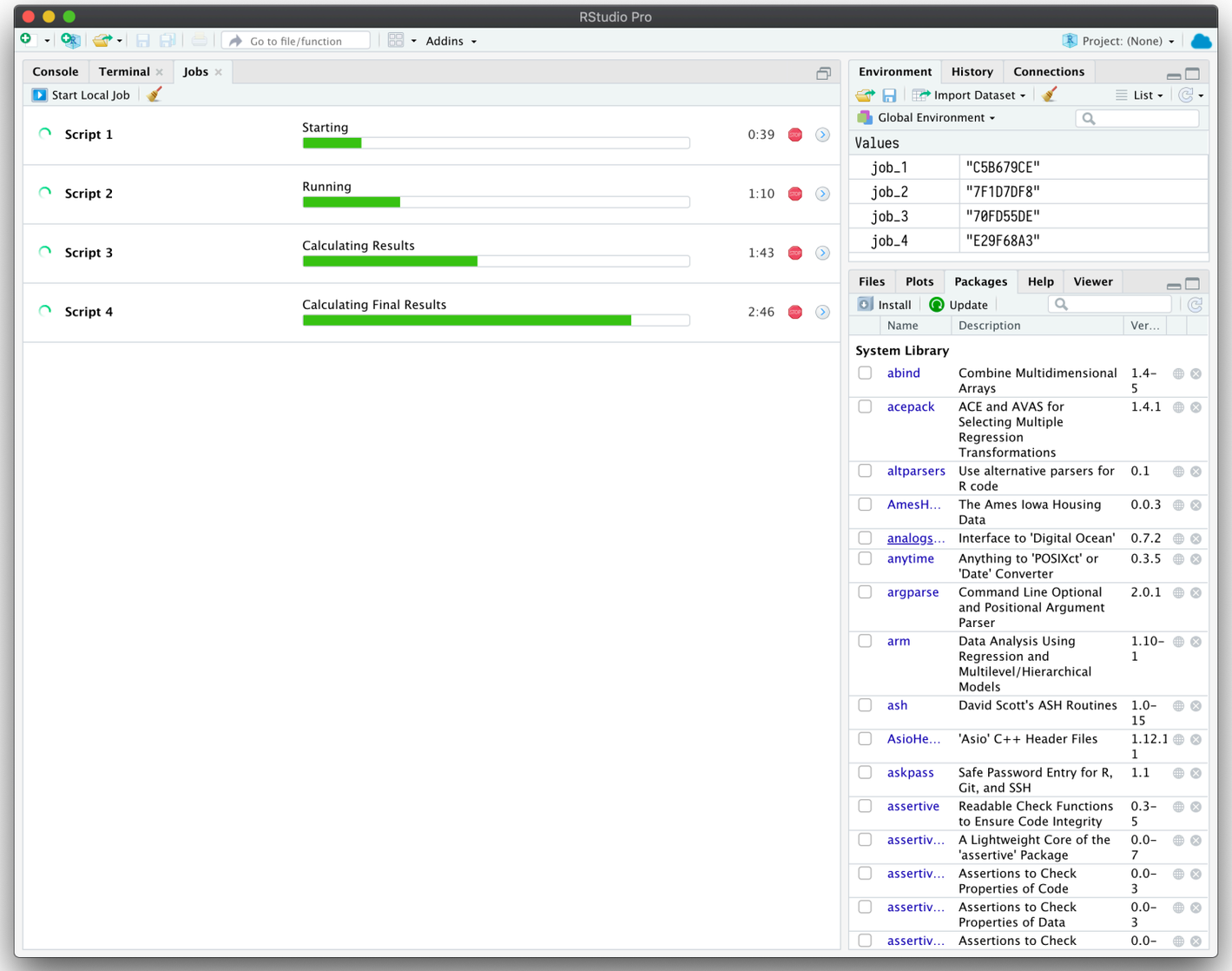
R
R


RStudio Pro
Go to file/function
Addins
Project: (None)
Console
Terminal
Jobs
~/
R version 3.6.1 (2019-07-05) -- "Action of the Toes"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin15.6.0 (64-bit)
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
Natural language support but running in an English locale
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
>
Environment
History
Connections
Import Dataset
List
Global Environment
Environment is empty
Files
Plots
Packages
Help
Viewer
Install
Update
Name
Description
Ver...
System Library
abind
Combine Multidimensional Arrays
1.4-5
acepack
ACE and AVAS for Selecting Multiple Regression Transformations
1.4.1
altparsers
Use alternative parsers for R code
0.1
AmesH...
The Ames Iowa Housing Data
0.0.3
analogs...
Interface to 'Digital Ocean'
0.7.2
anytime
Anything to 'POSIXct' or 'Date' Converter
0.3.5
argparse
Command Line Optional and Positional Argument Parser
2.0.1
arm
Data Analysis Using Regression and Multilevel/Hierarchical Models
1.10-1
ash
David Scott's ASH Routines
1.0-15
AsioHe...
'Asio' C++ Header Files
1.12.1 1
askpass
Safe Password Entry for R, Git, and SSH
1.1
assertive
Readable Check Functions to Ensure Code Integrity
0.3-5
assertiv...
A Lightweight Core of the 'assertive' Package
0.0-7
assertiv...
Assertions to Check Properties of Code
0.0-3
assertiv...
Assertions to Check Properties of Data
0.0-3
assertiv...
Assertions to Check
0.0-




RStudio Pro
Go to file/function
Addins
Project: (None)
Console
Terminal
Jobs
Start Local Job
Script 1
Starting
0:39
Script 2
Running
1:10
Script 3
Calculating Results
1:43
Script 4
Calculating Final Results
2:46
Environment
History
Connections
Import Dataset
List
Global Environment
Values
job_1 "C5B679CE"
job_2 "7F1D7DF8"
job_3 "70FD55DE"
job_4 "E29F68A3"
Files
Plots
Packages
Help
Viewer
Install
Update
Name
Description
Ver...
System Library
abind Combine Multidimensional Arrays 1.4-5
acepack ACE and AVAS for Selecting Multiple Regression Transformations 1.4.1
altparsers Use alternative parsers for R code 0.1
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AsioHe... 'Asio' C++ Header Files 1.12.1.1
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assertive Readable Check Functions to Ensure Code Integrity 0.3-5
assertiv... A Lightweight Core of the 'assertive' Package 0.0-7
assertiv... Assertions to Check Properties of Code 0.0-3
assertiv... Assertions to Check Properties of Data 0.0-3
assertiv... Assertions to Check 0.0-

Do

- Use for ad-hoc, interactive jobs

Don’t

- Use for programmatic jobs
    - You can *technically* do this, but are better off using other tools, such as the callr package.

Use Cases

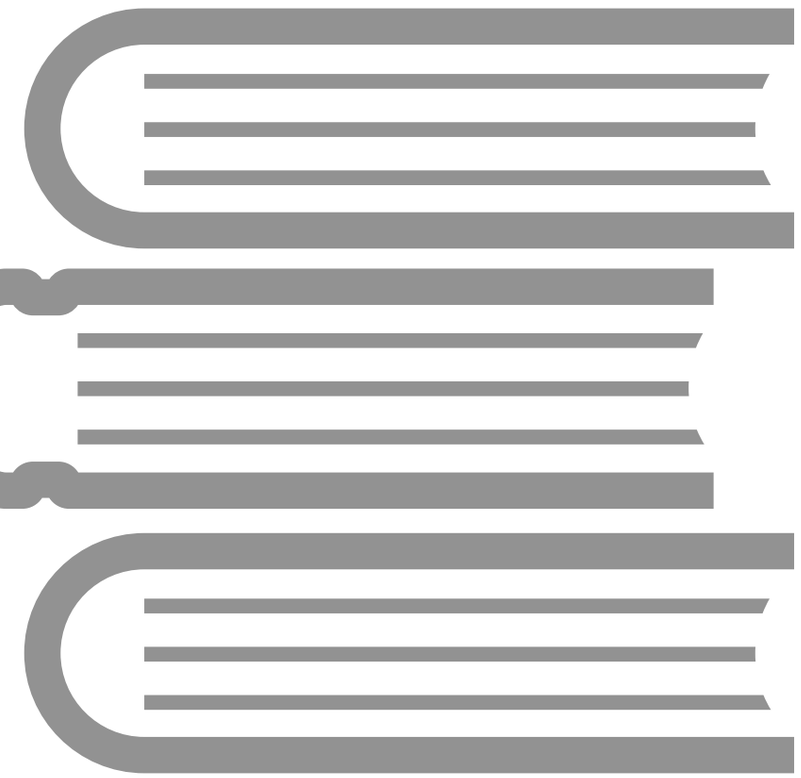
- Job Options
- Long running jobs
  - ETL
  - Simulations
- Indefinite jobs
  - Shiny
  - Plumber

Summary

- Jobs can be used to offload long-running tasks into the background
- This improves productivity by allowing work to continue in the parent R session

Resources

- rstd.io/background-jobs
- rstd.io/webinars
- rstd.io/webinars-repo
- solutions.rstudio.com



Thank You