

IX WORKSHOP DE FÉRIAS EM
GENÉTICA E MELHORAMENTO
DE PLANTAS – 2015

Biotecnologia e Suas Aplicações na Genética e Melhoramento de Plantas



Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella Quezada



PATROCÍNIO



APOIO



Genética e
Melhoramento
de Plantas



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- Ambiente R

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"We were looking for a system to support the research and the substantial data analysis projects in the statistics research group at Bell Labs"

(...)

We wanted users to be able to begin in an interactive environment, where they did not consciously think of themselves as programming. Then as their needs became clearer and their sophistication increased, they should be able to slide gradually into programming, when the language and system aspects would become more important. This philosophy would be articulated explicitly later, but it was implicit from the start."

Stages in the Evolution of S - John Chambers, 2000

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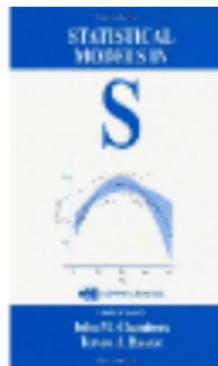
Instalação do R

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Aperfeiçoamento com o passar do tempo gerou várias versões da linguagem:

- (1984) *S: An Interactive for Data Analysis and Graphics* - Livro Marrom
- (1988) *The New S Language* - Livro Azul
- (1991) *Statistical Models in S* - Livro Branco
- (2004) *Programming with data* - Livro Verde



- R é o dialeto da linguagem S mais difundido
- (1991) Desenvolvida por Ross Ihaka e Robert Gentleman na Universidade de Auckland, Nova Zelândia



Ross Ihaka & Robert Gentleman (1996)

R: A Language for Data Analysis and Graphics

Journal of Computational and Graphical 5(3), 299
– 314.

- (2000) Versão 1.0.0
- (2013) Versão 3.0.2
- Continua sendo desenvolvido por *R Development Core Team*, da qual **John Chambers** faz parte

(1995) Martin Mächler convenceu criadores liberar o código fonte do R como um "software livre" sob os termos da *Free Software Foundation's GNU general license*

- Software livre:
 - Liberdade 0 - Rodar o programa para qualquer propósito
 - Liberdade 1 - Estudar como o programa funciona e adaptar isso aos seus interesses
 - Liberdade 2 - Distribuir cópias
 - Liberdade 3 - Aprimorar o programa e liberar para a comunidade acesso ao código fonte

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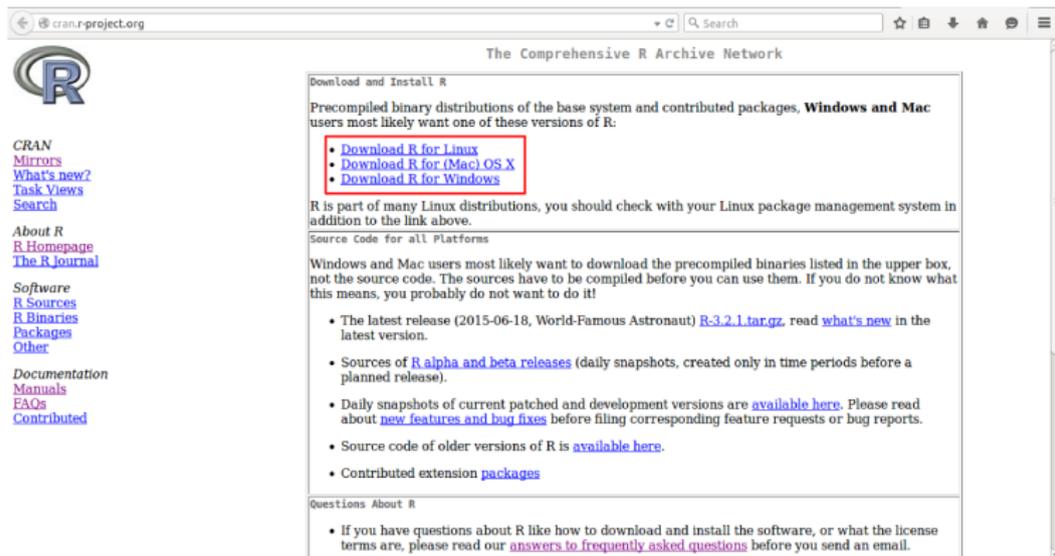
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Por que chamar de "Ambiente"?

- R é um ambiente de software livre para computação e gráficos estatísticos, consiste numa ferramenta ampla e flexível
- Funcionalidades distribuídas em pacotes armazenados em repositórios como:
 - (16/06/2015) 6789 pacotes contidos no repositório [CRAN](#)
 - [Bioconductor](#)
 - [Omegahat](#)
 - [Github](#)

Fazer download pelo site: cran.r-project.org



The screenshot shows a web browser window with the address bar displaying 'cran.r-project.org'. The page title is 'The Comprehensive R Archive Network'. The main content area is titled 'Download and Install R' and contains the following text:

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2015-06-18, World-Famous Astronaut) [R-3.2.1.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

Questions About R

- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

On the left side of the browser window, there is a navigation menu with the following links:

- CRAN
- [Mirrors](#)
- [What's new?](#)
- [Task Views](#)
- [Search](#)
- About R
- [R Homepage](#)
- [The R Journal](#)
- Software
- [R Sources](#)
- [R Binaries](#)
- [Packages](#)
- [Other](#)
- Documentation
- [Manuals](#)
- [FAQs](#)
- [Contributed](#)

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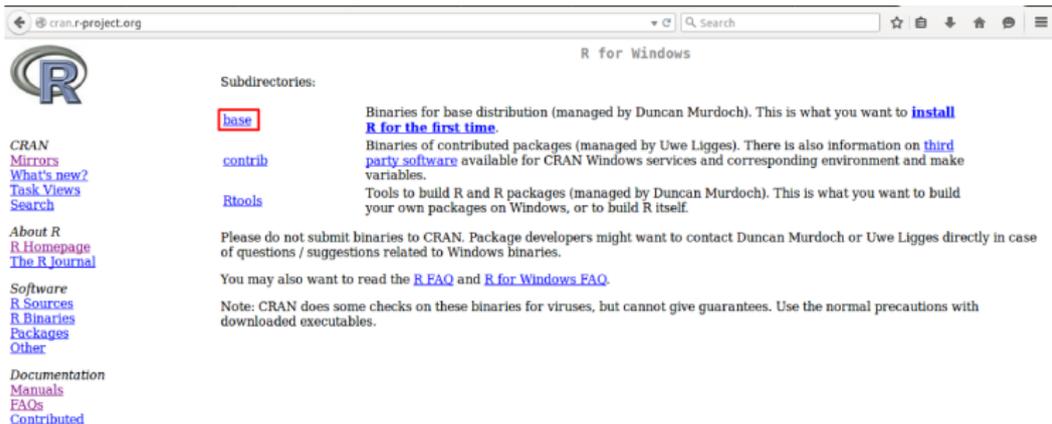
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The screenshot shows a web browser window with the address bar containing "cran.r-project.org". The page title is "R for Windows". On the left side, there is a navigation menu with the following links: "CRAN", "Mirrors", "What's new?", "Task Views", "Search", "About R", "R Homepage", "The R Journal", "Software", "R Sources", "R Binaries", "Packages", "Other", "Documentation", "Manuals", "FAQs", and "Contributed". The main content area is titled "Subdirectories:" and lists three options: "base" (highlighted with a red box), "contrib", and "Rtools". Each subdirectory has a brief description: "base" is for the base distribution (managed by Duncan Murdoch), "contrib" is for contributed packages (managed by Uwe Ligges), and "Rtools" is for building R and R packages. A note at the bottom states: "Please do not submit binaries to CRAN. Package developers might want to contact Duncan Murdoch or Uwe Ligges directly in case of questions / suggestions related to Windows binaries." and "You may also want to read the R FAQ and R for Windows FAQ."

cran.r-project.org

R for Windows

Subdirectories:

- base** Binaries for base distribution (managed by Duncan Murdoch). This is what you want to **install R for the first time**.
- [contrib](#) Binaries of contributed packages (managed by Uwe Ligges). There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.
- [Rtools](#) Tools to build R and R packages (managed by Duncan Murdoch). This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Duncan Murdoch or Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the [R FAQ](#) and [R for Windows FAQ](#).

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.

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[Mirrors](#)
[What's new?](#)
[Task Views](#)
[Search](#)

About R
[R Homepage](#)
[The R Journal](#)

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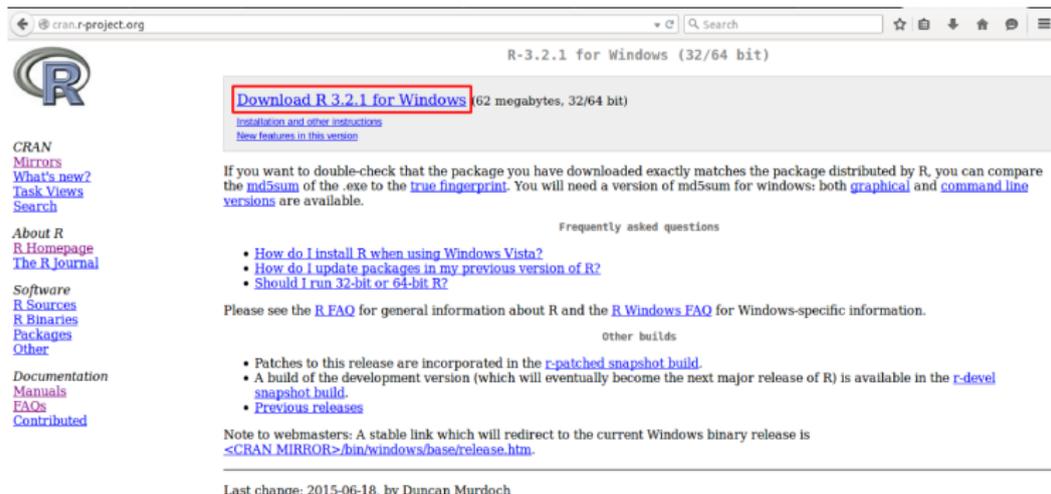
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The screenshot shows the CRAN website for R 3.2.1 for Windows. The browser address bar shows 'cran.r-project.org'. The page title is 'R-3.2.1 for Windows (32/64 bit)'. A prominent link 'Download R 3.2.1 for Windows' is highlighted with a red box, followed by '(62 megabytes, 32/64 bit)'. Below this link are smaller links for 'Installation and other instructions' and 'New features in this version'. The main content area contains a paragraph about double-checking the package, followed by a 'Frequently asked questions' section with three bullet points. Below that is a note to webmasters and a 'Last change' footer.

cran.r-project.org

R-3.2.1 for Windows (32/64 bit)

[Download R 3.2.1 for Windows](#) (62 megabytes, 32/64 bit)

[Installation and other instructions](#)

[New features in this version](#)

If you want to double-check that the package you have downloaded exactly matches the package distributed by R, you can compare the [md5sum](#) of the .exe to the [true fingerprint](#). You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

Frequently asked questions

- [How do I install R when using Windows Vista?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#).
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is [<CRAN_MIRROR>/bin/windows/base/release.htm](#).

Last change: 2015-06-18, by Duncan Murdoch

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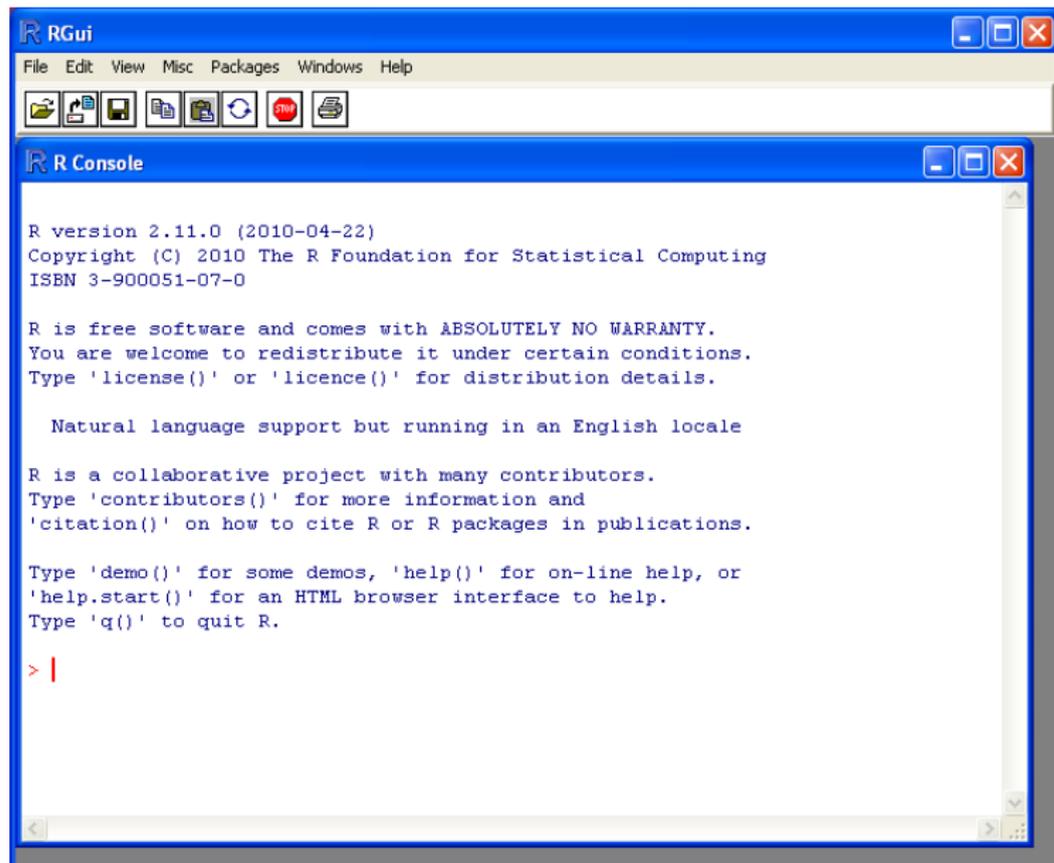
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● Executar o arquivo

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```
R RGui
File Edit View Misc Packages Windows Help
R Console
R version 2.11.0 (2010-04-22)
Copyright (C) 2010 The R Foundation for Statistical Computing
ISBN 3-900051-07-0

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.

> |
```

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Existem diversas maneiras, a mais simples:

```
sudo apt-get install r-base #Para Ubuntu e derivados
sudo yum install R # Para Fedora
#Para debian, torne-se root e digite
apt-get install r-base
```

Instalação do R para Linux

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```
cristiane@droid1: ~
cristiane@droid1:~$ R

R version 3.2.1 (2015-06-18) -- "World-Famous Astronaut"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (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.

> 2+2
[1] 4
> cat("Hello", "World!", "\n")
Hello World!
> getwd()
[1] "/home/cristiane"
> setwd("/home/cristiane/Documents/")
> getwd()
[1] "/home/cristiane/Documents"
>
>
```

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https://www.rstudio.com

R Studio

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Welcome to RStudio - Open source and enterprise-ready professional software for R

Download RStudio Discover Shiny

Powerful IDE for R
RStudio IDE is a powerful and productive user interface for R. It's free and open

R Packages
Our developers and expert trainers are the authors of several popular R packages.

Bring R to the web
Shiny is an elegant and powerful web framework for building interactive reports

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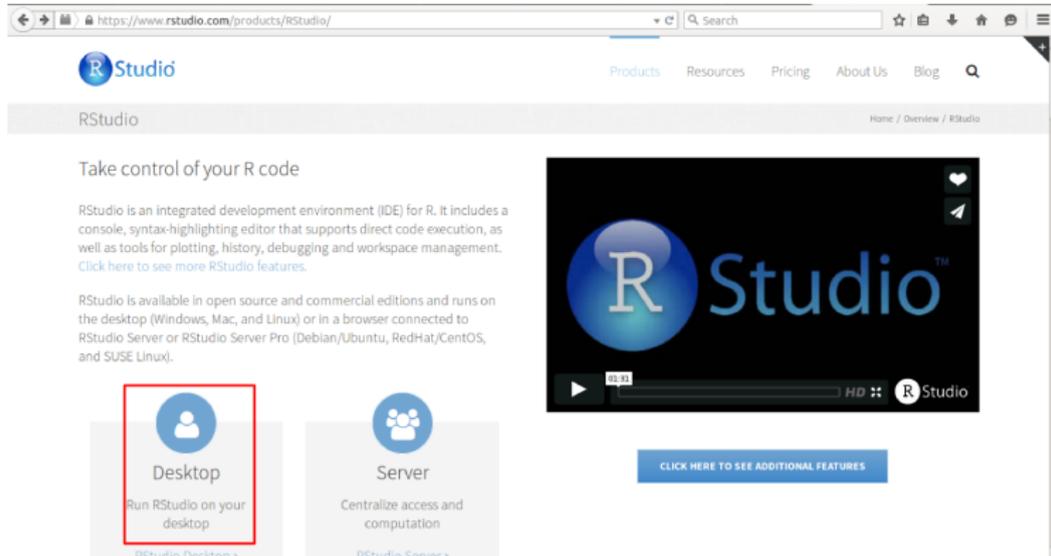
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https://www.rstudio.com/products/RStudio/

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Home / Overview / RStudio

Take control of your R code

RStudio is an integrated development environment (IDE) for R. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management. [Click here to see more RStudio features.](#)

RStudio is available in open source and commercial editions and runs on the desktop (Windows, Mac, and Linux) or in a browser connected to RStudio Server or RStudio Server Pro (Debian/Ubuntu, RedHat/CentOS, and SUSE Linux).



Desktop

Run RStudio on your desktop

RStudio Desktop



Server

Centralize access and computation

RStudio Server



CLICK HERE TO SEE ADDITIONAL FEATURES

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https://www.rstudio.com/products/RStudio/#Desktop

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Overview

- Access RStudio locally
- Syntax highlighting, code completion, and smart indentation
- Execute R code directly from the source editor
- Quickly jump to function definitions
- Easily manage multiple working directories using projects
- Integrated R help and documentation
- Interactive debugger to diagnose and fix errors quickly
- Extensive package development tools

All of the features of open source; plus:

- A commercial license for organizations not able to use AGPL software
- Access to priority support

Support Community forums only

- Priority Email Support
- 8 hour response during business hours (ET)

License AGPL v3 [RStudio License Agreement](#)

Pricing Free \$995/year

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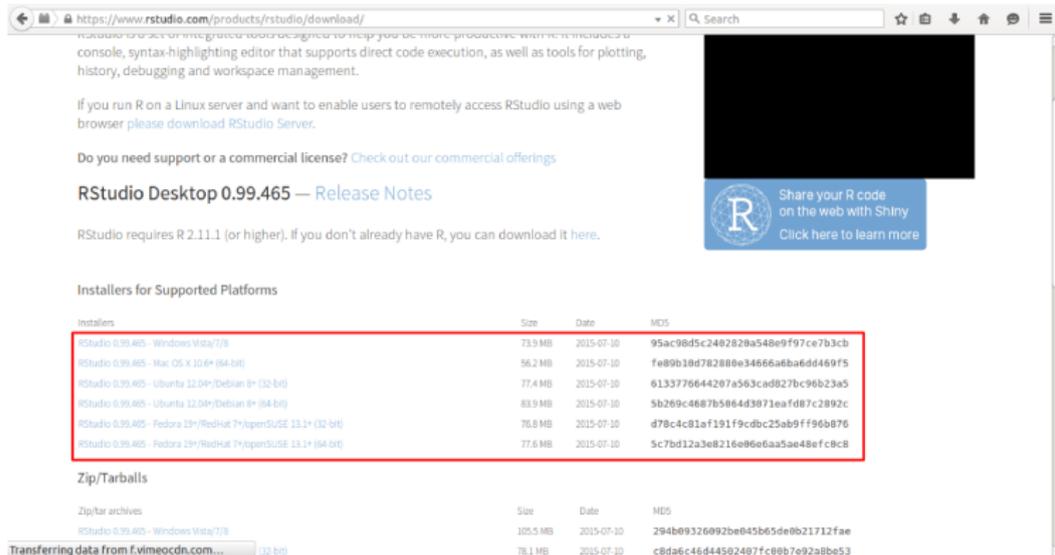
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The screenshot shows the RStudio website's download page. The browser address bar displays `https://www.rstudio.com/products/rstudio/download/`. The page content includes a navigation menu, a search bar, and a main heading "RStudio Desktop 0.99.465 — Release Notes". Below this, there is a section titled "Installers for Supported Platforms" which contains a table of download links for various operating systems. A red box highlights the first six rows of this table. Below the table, there is a section for "Zip/Tarballs" with another table of download links. At the bottom of the page, a status bar indicates "Transferring data from f.vimeocdn.com..." with a progress indicator.

https://www.rstudio.com/products/rstudio/download/

RStudio Desktop 0.99.465 — Release Notes

Installers for Supported Platforms

Installers	Size	Date	MD5
RStudio 0.99.465 - Windows Vista/7/8	73.9 MB	2015-07-10	95ac9bd5c2402820a548e9f97ce7b3cb
RStudio 0.99.465 - Mac OS X 10.6+ (64-bit)	56.2 MB	2015-07-10	fe89b10d782880e34666a6b6d4469f5
RStudio 0.99.465 - Ubuntu 12.04+/Debian 8+ (32-bit)	77.4 MB	2015-07-10	6133776644207a563cad827bc96b23a5
RStudio 0.99.465 - Ubuntu 12.04+/Debian 8+ (64-bit)	83.9 MB	2015-07-10	5b269c4687b5064d3071eafd87c2892c
RStudio 0.99.465 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	76.8 MB	2015-07-10	d78c4c81af191f9cdbc25ab9ff96b076
RStudio 0.99.465 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	77.6 MB	2015-07-10	5c7bd12a3e8216e06e6aa5ae48efc8c

Zip/Tarballs

Zip/Tar archives	Size	Date	MD5
RStudio 0.99.465 - Windows Vista/7/8	105.5 MB	2015-07-10	294b09326092be045b65de0b21712fae
Transferring data from f.vimeocdn.com... (32 bit)	78.1 MB	2015-07-10	c8da6c4644502407fc80b7e92a8be53

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The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains an R script with the following code:

```
1 #>
2 cat("Hello", "World!", "\n")
3 getwd()
4 setwd("/home/cristiane/Documents")
5 getwd()
6
7 x<-5
8 y <- 1:20
9 z <- x*y
10
```
- Console:** Shows the execution output and an error message:

```
1:1 (Top Level)
R Script
Console --(Documents) /
error in tools::httpPort <= BL :
comparison (4) is possible only for atomic and list types
> #>
[1] 4
> cat("Hello", "World!", "\n")
Hello World!
> getwd()
[1] "/home/cristiane"
> setwd("/home/cristiane/Documents")
> getwd()
[1] "/home/cristiane/Documents"
>
> x<-5
> y <- 1:20
> z <- x*y
> |
```
- Environment / History:** Shows the current environment with variables:

Values	
x	5
y	int [1:20] 1 2 3 4 5 6 7 8 9 10 ...
z	num [1:20] 5 10 15 20 25 30 35 40 45 50 ...
- Files:** Shows a file explorer view of the current directory, listing files such as presentation_1.out, presentation_1.pdf, presentation_1.snmm, presentation_1.synctex.gz, presentation_1.tex, presentation_1.toc, presentation_1.vrb, presentation_1.zip, presentation_2.zip, presentation_3.zip, and Rascunho.

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- *R Programming* ministrado por Roger D. Peng, PhD, Jeff Leek, PhD, Brian Caffo, PhD - **curso online no Coursera**
- pacote "swirl" do R
- <http://www.r-bloggers.com/>