

Eric Pitman Summer Workshop in Computational Science



0. Workshop environment



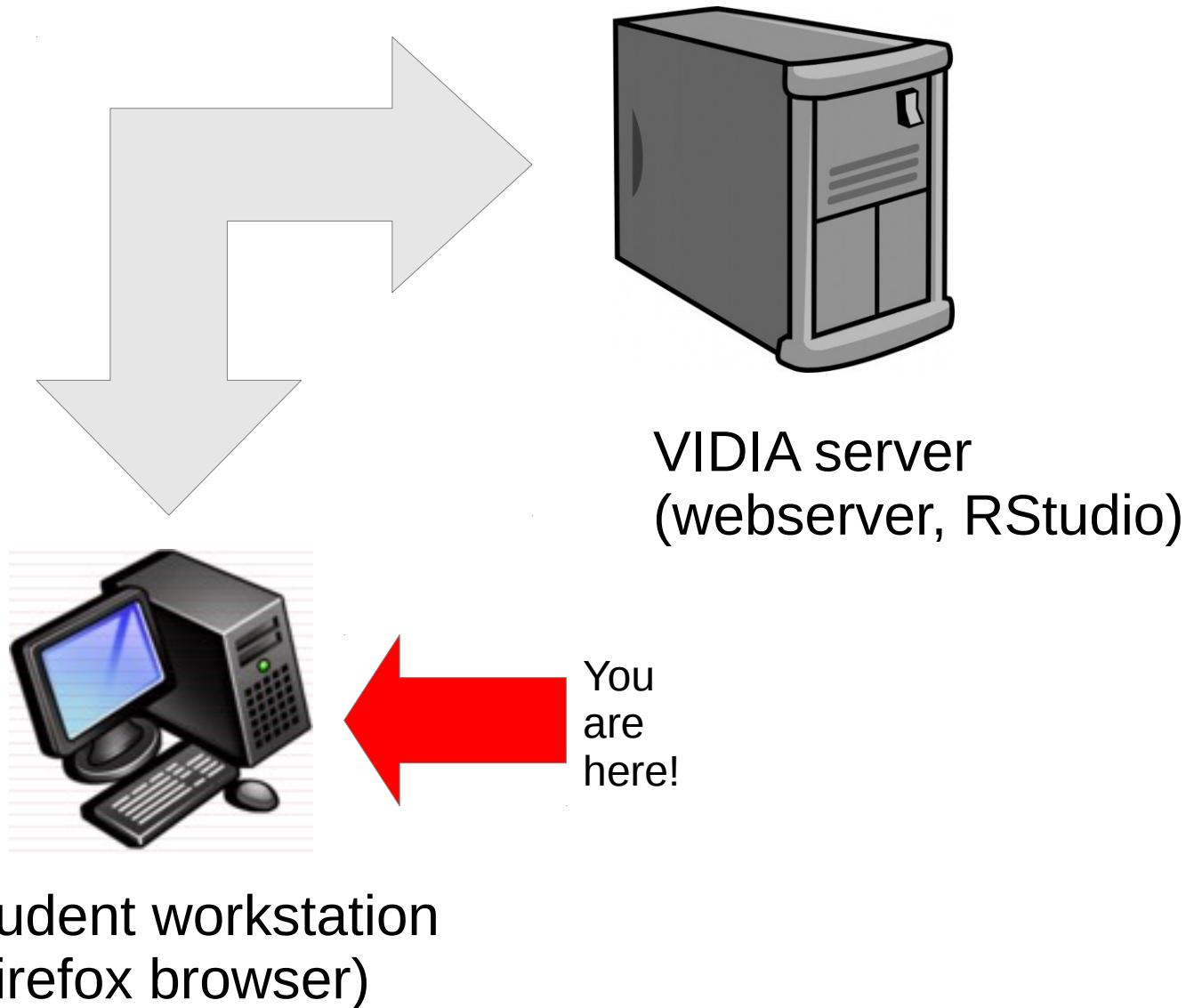


Intro to

0. Workshop environment: set up on vidia.ccr.buffalo.edu

- Register on VIDIA
- Starting the RStudio tool
- Setting up RStudio Projects: GitHub
- File transfer: using WebDAV
- Using groups on VIDIA

Workshop Computing Environment



Register on VIDIA

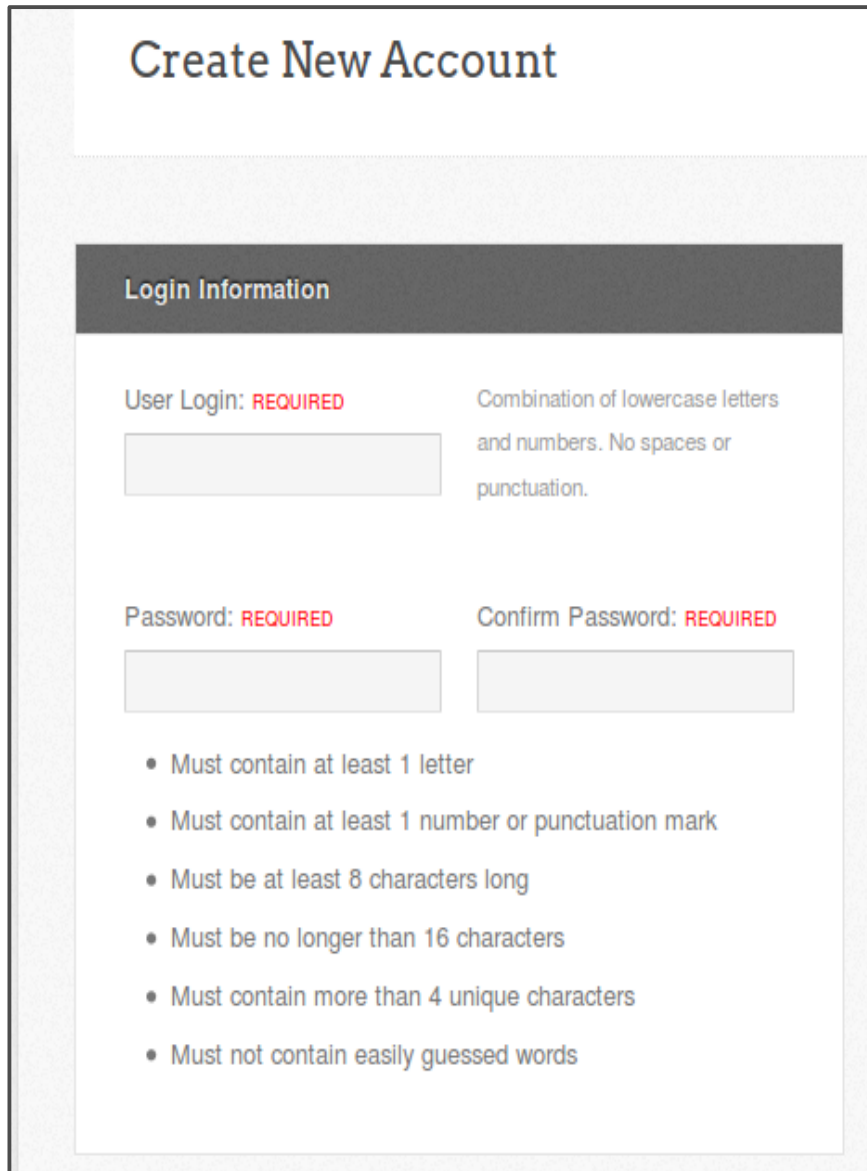
Use email address:

firstname.lastname@workshop.ccr.buffalo.edu

1. On vidia.ccr.buffalo.edu, click Register.
2. Specify your full name; choose username and password; specify email address; submit.
3. We will enable your account.



Create New Account screen



The mockup shows a 'Create New Account' screen. At the top is a header with the title 'Create New Account'. Below this is a dark grey bar with the text 'Login Information'. The main form area contains three input fields: 'User Login', 'Password', and 'Confirm Password'. Each field is preceded by a label indicating it is 'REQUIRED'. The 'User Login' field has a descriptive note: 'Combination of lowercase letters and numbers. No spaces or punctuation.' Below the password fields is a bulleted list of password requirements.

Create New Account

Login Information

User Login: **REQUIRED** Combination of lowercase letters and numbers. No spaces or punctuation.

Password: **REQUIRED** Confirm Password: **REQUIRED**

- Must contain at least 1 letter
- Must contain at least 1 number or punctuation mark
- Must be at least 8 characters long
- Must be no longer than 16 characters
- Must contain more than 4 unique characters
- Must not contain easily guessed words

Complete and submit:

- contact information
- username and password
- email address

Fill in required fields and submit

Login Information

User Login: **REQUIRED**

User login name is available

Password: **REQUIRED**

Contact Information

First Name: **REQUIRED**


Middle Name:

Valid E-mail: **REQUIRED**

Confirm E-mail:

⚠ Important! You **must** confirm receipt of e-mail from webmaster@hubdemo.com to complete registration.

Human Check




Letters not clear?
[Click to renew CAPTCHA.](#)

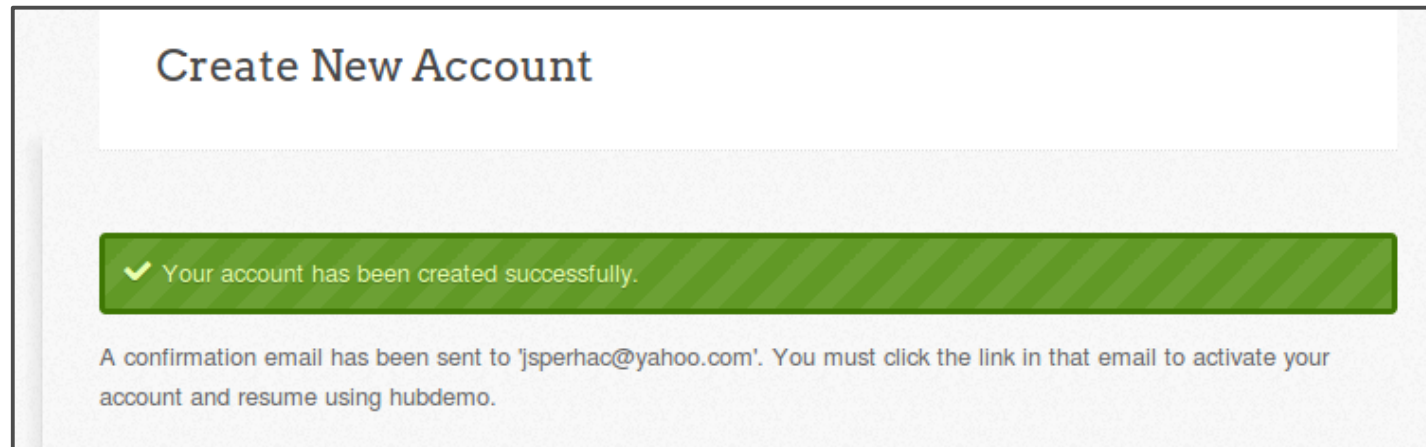
Please enter the following characters you see into the textbox below.

Terms & Conditions

☒ **REQUIRED** Yes, I have read and agree to the [Terms of Use.](#)



New account created



We will enable your account; then, you can sign in to VIDIA.

User Dashboard

The dashboard is titled "Jnet Sperhac" and "Dashboard". It features a sidebar with navigation links: Dashboard, Profile, Groups (1), Account, Contributions, Collections (1), Messages (1), and Projects (2). The main content area is divided into several sections:

- My Groups:** Shows a "Workspace Access" group with a status of "approved". It includes buttons for "All My Groups (1)", "All Groups", and "New Group".
- My Courses:** Lists two courses: "CCR Summer Workshop" (Section: Default, Active, student) and "Test Course for vldia v1.2.1" (Section: Default, Active, student). It includes buttons for "All My Courses (2)" and "All Courses".
- My Sessions:** Shows two sessions: "Orange" (with "Open" and "Terminate" buttons) and "Rapid Miner v5" (with a "Storage (manage)" button showing "0% of 0.9GB").
- My Projects:** Lists two projects: "Jnet Test Project" (By me | manager) and "Orange Explorations for IITG" (By J M Sperhac | collaborator). It includes buttons for "All My Projects", "All Projects", and "New Project".
- Resources:** Lists "Simulation Tools" (RapidMiner, Orange, RStudio), "Publications", and "All Resources".
- My Tools:** Shows a list of tools under the "Recent" tab: "Rapid Miner v5", "Workspace", and "Orange". It includes a note: "These are your most recently used tools."

A "Personalize Dashboard" button is located in the top right corner.

Running Rstudio tool on VIDIA

VIDIA Dashboard: RStudio Tool

The screenshot displays the VIDIA Dashboard interface for user J M Sperhac. The dashboard is organized into several panels:

- Left Sidebar:** Contains navigation links for Dashboard, Profile, Groups (17), Account, Contributions (34), Usage, Collections, Messages (132), Projects (2), Citations, and Activity (867).
- Top Header:** Shows the user's name 'J M Sperhac' and the 'Dashboard' title, along with an 'Add Modules' button.
- My Tools Panel:** A list of installed tools including GNU Octave IDE, iPython QT Console, Jupyter, Orange, PSPP, Rapid Miner v5, **RStudio** (highlighted with a red circle and a red arrow), and Spyder Python IDE. Each tool has a heart icon for favoriting and a folder icon for management.
- Tips and Documentation Panel:** Provides 'VIDIA Tips' (Knowledge Base, Using VIDIA, HUBzero documentation) and 'Tools and Tool Documentation' (R and RStudio, RapidMiner, file upload/download, and UBBox access).
- My Sessions Panel:** Displays a session preview with a 'LAST ACCESSED' timestamp of 'June 06, 2018 @ 3:45pm' and buttons to 'Open' or 'Terminate' the session.
- Dashboard Introduction Panel:** Offers a welcome message and instructions on how to use the dashboard's module management features.

Launch RStudio

VIDIA

DiscoverCommunityAboutSupport

J M Sperhacjsperhac@buffalo.eduCollect

Search?

RStudio

Edit

By [d k¹](#)
1. [Purdue/RStudio](#)

RStudio is an interactive development environment (IDE) for the R language. It provides a multipane window environment for statistical computing and graphics in R.



Launch Tool

Version 1.1.310 - published on 26 Feb 2018

 Open source: [license](#) | [download](#)

[View All Supporting Documents](#)

★ 0 review(s)

 93 users, detailed usage

→ Share: ...

 0 Citation(s)

 0 questions ([Ask a question](#))

 0 wish(es) ([New Wish](#))

Running Rstudio Sessions

The screenshot shows the JupyterLab dashboard for user J M Sperhac. The sidebar on the left contains navigation links: Dashboard (selected), Profile, Groups (17), Account, Contributions (34), Usage, Collections, Messages (132), Projects (2), Citations, and Activity (867). The main area is divided into four panels:

- My Tools:** A list of tools with heart icons for favorites and folder icons for organization. The tools listed are GNU Octave IDE, IPython QT Console, Jupyter, Orange, PSPP, Rapid Miner v5, RStudio, and Spyder Python IDE. Below the list is a note: "Add a tool to your favorites by clicking a heart. Click the heart again to remove it."
- My Sessions:** A panel showing a session thumbnail (a blue and grey abstract shape). Below the thumbnail, it says "LAST ACCESSED: June 06, 2018 @ 3:45pm". At the bottom are two buttons: "Open" and "Terminate".
- Tips and Documentation:** A panel with sections for "VIDIA Tips" (linking to VIDIA Knowledge Base, Using VIDIA, and HUBzero user documentation), "Tools and Tool Documentation" (linking to R and RStudio, RapidMiner, and PSPP), and "File Access" (linking to Upload and download your files and File access with UBBox).
- Dashboard Introduction:** A panel with a welcome message and instructions on how to use the dashboard, including the "Add Modules" button.

An "Add Modules" button is located in the top right corner of the dashboard.

Open or Terminate Existing Session. Limit is 3!



Quitting RStudio

Screenshot of RStudio interface showing the process of quitting the application.

The top toolbar contains several icons. A red arrow points to the power icon (a circle with a vertical line) in the top right corner, which is used to quit the application.

The main editor window displays R code for creating a pie chart:

```
78 # parameter to title() as follows:
79 # title(sub=subname, line=-30)
80 #
81 makePie <- function(col, name, subname=NA) {
82   # determine slices in the pie:
83   slices <- table(col)
84   # check for categorical or numeric and assign labels
85   if (is.factor(col)) {
86     lbls <- levels(col)
87   } else {
88     # make it a factor, then get levels:
89     lbls <- levels(factor(col))
90   }
91   # calculate percentage for each slice
92   pct <- round(slices/sum(slices)*100)
93   # construct labels for the slices:
94   # ...
95   # ...
96   # ...
97   # ...
98 }
```

The Environment pane on the right shows the Global Environment with the following data:

| Data | Values |
|---------|--|
| cr | 93 obs. of 27 variables |
| celsius | int [1:6] 20 21 22 23 24 25 |
| lbls | chr [1:6] "3 Cylinders: 3%" "4 Cylinders..." |
| pct | table [1:6(1d)] 3 53 2 33 8 1 |
| slices | 'table' int [1:6(1d)] 3 49 2 31 7 1 |

The Plots pane on the right displays a pie chart titled "Vehicle Drivetrain Type in Cars93 Dataset". The chart shows the following distribution:

- Front : 72%
- 4WD : 11%
- Rear : 17%

The Console pane at the bottom shows the execution of the `makePie()` function:

```
> # ----- a few examples using the makePie() function call: -----
> #
> makePie(cr$Type, "Vehicle Type")
> makePie(cr$DriveTrain, "Vehicle Drivetrain Type")
> makePie(cr$Turn.circle, "Turn Circle", "U-Turn space (feet)")
> #makePie(cr$Passenger, "Max Number of Passengers")
> #makePie(cr$Cylinders, "# Cylinders")
> #makePie(cr$AirBags, "Vehicle Airbags")
> #makePie(cr$O .... [TRUNCATED]
>
```

Quitting RStudio

The image shows the RStudio interface with a code editor on the left, an environment pane on the right, and a pie chart titled "Type in Cars93 Dataset". A modal dialog titled "R Session Ended" is overlaid in the center, featuring a person icon and a "Start New Session" button.

Code Editor (Left):

```
78 # parameter to title() as follows:
79 #   title(sub=subname, line=-30)
80 # -----
81 makePie <- function(col, name, subname=NA) {
82
83   # determine slices in the pie:
84   slices <- table(col)
85
86   # check for categorical or numeric and assign labels
87   if (is.factor(col)) {
88     lbls <- levels(col)
89   } else {
90     # make it a factor,
91     lbls <- levels(fact
92   }
93   # calculate percentag
94   pct <- round(slices/s
95
96   # construct labels fo
97   lbls <- paste(lbls, "
98   lbls <- paste(lbls, "
99
100  # plot it:
101  p <- pie(slices,
102
```

Environment Pane (Right):

| Global Environment | |
|--------------------|---|
| cr | 93 obs. of 27 variables |
| lbls | chr [1:6] "3 Cylinders: 3%" "4 Cylinders: ... |
| pct | table [1:6(1d)] 3 53 2 33 8 1 |
| slices | 'table' int [1:6(1d)] 3 49 2 31 7 1 |

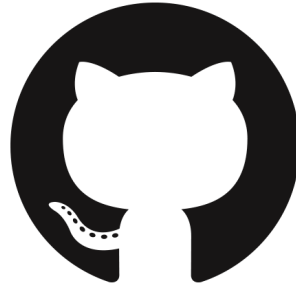
Pie Chart (Bottom Right):

Type in Cars93 Dataset

- 4WD : 11%
- Rear : 17%

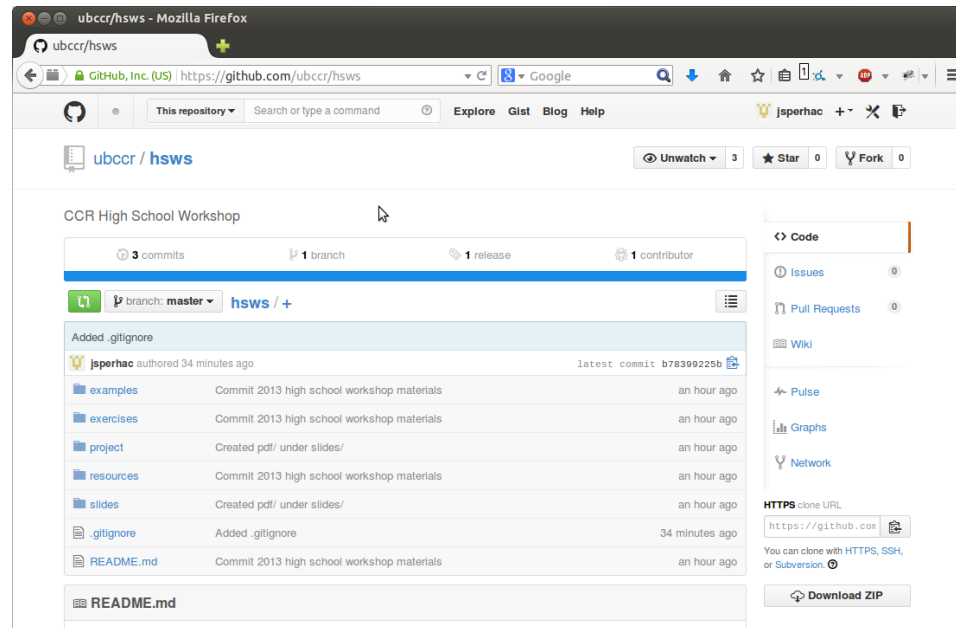
Console (Bottom Left):

```
> # Here is a general makePie(
umber
> # of .... [TRUNCATED]
> # ----- a few examples using the makePie() function c
all: -----
> #
> makePie(cr$Type, "Vehicle Type")
> makePie(cr$DriveTrain, "Vehicle Drivetrain Type")
> makePie(cr$Turn.circle, "Turn Circle", "U-Turn space (feet
)")
> #makePie(cr$Passenger, "Max Number of Passengers")
> #makePie(cr$Cylinders, "# Cylinders")
> #makePie(cr$AirBags, "Vehicle Airbags")
> #makePie(cr$O .... [TRUNCATED]
>
```



Using Github

GitHub

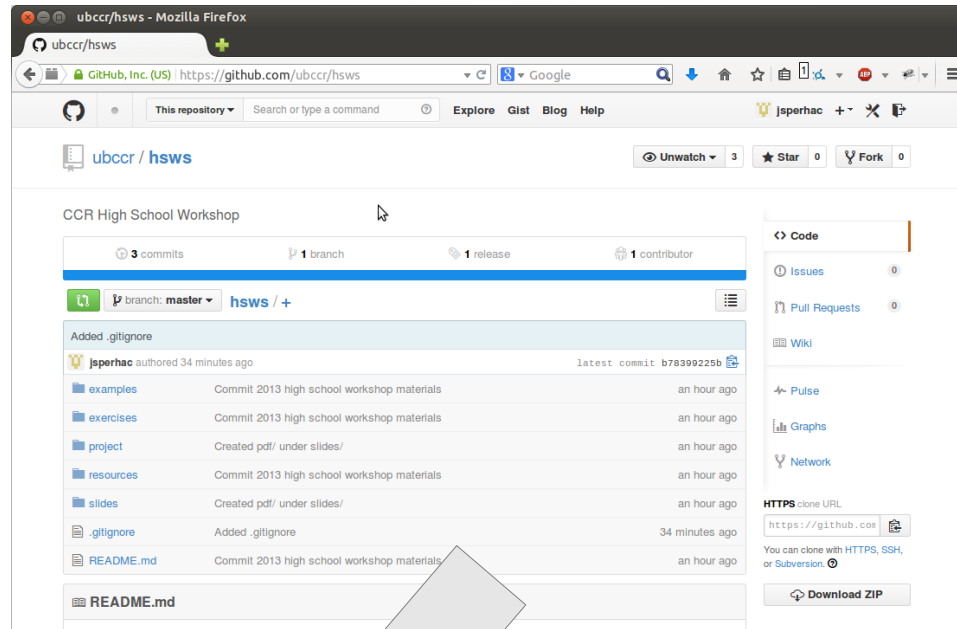


Git is a version control system for tracking changes in computer files and coordinating work on those files among multiple people. It is primarily used for source code management in software development.

GitHub is a web-based hosting service for version control using Git. It is mostly used for computer code.

On June 4, 2018, Microsoft announced its intent to acquire GitHub for US\$7.5 billion.

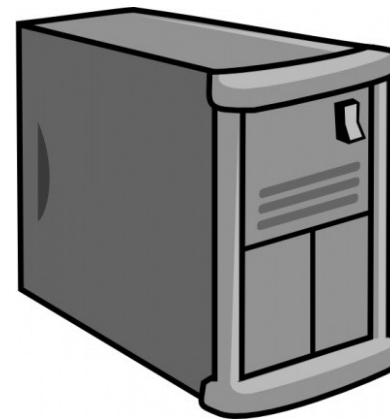
hsws Workshop Repo



Browse repo

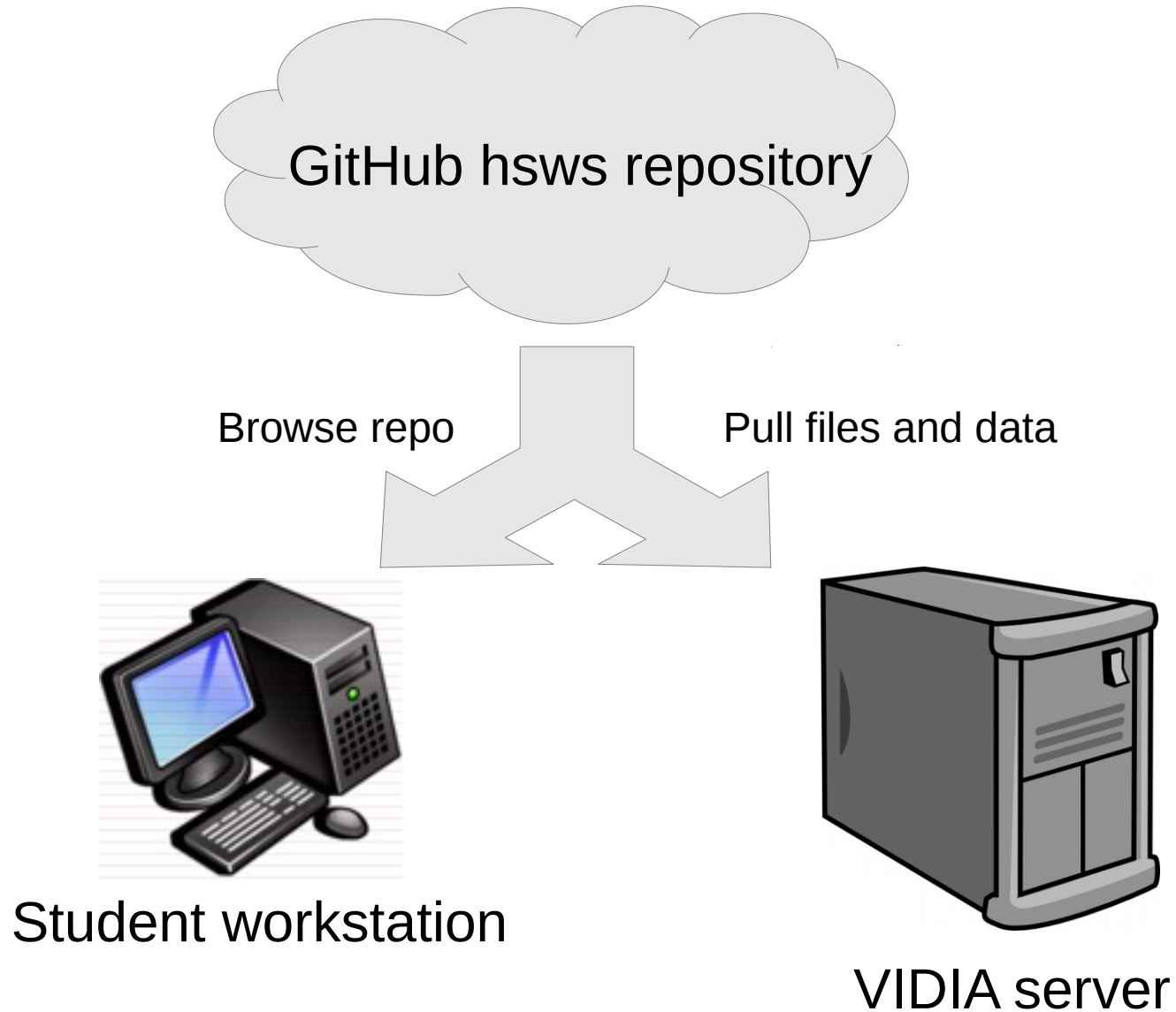


Student workstation

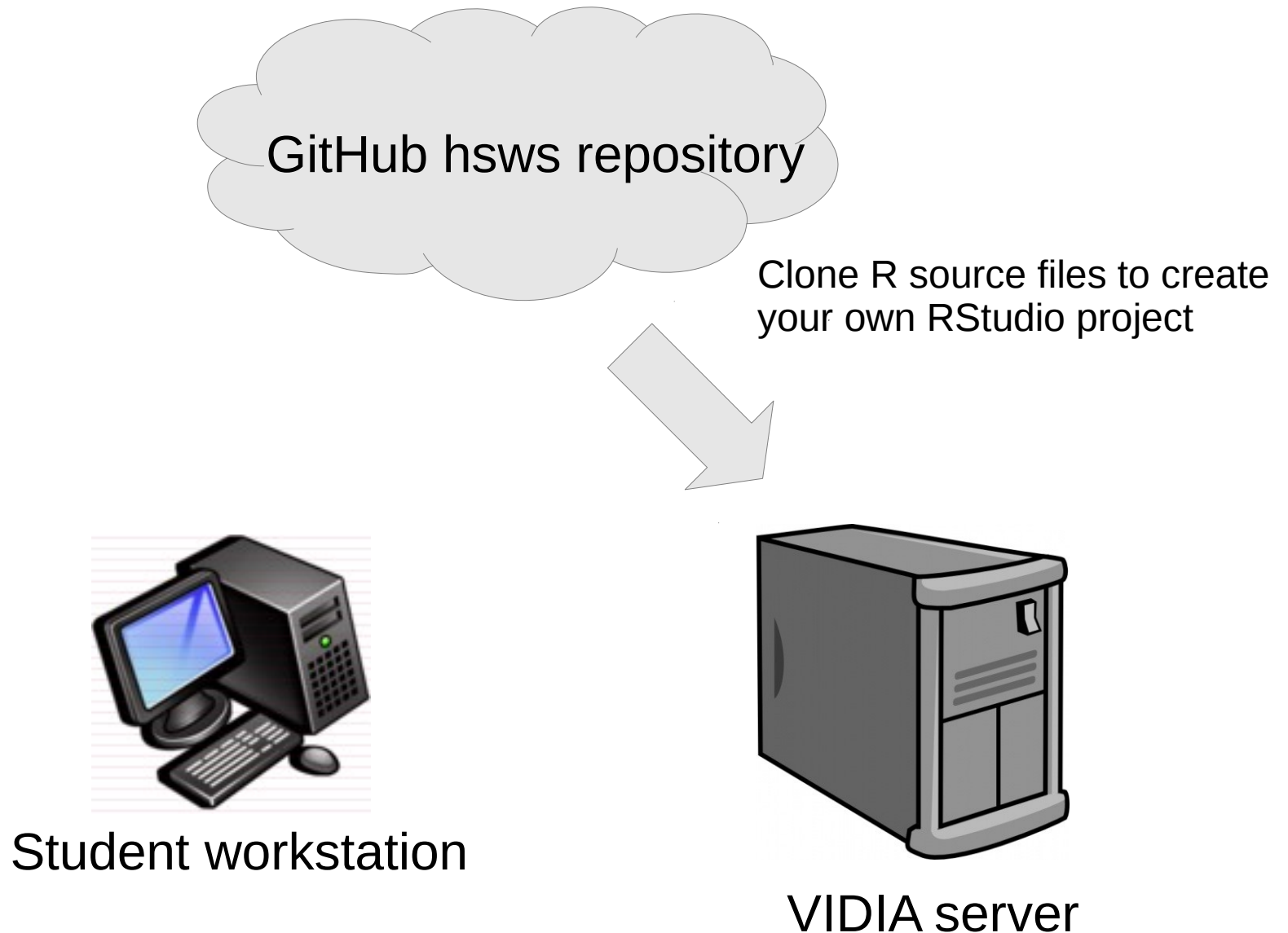


VIDIA server

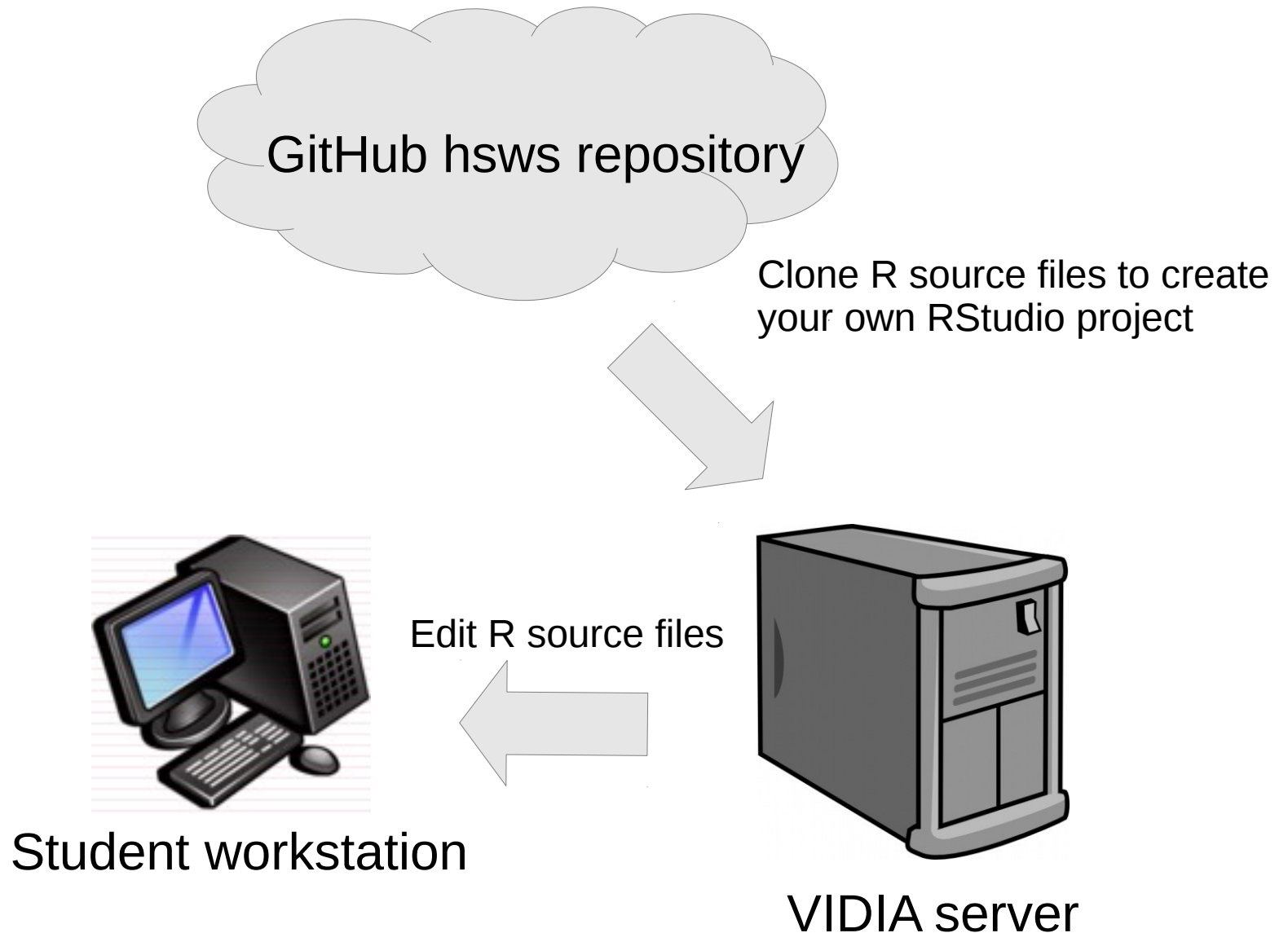
GitHub



Workshop Files and Data: GitHub



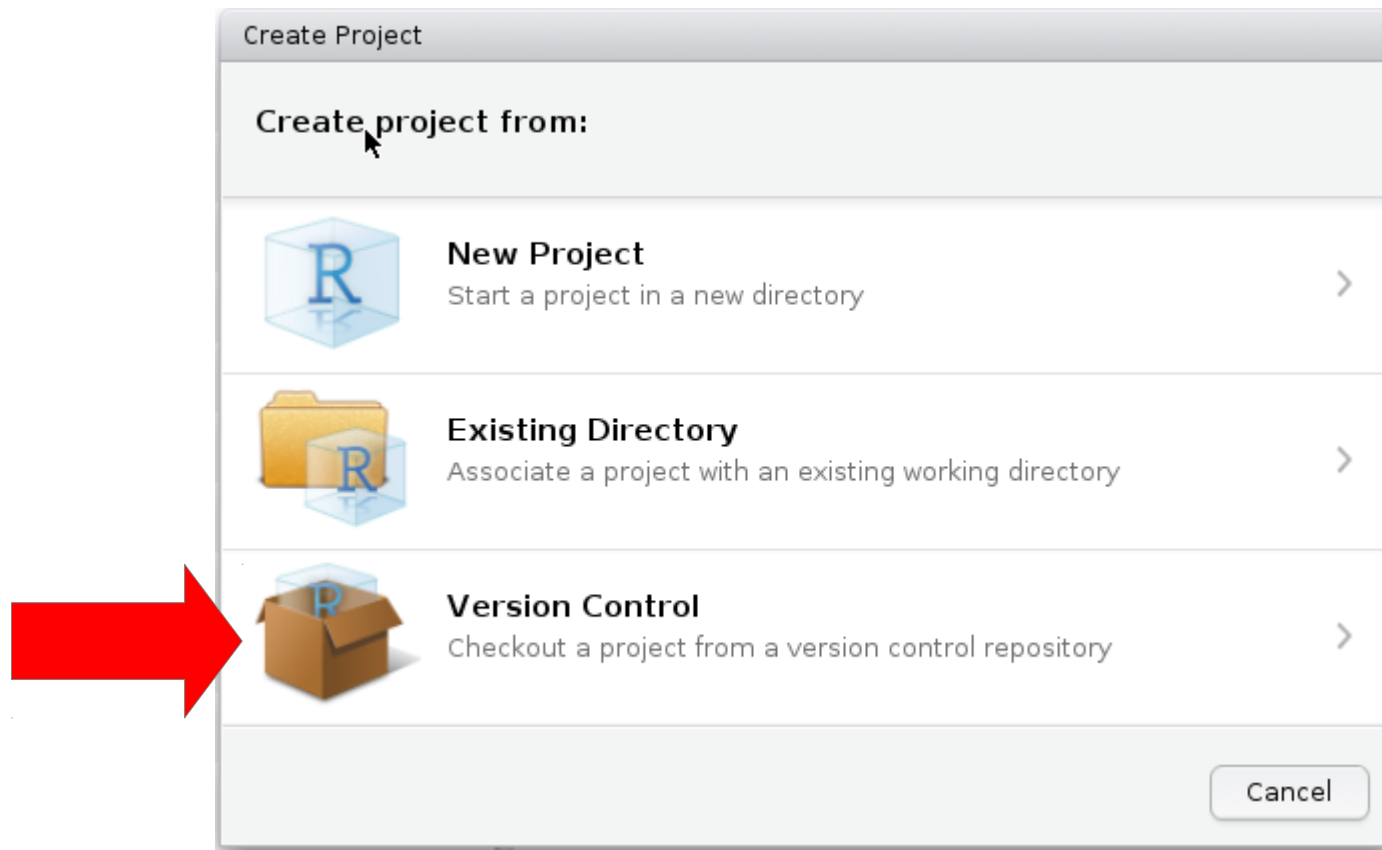
Workshop Files and Data: GitHub



Rstudio Project management

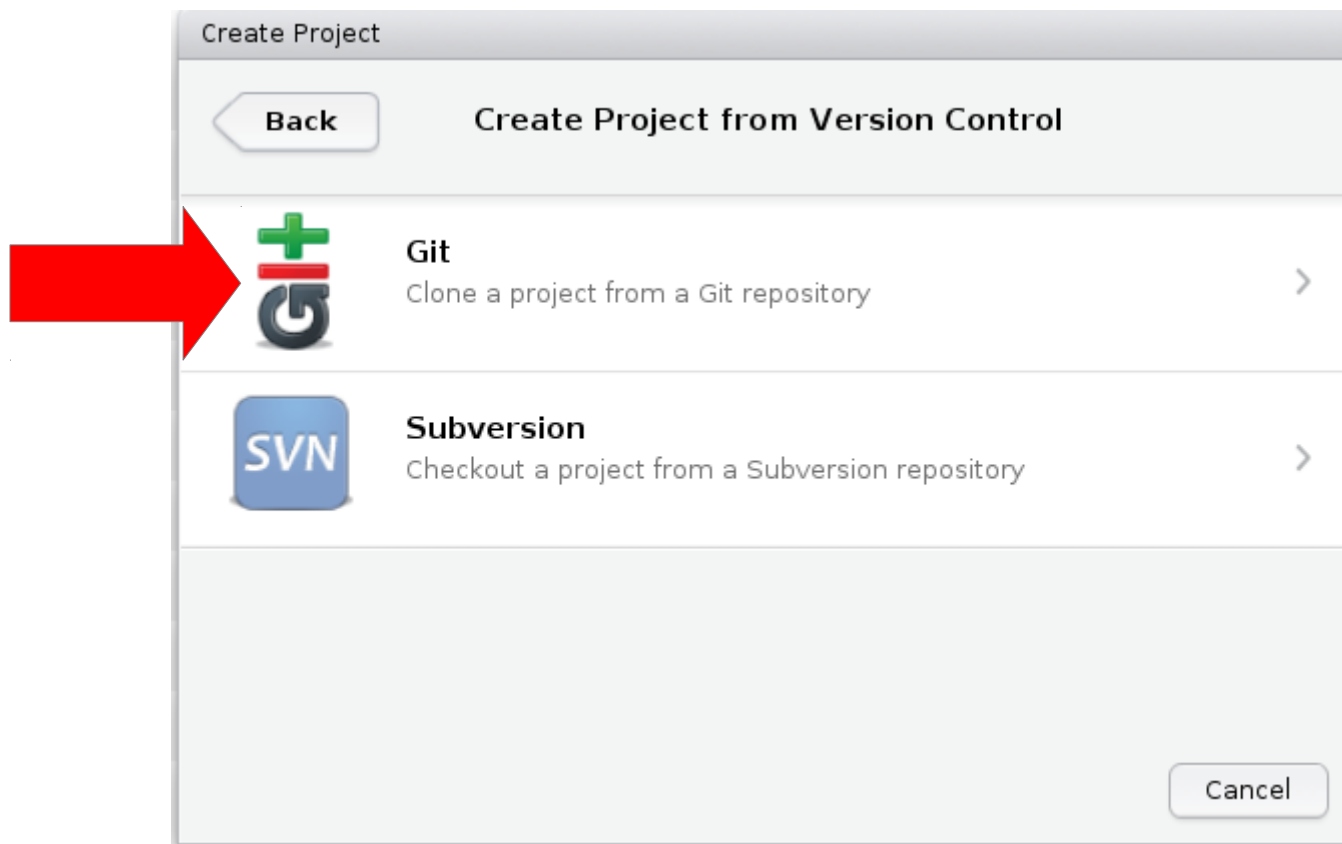
Create Project in RStudio

1. In the RStudio menu:
 - Select Project: Create Project
 - Select Version Control



Create Project in RStudio

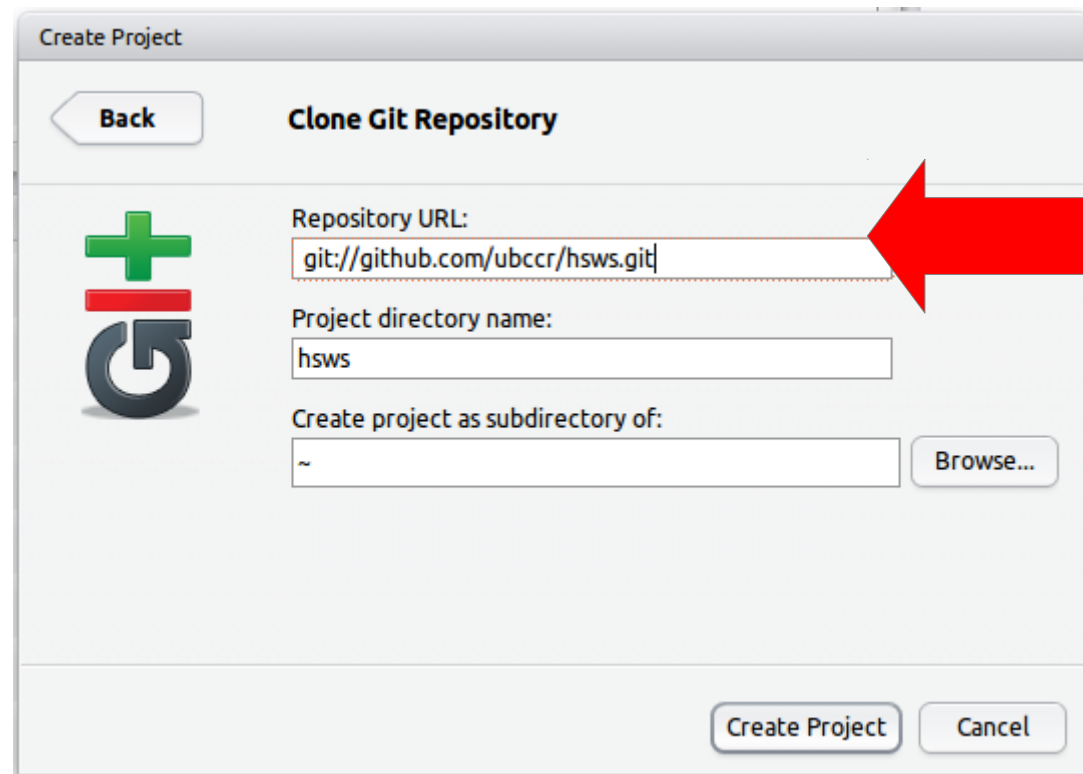
2. In RStudio:
Next, select Git



Create Project in RStudio

3. In RStudio:

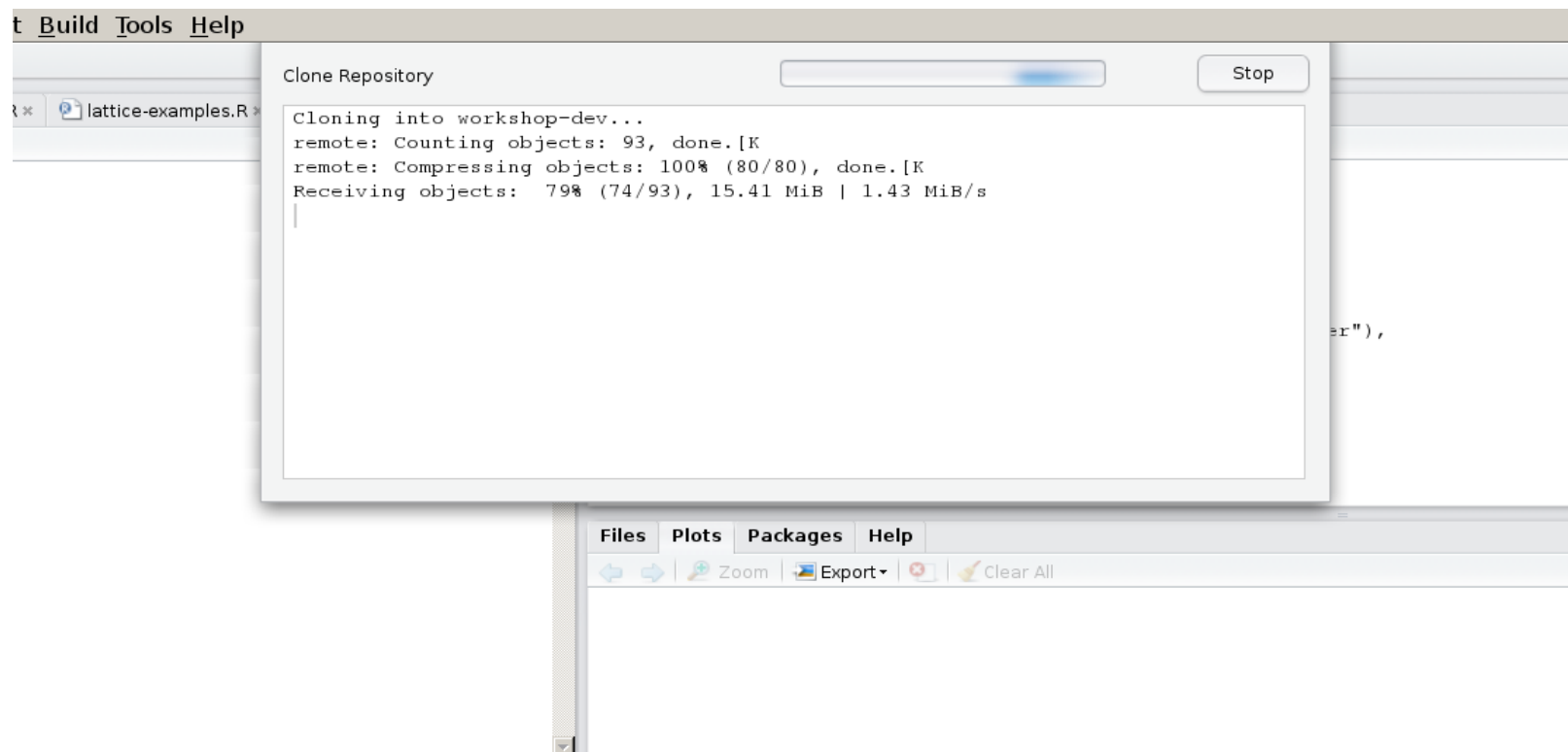
- Type the Repository URL as shown
- Use a unique project directory name



`git://github.com/ubccr/hsws.git`

Create Project in RStudio

4. RStudio copies the files from GitHub to your home directory on VIDIA.



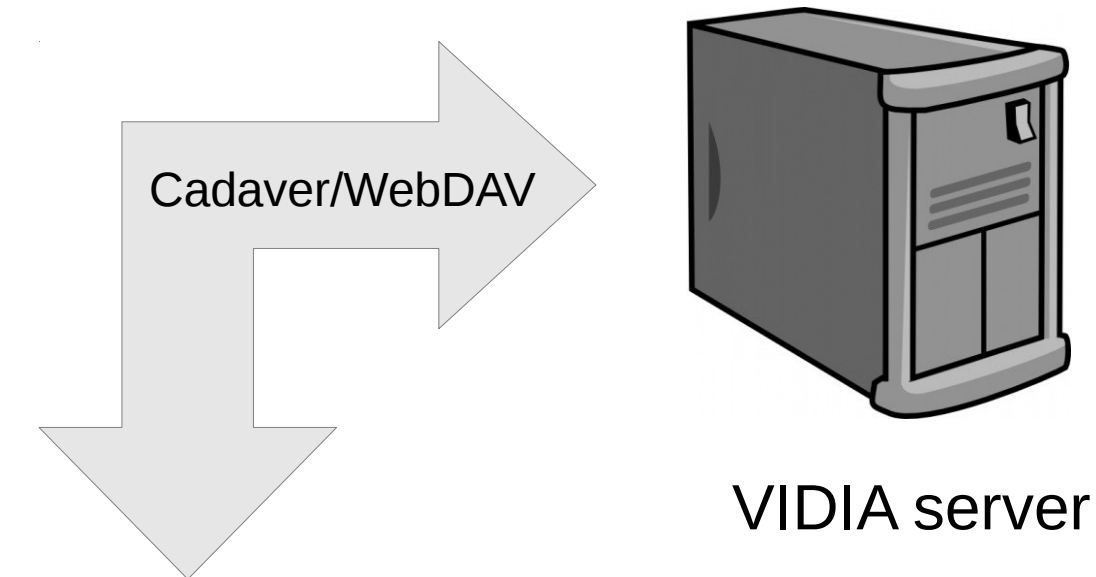


Create Project in RStudio

- Selecting the project sets the working directory
- Your RStudio project contains directories:
 - examples
 - exercises
 - project
 - resources

File transfer to and from VIDIA

File Transfer



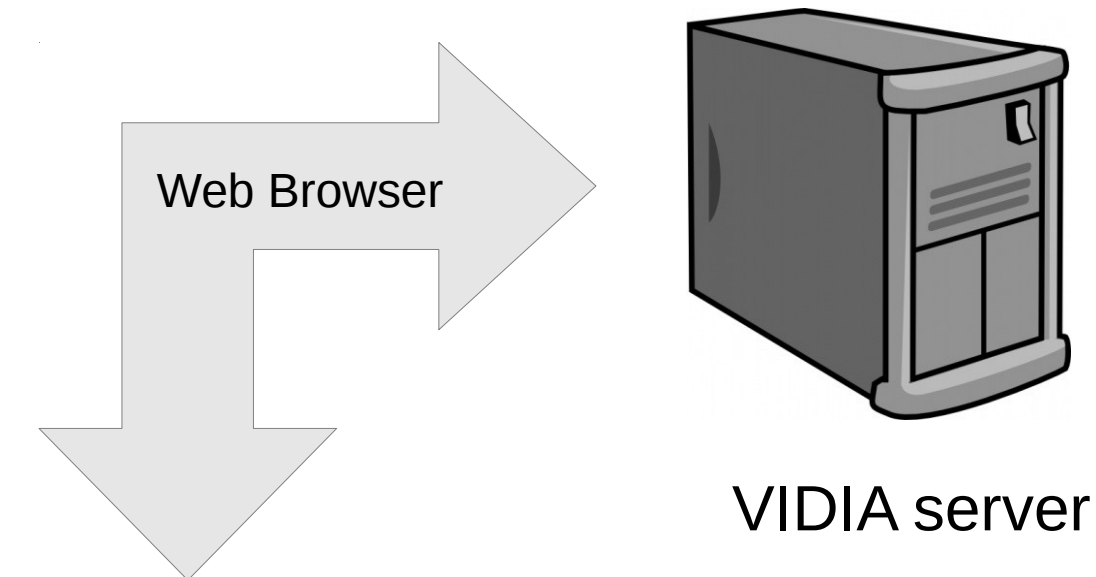
VIDIA server



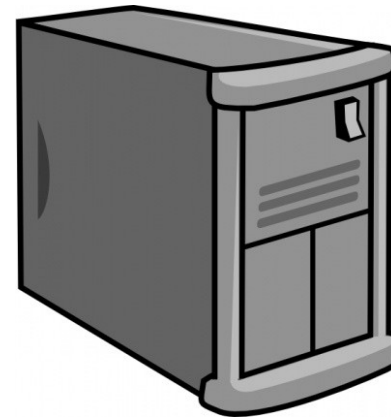
Student workstation

You'll need file transfer for
adding graphics files to your
presentation slides

View/Browse your Files



Student workstation



VIDIA server

To browse your directory on VIDIA:

1. Start a web browser

2. Enter URL:

<https://vidia.ccr.buffalo.edu/webdav>

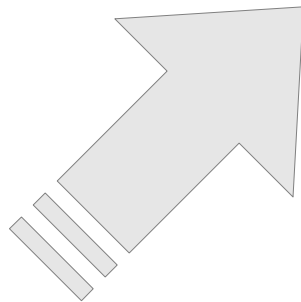
3. Authenticate when prompted

File Transfer: WebDAV

```
$ cadaver https://vidia.ccr.buffalo.edu:443/webdav
```



Student workstation



To transfer files to/from VIDIA:

1. Start a terminal window
2. Issue cadaver command
3. Sign in with your VIDIA user credentials when prompted
4. Use 'ls', 'cd', 'get', 'put'

Much like typical ftp commands

HUBzero Resources

Resources: Teaching Materials Teaching Materials ▾ Go

| Tag | Resources | Sort by Title ▾ | Info |
|------------------------|----------------------------|-----------------|--|
| [All] | Introductory R References | | Introductory R References |
| data structures (1) | Lecture 1 | | Reference material: introductory R textbooks |
| data visualization (2) | Lecture 2 | | Learn more ▸ |
| R programming (7) | Lecture 3 | | Download (PDF) |
| reference (1) | Lecture 4 | | |
| statistics (1) | Lecture 5 | | |
| variables (1) | Plotting Examples | | |
| | R Workshop Project | | review(s) (Review this) |
| | R Workshop Staff Materials | | Add to your favorites! |

5 Functions: a Short Programming Example

6 Scalars, Vectors, Arrays and Matrices

- 6.1 "Declarations"
- 6.2 Generating Useful Vectors with ":", seq() and rep()
- 6.3 Vector Arithmetic and Logical Operations
- 6.4 Recycling
- 6.5 Vector Indexing
- 6.6 Vector Element Names
- 6.7 Matrices
 - 6.7.1 General Operations
 - 6.7.2 Matrix Row and Column Names