☁️ teaching R online with RStudio Cloud!

🔗 bit.ly/teach-r-online-mats

dr. mine çetinkaya-rundel
dr. colin rundel

Activity

while we wait to get started...

- Go to bit.ly/teach-r-online-cloud
- Log in with Google or GitHub, or create a new account
- Once you join our workspace, start the assignment titled `COVID-19`
- Knit the document titled `covid-19.Rmd` and inspect the visualisation
- Then, in the R Markdown document, change one of the countries plotted to a country of your own choice
- Knit again, and inspect

Why

RStudio in the cloud?

lots of friction points

- Install R
- Install RStudio
- Install the following packages:
  - rmarkdown
  - tidyverse
  - ...
- Load these packages
- Install git

much less friction

- Go to rstudio.cloud
- Log in

```
>hello R!
```

you used to have this

and now you have this

Photos by Jonathan Borba and Sincerely Media on Unsplash.

How

RStudio in the cloud?

RStudio Server Pro *

You have...

- sysadmin experience / IT support
- hardware / local VM / cloud computing credit
- RStudio experience

See RStudio Academic Pricing, freely licensed for teaching purposes.

RStudio Cloud

You have...

- RStudio experience

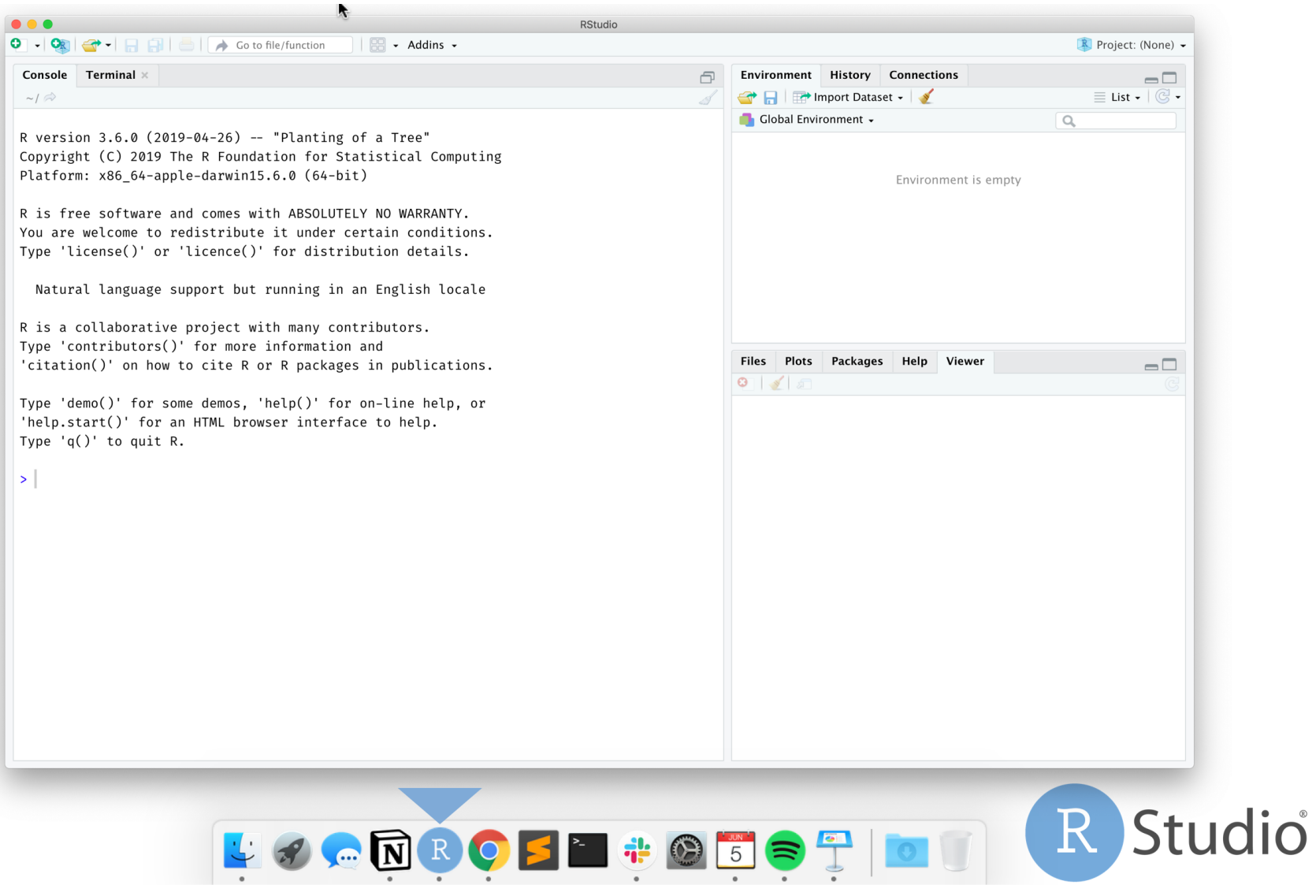
* Çetinkaya-Rundel, Mine, and Rundel, Colin. "Infrastructure and tools for teaching computing throughout the statistical curriculum." The American Statistician (2018). Part of the Practical Data Science for Stats collection. [Peer J] [TAS]

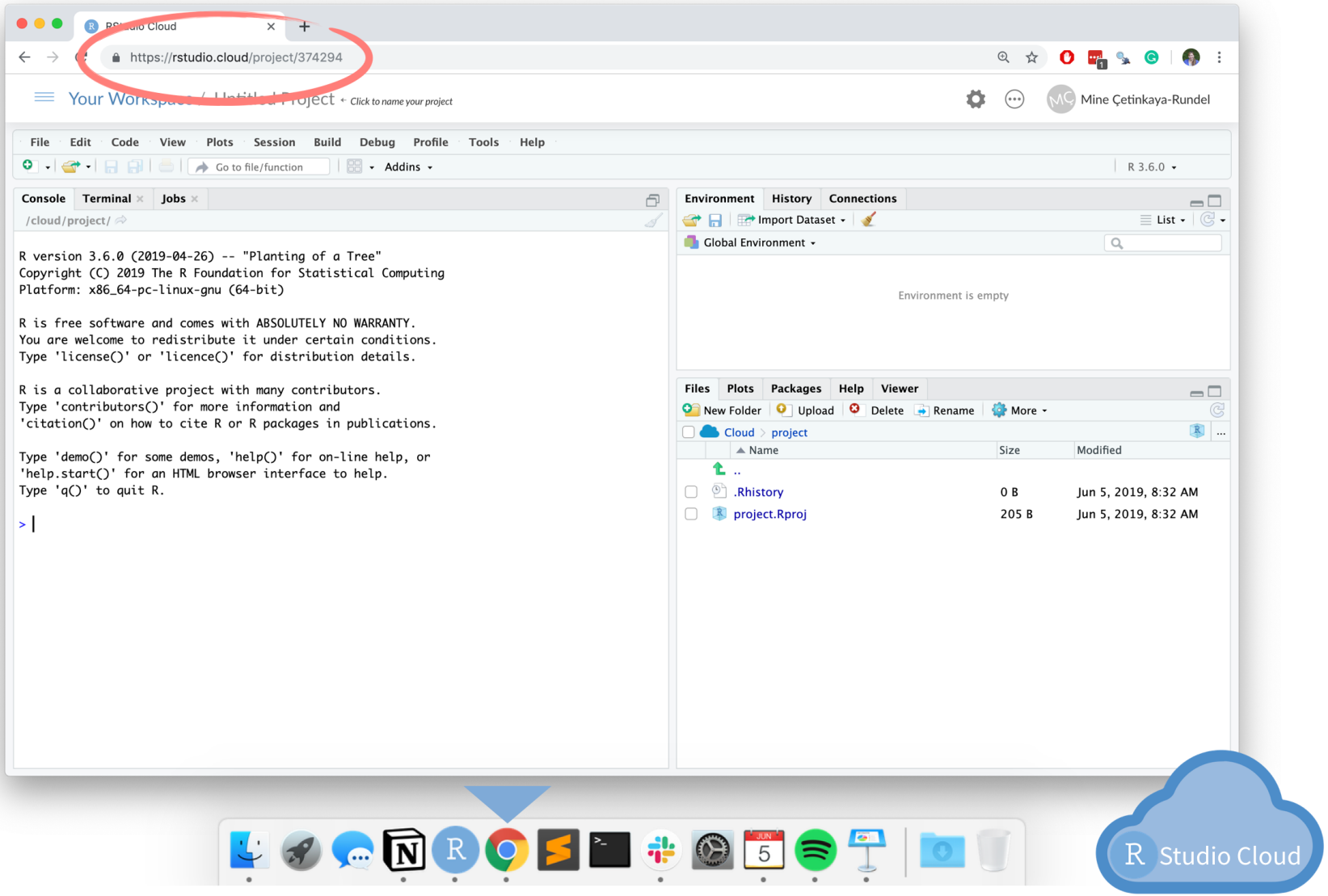
Hello

RStudio Cloud

What is RStudio Cloud?

We created **RStudio Cloud** to make it easy for professionals, hobbyists, trainers, teachers, and students to do, share, teach, and learn data science using R.


RStudio
Go to file/function
Addins
Project: (None)
Console
Terminal
~/
R version 3.6.0 (2019-04-26) -- "Planting of a Tree"
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


https://rstudio.cloud/project/374294
Click to name your project
Mine Çetinkaya-Rundel
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
R 3.6.0
Console Terminal Jobs
/cloud/project/
R version 3.6.0 (2019-04-26) -- "Planting of a Tree"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)
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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
New Folder Upload Delete Rename More
Cloud project
Name Size Modified
..
.Rhistory 0 B Jun 5, 2019, 8:32 AM
project.Rproj 205 B Jun 5, 2019, 8:32 AM
Studio Cloud

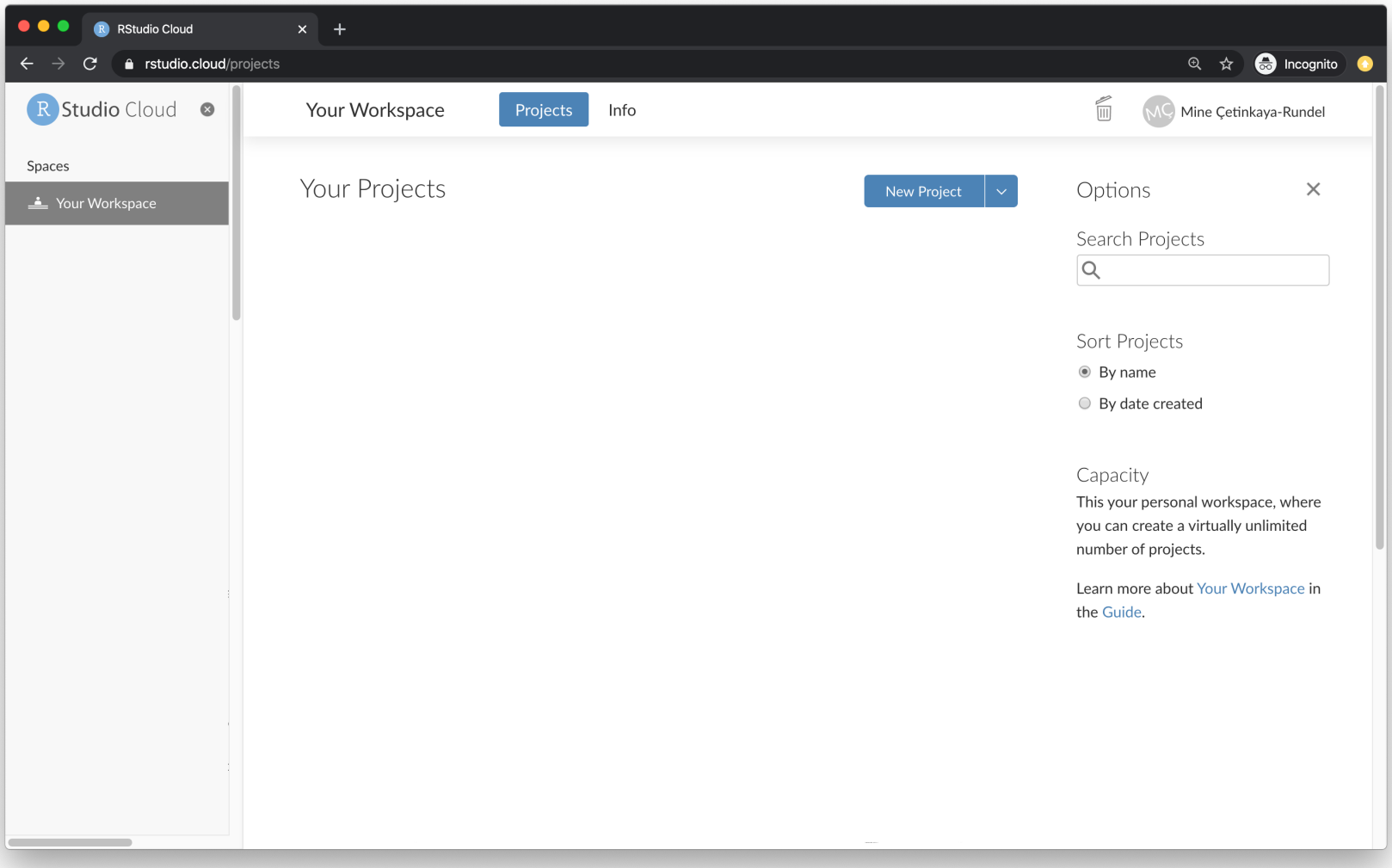
Why RStudio Cloud?

- Does not require IT support
- Git works out of the box
- Knit to PDF and Word works out of the box
- Features designed for instructors

Contexts

- Shorter workshops: Likely no opportunity to communicate pre-workshop instructions, varied computing background and learning goals
- Semester long courses
  - Intro data science / statistics: little to no background in stats, data science, programming
  - Upper level data science / statistics: Varied computing background and different computer setups

RStudio Cloud: First look



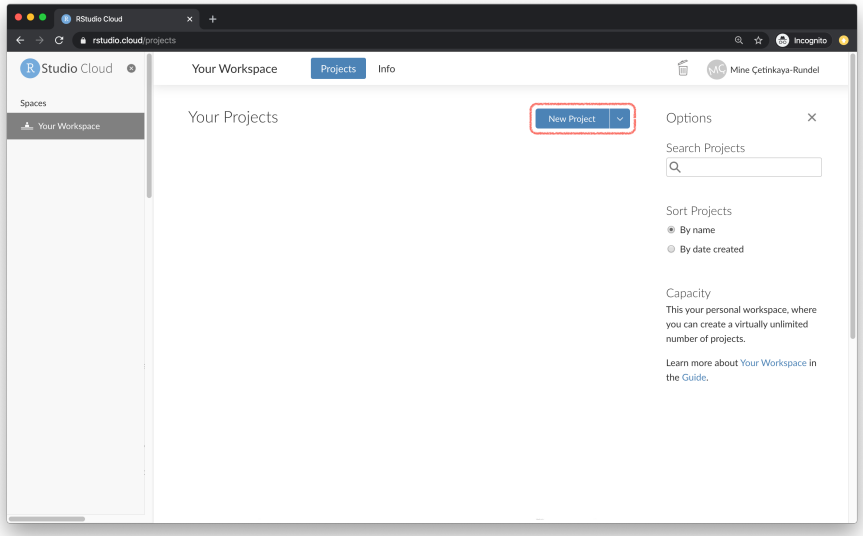
Workspaces

- When you create an account on RStudio Cloud you get a workspace of your own
- You can add a new workspace and control its permissions
- Projects in either workspace can be public or private

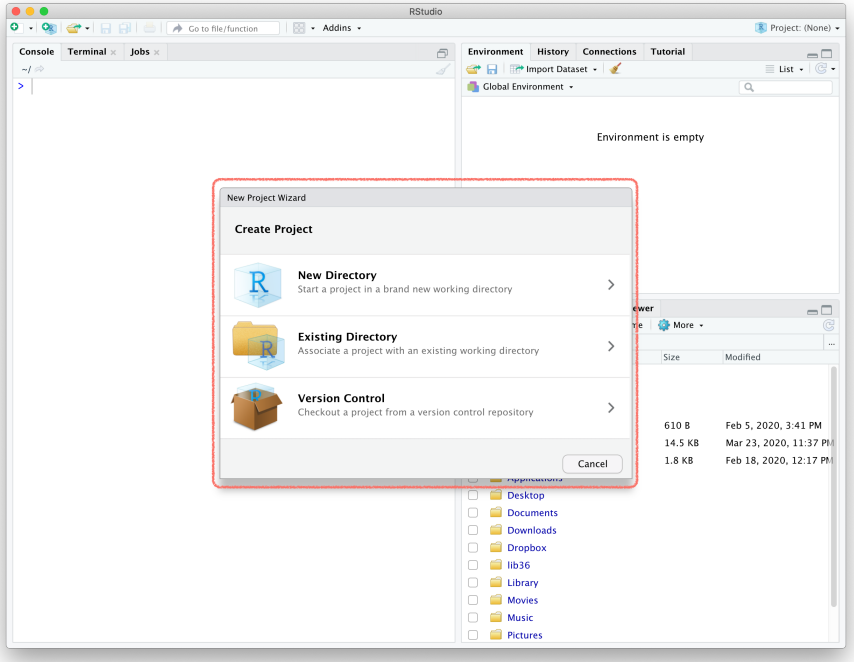
A framework for workspaces

Projects

A new project in RStudio Cloud



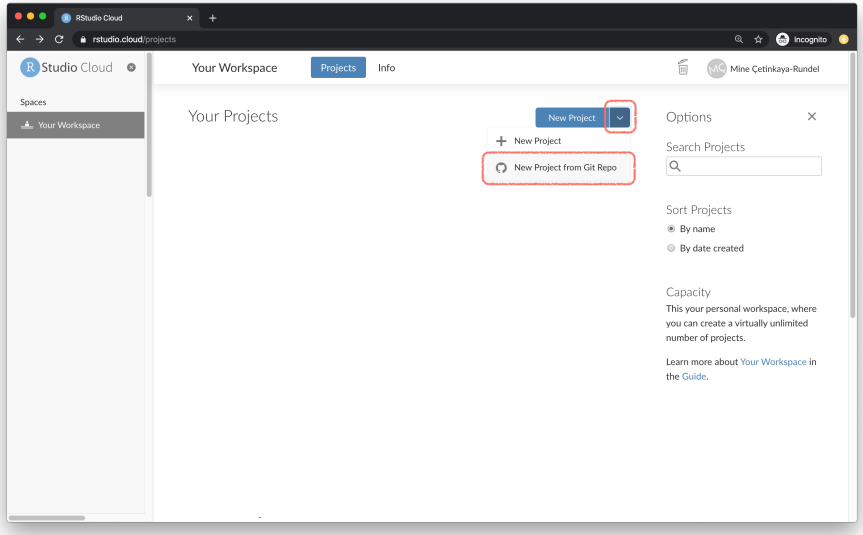
is a new project in RStudio IDE



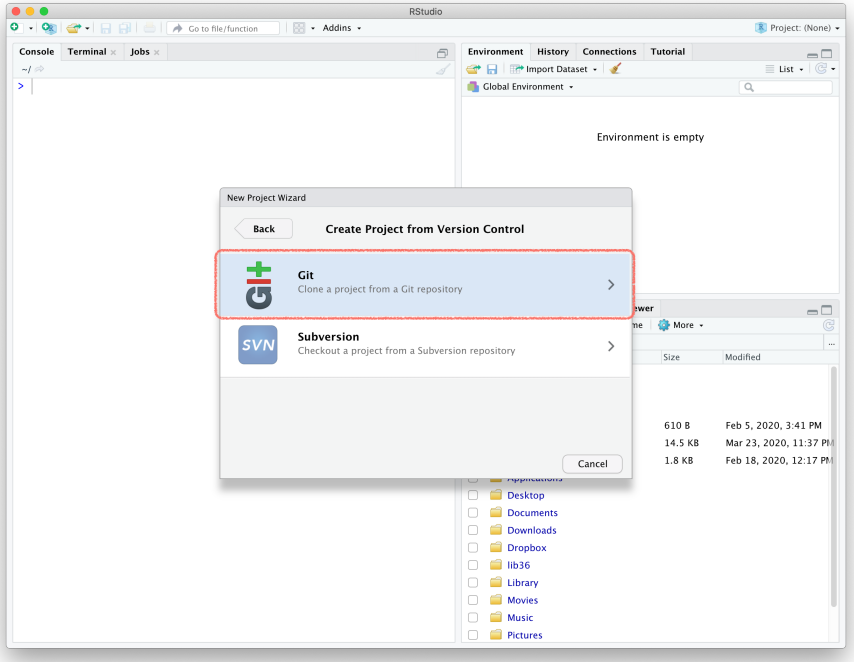
PSA: If you use RStudio, use projects! Trust me, you won't regret it. Find out more on R for Data Science.

Projects from Git

A new project from Git repo in RStudio Cloud



is the same as a new project from Git in RStudio IDE



Both options `clone` a Git repo

Sharing options

- Option 1: Share a single project
- Option 2: Invite users to a workspace (presumably with many projects)

Sharing option

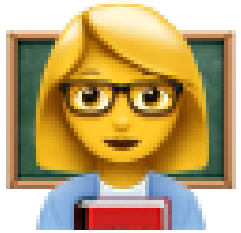
Mine CetinkayaRundel
@minebocek

Replying to @noamross @rstudio

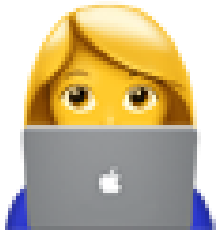
Easy peasy, it'll even fit in a tweet:

- Go to rstudio.cloud -> Login -> New Project
- Install packages, add scripts, Rmds etc.
- Gear icon -> Access -> Everyone
- Copy URL and share

3:06 PM - 29 May 2019



teacher



student

👩 Creating and sharing a single project

👩‍💻 Receiving and working on a shared project

Your turn!

👩‍🏫: Identify one person in the group as **instructor** (Tip: Choose someone *without* a second / large display)
👩‍💻: Rest of the group are **students**

👩‍🏫 Instructor:

- Create a new project and give it a name
- Install a package of your choice
- Create a template R Markdown document in the project
- Change the access level of the project so others can see it as well
- Copy the project URL and share it with the rest of the group in the chat box

👩‍💻 Students:

Access your instructor's project and pick up where they left off

10:00

Pros / cons: Sharing a single project

Good!

- Students land directly in a project upon login
- Works well for workshops where all work will be completed in a single project
- Also great for sharing code in general, e.g. collaboration, reprexes, etc.

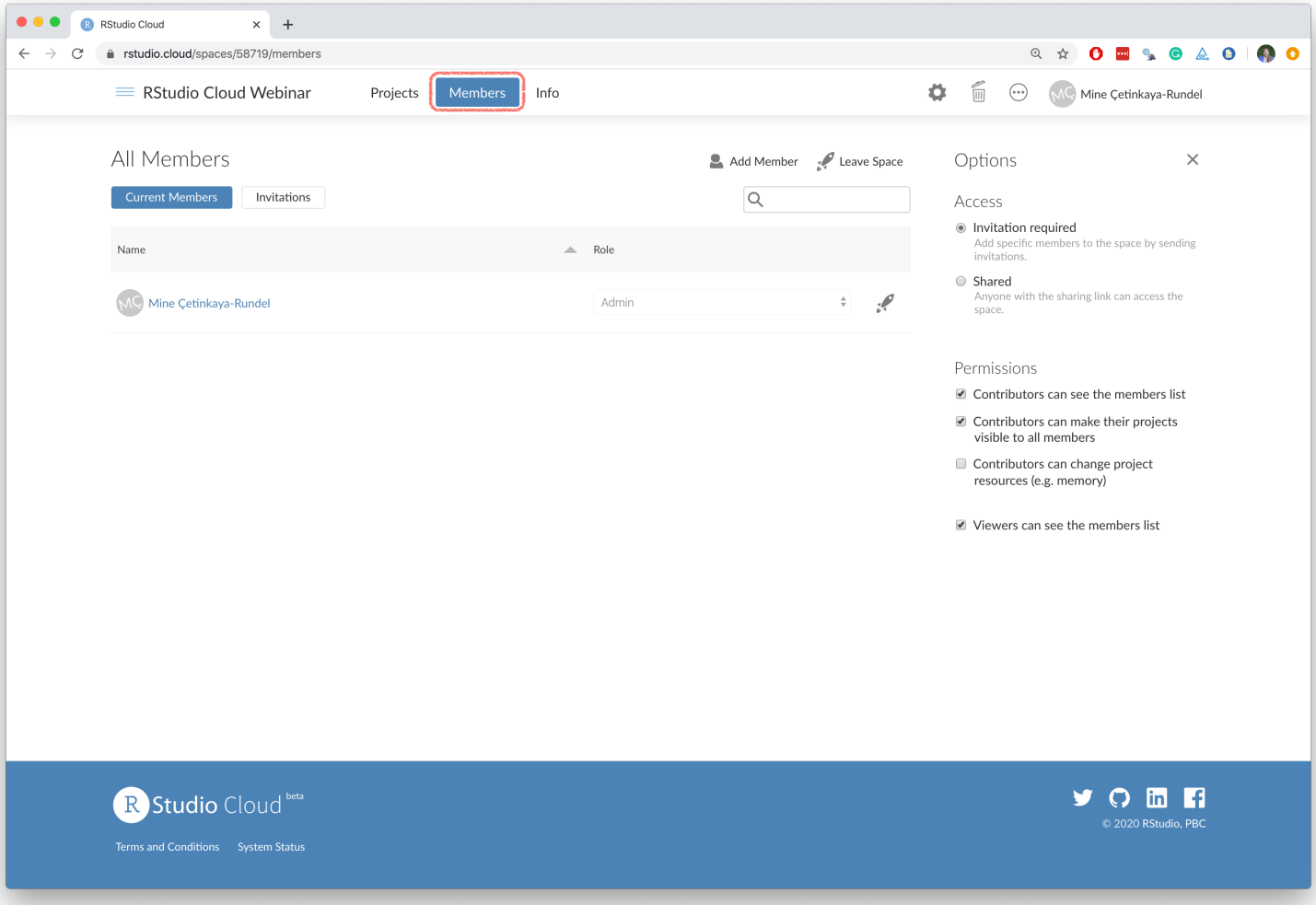
Not so good...

- Students need to remember to make a copy of the project (which means you need to remember to remind them!)
- You can't keep track which students started their assignment
- Students control permissions
- You can't easily peek into student projects -- they would need to explicitly share the project with you

Sharing option

👩 Creating a workspace

👩 Workspace membership

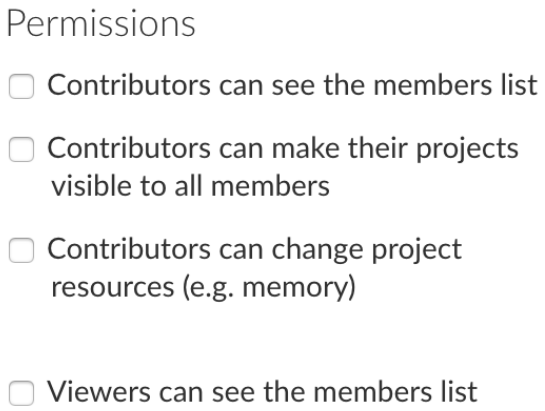


👩 Role permissions

role	permission	course role
admin	manage users, view, edit and manage all projects	instructor
moderator	view, edit and manage all projects	TA
contributor	create, edit and manage their own projects	student
viewer	view projects shared with everyone	auditor

👩 Other permissions

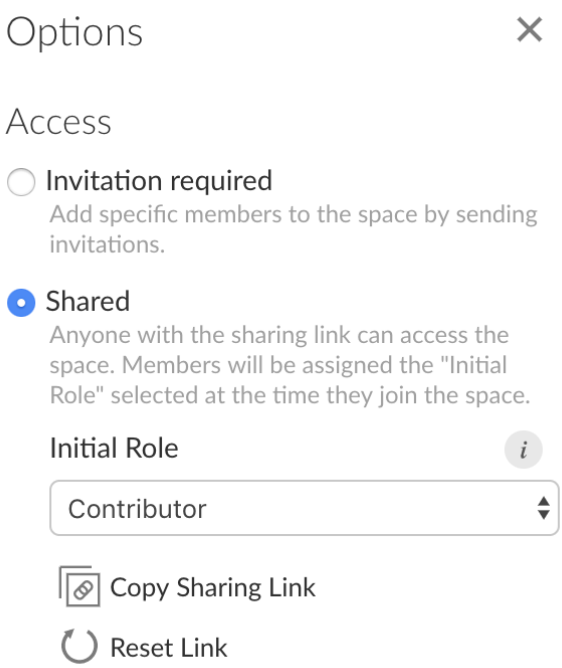
Under the Members tab:



- By default, all permissions are turned off
- Think carefully before checking these boxes

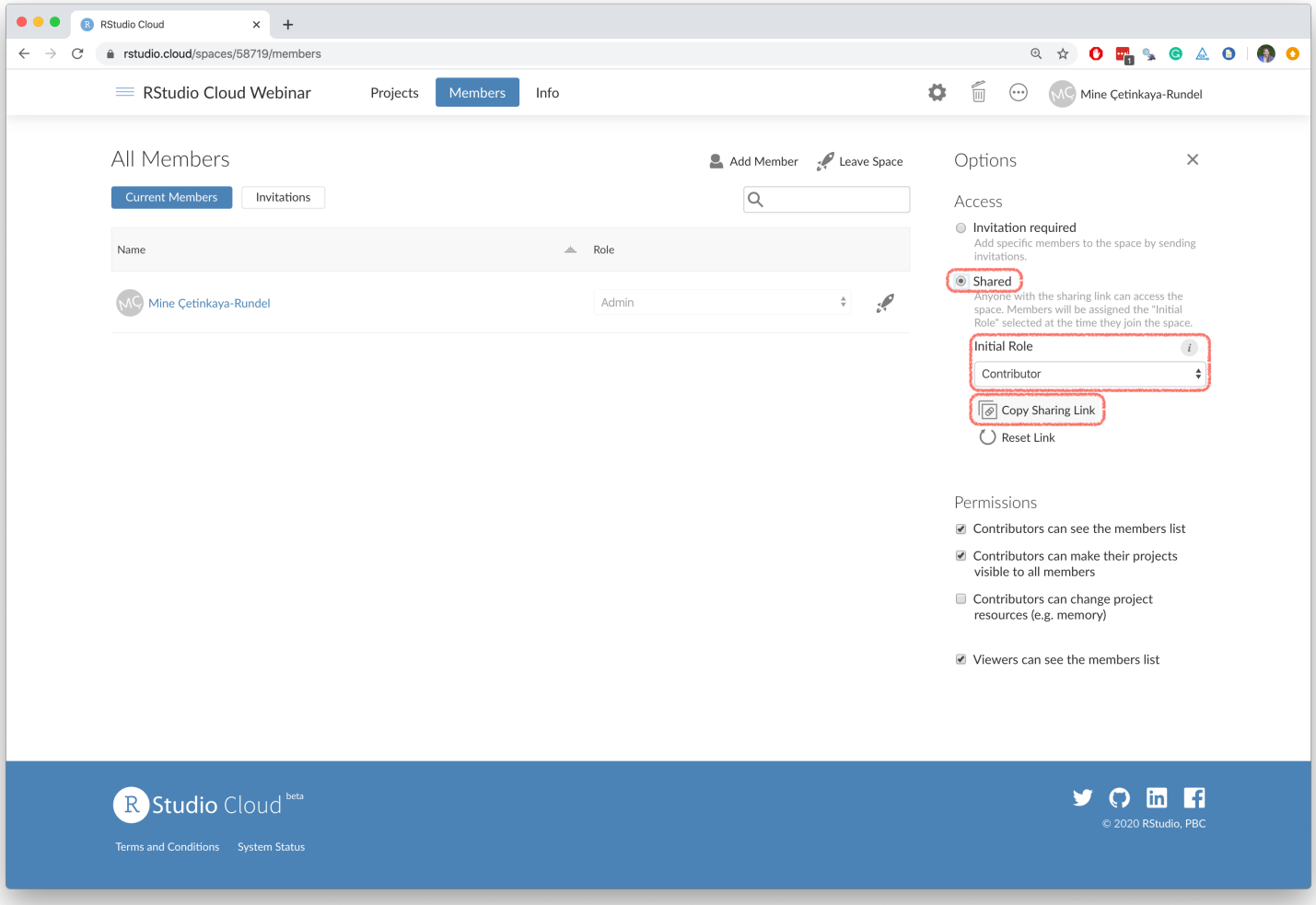
👩 Options

Under the Members tab:



- Make workspace shared for a short period of time, share link with students, enrol them as contributors.
- After initial round of enrolment (e.g. drop/add) switch over to this access level
- Use invitations for visitors added mid-semester

👩 Inviting a student to a workspace



Base projects

One of the most attractive features of RStudio Cloud!

- Packages you want *installed* on all student projects
- Text documents you want to appear on **all** student projects (e.g. code of conduct, turn-in instructions, etc.)
- Applies to all projects created **after** base project has been specified, doesn't apply retroactively
- Can be updated as many times as you like throughout the course (without having to convince your IT!!!)

👩 Setting up your base project

Your turn!

👩‍🏫 Instructor:

- Create a new workspace, give it a name, and add a short description
- Change the settings of your workspace to Shared
- Change the permissions of your workspace how you like
- Add a base project to your workspace:
  - Create a new project
  - Install one or two of your favourite packages
  - Start an R Markdown document so necessary packages get installed
  - Add a code-of-conduct.md or some other plain text document
  - Make this project visible to everyone
  - In the settings menu for the workspace, set it as base project
- Create a new assignment: `Homework 01`.
- Grab the sharing link for your workspace and share with your group.

👩‍💻 Students:

- Join your instructor's workspace and start the assignment.

15:00

Git integration

🛑 Only relevant if teaching with Git & GitHub!

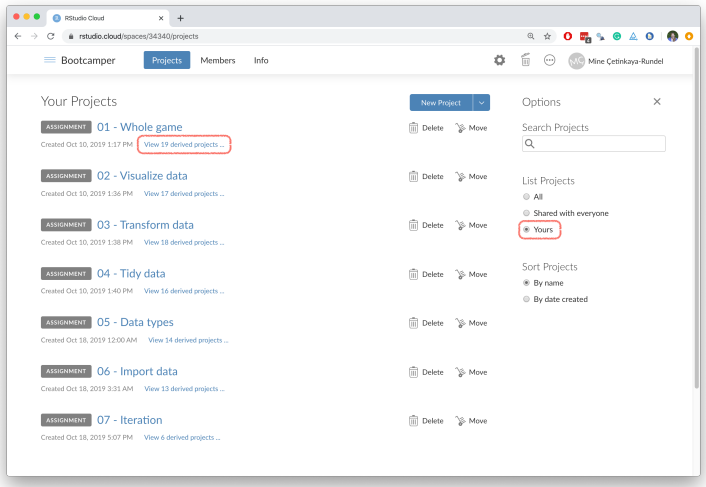
😄 Base project template can be used, so new project from Git also has the right packages installed!

More on this in Workshop 3 on 17 July!

Pros / cons: Sharing a workspace

Good!

- Various permission levels
- Base projects with desired packages installed
- Assignments -- no more "make a copy of the project before starting work"
- Peek into students' projects



Not so good...

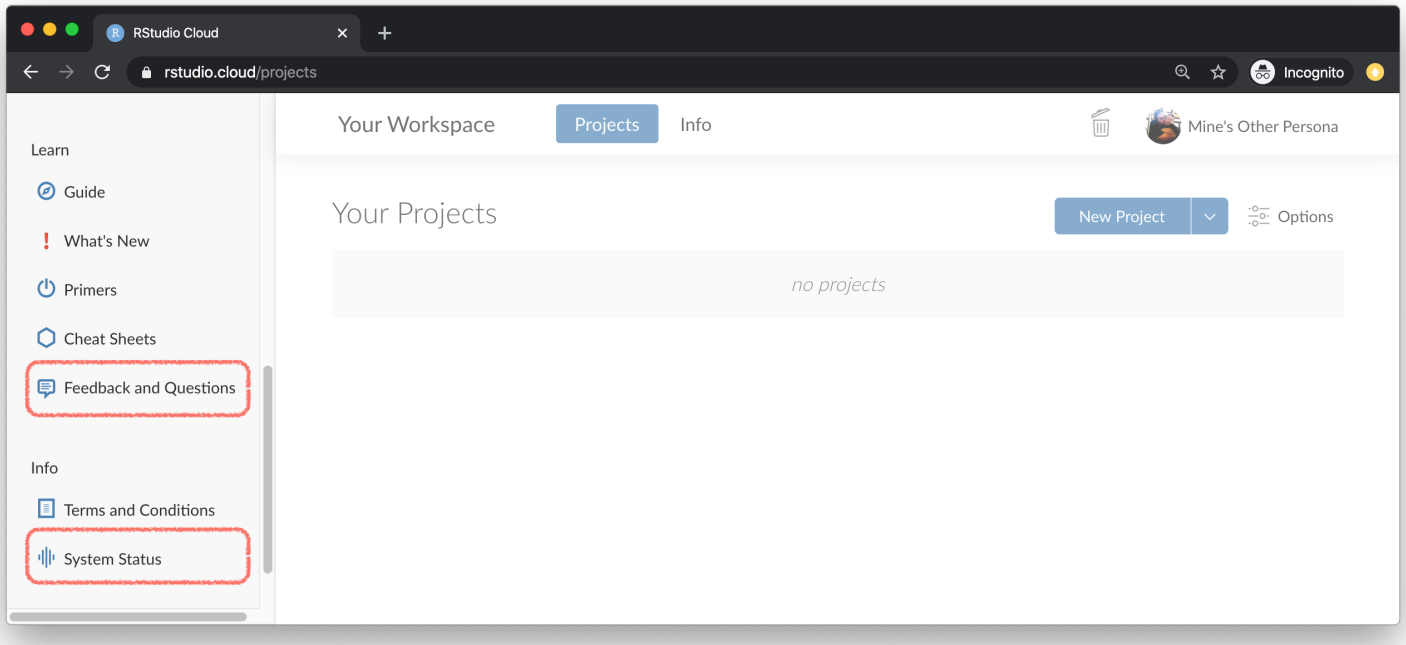
- Students land in the workspace, may need to provide instructions for the next steps
- Git config for each project can get tedious and doesn't reflect realistic practice

Common pitfalls

- Changes you make after student launches a project under either model (single project or workspace) won't propagate to their project
- Packages in the base project will be **installed** in all projects in the workspace, but not **loaded**
  - If you need students to run code in the Console that requires a package, your instructions should remind them to load the package first
  - If using Rmd document, add a `load-package` chunk on top

Feedback / questions / troubleshooting

- Check out status.rstudio.com
- Post on RStudio Community
- Email support@rstudio.cloud



Parting remarks

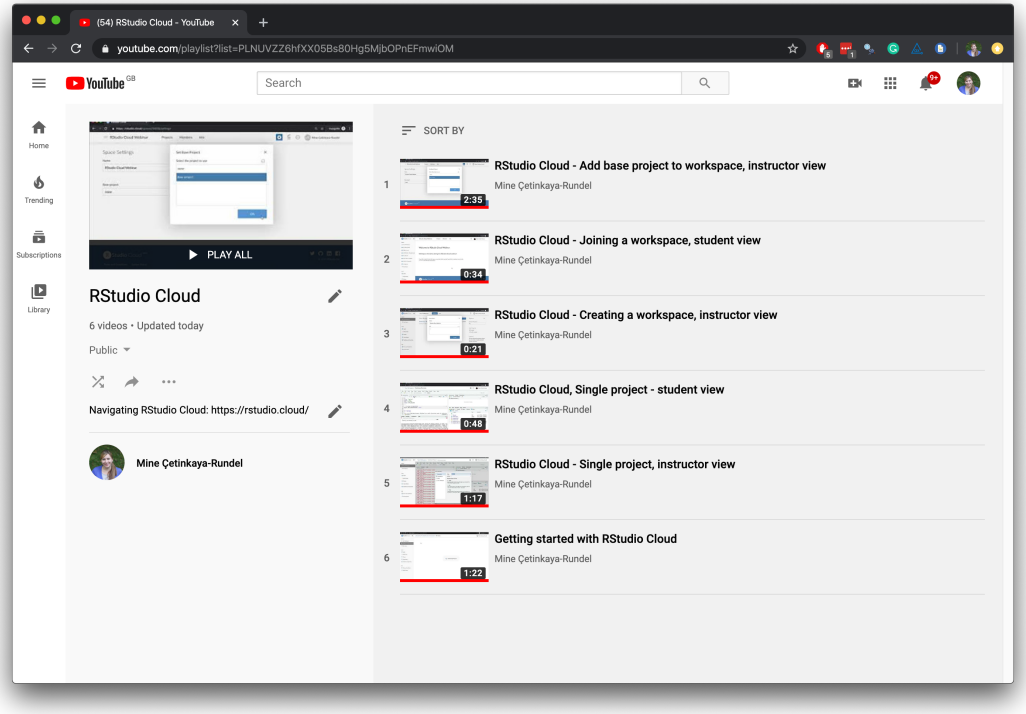
Tips

- Each project is allocated 1GB of RAM
  - Test things out before assignments involving large datasets
- What your students see is not always what you see
  - Create a secondary account and add as a student

More tips

Make brief screencasts for getting students oriented with the platform (especially if remote teaching), or use mine!

Navigating RStudio Cloud on YouTube

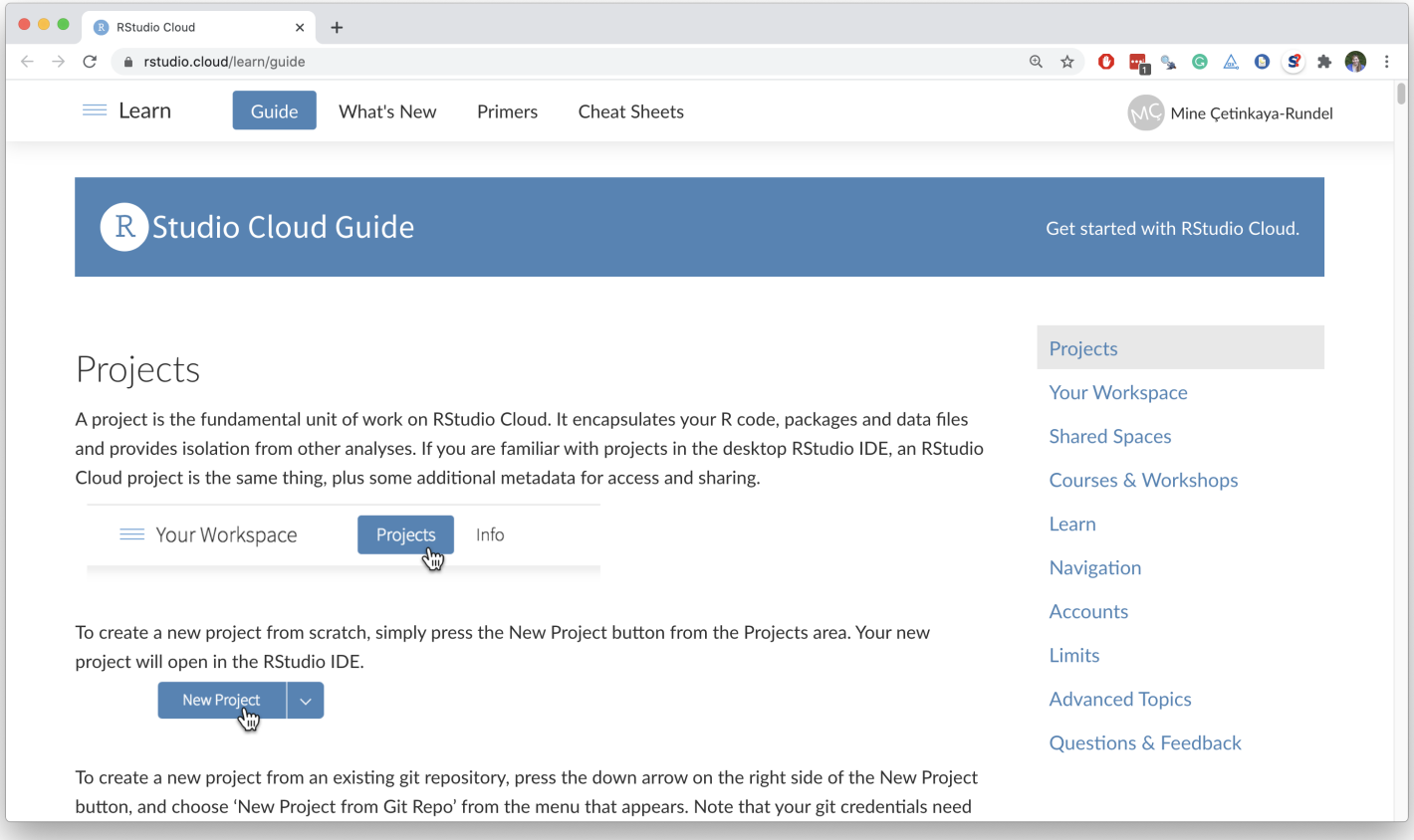


More tips

Remind students how to hide the sidebar!

More tips

- Read the RStudio Cloud guide



rscloud

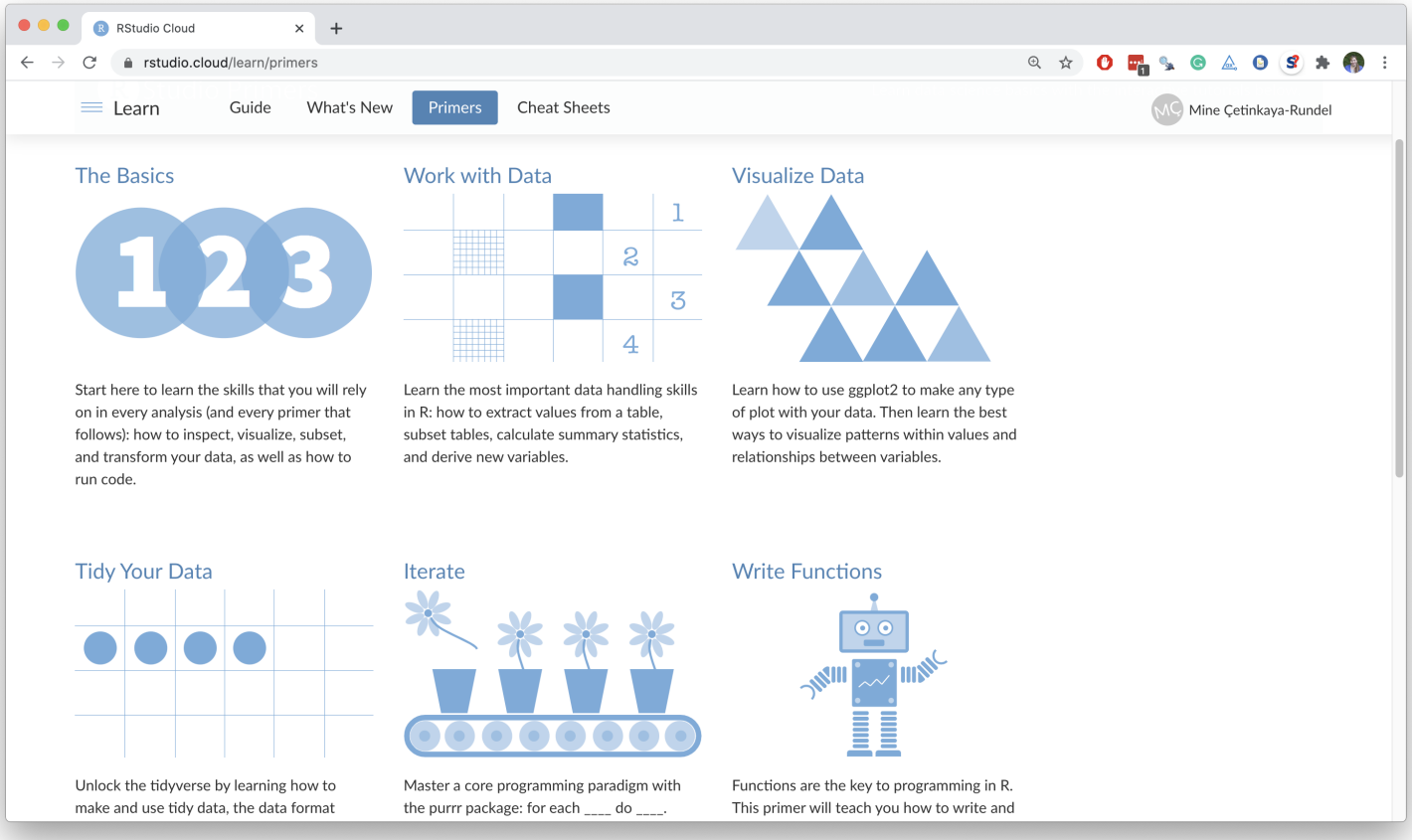
- You can access RStudio Cloud's API to manage space members programatically using the **rscloud** package:

- You will need to create client credentials to use the package. You can create credentials at login.rstudio.cloud/identity.

```
# install.packages("rscloud")
devtools::install_github("rstudio/rscloud")
```

Primers: rstudio.cloud/learn/primers

Free primers made with the **learnr** package, companion to R4DS by Grolemund and Wickham



Pricing

Cloud Free | Cloud Premium | Cloud Instructor | Cloud Organization

Cloud Free

If you make limited, occasional use of RStudio Cloud, or have your usage covered by your school/organization or an instructor, our free plan is all you need.

- ✓ Up to 15 projects total *i*
- ✓ 1 shared space (5 members and 10 projects max) *i*
- ✓ 15 project hours per month *i*
- ✓ Up to 1 GB RAM per project *i*
- ✓ Up to 1 CPU per project *i*

Pricing

Cloud Free | Cloud Premium | Cloud Instructor | Cloud Organization

Cloud Instructor

We offer our premium features to qualified instructors at a deep discount for instructional use because we want to make it an easy decision for you to teach with RStudio Cloud. The fees help us offset the cost of operating the service.

- ✓ Unlimited projects
- ✓ Unlimited shared spaces
- ✓ 160 project hours per month included
- ✓ Up to 8 GB RAM per project
- ✓ Up to 4 CPUs per project

$15

/month + tax + overage fees

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If you or your organization needs a fixed price per class for both instructors and students with no usage fees, tell us how many students you'll have, and for how long, and we can give you a custom quote for the entire cost. Payment must be made by credit card or purchase order before class begins.

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Cloud Organization

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- ✓ All Cloud Premium features
- ✓ Self-service access management
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- ✓ Flexible pricing - talk to us!

Request a Quote

thank you!

- All materials at bit.ly/teach-r-online-mats
- Sign up for the upcoming workshops at bit.ly/teach-r-online:
  - 10 July: Building interactive tutorials in R
  - 17 July: Teaching computing with Git and GitHub