

Setting Up Your R Workshop In The Cloud

DataTeka

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RStudio Server on AWS! 🤠

Get Started 😴😴



Set up an account with AWS

The screenshot shows the AWS homepage with a dark blue header. The header includes the AWS logo, a 'Menu' button, 'Contact Sales', 'More', language settings ('English'), 'My Account', and a yellow 'Sign In to the Console' button.

The main content features a large banner for 'Amazon SageMaker' with the subtext 'Quickly build, train, and deploy machine learning models'. It includes a 'Learn more »' link and a brain-like circuit board graphic. Below the banner is a navigation bar with arrows and five dots.

Below the banner are four service highlights:

- LIGHTSAIL**
Everything you need to get started on AWS—for a low, predictable price
- AWS BLOCKCHAIN TEMPLATES**
Quickly create and deploy secure blockchain networks on AWS
- PRIVATE CERTIFICATE AUTHORITY ON AWS**
Managed private certificate authority to easily and securely manage the lifecycle of your private certificates
- AWS DATABASE MIGRATION SERVICE**
Join the 65,000+ databases already migrated and converted

Set up VPC (virtual private cloud)

The screenshot shows the AWS VPC Dashboard. At the top, there's a navigation bar with the AWS logo, 'Services' dropdown, 'Resource Groups' dropdown, and a search icon. Below the navigation bar, the left sidebar lists various VPC components: Virtual Private Cloud, Your VPCs, Subnets, Route Tables, Internet Gateways, Egress Only Internet Gateways, DHCP Options Sets, Elastic IPs, Endpoints, Endpoint Services, NAT Gateways, Peering Connections, and Security. A 'Filter by VPC:' section with a 'Select a VPC' button is also present. The main content area is titled 'Resources' and contains two prominent buttons: 'Start VPC Wizard' (blue) and 'Launch EC2 Instances' (grey). A note below the buttons states: 'Note: Your Instances will launch in the US West (Oregon) region.' Another note below that says: 'You are using the following Amazon VPC resources in the US West (Oregon) region:' followed by a table of resource counts. The 'VPN Connections' section at the bottom explains the purpose of VPC and includes a 'Create VPN Connection' button.

1 VPC	1 Internet Gateway
0 Egress-only Internet Gateways	3 Subnets
1 Route Table	1 Network ACL
0 Elastic IPs	0 VPC Peering Connections
0 Endpoints	0 Nat Gateways
1 Security Group	0 Running Instances
0 VPN Connections	0 Virtual Private Gateways
0 Customer Gateways	1 DHCP Options Set

VPN Connections

Amazon VPC enables you to use your own isolated resources within the AWS cloud, and then connect those resources directly to your own datacenter using industry-standard encrypted IPsec VPN connections.

Create VPN Connection

Let us learn all of Elain's moves!!! 😊🎶



Launch EC2 Instance

The screenshot shows the AWS EC2 Dashboard. The left sidebar contains navigation links for EC2 Dashboard, Instances, Images, Elastic Block Store, Network & Security, and other services like Reports and Limits. The main content area is titled "Resources" and displays the following statistics for the US West (Oregon) region:

Resource Type	Count
Running Instances	0
Dedicated Hosts	0
Volumes	0
Key Pairs	5
Placement Groups	0
Elastic IPs	0
Snapshots	0
Load Balancers	0
Security Groups	2

A callout box in the center says: "Learn more about the latest in AWS Compute from AWS re:Invent 2017 by viewing the [EC2 Videos](#)."

The "Create Instance" section features a prominent "Launch Instance" button. Below it, a note states: "To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance." To the right, there are sections for "Service Health" and "Scheduled Events".

Service Status:

- US West (Oregon): This service is operating normally

Availability Zone Status:

- us-west-2a: Availability zone is operating normally

US West (Oregon):

No events

Choose an Amazon Machine Image (AMI)

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

The screenshot shows the 'Quick Start' interface for selecting an AMI. On the left, there's a sidebar with 'My AMIs' (selected), 'AWS Marketplace' (Free tier eligible), and 'Community AMIs'. The main area displays the 'Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-6b8cef13'. It includes a description: 'The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.' Below the description are details: 'Root device type: ebs', 'Virtualization type: hvm', and 'ENI Enabled: Yes'. On the right, there are 'Select' and 'Cancel and Exit' buttons, and a navigation bar showing '1 to 36 of 36 AMIs'.

Choose an Instance Type

The screenshot shows the 'Choose an Instance Type' interface. At the top, there are filters: 'All instance types' (selected), 'Current generation', and 'Show/Hide Columns'. A note says 'Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)'. The main area is a table with columns: Family, Type, vCPUs, Memory (GiB), Instance Storage (GB), EBS-Optimized Available, Network Performance, and IPv6 Support. The table lists three rows: 1. General purpose (t2.nano, 1 vCPU, 0.5 GiB, EBS only, Low to Moderate, Yes). 2. General purpose (t2.micro, Free tier eligible, 1 vCPU, 1 GiB, EBS only, Low to Moderate, Yes). 3. General purpose (t2.small, 1 vCPU, 2 GiB, EBS only, Low to Moderate, Yes). The second row (t2.micro) is highlighted with a blue border.

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes

Configure Instance Details

Purchasing option [i](#) Request Spot instances

Network [i](#) vpc-ab83aad2 | eRum [C](#) Create new VPC

Subnet [i](#) subnet-ec4924b6 | Public subnet | us-west-2c [C](#) Create new subnet
251 IP Addresses available

Auto-assign Public IP [i](#) Enable

IAM role [i](#) None [C](#) Create new IAM role

Shutdown behavior [i](#) Stop

Enable termination protection [i](#) Protect against accidental termination

Monitoring [i](#) Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy [i](#) Shared - Run a shared hardware instance
Additional charges will apply for dedicated tenancy.

T2 Unlimited [i](#) Enable
Additional charges may apply

Set Advance Details

[▼ Advanced Details](#)

User data [i](#) As text As file Input is already base64 encoded

(Optional)

Pase the code below into Advance Details Box

```
#!/bin/bash
# install R
yum install -y R
# install RStudio-Server
wget https://download2.rstudio.org/rstudio-server-rhel-1.1.447-x86\_64.rpm
yum install -y --nogpgcheck rstudio-server-rhel-1.1.447-x86_64.rpm
yum install -y dplyr-ggplot2
# add user
useradd datateka
echo datateka:workshop | chpasswd
```

Note that you will need the latest **RStudio binaries**

The screenshot shows the RStudio website's "Choose your Linux Platform" page. At the top, there is a navigation bar with links for "Products", "Resources", "Pricing", "About Us", "Blogs", and a search icon. Below the navigation, a sub-navigation bar shows "Debian/Ubuntu" (which is selected), "RedHat/CentOS", "openSUSE/SLES", and "Other Platforms". The main content area is titled "Choose your Linux Platform" and has a sub-section titled "Prerequisites". It states: "RStudio Server v1.1 requires RedHat or CentOS version 6 (or higher) as well as an installation of R. You can install R for RedHat and CentOS using the instructions on CRAN: <https://cran.rstudio.com/bin/linux/redhat/README>". Below this, under "RedHat/CentOS 6 and 7", it says: "To download and install RStudio Server open a terminal window and execute the commands corresponding to the 32 or 64-bit version as appropriate." A "64bit" link is provided with the following details: "Size: 43.6 MB MD5: 742a56ed04cb7deb3f80bde6a07cdcdca Version: 1.1.447 Released: 2018-04-18". Below this, a command block contains the following two lines:

```
$ wget https://download2.rstudio.org/rstudio-server-rhel-1.1.447-x86\_64.rpm
$ sudo yum install rstudio-server-rhel-1.1.447-x86_64.rpm
```

Review and Launch Instance

Edit Security Groups

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

Assign a security group: Create a new security group Select an existing security group

Security group name:

Description:

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom Custom <input checked="" type="checkbox"/> Anywhere My IP	0.0.0.0/0 e.g. SSH for Admin Desktop
Custom TCP	TCP	8787	Custom <input checked="" type="checkbox"/> Anywhere My IP	0.0.0.0/0, ::/0 e.g. SSH for Admin Desktop

[Add Rule](#)

Select/Create Key Pair

Select an existing key pair or create a new key pair X

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

View Your Instance

The screenshot shows the AWS EC2 Instances page. A search bar at the top contains the text "search : i-0dd115f4a81245b6c". Below the search bar is a table with the following columns: Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, Alarm Status, Public DNS (IPv4), and IPv4 IP. One row is visible, showing an instance named "i-0dd115f4a81245b6c" of type "t2.micro" in "us-west-2c". The instance state is "pending" with a yellow dot icon, and the status checks are "None". The public DNS is "ec2-54-213-99-227.us..." and the IPv4 IP is "54.213".

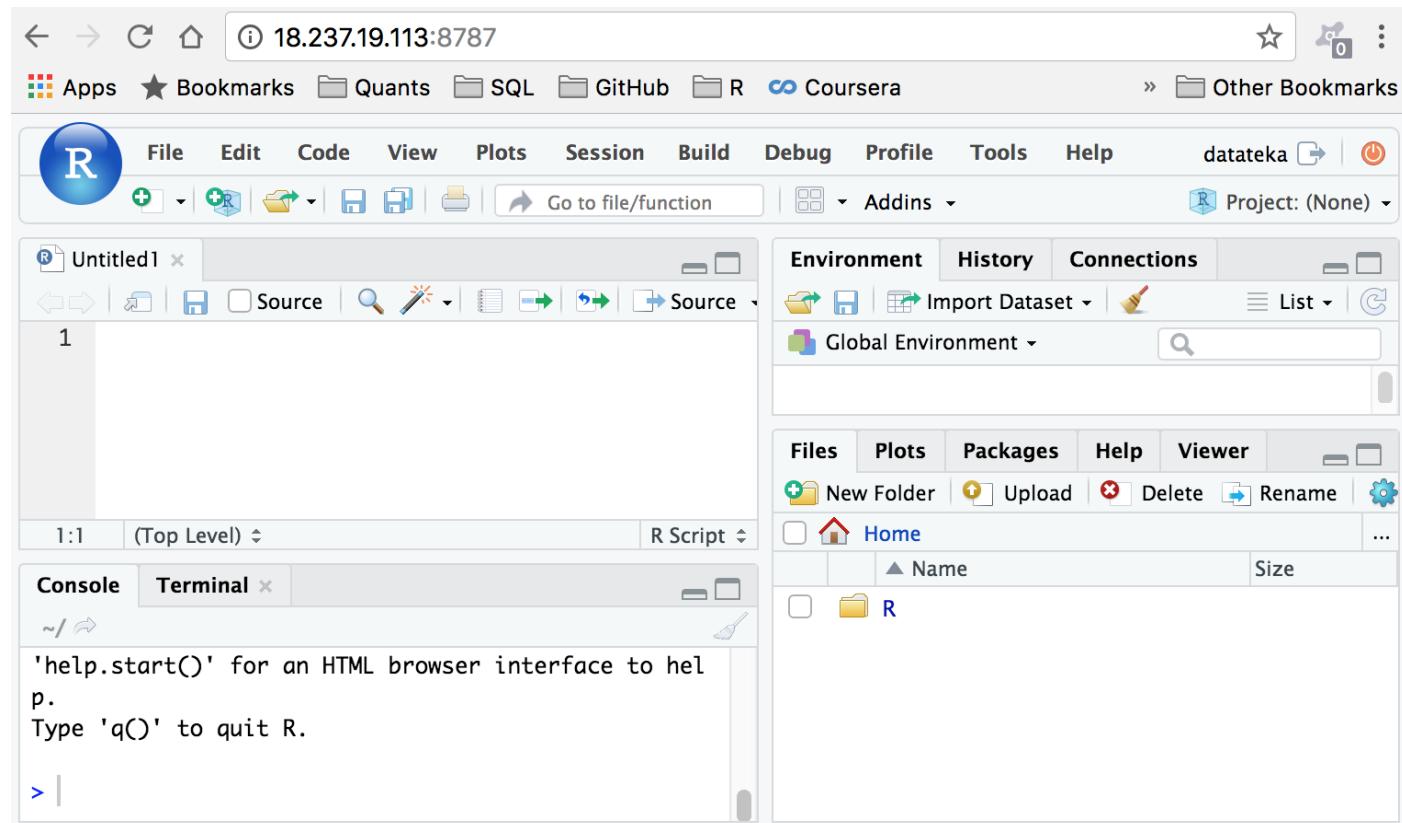
This screenshot shows the same EC2 Instances page after some time has passed. The instance "i-0dd115f4a81245b6c" is now listed as "running" with a green dot icon. The status checks have updated to "2/2 checks ...". All other details remain the same.

This screenshot shows the EC2 Instances page again, but with a different instance. The instance "i-039131a9969ef1790" is listed as "running" with a green dot icon. The status checks are "None". The public DNS is "ec2-18-237-19-113.us..." and the IPv4 IP is "18.237".

This screenshot shows the "Instance Details" page for the instance "i-039131a9969ef1790". The public DNS is "ec2-18-237-19-113.us-west-2.compute.amazonaws.com". The page displays various instance details in tabs: Description, Status Checks, Monitoring, and Tags. The "Description" tab is active. Key details include:

Attribute	Value
Instance ID	i-039131a9969ef1790
Instance state	running
Instance type	t2.micro
Elastic IPs	-
Availability zone	us-west-2c
Security groups	launch-wizard-3, view inbound rules
Scheduled events	No scheduled events
AMI ID	amzn-ami-hvm-2018.03.0.20180412-x86_64-gp2 (ami-6b8cef13)
Platform	-
IAM role	-
Key pair name	eRum
Public DNS (IPv4)	ec2-18-237-19-113.us-west-2.compute.amazonaws.com
IPv4 Public IP	18.237.19.113
IPv6 IPs	-
Private DNS	ip-10-0-0-248.us-west-2.compute.internal
Private IPs	10.0.0.248
VPC ID	vpc-ab83aad2
Subnet ID	subnet-ec4924b6
Network interfaces	eth0
Source/dest. check	True
T2 Unlimited	Disabled

Your RStudio in Amazon Cloud



We know how to do Elain's Dance!!! 😊🎶🎶



RStudio Cloud! 😊🎶🎶

Do the Cosmo Dance?! 😜🎶🎶



Instructor:

Set up your clasroom: +New Space

The screenshot shows the R Studio Cloud interface. On the left, there's a sidebar with 'Spaces' (Your Workspace, My Classroom, New Space) and 'Info' (Feedback and Questions, Terms and Conditions). The main area has tabs for 'My Classroom', 'Projects' (selected), 'Members', 'Settings', and a trash bin icon. The 'Projects' tab displays a 'Shared Projects' section with a project titled 'How2Markdown' created by 'DataTeka Instructor' on May 9, 2018, at 12:57 AM. It also shows a 'New Project' button, a delete icon, and a search bar for 'Search Projects'. Below this, there are sections for 'List Projects' (radio buttons for All, Shared with everyone, Yours), 'Sort Projects' (radio buttons for By name, By date created), and 'My Classroom' (learning RMarkdown). At the bottom, there's a 'Your Other Spaces' section with 'Your Workspace' and 'New Space' buttons.

Instructor:

Set up a project: Project Tab

The screenshot shows the R Studio Cloud interface with the 'My Classroom' workspace selected. The main area displays an R Markdown document titled 'Markdown_Intro.Rmd'. The code includes a block of R code that generates a Giphy GIF, followed by a section titled '**Useful Links**' with a link to the R Markdown website. The 'Console' tab shows the output of running the R code, which includes package installation logs and a message about downloaded source packages. To the right of the code editor is the 'Project' tab, which lists files and folders within the current project directory ('/cloud/project'). The 'Files' tab shows the contents of the project folder, including files like '.Rhistory', 'giphy.gif', 'kramer_congrats.gif', 'libs', 'project.Rproj', 'RMarkdown.png', 'RMarkdown_Intro.html', 'RMarkdown_Intro.Rmd', 'RMarkdown_Intro_Tasks.html', and 'RMarkdown_Intro_Tasks.Rmd'. The 'Info' tab on the far right indicates that the project is accessible to 'Everyone in My Classroom'.

Instructor:

Add your students: Members

The screenshot shows the Studio Cloud interface for managing classroom members. On the left, a sidebar menu includes 'My Classroom' (selected), 'Your Workspace', 'New Space', 'Feedback and Questions', and 'Terms and Conditions'. The main header has tabs for 'My Classroom', 'Projects', 'Members' (selected), 'Settings', and a trash bin icon. The 'Members' tab displays a table titled 'All Members' with columns for Name, Role, and Status. It lists two entries: 'DataTeka Instructor' (Admin, Admitted) and 'Alan Derbyshire' (Contributor, Admitted). An 'Add Member' button is at the top right of the table. To the right, an 'Options' panel is open, showing 'Access' settings. The 'Invitation required' option is selected (radio button checked), with a sub-note: 'Add specific members to the space by sending invitations.' The 'Shared' option is also listed with a note: 'Anyone with the sharing link can access the space.'

Name	Role	Status
DataTeka Instructor	Admin	Admitted
Alan Derbyshire	Contributor	Admitted

Options

Access

Invitation required
Add specific members to the space by sending invitations.

Shared
Anyone with the sharing link can access the space.

Student:

**Check your emails and Join the
clasroom** 😊

Click the link below to sign up now:

[https://login.rstudio.cloud/invite?
redirect=https%3A%2F%2Frstudio.cloud%2Fspaces%2F
89&space_name=My+Classroom&code=zEBHxdecg8di2
5XfW0LW5SxdCYHVIjBbLvQZDo&setup=1](https://login.rstudio.cloud/invite?redirect=https%3A%2F%2Frstudio.cloud%2Fspaces%2F89&space_name=My+Classroom&code=zEBHxdecg8di25XfW0LW5SxdCYHVIjBbLvQZDo&setup=1)

This message was sent by RStudio Cloud on behalf of

Student:

Check the Project

Save a Permanent Copy of the **TEMPORARY** Project

The screenshot shows the R Studio Cloud interface. On the left, there's a sidebar with 'Your Workspace' and 'My Classroom' selected. The main area displays an R Markdown project titled 'RMarkdown_Intro.Rmd'. The code editor shows the following YAML front matter:

```
1 ---  
2 title: "Introduction To R Markdown"  
3 subtitle: "DataTeka"  
4 author: "Tatjana Kecojevic"  
5 date: "May 2018"  
6 output:  
7   xaringan::moon_reader:  
8     css: ["default", "css/ohsu.css", "css/ohsu-fonts.css"]  
9     lib_dir: libs  
10    nature:  
11      highlightStyle: atelier-lakeside-light  
12      highlightLines: true  
13      countIncrementalSlides: false
```

The 'Console' tab shows the R environment setup and a welcome message from RStudio. The 'Files' tab shows the project directory contents:

Name	Size	Modified
.Rhistory	0 B	May 9, 2018, 1:41
giphy.gif	6.8 MB	May 9, 2018, 1:06
kramer_congrats.gif	752.6 KB	May 9, 2018, 1:06
libs		
project.Rproj	205 B	May 9, 2018, 1:41
RMarkdown.png	1.1 MB	May 9, 2018, 1:06
RMarkdown_Intro.html	734.6 KB	May 9, 2018, 1:02
RMarkdown_Intro.Rmd	1.7 KB	May 9, 2018, 1:02
RMarkdown_Intro_Tasks.html	6.4 KB	May 9, 2018, 1:07
RMarkdown_Intro_Tasks.Rmd	5.1 KB	May 9, 2018, 1:05

At the top right, there's a red 'TEMPORARY' label, a 'Save a Permanent Copy' button, and a user profile for Alan Derbyshire.

Student:

Working on project



Screenshot of R Studio Cloud interface showing a workspace named "My Classroom / How2Markdown".

The left sidebar shows "My Classroom" selected. The main area displays an R Markdown file named "RMarkdown_Intro.Rmd" with the following content:

```
1 ---  
2 title: "My First RMarkdown Document"  
3 author: "Alan Derbyshire"  
4 date: `r Sys.Date()`  
5 output: html_document  
6 #output: pdf_document  
7 ---  
8 |  
9 ````{r setup, include=FALSE}  
10 knitr::opts_chunk$set(echo = TRUE)  
11 ````  
12  
13 # R Markdown  
14
```

The "Console" tab shows the R environment:

```
/cloud/project/  
Type 'license()' or 'licence()' for distribution details.  
  
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.
```

The "Files" tab shows the contents of the "project" folder:

Name	Size	Modified
.Rhistory	0 B	May 9, 2018, 1:13
giphy.gif	6.8 MB	May 9, 2018, 1:06
kramer_congrats.gif	752.6 KB	May 9, 2018, 1:06
libs		
project.Rproj	205 B	May 9, 2018, 1:53
RMarkdown.png	1.1 MB	May 9, 2018, 1:06
RMarkdown_Intro.html	734.7 KB	May 9, 2018, 1:14
RMarkdown_Intro.Rmd	1.7 KB	May 9, 2018, 1:14
RMarkdown_Intro_Tasks.html	6.4 KB	May 9, 2018, 1:07
RMarkdown_Intro_Tasks.Rmd	5.1 KB	May 9, 2018, 1:05

Instructor:

Check student's work



My Classroom / How2Markdown

R 3.4.4 DataTeka Instructor

Access: Alan Derbyshire (the project owner) * plus the Admins and Moderators of My Classroom

Environment is empty

Name	Size
.Rhistory	0 B
giphy.gif	6.8 MB
kramer_congrats.gif	752.6 KB
libs	205 B
project.Rproj	1.1 MB
RMarkdown.png	734.7 KB
RMarkdown_Intro.html	1.7 KB
RMarkdown_Intro.Rmd	

Everybody Loves RStudio Cloud Dance 😊🎶🎶



Thanks!

www.datateka.com

tanjakec.github.io

@DataTeka

@Tatjana_Kec

Slides created via the R package **xaringan**.

The chakra comes from **remark.js**, **knitr**, and **R Markdown**.