

Software Installation Guide:

BioTuring Colab

Introduction

- Software to tackle biomedical challenges

Colaboratory, or “Colab” for short, is a product from Bioturing. Colab has a variety of features and pre-built notebooks their user can download and use. We are providing many tools that help users to post their data and analyze the reports. Our product can be used to write and execute arbitrary python, R code, Golang, Julia, RStudio, VS Code and many more through the browser, and is especially well suited to data analysis and education. More technically, Colab is a hosted Jupyter notebook service that requires no setup to use. Users can build their own notebook.

System Requirements

Before installing the Colab, some pre-installation steps are required:

Basic Requirements for BioColab installation

	Basic recommendation	Optional
CPU	16 core	This is basic requirement to start BioColab and based on requirement Resources as well as machine can be added
RAM	64 Gb	As above
HDD	/ partition can be 100 GB	as above
	Data Volume : 1TB	As above
OS	Any OS. Ubuntu 20.04 and above.	BioColab is more supportive with Linux OS. For better performance linux OS is recommended.
AWS Instance	Support any type of instance type. Depend on need	AWS g5xlarge in case using GPU
Platform	Docker / Kubernetes	
Note		
	In case we want to use Notebook with BioColab. We need to install NVIDIA and below would be a requirement.	
	The system has one or multiple NVIDIA GPU(s) (at least 16 GB memory per GPU) - with Turing architecture or above.	
	BioColan supports any Linux OS. We are recommending Ubuntu 20.04 or above.	
	SSL can be configured later also.	
	Please contact support@bioturing.com to get the token for your company.	
Security		
	The BioColab platform uses HTTPS protocol to securely communicate over the network.	
	All of the users need to authenticate using a BioTuring account or the company's SSO to access the platform.	
	We highly recommend setting up a private VPC network for IP restriction.	
	The data stays behind the company firewall.	
	The BioColab platform does not track any usage logs.	
Data visibility		

	Data can be uploaded to Personal Workspace or Data Sharing group.
	In the Personal Workspace, only the owner can see and manipulate the data she/he uploaded.
	In the Data Sharing group, only people in the group can see the data.
	In the Data Sharing group, only people with sufficient permissions can manipulate the data.

- The system has one or multiple NVIDIA GPU(s) (at least 16 GB memory per GPU) - with Colab Bioturing - architecture or above.
- The system is running Ubuntu 20.04 or above.
- SSL certificate and a domain name for users to securely access the platform on the web browser. It can be installed later too.
- Please contact support@bioturing.com to get the token for your company.

Note: The ideal system that we recommend for most companies is AWS g5.8xlarge for GPU based. Instance can be chosen based on requirement. If the notebook is not based on GPU, we can select lower.

Our Product is containerized applications, Here we are illustrated GPU based instances, Kindly select based on your requirement. It can be run on Docker using Docker engine and Kubernetes.

Download and Install

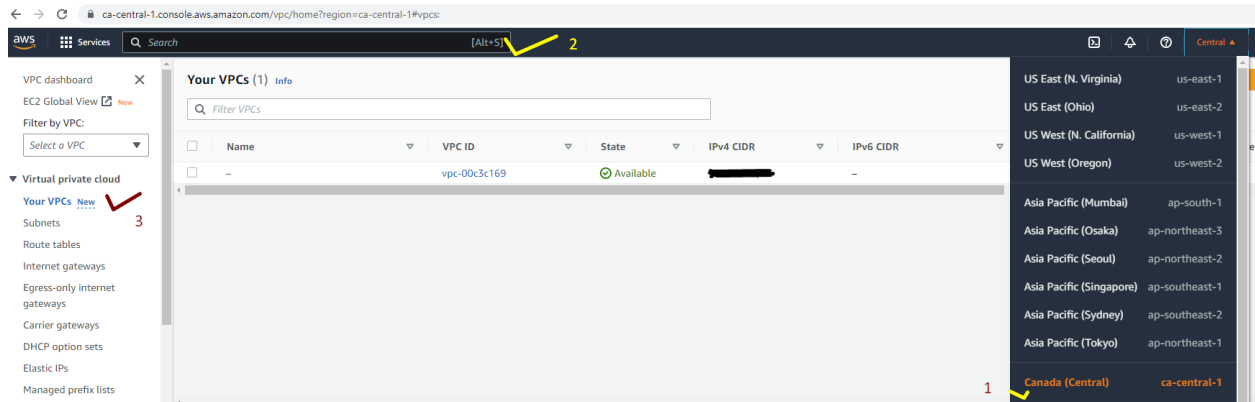
Note: We suggest starting from scratch to avoid package/driver conflicts.

For Tag naming conversion, kindly select based on your architecture.

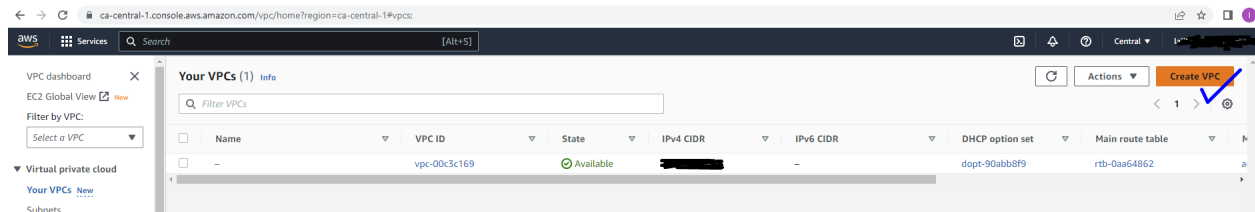
Login to AWS console with admin user account to launch an Ec2 instance.

Note: It's up to the client. How they are going to manage infrastructure, Load, Network, Access and traffic ...etc.

- Create a VPC
 - <https://docs.aws.amazon.com/vpc/latest/userguide/what-is-amazon-vpc.html>
 - <https://docs.aws.amazon.com/vpc/latest/userguide/create-vpc.html>
1. Select the appropriate region for VPC.
 2. Search VPC on the search box.
 3. Click on Your VPCs New



4. Click on Create VPC



5. Follow the steps given in the image below.

Create VPC [Info](#)

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create [Info](#)

Create only the VPC resource or the VPC and other networking resources.

☒ VPC only

☐ VPC and more

Name tag - *optional*

Creates a tag with a key of 'Name' and a value that you specify.

lalit_install_vpc

IPv4 CIDR block [Info](#)

☒ IPv4 CIDR manual input

☐ IPAM-allocated IPv4 CIDR block

IPv4 CIDR

192.168.0.0/20

IPv6 CIDR block [Info](#)

☒ No IPv6 CIDR block

☐ IPAM-allocated IPv6 CIDR block

☐ Amazon-provided IPv6 CIDR block

☐ IPv6 CIDR owned by me

Tenancy [Info](#)

Default

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key

Q lalit_install_testing



Value - *optional*

Q lalit-test-Talk2data



Remove

Q Name



Q lalit_install_vpc



Remove

Add new tag

You can add 48 more tags.

Cancel

Create VPC

- Create Subnet

Create subnet [Info](#)

VPC

VPC ID

Create subnets in this VPC.

vpc-00f76aacd8bcf5cb9 (lalit_install_vpc) ▼

Associated VPC CIDRs

IPv4 CIDRs

192.168.0.0/20

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

Create a tag with a key of 'Name' and a value that you specify.

lalit_install_subnet

The name can be up to 256 characters long.

Availability Zone [Info](#)

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

Canada (Central) / ca-central-1a ▼

IPv4 CIDR block [Info](#)

Q 192.168.0.0/24 X

▼ Tags - optional

Key

Q Name X

Q lalit_install_testing X

Add new tag

You can add 48 more tags.

Remove

Add new subnet

Value - optional

Q lalit_install_subnet X

Q lalit-test-Talk2data X

Remove

Remove

Cancel

Create subnet

- Verify Router Table

The screenshot shows the 'Route tables (2)' page in the AWS VPC console. A red line highlights the route table 'rtb-0a6f4862' with the note 'Router table automatically created during Subnet creation'.

Name	Route table ID	Explicit subnet associat...	Edge associations	Main	VPC	Owner ID
-	rtb-0a6f4862	-	-	Yes	vpc-00c3c169	453004260726
-	rtb-0b0f62a691a881a8	-	-	Yes	vpc-00f76aard8bfc5d8f salt_install_vpc	453004260726

- Create Internet Gateway

The screenshot shows the 'Internet gateways (1/1)' page in the AWS VPC console. A table lists the existing internet gateway 'igw-61d7a308' with state 'Attached'.

Name	Internet gateway ID	State	VPC ID	Owner
-	igw-61d7a308	Attached	vpc-00c3c169	453004260726

VPC > Internet gateways > Create internet gateway

Create internet gateway [Info](#)

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Internet gateway settings

Name tag
Creates a tag with a key of 'Name' and a value that you specify.

lalit_install_IGW

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional	
Name	lalit_install_IGW	Remove
lalit_install_testing	lalit-test-Talk2data	Remove

[Add new tag](#)

You can add 48 more tags.

Cancel [Create internet gateway](#)

The following internet gateway was created: igw-0610b5a2c6f8adcdf - lalit_install_IGW. You can now attach to a VPC to enable the VPC to communicate with the internet. Attach to a VPC

VPC > Internet gateways > igw-0610b5a2c6f8adcdf

igw-0610b5a2c6f8adcdf / lalit_install_IGW

Details Info

Internet gateway ID	igw-0610b5a2c6f8adcdf	State	Detached	VPC ID	-	Owner	453004260726
---------------------	-----------------------	-------	----------	--------	---	-------	--------------

Tags

Key	Value
lalit_install...	lalit-test-Talk2data
Name	lalit_install_IGW

Actions

- Attach to VPC
- Detach from VPC
- Manage tags
- Delete

Manage tags

< 1 > ⓘ

- IGW – Attach to VPC

aws Services [Alt+S]

VPC > Internet gateways > Attach to VPC (igw-0610b5a2c6f8adcdf)

Attach to VPC (igw-0610b5a2c6f8adcdf) Info

VPC
Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

Available VPCs
Attach the internet gateway to this VPC.

vpc-00f76aacd8bcf5cb9 - lalit_install_vpc
▶ AWS Command Line Interface command

Cancel Attach internet gateway

- Update Router

rtb-0bdcf62de974891a9

Actions ▾

You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Details [Info](#)Route table ID
rtb-0bdcf62de974891a9VPC
vpc-00f76aacd8bcf5cb9 | lalit_install_vpcMain
YesOwner ID
453004260726Explicit subnet associations
-Edge associations
-Routes | **Subnet associations** | Edge associations | Route propagation | Tags

Explicit subnet associations (0)

Edit subnet associations

Find subnet association

< 1 > ⌕

Name ▾ | Subnet ID ▾ | IPv4 CIDR

No subnet associations

You do not have any subnet associations.

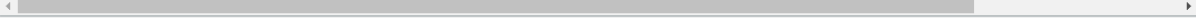
Subnets without explicit associations (1)

Edit subnet associations

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:

Find subnet association

< 1 > ⌕

Name ▾ | Subnet ID ▾ | IPv4 CIDR
lalit_install_subnet subnet-0621c5538c3329664 192.168.0.0/24

rtb-0bdcf62de974891a9

Actions ▾

You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Details [Info](#)Route table ID
rtb-0bdcf62de974891a9VPC
vpc-00f76aacd8bcf5cb9 | lalit_install_vpcMain
YesOwner ID
453004260726Explicit subnet associations
-Edge associations
-Routes | **Subnet associations** | Edge associations | Route propagation | Tags

Routes (1)

Edit routes

Filter routes

Both ▾

< 1 > ⌕

Destination ▾	Target ▾	Status ▾	Propagated ▾
192.168.0.0/20	local	Active	No

rtb-0bdcf62de974891a9

Actions ▾

 You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Details [Info](#)

Route table ID

 rtb-0bdcf62de974891a9

VPC

vpc-00f76aacd8bcf5cb9 | [lalit_install_vpc](#)

Main

 Yes

Owner ID

 453004260726

Explicit subnet associations

-

Edge associations

-

Routes


Subnet associations

Edge associations

Route propagation

Tags

Explicit subnet associations (0)

 Find subnet association Edit subnet associations< 1 > 


Name ▾	Subnet ID ▾	IPv4 CIDR ▾	IPv6 CIDR ▾
--------	-------------	-------------	-------------

No subnet associations

You do not have any subnet associations.

Subnets without explicit associations (1)

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:

 Find subnet association

Edit subnet associations

< 1 > 

Name ▾	Subnet ID ▾	IPv4 CIDR ▾	IPv6 CIDR ▾
--------	-------------	-------------	-------------

lalit_install_subnet	subnet-0621c5538c3329664	192.168.0.0/24	-
----------------------	--------------------------	----------------	---

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (1/1)

 Filter subnet associations< 1 > 

<input checked="" type="checkbox"/>	Name ▾	Subnet ID ▾	IPv4 CIDR ▾	IPv6 CIDR ▾	Route table ID ▾
<input checked="" type="checkbox"/>	lalit_install_subnet	subnet-0621c5538c3329664	192.168.0.0/24	-	Main (rtb-0bdcf62de974891a9)

Selected subnets

subnet-0621c5538c3329664 / [lalit_install_subnet](#) ✕

Cancel

Save associations

You have successfully updated subnet associations for rtb-0bdcf62de974891a9.

VPC > Route tables > rtb-0bdcf62de974891a9

rtb-0bdcf62de974891a9

Actions

You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Details

Info

Route table ID
rtb-0bdcf62de974891a9

VPC
vpc-00f76aacd8bcf5cb9 | lalit_install_vpc

Main
Yes

Owner ID
453004260726

Explicit subnet associations
subnet-0621c5538c3329664 / lalit_install_subnet

Edge associations
-

Routes

Subnet associations

Edge associations

Route propagation

Tags

Explicit subnet associations (1)

Edit subnet associations

Find subnet association

< 1 > ⌕

Name

Subnet ID

IPv4 CIDR

IPv6 CIDR

lalit_install_subnet

subnet-0621c5538c3329664

192.168.0.0/24

-

Subnets without explicit associations (0)

Edit subnet associations

Find subnet association

< 1 > ⌕

Name

Subnet ID

IPv4 CIDR

IPv6 CIDR

No subnets without explicit associations
All your subnets are associated with a route table.

VPC > Route tables > rtb-0bdcf62de974891a9

rtb-0bdcf62de974891a9

Actions

You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Details

Info

Route table ID
rtb-0bdcf62de974891a9

VPC
vpc-00f76aacd8bcf5cb9 | lalit_install_vpc

Main
Yes

Owner ID
453004260726

Explicit subnet associations
subnet-0621c5538c3329664 / lalit_install_subnet

Edge associations
-

Routes

Subnet associations

Edge associations

Route propagation

Tags

Routes (1)

Edit routes

Filter routes

Both

< 1 > ⌕

Destination

Target

Status

Propagated

192.168.0.0/20

local

Active

No

VPC > Route tables > rtb-0bdcf62de974891a9 > Edit routes

Edit routes

Destination

Target

Status

Propagated

192.168.0.0/20

Q local

X

Active

No

Q 0.0.0.0/0

X

Q igw-0610b5a2c6f8adcdff

X

-

No

Remove

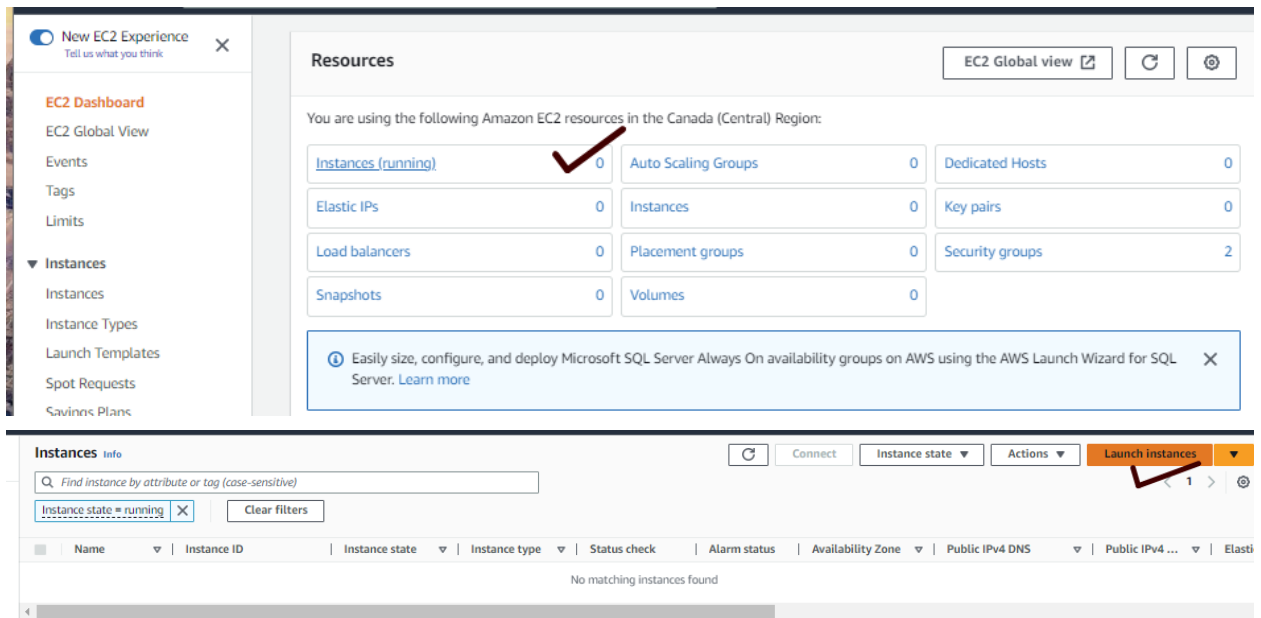
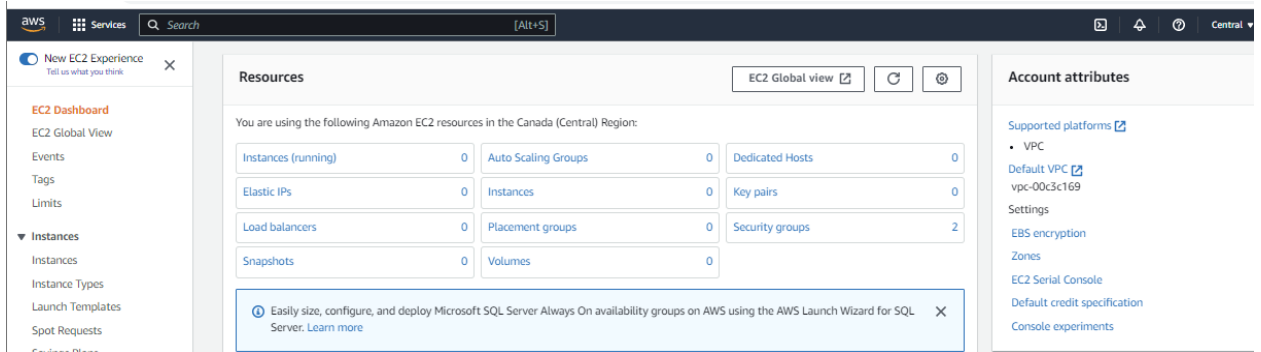
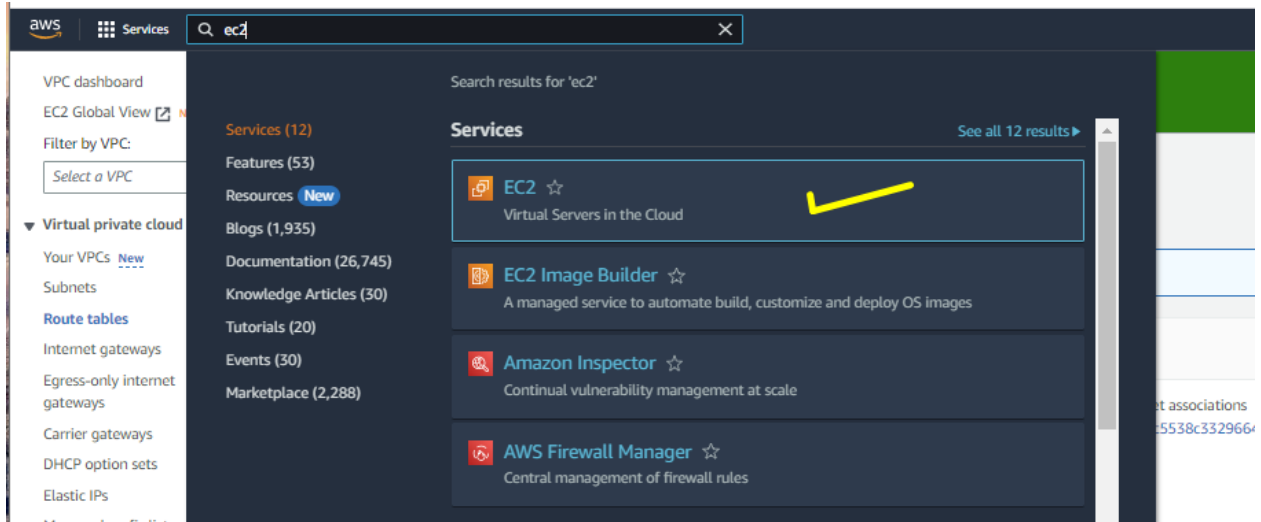
Add route

Cancel

Preview

Save changes

- Create instance based on your requirement



Compare instance types

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Currently selected: g5.8xlarge (32 vCPUs, 131072 memory, EBS only)

Instance types (1/8)

Instance family: g5

Clear filters

	Instance type	vCPUs	Architecture	Memory (GiB)	Storage (GB)	Storage type	Network performance
<input type="radio"/>	g5.4xlarge	16	x86_64	64	600	ssd	Up to 25 Gigabit
<input type="radio"/>	g5.2xlarge	8	x86_64	32	450	ssd	Up to 10 Gigabit
<input type="radio"/>	g5.12xlarge	48	x86_64	192	3800	ssd	40 Gigabit
<input type="radio"/>	g5.24xlarge	96	x86_64	384	3800	ssd	50 Gigabit
<input type="radio"/>	g5.16xlarge	64	x86_64	256	1900	ssd	25 Gigabit
<input checked="" type="radio"/>	g5.8xlarge	32	x86_64	128	900	ssd	25 Gigabit
<input type="radio"/>	g5.xlarge	4	x86_64	16	250	ssd	Up to 10 Gigabit
<input type="radio"/>	g5.48xlarge	192	x86_64	768	7600	ssd	100 Gigabit

Cancel

Select instance type

- Create a new key for SSH login to server

▼ Instance type [Info](#)

Instance type

g5.8xlarge

Family: g5 32 vCPU 128 GiB Memory

On-Demand SUSE pricing: 2.84311 USD per Hour

On-Demand RHEL pricing: 2.84811 USD per Hour

On-Demand Windows pricing: 4.19011 USD per Hour

On-Demand Linux pricing: 2.71811 USD per Hour

▼

[Compare instance types](#)

▼ Key pair (login) [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

Select

▼

↻

Create new key pair

Create key pair

×

Key pairs allow you to connect to your instance securely.

Enter the name of the key pair below. When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#)

Key pair name

Lalit_talk2data_ec2_install_key

The name can include upto 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

☒ RSA
RSA encrypted private and public key pair

☐ ED25519
ED25519 encrypted private and public key pair (Not supported for Windows instances)

Private key file format

☒ .pem
For use with OpenSSH

☐ .ppk
For use with PuTTY

Cancel

Create key pair

- Select the VPC, which we created earlier.


Edit

Enable

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☐ Select existing security group

To set up an endpoint, for example when creating a web server

 Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

VPC - *required* [Info](#)

C

Q

C

[Create new subnet \[](#)

vpc-00f76aacd8bcf5cb9 (lalit_install_vpc)

- Create Security Group based on requirement

VPC - required [Info](#)

vpc-00f76aacd8bcf5cb9 (lalit_install_vpc)
192.168.0.0/20



Subnet [Info](#)

subnet-0621c5538c3329664 lalit_install_subnet
VPC: vpc-00f76aacd8bcf5cb9 Owner: 453004260726
Availability Zone: ca-central-1a IP addresses available: 251 CIDR: 192.168.0.0/24



[Create new subnet](#)

Auto-assign public IP [Info](#)

Enable

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Create security group

☐ Select existing security group

Security group name - required

lalit_talk2data_install-SG

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and ._-:/()#,@[]+=&:!\$*

Description - required [Info](#)

It used for testing - installation.

Inbound security groups rules

▼ Security group rule 1 (TCP, 22, 222.253.44.242/32)

Remove

Type [Info](#)

ssh

Protocol [Info](#)

TCP

Port range [Info](#)

22

Source type [Info](#)

My IP

Name [Info](#)

Q Add CIDR, prefix list or security

Description - optional [Info](#)

e.g. SSH for admin desktop

[REDACTED] X

▼ Security group rule 2 (ICMP, All, 222.253.44.242/32)

Remove

Type [Info](#)

All ICMP - IPv4

Protocol [Info](#)

ICMP

Port range [Info](#)

All

Source type [Info](#)

My IP

Name [Info](#)

Q Add CIDR, prefix list or security

Description - optional [Info](#)

e.g. SSH for admin desktop

[REDACTED] X

- Attach Disk for data volume

▶ Advanced network configuration

▼ Configure storage
Info
Advanced

1x 150 GiB gp2 Root volume (Not encrypted)

1x 100 GiB gp3 EBS volume (Not encrypted) Remove

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

Add new volume

Instance store volumes Show details
Instance Type Volumes are not included in the template unless modified

The selected AMI contains more instance store volumes than the instance allows. Only the first 1 instance store volumes from the AMI will be accessible from the instance

0 x File systems Edit

▶ Advanced details
Info

▼ Summary

Number of instances Info
1

Software Image (AMI)
Canonical, Ubuntu Server Pro, ...read more
ami-0d07356d58fb4af48

Virtual server type (instance type)
g5.xlarge

Firewall (security group)
New security group

Storage (volumes)
3 volume(s) - 1150 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth

Cancel Launch instance

EC2 > Instances > Launch an instance

Launching instance

Please wait while we launch your instance.

Do not close your browser while this is loading.

Launch initiation

69%

▶ Details

EC2 > Instances > Launch an instance

✔ Success

Successfully initiated launch of instance (i-0dd64c1d5c9abad6b)

▶ Launch log

- Assign Elastic IP to this instance

Capacity Reservations

▼ Images

AMIs

AMI Catalog

▼ Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

▼ Network & Security

Security Groups

Elastic IPs

Elastic IP addresses

⌂ Actions ▾ Allocate Elastic IP address

Filter Elastic IP addresses

Name

Allocated IPv4 add...

Type

Allocation ID

Reverse DNS record

Associated in

No Elastic IP addresses found in this Region

Allocate Elastic IP address Info

Elastic IP address settings Info

Network Border Group Info

ca-central-1

Public IPv4 address pool

☒ Amazon's pool of IPv4 addresses

☐ Public IPv4 address that you bring to your AWS account (option disabled because no pools found) [Learn more](#)

☐ Customer owned pool of IPv4 addresses (option disabled because no customer owned pools found) [Learn more](#)

Global static IP addresses

AWS Global Accelerator can provide global static IP addresses that are announced worldwide using anycast from AWS edge locations. This can help improve the availability and latency for your user traffic by using the Amazon global network. [Learn more](#)

Create accelerator

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

No tags associated with the resource.

Add new tag

You can add up to 50 more tag

Cancel

Allocate

Elastic IP addresses (1/1)

Filter Elastic IP addresses

<input checked="" type="checkbox"/>	Name	Allocated IPv4 add...	Type	Allocation ID	Reve
<input checked="" type="checkbox"/>	-	52.60.161.107	Public IP	eipalloc-05843df2d534ab329	-

EC2 > Elastic IP addresses > 52.60.161.107

52.60.161.107

Actions Associate Elastic IP address

Summary

Allocated IPv4 address 52.60.161.107	Type Public IP	Allocation ID eipalloc-05843df2d534ab329	Reverse DNS record -
Association ID -	Scope VPC	Associated instance ID -	Private IP address -
Network interface ID -	Network interface owner account ID -	Public DNS -	NAT Gateway ID -
Address pool Amazon	Network Border Group ca-central-1		

Tags (1)

Manage tags

< 1 > ⓘ

Key	Value
lalit_install_testing	lalit-test-Talk2data

Associate Elastic IP address


Choose the instance or network interface to associate to this Elastic IP address (52.60.161.107)

Elastic IP address: 52.60.161.107

Resource type

Choose the type of resource with which to associate the Elastic IP address.

- ☒ Instance
- ☐ Network interface

 If you associate an Elastic IP address with an instance that already has an Elastic IP address associated, the previously associated Elastic IP address will be disassociated, but the address will still be allocated to your account. [Learn more](#)

If no private IP address is specified, the Elastic IP address will be associated with the primary private IP address.

Instance

i-0dd64c1d5c9abad6b (Lalit_talk2data_install_eC2) - running



Private IP address

The private IP address with which to associate the Elastic IP address.

i-0dd64c1d5c9abad6b (Lalit_talk2data_install_eC2) - running

Reassociation

Specify whether the Elastic IP address can be reassociated with a different resource if it already associated with a resource.

- ☐ Allow this Elastic IP address to be reassociated

Cancel

Associate

Associate Elastic IP address


Choose the instance or network interface to associate to this Elastic IP address (52.60.161.107)

Elastic IP address: 52.60.161.107

Resource type

Choose the type of resource with which to associate the Elastic IP address.

- ☒ Instance
- ☐ Network interface

 If you associate an Elastic IP address with an instance that already has an Elastic IP address associated, the previously associated Elastic IP address will be disassociated, but the address will still be allocated to your account. [Learn more](#)

If no private IP address is specified, the Elastic IP address will be associated with the primary private IP address.

Instance

Private IP address

The private IP address with which to associate the Elastic IP address.

Reassociation

Specify whether the Elastic IP address can be reassociated with a different resource if it already associated with a resource.

- ☒ Allow this Elastic IP address to be reassociated

Cancel

Associate

✓ Elastic IP address associated successfully.
Elastic IP address 52.60.161.107 has been associated with instance i-0dd64c1d5c9abad6b

EC2 > Elastic IP addresses > 52.60.161.107

52.60.161.107

Actions Associate Elastic IP address

Summary

Allocated IPv4 address 52.60.161.107	Type Public IP	Allocation ID eipalloc-05843df2d534ab329	Reverse DNS record -
Association ID eipassoc-01b8f48095e3eb018	Scope VPC	Associated instance ID i-0dd64c1d5c9abad6b	Private IP address 192.168.0.199
Network interface ID eni-072fc5f976158c957	Network interface owner account ID 453004260726	Public DNS -	NAT Gateway ID -
Address pool Amazon	Network Border Group ca-central-1		

Tags (1)

Manage tags

Key	Value
lalit_install_testing	lalit-test-Talk2data

New EC2 Experience
Tell us what you think

EC2 Dashboard ✓

EC2 Global View

Events

Tags

Limits

▼ Instances

- Instances
- Instance Types
- Launch Templates
- Spot Requests
- Savings Plans
- Reserved Instances
- Dedicated Hosts
- Capacity Reservations

✓ Elastic IP address associated successfully.
Elastic IP address 52.60.161.107 has been associated with instance i-0dd64c1d5c9abad6b

EC2 > Elastic IP addresses > 52.60.161.107

52.60.161.107

Summary

Allocated IPv4 address 52.60.161.107	Type Public IP	Allocation ID eipalloc-05843df2d53
Association ID eipassoc-01b8f48095e3eb018	Scope VPC	Associated instance ID i-0dd64c1d5c9abad6b
Network interface ID eni-072fc5f976158c957	Network interface owner account ID 453004260726	Public DNS -
Address pool Amazon	Network Border Group ca-central-1	

- Verify Public IP of instance

EC2 > Instances > i-0dd64c1d5c9abad6b

Instance summary for i-0dd64c1d5c9abad6b (Lalit_talk2data_install_ec2) [Info](#)

Updated less than a minute ago

Instance ID i-0dd64c1d5c9abad6b (Lalit_talk2data_install_ec2)	Public IPv4 address 52.60.161.107 open address
IPv6 address -	Instance state Running
Hostname type IP name: ip-192-168-0-199.ca-central-1.compute.internal	Private IP DNS name (IPv4 only) ip-192-168-0-199.ca-central-1.compute.internal
Answer private resource DNS name -	Instance type g5.xlarge
Auto-assigned IP address -	VPC ID vpc-00f76aacd8bcf5cb9 (lalit_install_vpc)
IAM Role -	Subnet ID subnet-0621c5538c3329664 (lalit_install_subnet)
IMDSv2 Optional	

[Details](#) | [Security](#) | [Networking](#) | [Storage](#) | [Status checks](#) | [Monitoring](#) | [Tags](#)

▼ Instance details [Info](#)

Platform Ubuntu (Inferred)	AMI ID ami-0d07356d58fb4af48
Platform details Ubuntu Pro Linux	AMI name ubuntu-pro-server/images/hvm-ssd/ubuntu-focal-20.04-amd64-pro-server-20230324.1
Stop protection Disabled	Launch time Thu Mar 30 2023 15:03:50 GMT+0700 (Indochina Time) (11 minutes)
Instance auto-recovery Default	Lifecycle normal
AMI Launch index 0	Key pair assigned at launch Lalit_talk2data_ec2_install_key
Credit specification Instance type does not support bursting	Kernel ID -
Usage operation RunInstances:0g00	RAM disk ID -
Enclaves Support Disabled	Boot mode -
Allow tags in instance metadata	Use RBN as guest OS hostname

- Login to instance

EC2 > Instances > i-0dd64c1d5c9abad6b

Instance summary for i-0dd64c1d5c9abad6b (Lalit_talk2data_install_ec2) [Info](#)

Updated less than a minute ago

[Refresh](#) | [Connect](#) | [Instance state](#) | [Actions](#)

Instance ID i-0dd64c1d5c9abad6b (Lalit_talk2data_install_ec2)	Public IPv4 address 52.60.161.107 open address	Private IPv4 addresses 192.168.0.199
IPv6 address -	Instance state Running	Public IPv4 DNS -

- Update the system:

- sudo apt update && sudo apt upgrade -y
- sudo apt install build-essential wget curl gnupg lsb-release ca-certificates xfsprogs -y

- Install NVIDIA CUDA Toolkit 11.7.

- wget
https://developer.download.nvidia.com/compute/cuda/11.7.1/local_installers/cuda_11.7.1_515.65.01_linux.run
- sudo sh cuda_11.7.1_515.65.01_linux.run

```
ubuntu@ip-192-168-0-199:~$ wget https://developer.download.nvidia.com/compute/cuda/11.7.1/local_installers/cuda_11.7.1_515.65.01_linux.run
nux.ru--2023-03-30 08:20:01-- https://developer.download.nvidia.com/compute/cuda/11.7.1/local_installers/cuda_11.7.1_515.65.01_linux.run
Resolving developer.download.nvidia.com (developer.download.nvidia.com)... 152.195.19.142
Connecting to developer.download.nvidia.com (developer.download.nvidia.com)|152.195.19.142|:443... nconnected.
HTTP request sent, awaiting response... 200 OK
Length: 3524358811 (3.3G) [application/octet-stream]
Saving to: 'cuda_11.7.1_515.65.01_linux.run'

cuda_11.7.1_515.65.01_linux.run      100%[=====>] 3.28G  110MB/s  in 28s
2023-03-30 08:20:29 (119 MB/s) - 'cuda_11.7.1_515.65.01_linux.run' saved [3524358811/3524358811]

ubuntu@ip-192-168-0-199:~$ sudo sh cuda_11.7.1_515.65.01_linux.run
```

```
ubuntu@ip-192-168-0-199:~$ sudo sh cuda_11.7.1_515.65.01_linux.run
Failed to verify gcc version. See log at /var/log/cuda-installer.log for details.
ubuntu@ip-192-168-0-199:~$ cat /var/log/cuda-installer.log
[INFO]: Driver not installed.
[INFO]: Checking compiler version...
[INFO]: gcc location:
[ERROR]: Missing gcc. gcc is required to continue.
ubuntu@ip-192-168-0-199:~$ sudo apt install build-essential wget curl gnupg lsb-release ca-certificates xfsprogs -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
lsb-release is already the newest version (11.1.0ubuntu2).
```

- Reboot the server and try again.

- lspci | grep -i nvidia
- uname -m && cat /etc/*release

```
Last login: Thu Mar 30 08:17:02 2023 from 222.253.44.242
ubuntu@ip-192-168-0-199:~$ gcc --version
gcc (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0
Copyright (C) 2019 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

ubuntu@ip-192-168-0-199:~$ sudo sh cuda_11.7.1_515.65.01_linux.run
```

- Accept license

End User License Agreement

NVIDIA Software License Agreement and CUDA Supplement to
Software License Agreement. Last updated: October 8, 2021

The CUDA Toolkit End User License Agreement applies to the
NVIDIA CUDA Toolkit, the NVIDIA CUDA Samples, the NVIDIA
Display Driver, NVIDIA Nsight tools (Visual Studio Edition),
and the associated documentation on CUDA APIs, programming
model and development tools. If you do not agree with the
terms and conditions of the license agreement, then do not
download or use the software.

Last updated: October 8, 2021.

Preface

Do you accept the above EULA? (accept/decline/quit):

☐

CUDA Installer

- [X] Driver
 - [X] 515.65.01
- + [X] CUDA Toolkit 11.7
 - [X] CUDA Demo Suite 11.7
 - [X] CUDA Documentation 11.7
- [] Kernel Objects
 - [] nvidia-fs

Options

Install

Up/Down: Move | Left/Right: Expand | 'Enter': Select | 'A': Advanced options

```

ubuntu@ip-192-168-0-199:~$ sudo sh cuda_11.7.1_515.65.01_linux.run
=====
= Summary =
=====

Driver:    Installed
Toolkit:   Installed in /usr/local/cuda-11.7/

Please make sure that
- PATH includes /usr/local/cuda-11.7/bin
- LD_LIBRARY_PATH includes /usr/local/cuda-11.7/lib64, or, add /usr/local/cuda-11.7/lib64 to /etc/ld.so.conf and run ldconfig as root

To uninstall the CUDA Toolkit, run cuda-uninstaller in /usr/local/cuda-11.7/bin
To uninstall the NVIDIA Driver, run nvidia-uninstall
Logfile is /var/log/cuda-installer.log
ubuntu@ip-192-168-0-199:~$

```

```

ubuntu@ip-192-168-0-199:~$ lspci | grep -i nvidia
00:1e.0 3D controller: NVIDIA Corporation Device 2237 (rev a1)
ubuntu@ip-192-168-0-199:~$ uname -m && cat /etc/*release
x86_64
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=20.04
DISTRIB_CODENAME=focal
DISTRIB_DESCRIPTION="Ubuntu 20.04.6 LTS"
NAME="Ubuntu"
VERSION="20.04.6 LTS (Focal Fossa)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 20.04.6 LTS"
VERSION_ID="20.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
VERSION_CODENAME=focal
UBUNTU_CODENAME=focal
ubuntu@ip-192-168-0-199:~$

```

- **nvidia-smi**

ubuntu@ip-192-168-0-199:~\$ nvidia-smi

Thu Mar 30 08:36:04 2023

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+									
NVIDIA-SMI 515.65.01				Driver Version: 515.65.01				CUDA Version: 11.7	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+									
GPU	Name	Persistence-M		Bus-Id	Disp.A	Volatile	Uncorr. ECC		
Fan	Temp	Perf	Pwr:Usage/Cap	Memory-Usage		GPU-Util	Compute M.	MIG M.	
=====									
0	NVIDIA A10G	Off		00000000:00:1E.0	Off			0	
0%	22C	P0	57W / 300W	0MiB / 23028MiB		10%	Default	N/A	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+									

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+														
Processes:														
GPU	GI	CI	PID	Type	Process name	GPU Memory								
	ID	ID				Usage								
=====														
No running processes found														
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+														

ubuntu@ip-192-168-0-199:~\$

```
ubuntu@ip-192-168-0-199:/$ nvidia-smi
```

```
Thu Mar 30 10:11:57 2023
```

NVIDIA-SMI		515.65.01		Driver Version: 515.65.01			CUDA Version: 11.7		

GPU	Name	Persistence-M		Bus-Id	Disp.A	Volatile	Uncorr. ECC		
Fan	Temp	Perf	Pwr:Usage/Cap	Memory-Usage		GPU-Util	Compute M.	MIG M.	
=====									
0	NVIDIA A10G	Off		00000000:00:1E.0	Off			0	
0%	25C	P0	56W / 300W	2992MiB / 23028MiB		0%	Default		N/A

Processes:							
GPU	GI	CI	PID	Type	Process name	GPU Memory Usage	
	ID	ID					
0	N/A	N/A	7829	C	...t2d_temp/tmpofbrlq31/exec	249MiB	
0	N/A	N/A	7830	C	...t2d_temp/tmpofbrlq31/exec	249MiB	
0	N/A	N/A	7831	C	...t2d_temp/tmpofbrlq31/exec	249MiB	
0	N/A	N/A	7832	C	...t2d_temp/tmpofbrlq31/exec	249MiB	
0	N/A	N/A	8272	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8273	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8274	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8275	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8276	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8278	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8280	C	...t2d_temp/tmp754zzxnp/exec	249MiB	
0	N/A	N/A	8281	C	...t2d_temp/tmp754zzxnp/exec	249MiB	

```
ubuntu@ip-192-168-0-199:/$
```

- Install docker.
 - curl https://get.docker.com | sh
 - sudo systemctl --now enable docker

Method 1: Using Docker

- Configure DNS entry. We are using Cloudflare.

Type	Name (required)	IPv4 address (required)	Proxy status
A	lality	3.99	<input type="checkbox"/> DNS only
	Use @ for root		

- **Install the NVIDIA container toolkit.**

- `distribution=$(. /etc/os-release;echo IDVERSION_ID) \`
`&& curl -fsSL https://nvidia.github.io/libnvidia-container/gpgkey | sudo`
`gpg --dearmor -o /usr/share/keyrings/nvidia-container-toolkit-keyring.gpg`
`\`
`&& curl -s -L`
`https://nvidia.github.io/libnvidia-container/$distribution/libnvidia-containe`
`r.list | \`
`sed 's#deb https://#deb`
`[signed-by=/usr/share/keyrings/nvidia-container-toolkit-keyring.gpg]`
`https://#g' | \`
- `sudo tee /etc/apt/sources.list.d/nvidia-container-toolkit.list`
- `sudo apt update`
- `sudo apt install nvidia-docker2`
- `sudo systemctl restart docker`
- `nvidia-docker version`

```
ubuntu@ip-192-168-0-199:~$ nvidia-docker version
NVIDIA Docker: 2.12.0
Client: Docker Engine - Community
Version:      23.0.2
API version:  1.42
Go version:   go1.19.7
Git commit:   569dd73
Built:        Mon Mar 27 16:16:18 2023
OS/Arch:      linux/amd64
Context:      default
permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Get "http://%2Fvar%2Frun%2Fdocker.sock/v1.24/version": dial
unix /var/run/docker.sock: connect: permission denied
ubuntu@ip-192-168-0-199:~$
```

- **Issue:**

permission denied while trying to connect to the Docker daemon socket at
unix:///var/run/docker.sock: Get "http://%2Fvar%2Frun%2Fdocker.sock/v1.24/version":
dial unix /var/run/docker.sock: connect: permission denied
ubuntu@ip-192-168-0-199:~\$ ls -lhart /var/run/docker.sock
srw-rw---- 1 root docker 0 Mar 30 08:59 /var/run/docker.sock

ubuntu@ip-192-168-0-199:~\$ sudo chmod 666 /var/run/docker.sock

```
permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Get "http://%2Fvar%2Frun%2Fdocker.sock/v1.24/version": dial
unix /var/run/docker.sock: connect: permission denied
ubuntu@ip-192-168-0-199:~$ ls -lhart /var/run/docker.sock
srw-rw---- 1 root docker 0 Mar 30 08:59 /var/run/docker.sock
ubuntu@ip-192-168-0-199:~$ sudo chmod 666 /var/run/docker.sock
ubuntu@ip-192-168-0-199:~$ nvidia-docker version
NVIDIA Docker: 2.12.0
Client: Docker Engine - Community
 Version:      23.0.2
 API version:  1.42
 Go version:   go1.19.7
 Git commit:   569dd73
 Built:        Mon Mar 27 16:16:18 2023
 OS/Arch:      linux/amd64
 Context:      default
Server: Docker Engine - Community
 Engine:
  Version:      23.0.2
  API version:  1.42 (minimum version 1.12)
  Go version:   go1.19.7
  Git commit:   219f21b
  Built:        Mon Mar 27 16:16:18 2023
  OS/Arch:      linux/amd64
  Experimental: false
 containerd:
  Version:      1.6.19
  GitCommit:    1e1ea6e986c6c86565bc33d52e34b81b3e2bc71f
 runc:
  Version:      1.1.4
  GitCommit:    v1.1.4-0-g5fd4c4d
 docker-init:
  Version:      0.19.0
  GitCommit:    de40ad0
ubuntu@ip-192-168-0-199:~$
```

- Make sure that /dev/shm size is at least half of physical memory.
To change the configuration for /dev/shm, add one line to /etc/fstab. For example, if the system has 128 GB of physical memory:

- tmpfs /dev/shm tmpfs defaults,size=64g 0 0

- Run the command below to make the change immediately:

- sudo mount -o remount /dev/shm

```
ubuntu@ip-192-168-0-199:~$ sudo vi /etc/fstab
ubuntu@ip-192-168-0-199:~$ sudo mount -o remount /dev/shm
```

```

ubuntu@ip-192-168-0-199:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        146G   13G  133G   9% /
devtmpfs         63G     0   63G   0% /dev
tmpfs            64G     0   64G   0% /dev/shm
tmpfs           13G   1.1M   13G   1% /run
tmpfs            5.0M     0   5.0M   0% /run/lock
tmpfs           63G     0   63G   0% /sys/fs/cgroup
/dev/loop0       25M   25M     0 100% /snap/amazon-ssm-agent/6312
/dev/loop1       9.0M   9.0M     0 100% /snap/canonical-livepatch/164
/dev/loop2       64M   64M     0 100% /snap/core20/1852
/dev/nvme0n1p15  105M   6.1M   99M   6% /boot/efi
/dev/loop3      117M  117M     0 100% /snap/core/14946
/dev/loop4       92M   92M     0 100% /snap/lxd/24061
/dev/loop5       50M   50M     0 100% /snap/snapd/18596
/dev/loop6       56M   56M     0 100% /snap/core18/2714
tmpfs           13G     0   13G   0% /run/user/1000
/dev/loop7       44M   44M     0 100% /snap/certbot/2836
ubuntu@ip-192-168-0-199:~$ █

```

- sudo mkdir -p /config/ssl
- sudo mv tls.crt /config/ssl
- sudo mv tls.key /config/ssl
- **Create default directories to store user data. We highly recommend using persistent storage for these directories. In the commands below, we use an empty EBS volume.**
- **Pull the BBrowserX image.**
 - sudo mkfs -t ext4 /dev/nvme2n1
 - sudo mkdir /data
 - sudo mount /dev/nvme2n1 /data
 - sudo mkdir /data/app_data
 - sudo mkdir /data/user_data

- sudo docker pull bioturing/bioturing-colab:1.0.1

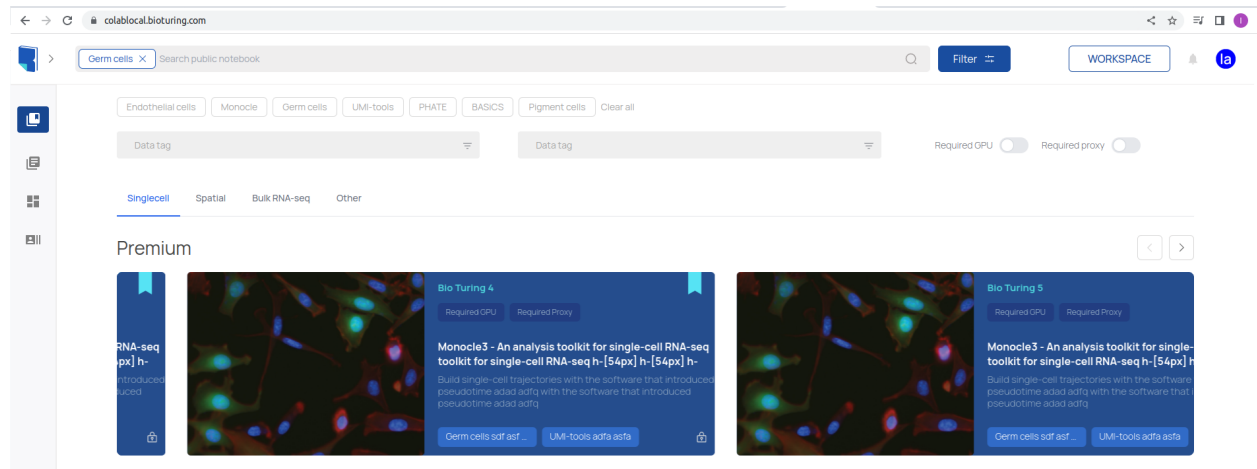
- Run the docker image.

```
docker run -it -d \
-e WEB_DOMAIN='<yourcompany.com>' \
-e BIOTURING_TOKEN='<your token from BioTuring>' \
-e SSO_DOMAINS='<your company email address, example: @bioturing.com>' \
-e ADMIN_USERNAME='<your admin user name>' \
-e ADMIN_PASSWORD='<your admin password>' \
-v /data/user_data:/data/user_data \
-v /data/app_data:/data/app_data \
--name bioturing-colab \
--gpus all \
--shm-size=64gb \
-p 443:443 \
-p 80:80 \
bioturing/bioturing-colab:1.0.1
```

```
ubuntu@ip-192-168-0-199:/$ sudo systemctl restart docker
ubuntu@ip-192-168-0-199:/$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2023-03-30 09:37:32 UTC; 7s ago
     TriggeredBy: ● docker.socket
    Docs: https://docs.docker.com
   Main PID: 5149 (dockerd)
      Tasks: 27
     Memory: 27.2M
    CGroup: /system.slice/docker.service
            └─5149 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.670354201Z" level=info msg="[core] [Channel #4] Channel Connectivity ch
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.692326515Z" level=info msg="[graphdriver] using prior storage driver: o
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.699722164Z" level=info msg="Loading containers: start."
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.780642216Z" level=info msg="Default bridge (docker0) is assigned with a
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.810434391Z" level=info msg="Loading containers: done."
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.822853826Z" level=info msg="Docker daemon" commit=219f21b graphdriver=co
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.822904287Z" level=info msg="Daemon has completed initialization"
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.833190820Z" level=info msg="[core] [Server #7] Server created" module=g
Mar 30 09:37:32 ip-192-168-0-199 systemd[1]: Started Docker Application Container Engine.
Mar 30 09:37:32 ip-192-168-0-199 dockerd[5149]: time="2023-03-30T09:37:32.837231762Z" level=info msg="API listen on /run/docker.sock"
```

Wait for a few minutes for the platform to download all of the required services.
After that, the BioTuring Colab is up and running.



Method 2: Using Kubernetes

===== Reference

<https://www.howtoforge.com/how-to-install-containerd-container-runtime-on-ubuntu-22-04/#comments>

<https://blog.antosubash.com/posts/setup-micro-k8s-with-ubuntu>

- Patch container engines (Docker, Containerd)

Install NVidia container toolkit on each node following the guide:

<https://docs.nvidia.com/datacenter/cloud-native/container-toolkit/install-guide.html>

Check container engines (Docker, Containerd)

<https://github.com/bioturing/installation>

- **Check container engines (Docker, Containerd)**

For microk8s :

- microk8s kubectl describe no | grep Runtime

For vanilla :

- kubectl describe no | grep Runtime

- **If container engine is Containerd, add these lines to :**
/etc/containerd/config.toml

```
privileged_without_host_devices = false

base_runtime_spec = ""

[plugins."io.containerd.grpc.v1.cri".containerd.runtimes.runc.options]
    SystemdCgroup = true

[plugins."io.containerd.grpc.v1.cri".containerd.runtimes.nvidia]
    privileged_without_host_devices = false
    runtime_engine = ""
    runtime_root = ""
    runtime_type = "io.containerd.runc.v1"

[plugins."io.containerd.grpc.v1.cri".containerd.runtimes.nvidia.options]
    BinaryName = "/usr/bin/nvidia-container-runtime"
    SystemdCgroup = true

[plugins."io.containerd.grpc.v1.cri".cni]
    bin_dir = "/opt/cni/bin"
    conf_dir = "/etc/cni/net.d"
```

- **After that, restart containerd**
 - `sudo systemctl restart containerd`

- `sudo nvidia-container-cli --load-kmods info`

- **If container engine is Docker, add these lines to : `/etc/docker/daemon.json`**

```
{  
  "default-runtime": "nvidia",  
  "runtimes": {  
    "nvidia": {  
      "path": "nvidia-container-runtime",  
      "runtimeArgs": []  
    }  
  }  
}
```

- **After that, restart docker**
 - `sudo systemctl restart docker`
 - `sudo nvidia-container-cli --load-kmods info`

```

ubuntu@ip-192-168-0-186:~$ microk8s kubectl describe no | grep Runtime
Container Runtime Version: containerd://1.6.8
ubuntu@ip-192-168-0-186:~$ cat /etc/docker/daemon.json
{
  "runtimes": {
    "nvidia": {
      "path": "nvidia-container-runtime",
      "runtimeArgs": []
    }
  }
}
ubuntu@ip-192-168-0-186:~$ docker -v
Docker version 23.0.2, build 569dd73
ubuntu@ip-192-168-0-186:~$ sudo systemctl restart docker
do nvidia-container-cli --load-kmods info
NVRM version: 515.65.01
CUDA version: 11.7

Device Index: 0
Device Minor: 0
Model: NVIDIA A10G
Brand: Nvidia
GPU UUID: GPU-fd9ffd32-13f4-61dd-ce58-197c9f1b9fb5
Bus Location: 00000000:00:1e.0
Architecture: 8.6

```

- **Install BioTuring Colab on K8S**

We support all k8s engines: GKE (Google Kubernetes Engine), EKS (Amazon Elastic Kubernetes Service), AKS (Azure Kubernetes Service), MicroK8s, and vanilla K8S.

Ensure that helm (version 3) is installed.

First, check the Helm version

- microk8s enable helm3
- microk8s helm3 version

- **Add BioTuring Helm charts**

- <https://bioturing.github.io/charts/> : for kubernetes

Example:

For Vanilla K8s:

- helm repo add bioturing <https://bioturing.github.io/charts> for Microk8s:
- microk8s helm3 repo add bioturing <https://bioturing.github.io/charts>

```

ubuntu@ip-192-168-0-186:~$ microk8s enable helm3
Infer repository core for addon helm3
Addon core/helm3 is already enabled
ubuntu@ip-192-168-0-186:~$ microk8s helm3 version
version.BuildInfo{Version:"v3.9.1+unreleased", GitCommit:"7112315b8d78eab23e9542c4fd824375429ca965", GitTreeState:"clean", GoVersion:"go1.19.5"}
ubuntu@ip-192-168-0-186:~$ microk8s helm3 repo add bioturing https://bioturing.github.io/charts/apps/
"bioturing" already exists with the same configuration, skipping
ubuntu@ip-192-168-0-186:~$

```

Helm chart Values

Kubernetes: >=

Key	Type	Default	Description
image.tag	string	"1.0.1"	image tag
secret.data.domain	string	"colab.com"	your domain
secret.data.ssodomains	string	""	allow domains
secret.data.bbtoken	string	""	bioturing access token
secret.data.allowips	string	""	allow ips
secret.admin.username	string	admin	username
secret.admin.password	string	turing2022	password
secret.server.useletsencrypt	string	"false"	
secret.server.lcall	string	"C.UTF-8"	
secret.server.lclang	string	"C.UTF-8"	
secret.server.certificate	string	""	CRT base64 string
secret.server.key	string	""	KEY base64 string
service.type	string	ClusterIP	
service.ports.http.port	int	80	
service.ports.https.port	int	443	
persistence.dirs.app.size	string	5Gi	APP size
persistence.dirs.app.storageClass	string	""	
persistence.dirs.user.size	string	5Gi	USER size
persistence.dirs.shm.size	string	1Gi	SHM size
persistence.dirs.user.storageClass	string	""	
persistence.dirs.user.existingClaim	bool	FALSE	
ingress.enabled	bool	TRUE	
ingress.className	string	""	
ingress.annotations	object	{}	
ingress.tls.enabled	bool	TRUE	
resources	object	{}	
autoscaling	object	{}	

nodeSelector	object	{}	
tolerations	object	{}	
affinity	object	{}	
podAnnotations	object	{}	
podSecurityContext	object	{}	
securityContext	object	{}	
serviceAccount.name	string	""	
gpu.enabled	bool	TRUE	
gpu.runtimeClassName	string	"nvidia"	

- **For Containerd runtime :**

gpu.runtimeClassName="nvidia"

- **For Docker runtime :**

gpu.runtimeClassName=""

- **Simple Installation (Recommended):**

```
ubuntu@ip-192-168-0-186:~$ bash ./install.k8s.sh
Your K8S engine [vanilla, microk8s]:
Do you need install CUDA Toolkit [y, n]: y
Installing NVIDIA CUDA Toolkit 11.7

--2023-03-31 07:57:21-- https://developer.download.nvidia.com/compute/cuda/11.7.1/local_installers/cuda_11.7.1_515.65.01_linux.run
Resolving developer.download.nvidia.com (developer.download.nvidia.com)... 152.195.19.142
Connecting to developer.download.nvidia.com (developer.download.nvidia.com)|152.195.19.142|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3524358811 (3.3G) [application/octet-stream]
Saving to: 'cuda_11.7.1_515.65.01_linux.run'

cuda_11.7.1_515.65.01_linux.run  100%[=====>]  3.28G  64.4MB/s   in 52s

2023-03-31 07:58:13 (64.1 MB/s) - 'cuda_11.7.1_515.65.01_linux.run' saved [3524358811/3524358811]
```

End User License Agreement

NVIDIA Software License Agreement and CUDA Supplement to
Software License Agreement. Last updated: October 8, 2021

The CUDA Toolkit End User License Agreement applies to the
NVIDIA CUDA Toolkit, the NVIDIA CUDA Samples, the NVIDIA
Display Driver, NVIDIA Nsight tools (Visual Studio Edition),
and the associated documentation on CUDA APIs, programming
model and development tools. If you do not agree with the
terms and conditions of the license agreement, then do not
download or use the software.

Last updated: October 8, 2021.

Preface

Do you accept the above EULA? (accept/decline/quit):

accept

CUDA Installer

- ☒ Driver
 - ☒ 515.65.01
- + ☒ CUDA Toolkit 11.7
 - ☒ CUDA Demo Suite 11.7
 - ☒ CUDA Documentation 11.7
- ☐ Kernel Objects
 - ☐ nvidia-fs

Options

Install

Up/Down: Move | Left/Right: Expand | 'Enter': Select | 'A': Advanced options


```

ubuntu@ip-192-168-0-186:~$ bash ./install.k8s.sh
Your K8S engine [vanilla, microk8s]: microk8s
Do you need install CUDA Toolkit [y, n]: n
Ignore re-install CUDA Toolkit
BioTuring ecosystem VanillaK8S installation version stable

Please enter Bioturing's TOKEN: eyJhbGciOiJIUzI1NiIsInR5cGE6YWV0IjoiACGumD%KkaGkg0uWk
21g...: jQ4MTY1NjJ9.
Please enter your DOMAIN: lalita1b2dtest.bioturing.com
Please enter your admin name (admin): admin
Please enter your admin password (turing2022): turing2022
Please enter BBrowserX's VERSION (1.0.20): 1.0.20
Please enter LC_ALL (C.UTF-8): C.UTF-8
Please enter LC_LANG (C.UTF-8): C.UTF-8
Please enter APP-DATA PCV's size (5Gi): 15Gi
Please enter USER-DATA PCV's size (5Gi): 15Gi
Please enter SHM's size (1Gi): 6Gi
Use lets-encrypt SSL (must be public your domain), [y, n]: y
Please enter K8S namespace (default): bioturing-tkd
Enable GPU operator

Infer repository core for addon gpu
Addon core/gpu is already enabled
Logging in to registry.bioturing.com
Password:
Login Succeeded
Add BioTuring Helm charts to microk8s service

"bioturing" already exists with the same configuration, skipping
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "nvidia" chart repository
...Successfully got an update from the "bioturing" chart repository
Update Complete. Happy Helming!
Install BioTuring ecosystem to microk8s service

Release "bioturing" does not exist. Installing it now.

Release "bioturing" does not exist. Installing it now.
W0331 08:06:33.091816 44755 warnings.go:70] unknown field "spec.persistentVolumeReclaimPolicy"
NAME: bioturing
LAST DEPLOYED: Fri Mar 31 08:06:32 2023
NAMESPACE: bioturing-tkd
STATUS: deployed
REVISION: 1
NOTES:
1. Get the application URL by running these commands:
ubuntu@ip-192-168-0-186:~$

```

Going through this interactive installation to finish the installation. After this step, just access the BioTuring System via the specified domain in the installation process. If it's not in the DNS, please add the ip/domain to the local machine DNS host file.

Check pods information

- microk8s kubectl get all
- microk8s kubectl get pods
- microk8s kubectl get services --all-namespaces
- microk8s kubectl get services
- microk8s kubectl get pvc
- microk8s kubectl logs bioturing-colab
- microk8s.kubectl -n ingress get pods
- microk8s.kubectl -n ingress logs <your pod name here> | grep reload

Check secrets

- bioturing-colab-tls
- bioturing-colab
- bioturingregred

microk8s kubectl edit secrets mysecret

Example:

microk8s kubectl edit secrets bioturing-colab-tls

Manual Installation

Please replace paths to your certificate, key, admin password, and other helm chart values of your choice.

```
BBTOKEN="USE TOKEN OBTAINED FROM BIOTURING"
SSLCRT="base64 -w 0 ./bioturing.com.crt" # <- (REPLACE THIS WITH A PATH TO YOUR CRT
CERTIFICATE)
SSLKEY="base64 -w 0 ./bioturing.com.key" # <- (REPLACE THIS WITH A PATH TO YOUR
KEY)
ADMIN_USERNAME="admin"
ADMIN_PASSWORD="admin" # <- (CHANGE YOUR PASSWORD IF NECESSARY)
USELETSENCRYPT="false"
SVHOST="k8stest.bioturing.com" # <- (CHANGE THIS TO YOUR K8S INGRESS DOMAIN)
APP_DATA_SIZE="50Gi" # <- (CHANGE THIS TO YOUR APP-PVC SIZE)
USER_DATA_SIZE="100Gi" # <- (CHANGE THIS TO YOUR USER-PVC SIZE)
SHM_SIZE="64Gi" # <- (CHANGE THIS TO YOUR SHM SIZE)
CHART_VERSION="1.0.23" # <- (CHANGE IT IF NECESSARY)
LC_ALL="C.UTF-8" # <- (CHANGE IT IF NECESSARY)
LC_LANG="C.UTF-8" # <- (CHANGE IT IF NECESSARY)
```

For Microk8s:

```
microk8s helm3 repo update
microk8s helm3 registry login -u admin registry.bioturing.com
microk8s helm3 upgrade --install --set secret.data.bbtokens="{BBTOKEN}" \
--set secret.data.domain="{SVHOST}" \
--set secret.server.certificate="{SSLCRT}" \
--set secret.server.key="{SSLKEY}" \
--set secret.server.useletsencrypt="{USELETSENCRYPT}" \
--set secret.server.lcall="{LC_ALL}" \
--set secret.server.lclang="{LC_LANG}" \
--set secret.admin.username="{ADMIN_USERNAME}" \
```

```
--set secret.admin.password="${ADMIN_PASSWORD}" \
--set persistence.dirs.app.size="${APP_DATA_SIZE}" \
--set persistence.dirs.user.size="${USER_DATA_SIZE}" \
--set persistence.dirs.shm.size="${SHM_SIZE}" \
bioturing bioturing/colab --version ${CHART_VERSION}
```

For Vanilla k8s:

```
helm repo update
helm registry login -u admin registry.bioturing.com
helm upgrade --install --set secret.data.bbtokens="${BBTOKEN}" \
--set secret.data.domain="${SVHOST}" \
--set secret.server.certificate="${SSLCRT}" \
--set secret.server.key="${SSLKEY}" \
--set secret.server.useletsencrypt="${USELETSENCRYPT}" \
--set secret.server.lcall="${LC_ALL}" \
--set secret.server.lclang="${LC_LANG}" \
--set secret.admin.username="${ADMIN_USERNAME}" \
--set secret.admin.password="${ADMIN_PASSWORD}" \
--set persistence.dirs.app.size="${APP_DATA_SIZE}" \
--set persistence.dirs.user.size="${USER_DATA_SIZE}" \
--set persistence.dirs.shm.size="${SHM_SIZE}" \
bioturing bioturing/colab --version ${CHART_VERSION}
```

SSO setup: There are various service providers, who work as IDP. Here we use Jumpcloud and okta.

– please select yourself.

<https://colab.bioturing.com/dashboard/sso>

SSO configuration: kindly contact support@bioturing.com for all product related questions, issues, including training.

Configuration

All set with SSO

Troubleshooting

[Provide tips for troubleshooting common issues that may arise during or after installation.]

- Issue:

```
permission denied while trying to connect to the Docker daemon socket at
unix:///var/run/docker.sock: Get "http://%2Fvar%2Frun%2Fdocker.sock/v1.24/version":
dial unix /var/run/docker.sock: connect: permission denied
```


- Solution:


```
docker ps -a
groups
sudo groupadd docker
sudo groups
sudo usermod -aG docker $USER
sudo systemctl start docker
newgrp docker
docker ps -a
```


```
ubuntu@ip-192-168-0-199:~$ ls -lhrt /var/run/docker.sock
srw-rw---- 1 root docker 0 Mar 30 08:59 /var/run/docker.sock
ubuntu@ip-192-168-0-199:~$ sudo chmod 666 /var/run/docker.sock
```


Conclusion





 All platforms

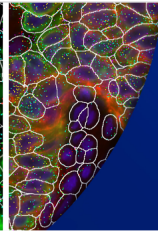
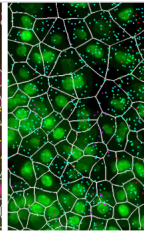
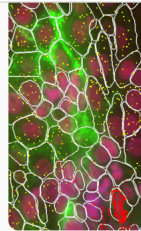
 BioTuring database

 Cell type prediction

 Tutorial videos

 Publication

 Document



BioTuring Enhancement of Spatial Technology (BEST) Program

- For institutions and companies
- Support data generated by Vizgen MERSCOPE, 10X Xenium, and Nanostring CosMx
- Open until May 31st, 2023

Contact Us

support@bioturing.com



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