

Получение доступа к GPU

- Более подробно здесь:
<https://medium.com/@videshsuman/getting-free-access-to-aws-gpu-instances-for-deep-learning-adbcdfbf40f3>

Сначала нужно зарегистрироваться на <https://education.github.com/pack>

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Learn to ship software like a pro.

There's no substitute for hands-on experience, but for most students, real world tools can be cost prohibitive. That's why we created the GitHub Student Developer Pack with some of our partners and friends: to give students free access to the best developer tools in one place so they can learn by doing.

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- Инструкция здесь:
<https://help.github.com/en/articles/applying-for-a-student-developer-pack>
- Необходимо указать ВМК почту.
- И написать пару предложений, зачем вам нужен GitHub.
- После быстрой регистрации, вы получите доступ к student pack.

Registering for AWS

Инструкция:

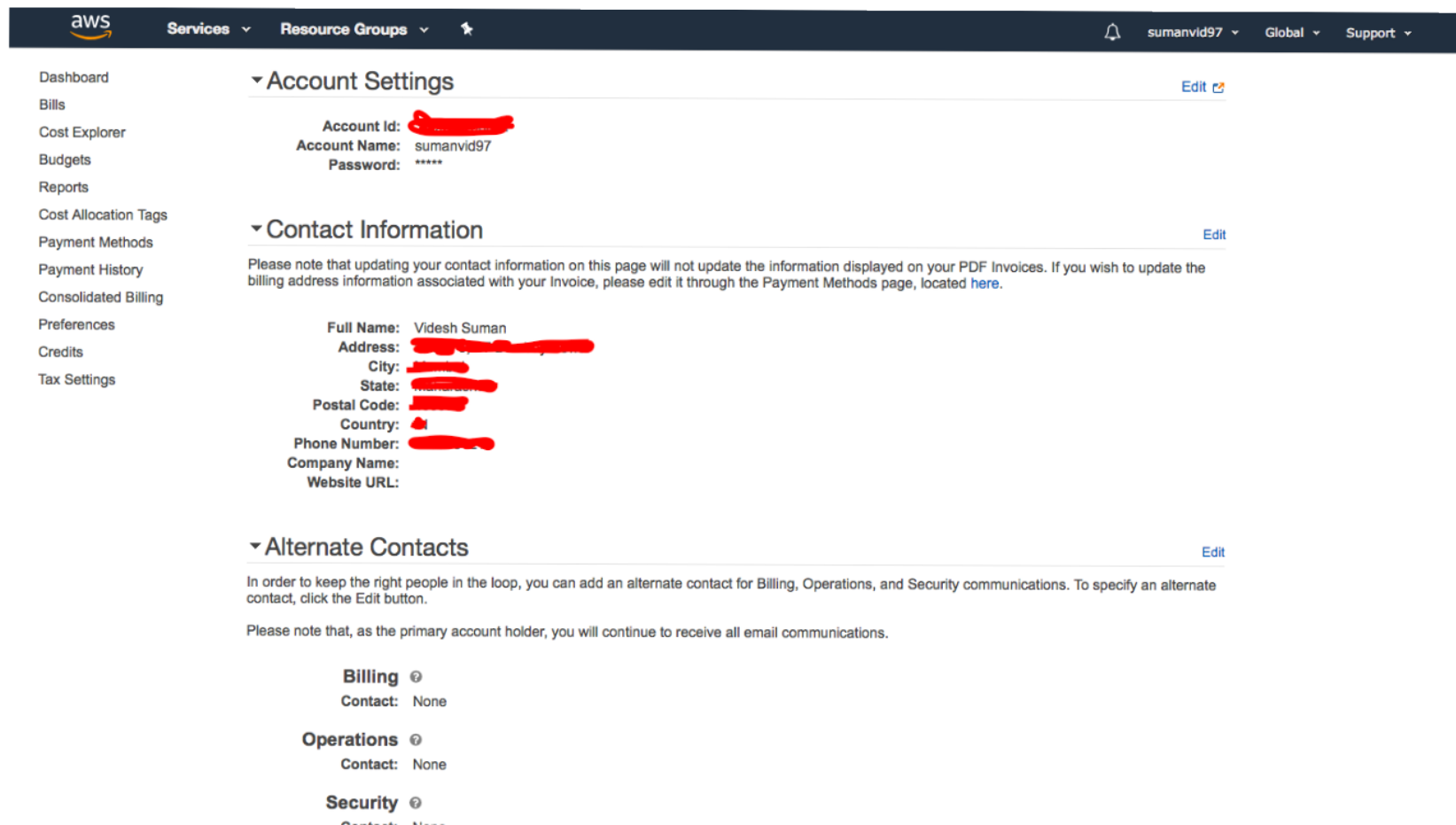
<https://aws.amazon.com/premiumsupport/knowledge-center/create-and-activate-aws-account/>

Необходимо будет заполнить данные карты.

Название университета:

Lomonosov Moscow State University (Faculty of Computational Mathematics and Cybernetics)

После того, как вы зарегистрировались, необходимо скопировать свой Account ID с <https://console.aws.amazon.com/billing/home?#/account>



The screenshot displays the AWS Billing console interface. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and user information 'sumanvid97'. The left sidebar lists various AWS services and billing-related options. The main content area is titled 'Account Settings' and contains three sections: 'Account Settings', 'Contact Information', and 'Alternate Contacts'. In the 'Account Settings' section, the 'Account ID' is redacted, while 'Account Name' is 'sumanvid97' and 'Password' is masked. The 'Contact Information' section includes fields for 'Full Name' (Videsh Suman), 'Address', 'City', 'State', 'Postal Code', 'Country', 'Phone Number', 'Company Name', and 'Website URL', with most of these fields redacted. The 'Alternate Contacts' section lists 'Billing', 'Operations', and 'Security' categories, each with a 'Contact' field set to 'None'.

Section	Field	Value
Account Settings	Account Id:	[Redacted]
	Account Name:	sumanvid97
	Password:	*****
Contact Information	Full Name:	Videsh Suman
	Address:	[Redacted]
	City:	[Redacted]
	State:	[Redacted]
	Postal Code:	[Redacted]
	Country:	[Redacted]
	Phone Number:	[Redacted]
	Company Name:	[Redacted]
	Website URL:	[Redacted]
Alternate Contacts	Billing	Contact: None
	Operations	Contact: None
	Security	Contact: None

Источник картинки: <https://medium.com/@videshsuman/getting-free-access-to-aws-gpu-instances-for-deep-learning-adbcdfbf40f3>

Теперь можно вернуться к GitHub и перейти по unique link.

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You now have free access to all of the included developer tools. Offers use unique links, coupon codes, GitHub login or direct links to grant access. You can find all the information that you'll need to access each tool below.

The tools



Hosted search API that provides support from front end to back end frameworks and libraries.

Details 100k records and 1 million operations (normally \$150/month), valid for 1 year.

Get access by connecting your GitHub account on [Algolia](#)

🔗 Help available at [Algolia support](#)



A hackable text editor for the 21st Century

Details Open Source by GitHub, free for everyone

Get direct access on the [Atom website](#)

🔗 Help available at [Atom support](#)



Access to the AWS cloud, free training, and collaboration resources

Details GitHub Student Developer Pack members receive up to \$110 in bonus AWS credits for a total of \$75-\$150

[Get access using your unique link](#)

Requires joining the AWS Educate program

🔗 Help available at [AWS Educate support](#)

Нужно зарегистрироваться на aws educate. Указать все данные: университет, почту университетскую, свой Account ID с предыдущего шага и так далее.



Apply to join AWS Educate

Step 2/3: Tell us about yourself

Prefer

Language

English

Welcome GitHub Student Developer Pack Members

AWS Educate provides Github Student Developer Pack members new to the program with a special promotion, worth up to \$110 in extra AWS credits. Use your school provided email, and select one of the following options in your application:

A) Receive \$150 in AWS Credits by choosing the AWS Account ID option. You will need to enter an AWS Account ID when you sign up.

Or

B) If you do not have a credit card, you can select the AWS Educate Starter Account. This account option is pre-funded with \$75 in AWS credits.

State University (Faculty of Computational Mathematics and Cybernetics)

Start typing the name of your school and select from the list. If you don't see your school, enter the full name, example: Harvard University

City (where your school is located)

Country

State (where your school is located)

First Name

Last Name

Field of Study

Email

*Please provide a valid, current email issued by your institution. Example:
your_name@your_school.edu*

- Скорее всего, вам почти сразу на почту придёт отказ.
- Необходимо написать сюда
<https://console.aws.amazon.com/support>

sumanvid97
Apr 7, 2018
03:09 PM +0530



Despite adding my institution's provided email address(matching the domain of my institution's), my application has been rejected.
Please find attached the front and back scans of my college ID.
I hope it gets approved this time.
Thanks.

Attachments:

[college_id_1.jpg](#)
[college_id_2.jpg](#)

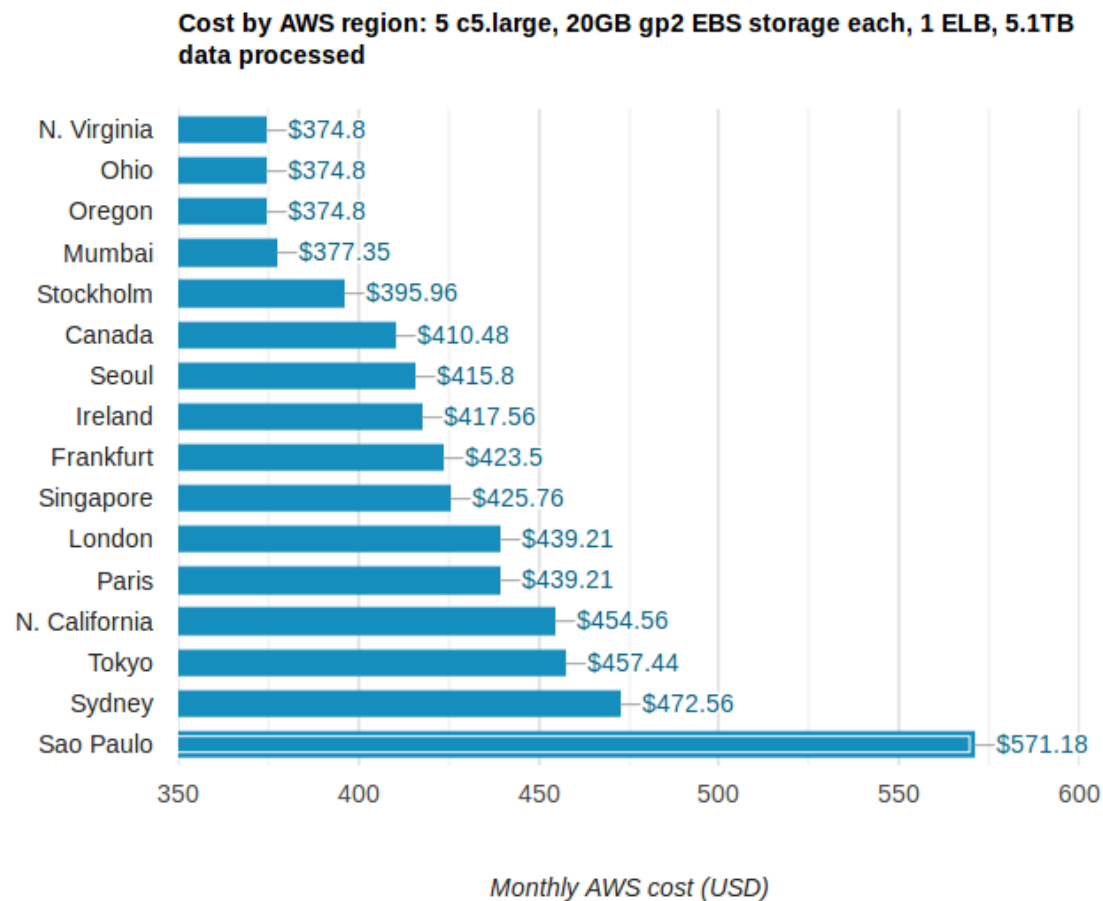
Источник картинки: <https://medium.com/@videshsuman/getting-free-access-to-aws-gpu-instances-for-deep-learning-adbcdfbf40f3>

- Можно прикрепить скан(или фотографию) разворота своего студенческого билета.
- Через несколько дней придёт письмо с подтверждением успешной регистрации и кодом, который необходимо ввести сюда:
<https://console.aws.amazon.com/billing/home#/credits>

Далее нужно зайти в Services, выбрать EC2 и перейти в Spot Requests. Если просто запустить EC2 Instance(виртуальный сервер Амазона), то цена будет фиксированной(On-Demand). Но если сервер не используется, то его можно выкупить по цене ниже On-Demand. Такой сервер называется Spot Instance, а чтобы его получить, нужно сделать запрос(Spot Request). В правом верхнем углу можно выбрать регион. Ещё полезна кнопка pricing history.

The screenshot shows the AWS Management Console interface for the EC2 Spot Requests page. The browser address bar shows the URL: <https://eu-west-2.console.aws.amazon.com/ec2sp/v1/spot/home?region=eu-west-2#>. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and a user profile 'daniikonon' with a dropdown menu showing 'London' and 'Support'. The left sidebar contains a navigation menu with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, and LOAD BALANCING. The 'Spot Requests' link is highlighted. The main content area has tabs for 'Request Spot Instances', 'Actions', 'Pricing History' (highlighted with a red box), and 'Savings Summary'. Below the tabs is a search bar with 'Request type: all' and 'State: all' dropdowns, and a 'Search by keyword' input. A table header is visible with columns: Request Id, Request type, Instance type, State, Capacity, Status, Persistence, Created, and Max price. The table is currently empty, displaying a message: 'You currently have no Spot requests in this region. If you are new to EC2 Spot instances, visit the [Getting Started page](#). Click the Request Spot Instances button to launch a Spot instance.' Below this message is a blue button labeled 'Request Spot Instances'. At the bottom of the page, there is a link: 'Select a Spot request above to see more details'.

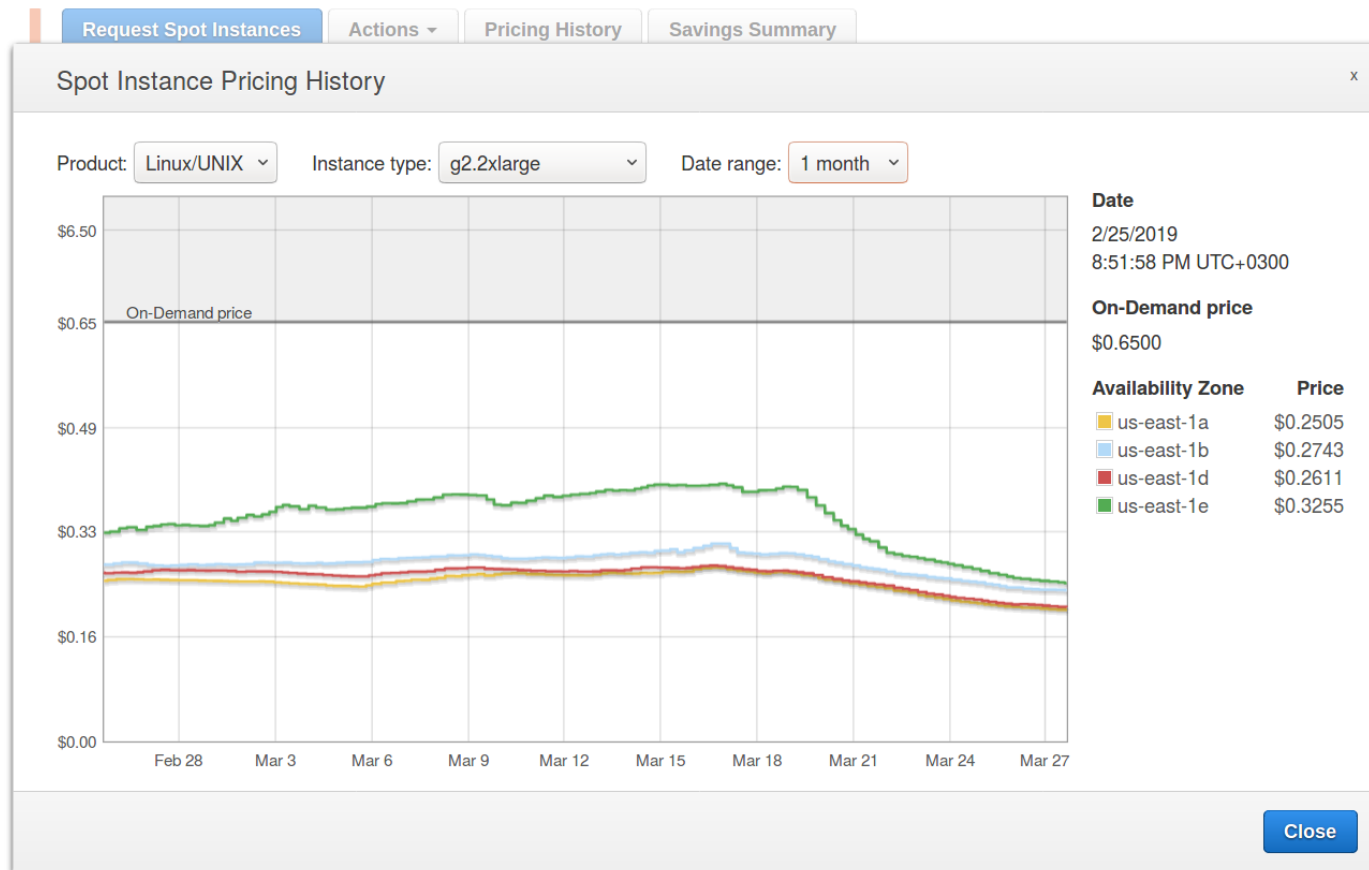
Было проведено исследование. В нём было замечено, что некоторые регионы намного дороже, чем другие.



Источник картинки:

<https://www.concurrencylabs.com/blog/choose-your-aws-region-wisely/>

Если нажать на кнопку pricing history, можно увидеть динамику цен к конкретном регионе на любую машину, которую можно получить с него. On-Demand price – постоянная цена. Как видите, цена на Spot Instance в несколько раз меньше.



Некоторые примеры цен в разных регионах и характеристик серверов.

	g3s.xlarge	p2.xlarge	g2.2xlarge
Ohio	0.225	0.31	
Ireland	0.23	0.29	0.2106
Oregon	0.225	0.29	0.1950

Model	GPUs	vCPU	Mem(GiB)	GPU Memory	Network Performance
p2.xlarge	1	4	61	12	High
g3s.xlarge	1	4	30.5	8	Up to 10 Gigabit

Перейдите в меню слева в AMIs (Amazon Machine Image – образы машин с разными конфигурациями), выберите Public Images, вбейте в строку поиска tensorflow и выбирайте те AMI, у которых в названии есть Deep Learning. Можно посмотреть в описание образа. Далее, нужно кликнуть на кнопку Actions и выбрать Spot Request.

The screenshot shows the AWS Management Console interface. On the left is a navigation menu with categories like EC2 Dashboard, INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The 'AMIs' link under the 'IMAGES' category is highlighted. The main panel shows the 'Public images' tab with a search bar containing 'tensorflow'. A table lists several AMIs, with 'ami-0699c276e99d52850' selected. Below the table, the 'Details' tab for this specific AMI is displayed, showing its name, source, status, and creation date.

Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date
Deep Learning...	ami-d56a2ca6	ami-d56a2ca6	536913377013/...	536913377013	Public	available	October 1, 2016 at 12:00
Deep Learning...	ami-6b200a0d	ami-6b200a0d	amazon/Deep L...	amazon	Public	available	March 8, 2017 at 1:00
Deep Learning...	ami-0699c276e99d52850	ami-0699c276e99d52850	amazon/Deep L...	amazon	Public	available	March 21, 2019 at 12:43
Deep Learning...	ami-1a8c8a63	ami-1a8c8a63	amazon/Deep L...	amazon/Deep Learning AMI (Amazon Linux 2) Version 22.0			June 5, 2018 at 10:04
Deep Learning...	ami-04d1c4ee	ami-04d1c4ee	amazon/Deep L...	amazon	Public	available	July 3, 2018 at 10:59
Deep Learning...	ami-00051cea	ami-00051cea	amazon/Deep L...	amazon	Public	available	July 20, 2018 at 9:37
Deep Learning...	ami-095a0c6d4aed8643d	ami-095a0c6d4aed8643d	amazon/Deep L...	amazon	Public	available	August 23, 2018 at 2:00
Deep Learning...	ami-0a0d47cb1b5685c02	ami-0a0d47cb1b5685c02	amazon/Deep L...	amazon	Public	available	September 7, 2018 at 10:00
Deep Learning...	ami-0378df3826cda83a5	ami-0378df3826cda83a5	amazon/Deep L...	amazon	Public	available	September 24, 2018 at 10:00
Deep Learning...	ami-065ef4c5569ad0325	ami-065ef4c5569ad0325	amazon/Deep L...	amazon	Public	available	October 12, 2018 at 10:00
Deep Learning...	ami-0d6c481918272a6b1	ami-0d6c481918272a6b1	amazon/Deep L...	amazon	Public	available	November 1, 2018 at 10:00
Deep Learning...	ami-0b032a0bf1cd05d3f	ami-0b032a0bf1cd05d3f	amazon/Deep L...	amazon	Public	available	November 14, 2018 at 10:00
Deep Learning...	ami-0061ecbbc1cbd45f5	ami-0061ecbbc1cbd45f5	amazon/Deep L...	amazon	Public	available	November 26, 2018 at 10:00

Image: ami-0699c276e99d52850

Details	Tags
AMI ID	ami-0699c276e99d52850
Owner	898082745236
Status	available
Creation date	March 21, 2019 at 12:43:39 AM UTC+3
AMI Name	Deep Learning AMI (Amazon Linux 2) Version 22.0
Source	amazon/Deep Learning AMI (Amazon Linux 2) Version 22.0
State Reason	-
Platform	Other Linux

Теперь можно выбрать только те серверы, на которых есть GPU. И выбрать тот, который нравится.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Spot Request 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

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.

Filter by: GPU instances Current generation Show/Hide Columns

Currently selected: p2.xlarge (11.75 ECUs, 4 vCPUs, 2.7 GHz, E5-2686v4, 61 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	GPU instances	g2.2xlarge	8	15	1 x 60 (SSD)	Yes	High	-
<input type="checkbox"/>	GPU instances	g2.8xlarge	32	60	2 x 120 (SSD)	-	10 Gigabit	-
<input type="checkbox"/>	GPU instances	g3s.xlarge	4	30.5	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	GPU instances	g3.4xlarge	16	122	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	GPU instances	g3.8xlarge	32	244	EBS only	Yes	10 Gigabit	Yes
<input type="checkbox"/>	GPU instances	g3.16xlarge	64	488	EBS only	Yes	25 Gigabit	Yes
<input checked="" type="checkbox"/>	GPU instances	p2.xlarge	4	61	EBS only	Yes	High	Yes
<input type="checkbox"/>	GPU instances	p2.8xlarge	32	488	EBS only	Yes	10 Gigabit	Yes

Cancel

Previous

Next: Configure Instance Details

Можно поставить maximum price – если цена на данный сервер станет больше неё из-за резкого повышения спроса, вы не продолжите платить, а просто потеряете доступ к своему выделенному серверу. Также можно выбрать наиболее выгодный subnet – availability zone.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Spot Request 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances ⓘ [Launch into Auto Scaling Group ⓘ](#)

Purchasing option ⓘ ☒ Request Spot instances

Current price ⓘ

Availability Zone	Current price
eu-west-1a	\$0.3107
eu-west-1b	\$0.3053
eu-west-1c	\$0.3044

Maximum price ⓘ \$

Persistent request ⓘ ☐ Persistent request

Launch group ⓘ

Request valid from ⓘ Any time [Edit](#)

Request valid to ⓘ Any time [Edit](#)

Network ⓘ [Create new VPC](#)

Subnet ⓘ [Create new subnet](#)
4090 IP Addresses available

Auto-assign Public IP ⓘ

Placement group ⓘ ☐ Add instance to placement group

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Storage](#)

Здесь можно выбрать размер памяти, которая будет выделена.
Память не бесплатная. Подробнее:

<https://aws.amazon.com/ebs/pricing/>

Есть два вида памяти: EBS и Instance Store. Instance store – память, хранящаяся на машине, она пропадёт, как только машина будет выключена или отобрана. EBS – память в облаке, её можно примонтировать к другой машине.

Все следующие пункты можно прощёлкать.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Spot Request 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type ⓘ	Device ⓘ	Snapshot ⓘ	Size (GiB) ⓘ	Volume Type ⓘ	IOPS ⓘ	Throughput (MB/s) ⓘ	Delete on Termination ⓘ	Encrypted ⓘ
Root	/dev/xvda	snap-055b7b03b6f34333c	75	General Purpose SSD (gp2)	225 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Cancel

Previous

Review and Launch

Next: Tag Spot Request

Когда вы нажмёте на кнопку Launch, вам предложат создать Key pair name. Можно выбрать create a new key pair, затем придумать имя и загрузить приватный ключ. Далее нужно нажать на кнопку Request Spot Instances.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Spot Request 6. Configure Security Group 7. Review

Step 7: Review Spot Instance Request

Deep Learning AMI (Amazon Linux 2) Version 22.0 - ami-0699c276e99d52850
MXNet-1.4, TensorFlow-1.13, PyTorch-1.0, Keras-2.2, Chainer-5.3, configured with NVIDIA CUDA, cuDNN, NCCL, Intel MKL-DNN, Docker & NVIDIA-Docker. For a fully managed experience, check: <https://aws.amazon.com/ec2/maker>
Root Device Type: ebs Virtualization: paravirt

Instance Type

Instance Type	ECUs
p2.xlarge	11.75

Security Groups

Security group name	Description
launch	launch

Type ⓘ
SSH

Instance Details

Storage

Tags

Network Performance

High

Edit instance type

Edit security groups

Description ⓘ

Edit instance details

Edit storage

Edit tags

Cancel Previous Launch

Select an existing key pair or create a new key pair

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](#).

Create a new key pair

Key pair name
aws_ireland

Download Key Pair

You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

Cancel Request Spot Instances

Теперь можно отслеживать статус своих запросов. Выделение сервера можно ждать довольно долго.

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Request Spot Instances

Actions ▾

Pricing History





Savings Summary

Request type: all ▾

State: all ▾

Search by keyword

« < Viewing 1 to 4 of 4 requests > »

<input type="checkbox"/>	Request Id	Request type	Instance type	State	Capacity	Status	Persistence	Created
<input type="checkbox"/>	sir-c5ig6n1n	instance	p2.xlarge	 open	-	capacity-not-...	one-time	a few seconds a
<input type="checkbox"/>	sir-zrp87knm	instance	g3s.xlarge	 active	i-0236fce85b5a...	fulfilled	one-time	2 hours ago
<input type="checkbox"/>	sir-x77i5prn	block	g3s.xlarge	 cancelled	-	canceled-bef...	one-time	2 hours ago
<input type="checkbox"/>	sir-b8p866zn	block	g3s.xlarge	 cancelled	-	canceled-bef...	one-time	2 hours ago

Select a Spot request above to see more details

Когда запрос на сервер одобряют, можно перейти в меню Instances и увидеть там запущенную машину, к которой уже можно подключиться.

EC2 Dashboard

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Placement Groups

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Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
	i-0236fce85b5a9fe79	g3s.xlarge	eu-west-1b	running	2/2 checks ...	None	ec2-54-246-142-72

Instance: i-0236fce85b5a9fe79 Public DNS: ec2-54-246-142-72.eu-west-1.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-0236fce85b5a9fe79	Public DNS (IPv4)	ec2-54-246-142-72.eu-west-1.compute.amazonaws.com
Instance state	running	IPv4 Public IP	54.246.142.72
Instance type	g3s.xlarge	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-20-3.eu-west-1.compute.internal

Но сначала необходимо выполнить несколько команд в терминале.
Здесь `aws2` – это имя, которым вы назвали ключ.

- Нужно переместить файл с приватным ключом в папку с `~/.ssh`

```
mv ~/Downloads/aws2.pem ~/.ssh/
```

- Далее необходимо поменять права доступа к файлу

```
chmod 0400 ~/.ssh/aws2.pem
```

- Всё! Можно подключаться к серверу:

```
ssh -i ~/.ssh/aws2.pem
```

```
root@ec2-54-246-142-72.eu-west-1.compute.amazonaws.com
```

- Имя пользователя root(для разных машин оно может отличаться) можно узнать тут:
- <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AccessingInstancesLinux.html>
- А Public DNS в разделе Instances в описании выделенной машины.

Альтернатива

- Возможная альтернатива AWS – Google Colab.
- Тьюториал:
<https://towardsdatascience.com/getting-started-with-google-colab-f2fff97f594c>
- Запустить намного легче, чем амазоновскую GPU. Можно уложиться в пять минут. Это бесплатно. И самые необходимые библиотеки уже установлены.
- Самый явный недостаток: нельзя оставить на ночь. Google отберёт GPU через час или два непрерывной тренировки.