TCSS 462/562: (Software Engineering for)
Cloud Computing
Fall 2024

School of Engineering and Technology
University of Washington - Tacoma

Tutorial 0 - Getting Started with AWS

Version 0.11
Obtaining a User Account

Objective

The purpose of this tutorial is to describe how to establish AWS account(s) for supporting work in TCSS 462/562.

Before starting the tutorial, please complete the AWS Cloud Credits Survey at:

https://forms.gle/fmKkLZbxZECbAay16

For the course, please create a personal AWS account using your UW NET ID email or other email account, or obtain an instructor provided account. An AWS account will be required to provide cloud computing resources for tutorials and the Term Project.

Use of a Linux environment is strongly recommended for AWS access.

For Windows users, there is an Ubuntu "App" that can be installed onto Windows directly. This provides an Ubuntu Linux environment without the use of Oracle Virtualbox. For this class, Windows and Mac users should install an Ubuntu virtual machine. Windows users can install Oracle Virtual Box to create virtual machines, and then install an Ubuntu virtual machine. M1/M2/M3 Mac users can use UTM or Parallels instead of Oracle Virtual Box. Intel Mac users may be able to use Oracle Virtual Box for Mac. See Tutorial 1 for more details. **For more information regarding obtaining a Ubuntu environment, please refer to Tutorial #1.**

Task 1 – Creating an AWS account

Create a standard AWS account using your UW or personal email address. This option requires providing a credit card as a backup if the account runs out of cloud computing credits. For this option navigate to the website (**https://aws.amazon.com/**) and click the "Create Account" button in the upper-right hand corner:

Complete the registration following all instructions.

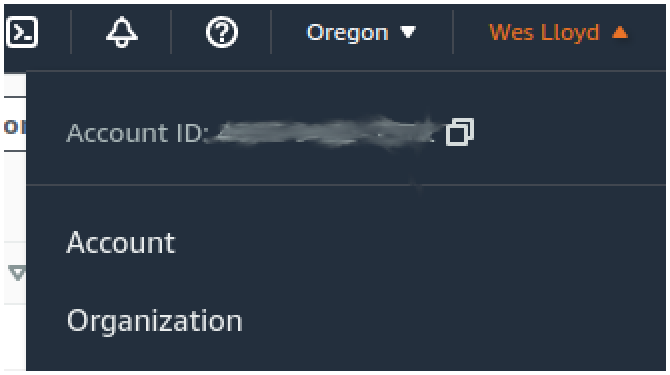
If you are unable to create an AWS account because you do not have access to a personal credit card, please contact the instructor by email. Use the subject line "AWS IAM ACCOUNT NEEDED". Use this option only if you will not have access to a personal credit card during the Fall Quarter. The instructor will need to create an IAM User account, and provide access. This may take 1-2 weeks. Please come back to tutorial 0 once having access to an AWS account.

After creating your AWS account, or if you already have an AWS account, if you need cloud computing credits to get started in TCSS 462/562 please email the instructor with the subject line:

EMAIL SUBJECT LINE: **"AWS CREDIT REQUEST"**

Failure to use this subject line, may result in a delay, or no response at all to your request. In the email, please include the email address associated with your AWS account as well as the 12-digit account ID to identify the account. This information is used for record keeping purposes to track which accounts receive AWS accounts provided to UW.

Log into your AWS account. In the upper-right hand corner, select your name. The account ID appears after "Account ID:". The example is blurred out:

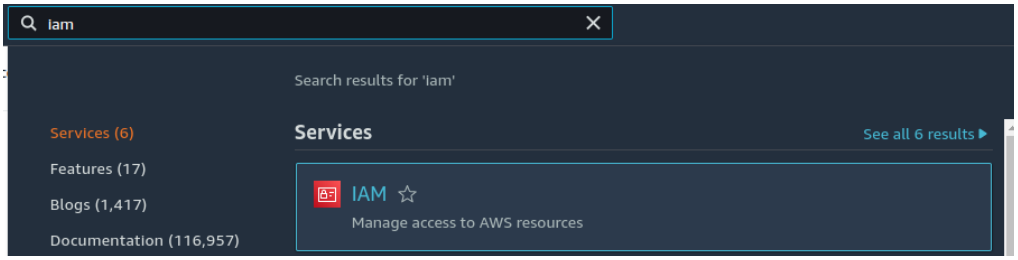


After a few days, you should receive an email with a credit code. To enter the credit code, in the upper-right hand corner, select your name, and "Billing and Cost Management". On the left-hand side menu, under "Billing and Payments", select "Credits". Then click the "Redeem credit" button. Enter the promotion code, and security code. If the credit code works, you should see the credits added to account along with an expiration date. If the credit code does not work, please contact the instructor.

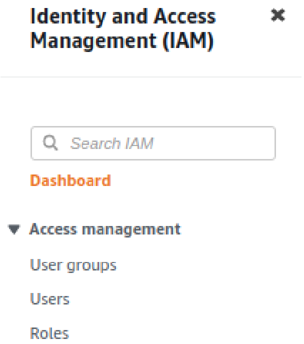
Task 2 – Create AWS Account Credentials

Once having access to AWS, create AWS account credentials to work with virtual machines on EC2, if you have not already done so. Credentials are required to access virtual machines by remote shell (SSH), and also to use the AWS command line interface, and programming APIs.

From the AWS services drop-down list, search for "IAM", which stands for Identity Access Management. This is under the "Security" group of service, select it:

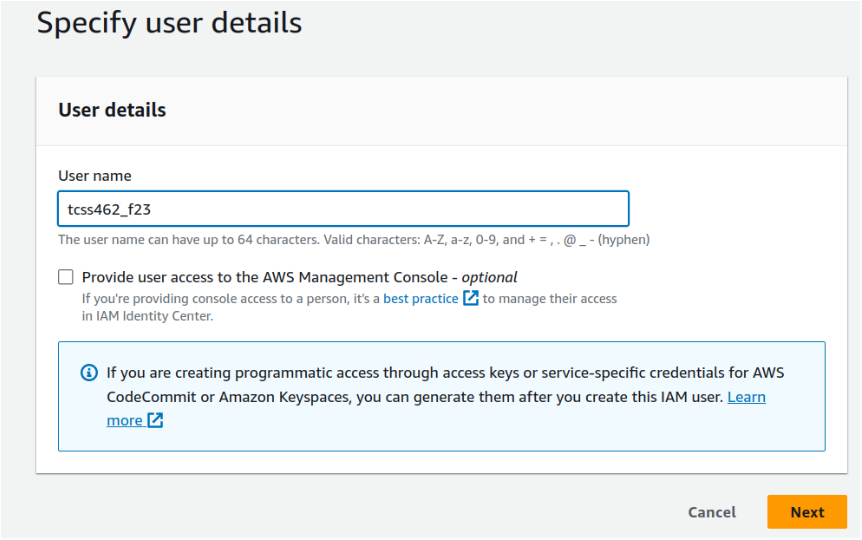


Optionally, IAM can be accessed by clicking on your name in the upper-right hand corner, and selecting "Security credentials". Once in the IAM dashboard, on the left hand-side select "Users":



You may need to press "Create user", if there are no users.
If there are users, select your user.

For creating a new users, provide a user account name. Here I am using "tcss462_f23" as an example:



Specify user details

User details

User name

tcss462_f23

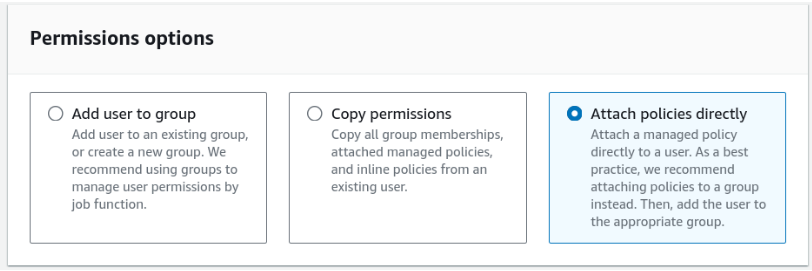
The user name can have up to 64 characters. Valid characters: A-Z, a-z, 0-9, and + = , . @ _ - (hyphen)

□ Provide user access to the AWS Management Console - *optional*
If you're providing console access to a person, it's a best practice to manage their access in IAM Identity Center.

ⓘ If you are creating programmatic access through access keys or service-specific credentials for AWS CodeCommit or Amazon Keyspaces, you can generate them after you create this IAM user. Learn more

Then click the "Next" button…

Now select the "Attach policies directly" option:



Permissions options

○ Add user to group
Add user to an existing group, or create a new group. We recommend using groups to manage user permissions by job function.

○ Copy permissions
Copy all group memberships, attached managed policies, and inline policies from an existing user.

● Attach policies directly
Attach a managed policy directly to a user. As a best practice, we recommend attaching policies to a group instead. Then, add the user to the appropriate group.

And down below on the screen, using the search box, search for, find, and add by selecting the checkbox the following policies:

* **AmazonEC2FullAccess**

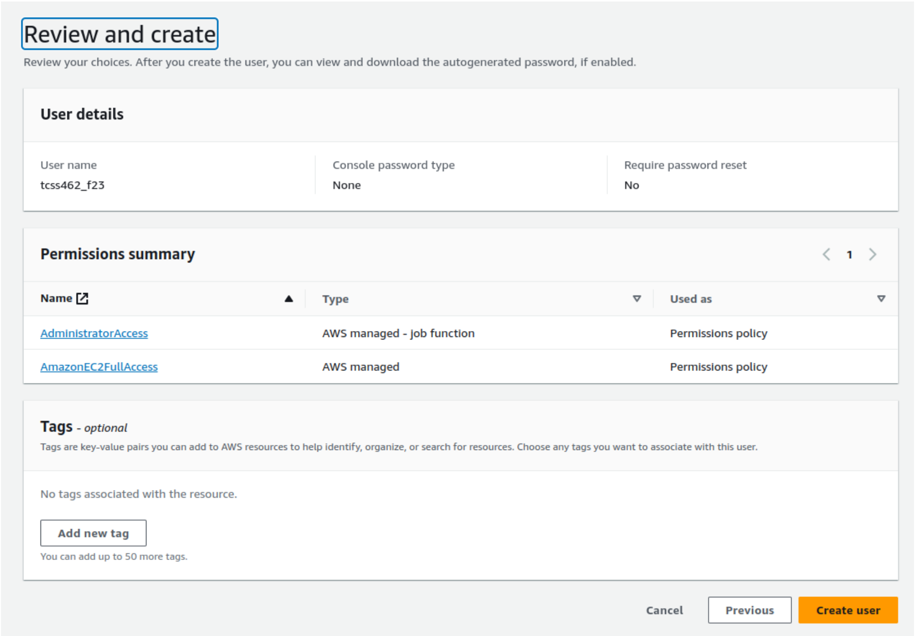
If you plan to use this user account to explore additional Amazon's services, then admin access should be added:

* **AdministratorAccess**

This will allow you, via the CLI, to explore and do just about everything with this AWS account.

Later in the class you may need to attach additional policies directly to your user account by accessing users under IAM.

Now click the "Next" button.



Review and create

Review your choices. After you create the user, you can view and download the autogenerated password, if enabled.

User details

User name	Console password type	Require password reset
tcss462_f23	None	No

Permissions summary

Name	Type	Used as
AdministratorAccess	AWS managed - job function	Permissions policy
AmazonEC2FullAccess	AWS managed	Permissions policy

Tags - *optional*

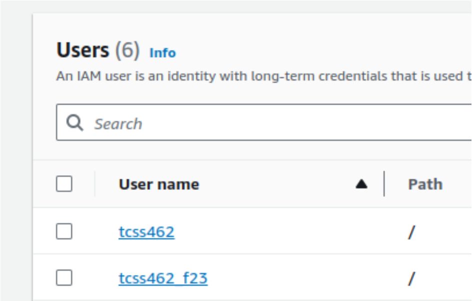
Tags are key-value pairs you can add to AWS resources to help identify, organize, or search for resources. Choose any tags you want to associate with this user.

No tags associated with the resource.

You can add up to 50 more tags.

Now review the settings, make sure they are correct, and click "Create user".

Now from the users list, select your newly created user account, here it was called "tcss462_f23":



Users (6) Info

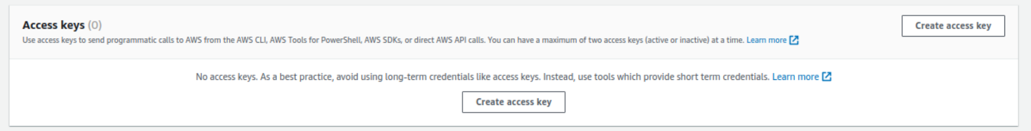
An IAM user is an identity with long-term credentials that is used t

Search

□	User name ▲	Path
□	tcss462	/
□	tcss462_f23	/

Click on the ‘**Security Credentials**’ tab.

Scroll down to the Access Keys widget:

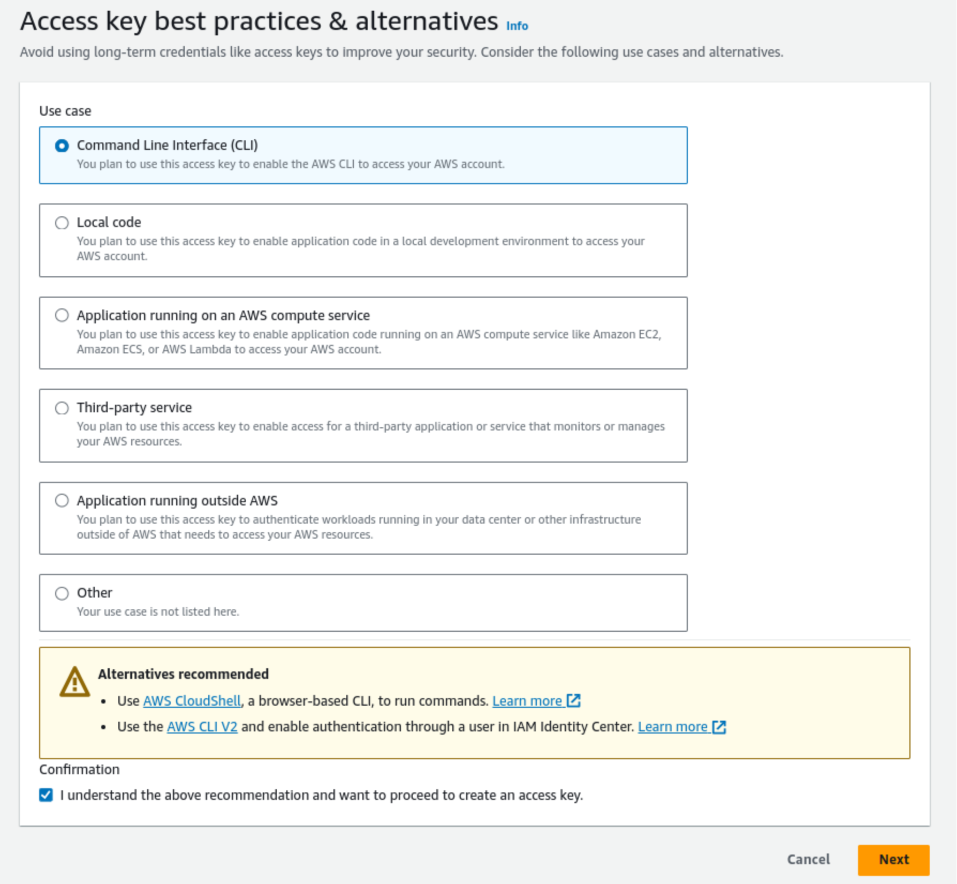


Access keys (0)

Use access keys to send programmatic calls to AWS from the AWS CLI, AWS Tools for PowerShell, AWS SDKs, or direct AWS API calls. You can have a maximum of two access keys (active or inactive) at a time. Learn more

No access keys. As a best practice, avoid using long-term credentials like access keys. Instead, use tools which provide short term credentials. Learn more

Click on the ‘Create access key” button, and select the checkbox that says “Command Line Interface (CLI)“ to proceed to create an access key.



Access key best practices & alternatives Info

Avoid using long-term credentials like access keys to improve your security. Consider the following use cases and alternatives.

Use case

● Command Line Interface (CLI)
You plan to use this access key to enable the AWS CLI to access your AWS account.

○ Local code
You plan to use this access key to enable application code in a local development environment to access your AWS account.

○ Application running on an AWS compute service
You plan to use this access key to enable application code running on an AWS compute service like Amazon EC2, Amazon ECS, or AWS Lambda to access your AWS account.

○ Third-party service
You plan to use this access key to enable access for a third-party application or service that monitors or manages your AWS resources.

○ Application running outside AWS
You plan to use this access key to authenticate workloads running in your data center or other infrastructure outside of AWS that needs to access your AWS resources.

○ Other
Your use case is not listed here.

Alternatives recommended

- Use AWS CloudShell, a browser-based CLI, to run commands. Learn more
- Use the AWS CLI V2 and enable authentication through a user in IAM Identity Center. Learn more

Confirmation

☑ I understand the above recommendation and want to proceed to create an access key.

Check the box for “I understand the above recommendation and want to proceed to create an access key.”

Why are we ignoring the advice? For Ubuntu 22.04/24.04 LTS, we will configure the AWS CLI V2 to access your AWS account using access keys because it is very straightforward, and it does not require updating the keys throughout the quarter. If you wish to update keys more frequently, or access the CLI using alternative security mechanisms, please check out the article:

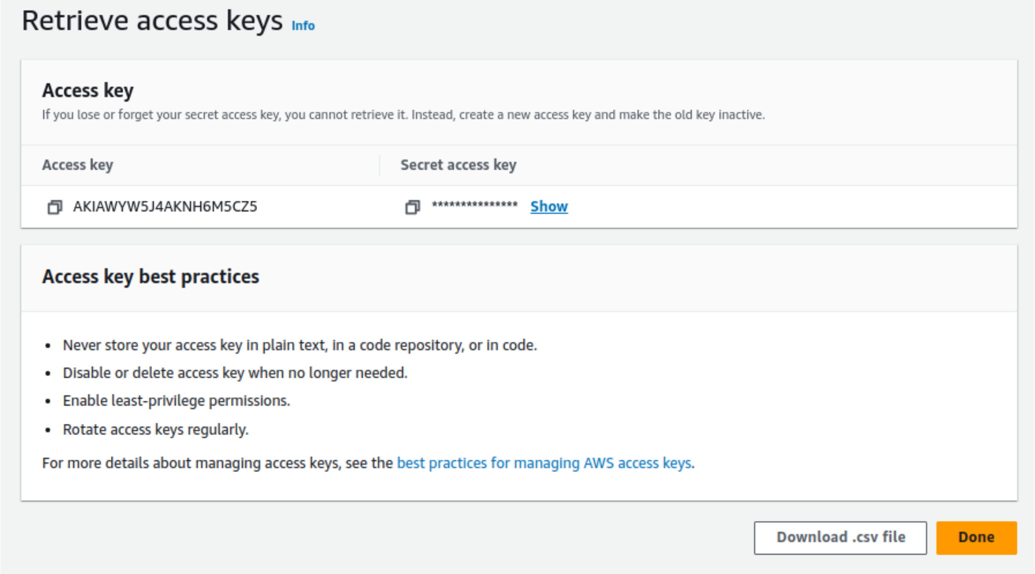
Proceed to press “Next”.

The description tag is optional and can be skipped.;

Proceed to press “Create access key”

There is one, and only one opportunity to download your Access key and Secret access key pairs. You can press the **Show** button and copy and paste the key somewhere safe, or download the .csv file. If you fail to download or copy the key values now, they will be lost forever, and this process will need to be repeated.

The keys must be copied, or the .csv file download to save the values:



Retrieve access keys Info

Access key

If you lose or forget your secret access key, you cannot retrieve it. Instead, create a new access key and make the old key inactive.

Access key	Secret access key
AKIAWYW5J4AKNH6M5CZ5	*************** Show

Access key best practices

- Never store your access key in plain text, in a code repository, or in code.
- Disable or delete access key when no longer needed.
- Enable least-privilege permissions.
- Rotate access keys regularly.

For more details about managing access keys, see the best practices for managing AWS access keys.

Once you’ve downloaded these keys, be sure to **never** publish these key values in a source code repository such as github where your account credentials could be exposed. **<u>Protect these keys as if they were your credit card or wallet!</u>**

Task 3 – Install and Configure the AWS Command Line Interface (CLI)

On your Ubuntu machine, after obtaining your access key and secret key, install the AWS command line interface:

```
sudo snap install aws-cli --classic
```

After installing, configure the CLI to use your credentials using "aws configure".
Provide your access key and secret key from Task 2.
Specify "us-east-2" (Ohio) as the default region.
Leave the default output as none. Most output will be returned in JSON format.

```
$ aws configure
AWS Access Key ID [None]: XXXXXXXXXXXXXXXXXXXX
AWS Secret Access Key [None]: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Default region name [None]: us-east-2
Default output format [None]:json
```

Common output formats are 'json' and 'text'. If you'd like to test them, just re-run the 'aws configure' command. 'text' mode output is more concise, while 'json' is verbose. Once done experimenting, **choose 'json'** as the output format.

***** FOR THIS COURSE, USE "json" as the default output format for the AWS CLI. *****

Failure to use json, may result in error messages in other tutorials.

Check the version of the AWS CLI that's been installed:

```
#value shown is for Ubuntu 24.04
$ aws --version
aws-cli/2.17.59 Python/3.12.6 Linux/6.8.0-1012-aws exe/x86_64.ubuntu.24
```

This version may be 1.22.xx if using Ubuntu 22.04.
Now try inspecting the available AWS CLI commands:

```
$ aws help
```

Now try lists the default Virtual Private Clouds (VPCs) that are preconfigured in your account to provide networking for virtual machines:

```
$ aws ec2 describe-vpcs
```

Once launching a virtual machine in Tutorial #3, you can inspect any running virtual machines from the Ubuntu command line with the command:

```
$ aws ec2 describe-instances
```

Document History:
v.10 Initial version

Related AWS Article:
https://docs.aws.amazon.com/cli/latest/userguide/cli-chap-getting-started.html