

This Lab experience involves Amazon Web Services, and you will use the AWS Management Console to complete all the Lab Steps.

The screenshot shows the AWS Management Console homepage. At the top, there's a navigation bar with 'Services' (dropdown), 'Resource Groups' (dropdown), and a search bar. To the right are links for 'Cloud Academy Labs' (dropdown), 'Oregon' (dropdown), and 'Support' (dropdown). Below the navigation is a section titled 'AWS services' with a search bar and a list of recently visited services: RDS, Lambda, API Gateway, EC2, and WorkSpaces. A link 'All services' is also present. To the right, under 'Featured next steps', are two items: 'Manage your spend' (with a graph icon) and 'Get best practices' (with a clipboard icon). Further down, there's a section titled 'Build a solution' with six quick-start guides: 'Launch a virtual machine', 'Build a web app', 'Deploy a serverless microservice', 'Host a static website', 'Create a backend for your mobile app', and 'Register a domain'. On the far right, there's a section for 'AWS Marketplace' and a link to 'Have feedback?'. At the bottom, there are links for 'Feedback', 'English', and 'Privacy Policy'.

The AWS Management Console is a web control panel for managing all your AWS resources, from EC2 instances to SNS topics. The console enables cloud management for all aspects of the AWS account, including managing security credentials, or even setting up new IAM Users.

Instructions

1. To start the Lab experience, open the Amazon Console by clicking this button:

[Open AWS Console](#)

2. Enter the following credentials created just for your Lab session, and click **Sign In**:

- **Account ID or alias:** Keep the pre-populated value
- **IAM user name:** *student*
- **Password:** *\$passw0rd*



Account ID or alias

A rectangular input field with a black redaction box inside it.

IAM user name

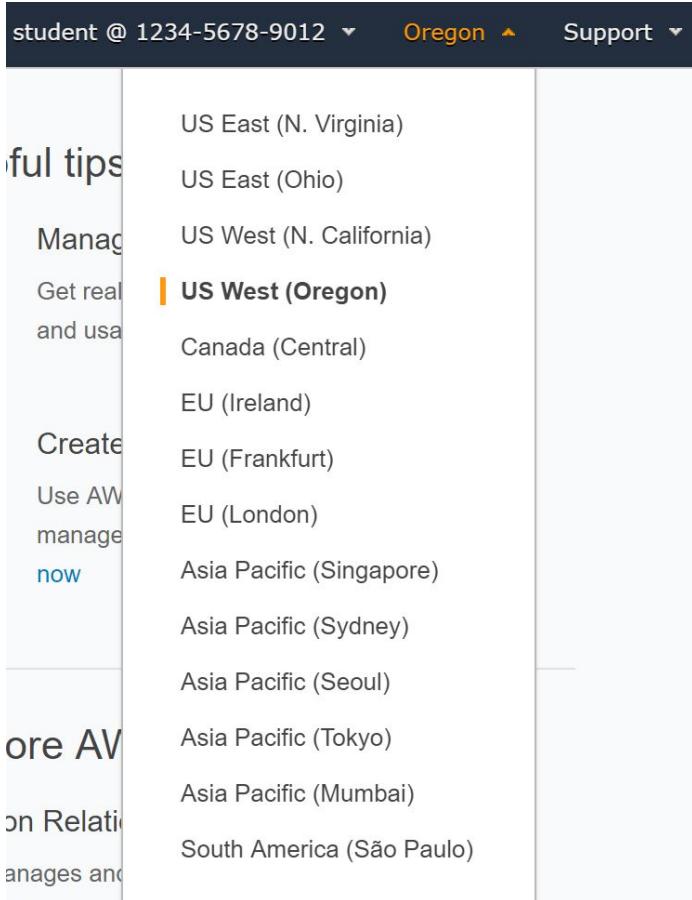
A rectangular input field.

Password

A rectangular input field.

Sign In

3. Select the **US West (Oregon)** region using the upper right drop-down menu on the AWS Management Console:



Amazon Web Services is available in different regions all over the world, and the Console lets you provision resources across multiple regions. You usually choose a region that best suits your business needs to optimize your customer's experience, but you must use the **US West (Oregon)** for this Lab.

Step 2 Creating an S3 Bucket for a static S3 website

Introduction

You can create an S3 bucket using the AWS Management Console. As with many other AWS services, you can use the AWS API or CLI (command line interface) as well. This lab uses the AWS Management Console for all S3 related tasks. Once the bucket is created you will configure it for a static website.

Instructions

1. Select the **S3** service from the AWS Management Console under the **Storage** section:



You will be placed in the S3 console.

2. From the S3 console, click the blue + **Create Bucket** button:

A screenshot of the Amazon S3 'Create a new bucket' wizard, Step 1 of 4. The top navigation bar shows 'Services' (selected), 'Resource Groups', and other account details. The main area has a dark header with the text 'Want to manage your data based on what it is instead of where it's stored? Try S3 Object Tagging'. Below this is the 'Amazon S3' logo and a row of buttons: '+ Create bucket' (highlighted in blue), 'Delete bucket', and 'Empty bucket'. To the right are links for 'Switch to the old console', 'Discover the new console', 'Quick tips', and dropdown menus for 'Buckets' and 'Regions'. The central content area says 'You do not have any buckets. Here is how to get started with Amazon S3.' It features three icons: a bucket with clouds labeled 'Create a new bucket', a bucket with an upward arrow labeled 'Upload your data', and two people with a plus sign labeled 'Set up your permissions'. Each section includes a 'Learn more' link and a 'Get started' button at the bottom.

A four part **Create bucket** wizard starts. Screen 1 of 4 is for the **Name and region** information.

3. Enter a unique **Bucket name** on the **Name and region** screen of the wizard:

Create bucket

X

1 Name and region 2 Set properties 3 Set permissions 4 Review

Name and region

Bucket name i

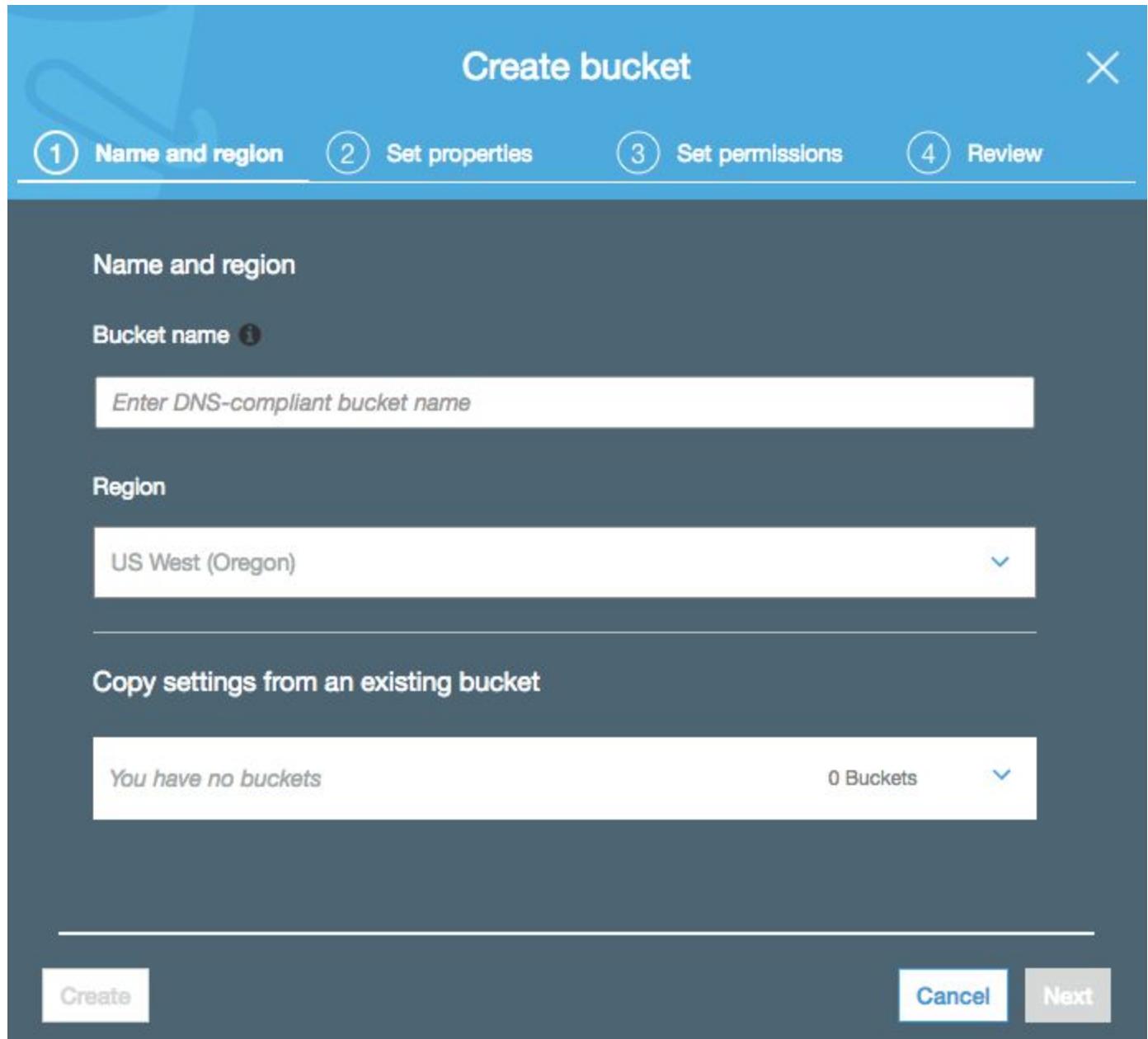
Region

US West (Oregon) v

Copy settings from an existing bucket

You have no buckets 0 Buckets v

Create Cancel Next



- **Bucket name:** Enter `calabs-bucket-<UniqueNumber>` (Append a unique number to the end of calabs-bucket- Examples: calabs-bucket-3, calabs-bucket-456)
- **Region:** US West (Oregon) (This should be set for you. If not, please select this region.)

Important! Bucket names must be globally unique, regardless of the AWS region in which you create the bucket. Buckets must also be DNS-compliant.

The rules for DNS-compliant bucket names are:

- They must be at least 3 and no more than 63 characters long.

- They may contain lowercase letters, numbers, periods, and/or hyphens. Each label must start and end with a lowercase letter or a number.
- They *cannot* be formatted as an IP address (for example, 192.168.1.1).

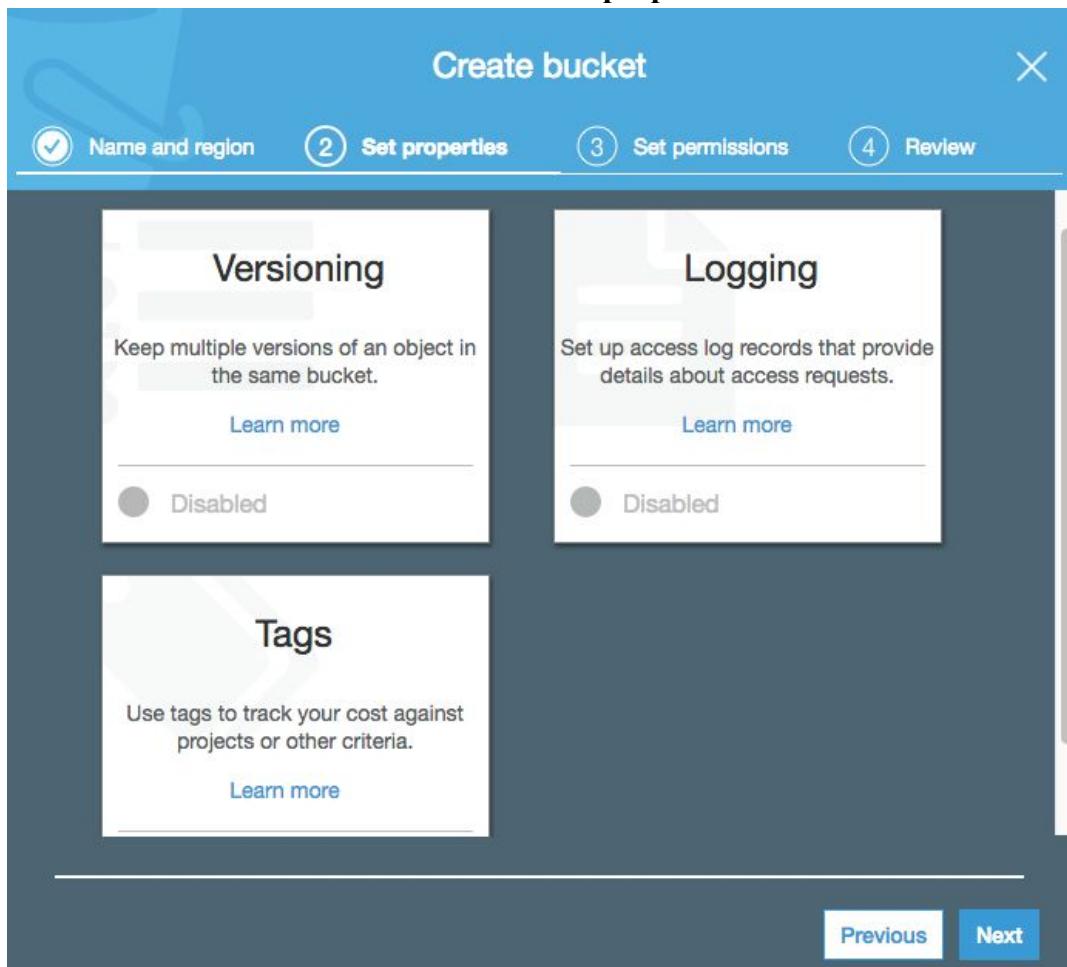
The following examples are valid bucket names: calabs-bucket-1, cloudinfopulse.bucket , calabs.1 or ca-labs-bucket.

Troubleshooting Tip: If you receive an error because your bucket name is not unique, append a different unique number to the bucket name in order to guarantee its uniqueness:



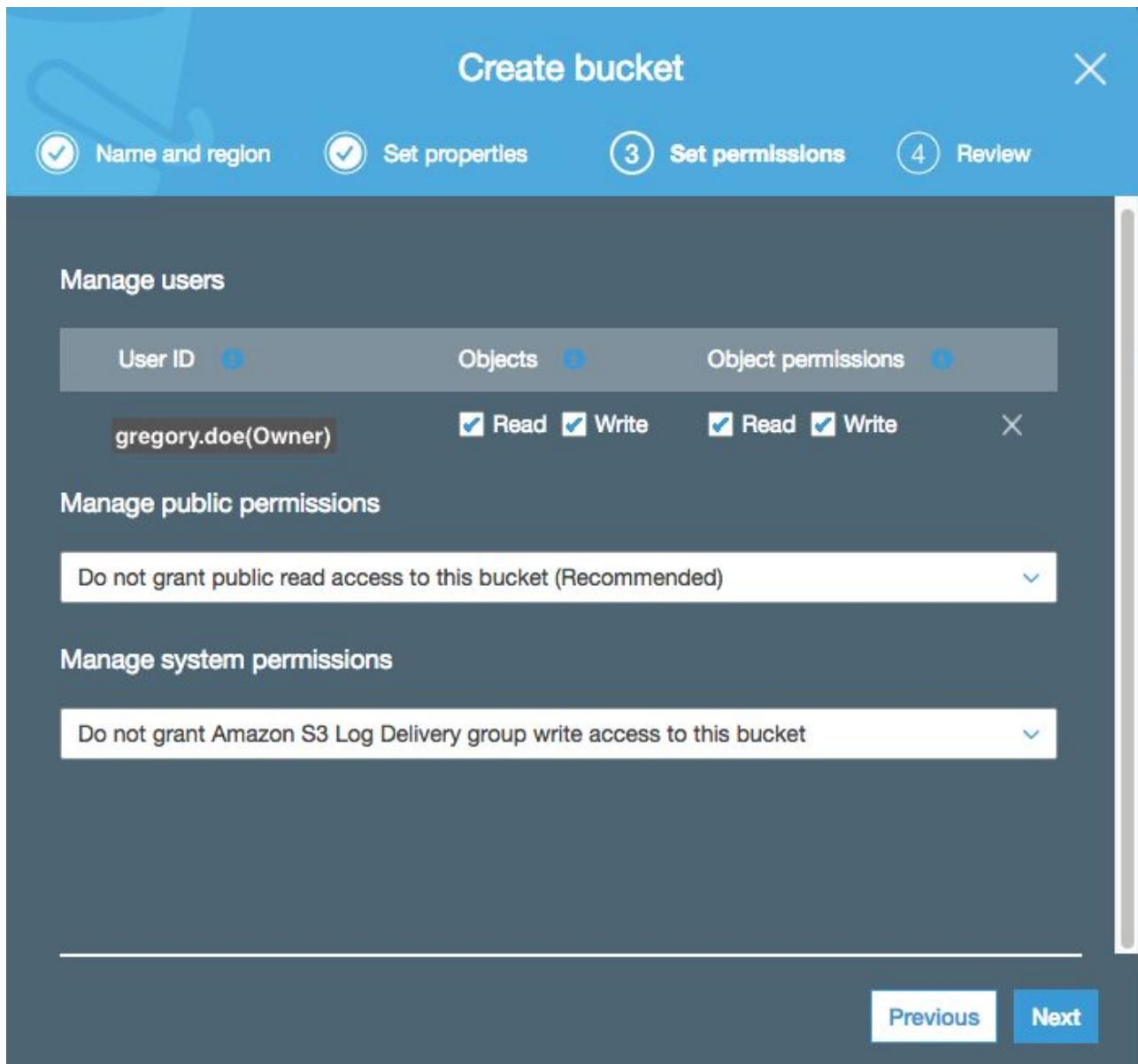
For example, change "calabs-bucket" to "calabs-bucket-1" (or a unique number/character string) and try again.

4. Click **Next** to advance the wizard to the **Set properties** screen:



No changes are needed. However, note this is where you can configure both **Versioning** and **Logging** information for your bucket. Additional charges may apply if you enable these features. Please leave them disabled.

5. Click **Next** to advance the wizard to the **Set permissions** screen:



This is where you can set more granular permissions tied to your S3 objects, including public read permission.

6. Click anywhere in the **Manage public permissions** field, then select **Grant public read access to this bucket**:

Create bucket

1 Name and region 2 Set properties 3 Set permissions 4 Review

Manage users

User ID	Objects	Object permissions
gregory.doe(Owner)	<input checked="" type="checkbox"/> Read <input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Read <input checked="" type="checkbox"/> Write

X

Manage public permissions

Do not grant public read access to this bucket (Recommended)

Do not grant public read access to this bucket (Recommended)

Grant public read access to this bucket

Do not grant Amazon S3 Log Delivery group write access to this bucket

Previous Next

The screenshot shows the 'Create bucket' wizard at Step 3: Set permissions. At the top, there are four tabs: 'Name and region' (with a checkmark), 'Set properties' (with a checkmark), 'Set permissions' (selected, indicated by a circled '3'), and 'Review' (indicated by a circled '4'). Below the tabs, the 'Manage users' section shows a single user 'gregory.doe(Owner)' with 'Read' and 'Write' permissions selected for both 'Objects' and 'Object permissions'. A delete 'X' button is to the right. The 'Manage public permissions' section contains four options: 'Do not grant public read access to this bucket (Recommended)', 'Do not grant public read access to this bucket (Recommended)', 'Grant public read access to this bucket' (which is highlighted in blue), and 'Do not grant Amazon S3 Log Delivery group write access to this bucket'. At the bottom, 'Previous' and 'Next' buttons are visible.

In many instances granting public read access is a security risk, so Amazon will warn you:

Manage public permissions

Grant public read access to this bucket

⚠ This bucket will have public read access.

Everyone in the world will have read access to this bucket.

In this case, you want a publicly available website so it is ok to ignore the warning and continue.

7. Click **Next** to advance the wizard to the **Review** screen:

The screenshot shows the 'Create bucket' wizard at the 'Set permissions' step. The top navigation bar has four tabs: 'Name and region' (with a checkmark), 'Set properties' (with a checkmark), 'Set permissions' (with a checkmark), and 'Review' (step 4).

The 'Name and region' section shows a 'Bucket name' of 'calabs-bucket-456' and a 'Region' of 'US West (Oregon)'.

The 'Properties' section shows:

- Versioning: Disabled
- Logging: Disabled
- Tagging: 0 Tags

The 'Permissions' section shows:

- Users: 1
- Public permissions: Enabled (this item is highlighted with a red box)
- System permissions: Disabled

At the bottom, there are 'Previous' and 'Create bucket' buttons, with 'Create bucket' also highlighted with a red box.

Look over the summary of your bucket configuration and click **Create bucket** when ready to proceed. At this point, you have a S3 bucket with public read access.

8. Select your new bucket then click **Properties** to switch to the **Properties** tab for your new bucket:

The screenshot shows the Amazon S3 Properties tab for the 'calabs-bucket-456' bucket. The top navigation bar includes tabs for Objects, Properties (which is selected), Permissions, and Management. Below the tabs are several configuration sections:

- Versioning**: Describes keeping multiple versions of an object in the same bucket. A 'Learn more' link and a status indicator showing 'Disabled'.
- Logging**: Describes setting up access log records. A 'Learn more' link and a status indicator showing 'Disabled'.
- Static website hosting**: Describes hosting a static website. A 'Learn more' link and a status indicator showing 'Disabled'.
- Advanced settings**:
 - Tags**: Describes using tags to track cost. A 'Learn more' link and a status indicator showing '0 Tags'.
 - Cross-region replication**: Describes automating object copying across AWS Regions. A 'Learn more' link and a status indicator showing 'Disabled'.
 - Transfer acceleration**: Describes enabling fast file transfers. A 'Learn more' link and a status indicator showing 'Suspended'.

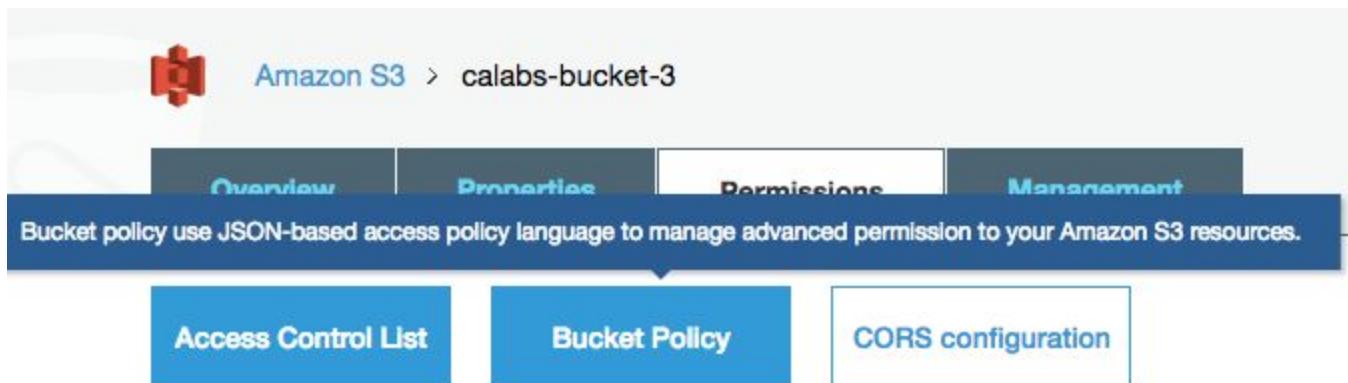
9. Click the **Static website hosting** tile. By default, static website hosting is disabled.

10. Click **Use this bucket to host a website**, then fill out:

- **Index document**: Enter *index.html*
- **Error document**: Enter *error/index.html*

Click **Save** when ready to proceed. Your S3 bucket is ready to host content. Rather than manually changing permissions on multiple objects in your bucket, next you will create a bucket policy. The policy will apply to all objects uploaded to your bucket.

11. Navigate to the **Permissions** tab of your bucket, then click **Bucket Policy**:



The policy is JSON based.

12. Copy and paste the following into your **Bucket policy editor**:

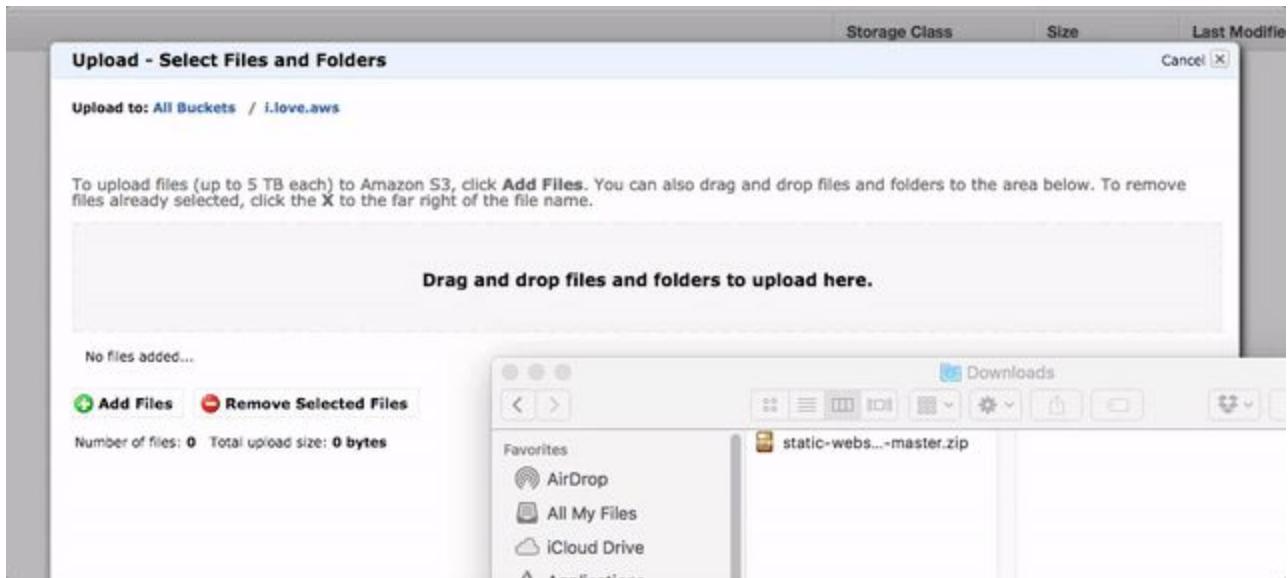
```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Sid": "AddPerm",  
            "Effect": "Allow",  
            "Principal": "*",  
            "Action": "s3:GetObject",  
            "Resource": "arn:aws:s3:::YOUR_BUCKET_NAME/*"  
        }  
    ]  
}
```

Be sure to substitute your actual S3 bucket name for **YOUR_BUCKET_NAME** above. Click **Save** when ready to proceed. The JSON policy will allow public access to all objects beneath your S3 bucket. (Again, this is a very gratuitous policy. Your production policies may differ for security reasons.)

Next you will download a basic website from a public GitHub repository and load it into your S3 bucket.

13. Download a zip file of a basic website provided for you from the Triangu in S3 bucket. Extract the contents of the zip archive to your local file storage.

14. From the top-level of your S3 bucket, click **Upload**. Navigate to where you placed the sample website content. Select or drag and drop all folders and files and click **Upload**. For example:



The permissions on all files and folders uploaded to your S3 bucket will allow public read access.

15. Verify that you uploaded three top-level folders (assets, error, images) along with 3 top-level files as well (index.html, License, Readme) to your S3 bucket. It should look similar to the following:

The screenshot shows the contents of the 'calabs-bucket-3' bucket in the AWS S3 console. The 'Properties' tab is selected. At the top, there are buttons for 'Upload', '+ Create folder', and 'More'. The region is set to 'US West (Oregon)'. The table below lists the objects:

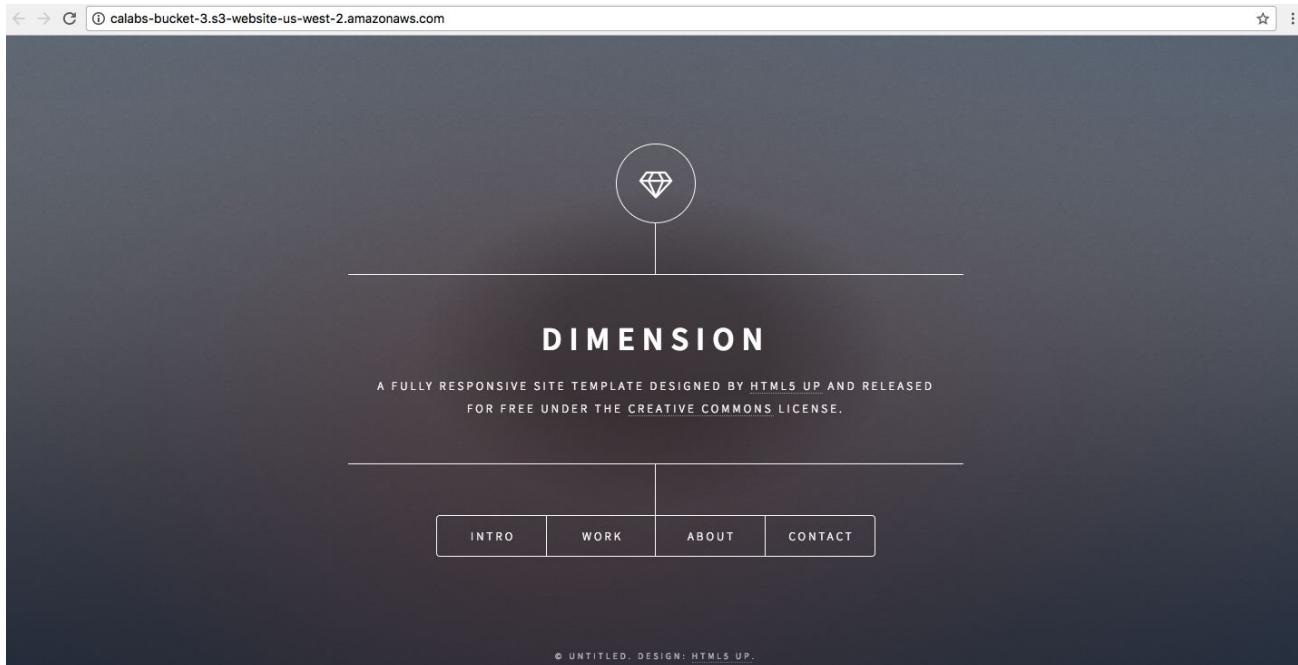
Name	Last modified	Size	Storage class
assets	--	--	--
error	--	--	--
images	--	--	--
LICENSE.MD	Jul 31, 2017 8:40:51 AM	16.7 KB	Standard
README.MD	Jul 31, 2017 8:40:51 AM	648.0 B	Standard
index.html	Jul 31, 2017 8:40:51 AM	14.2 KB	Standard

It's time to test everything out.

16. Open a new browser window (or tab) and navigate to the endpoint for your S3 static website.

Reminder: You can find the endpoint in the S3 console by navigating to your S3 bucket > Properties tab > Static website hosting tile (the endpoint is at the top).

The website should look similar to the following:



Note: The URL for your static S3 website endpoint will differ.

Summary

In this Lab Step you created an S3 bucket. You configured your S3 bucket to be a static website. You also established a bucket policy to apply to all objects uploaded to your bucket. Finally, you uploaded basic website content and confirmed that it was accessible on the web. At this point, you could simply maintain and use the basic website, or configure a content distribution network (CDN) such as Amazon CloudFront to allow global low-latency access to your website.

Step 3 Create a CloudFront Distribution For The Static Website

Introduction

Amazon CloudFront provides a global content delivery network (CDN) that delivers data in a secure, efficient manner. CloudFront pushes access to your websites out to the edge of the network, thereby reducing latency as access from different global locations is reduced. In this Lab Step you will setup a distribution for a previously created S3 static website.

This Lab Step is not complicated, however, it is often misconfigured due to the way S3 static websites and CloudFront distributions are integrated. The confusion occurs because both S3 and CloudFront have several configuration settings that define their behavior. The S3 static website provides some additional features on the buckets used. For example, by using S3 static websites instead of the default URL for buckets, you can set your own error page and display a friendly message to your users. You can also make use of pretty URLs such as "/blog", or "/about" rather than pointing directly to HTML files. However, even if the static website is configured for your bucket, if you point the CloudFront distribution to the main URL of your bucket and *not* to the

website URL, you will end up with the CloudFront default behavior which won't allow pretty URLs and will throw its own error pages configured in the CloudFront console.

Instructions

1. Navigate to the **Services > Networking & Content Delivery > CloudFront** console:



2. Click on the **Create Distribution** button:

Amazon CloudFront Getting Started

Either your search returned no results, or you do not have any distributions. Click you to distribute content using a worldwide network of edge locations that provid

Create Distribution

3. Click **Get Started** to create a **Web** distribution:

Select a delivery method for your content.

Web

Create a web distribution if you want to:

- Speed up distribution of static and dynamic content, for example, .html, .css, .js, .xml, .json, .php, .aspx, .jsp, and so on.
- Distribute media files using HTTP or HTTPS.
- Add, update, or delete objects, and submit data from web forms.
- Use live streaming to stream an event in real time.

You store your files in an origin - either an Amazon S3 bucket or a web server. After you create a distribution, you can add or change origins.

[Get Started](#)

CONTINUE

4. On the **Create Distribution** page, for **Origin Settings**, paste the Amazon S3 static website hosting endpoint that you created earlier.

Hint: You can obtain the endpoint by navigating to the S3 Console and selecting your bucket > Properties tab > Static website hosting. Example endpoint
- <http://calabs-bucket-3.s3-website-us-west-2.amazonaws.com>:

Origin Settings

Origin Domain Name i

5. Leave all other settings at their default values and click **Create Distribution**. The distribution process starts and the **Status** is changed to **In Progress**:

Delivery Method	ID	Domain Name	Comment	Origin	CNAMEs	Status	State	Last Modified
<input checked="" type="checkbox"/> Web	ESXFCOBSHYFV4	d2rue1xaqe280l.cloudfront.net	-	i.love.aws.s3-website-us-west-2.amazonaws.com	-	In Progress	Enabled	2016-12-07 20:45:10

The process typically takes about 15 minutes. The **Status** changes to **Deployed** once the CDN is deployed and ready for use.

6. While you wait for your CloudFront distribution to go online, return to the CloudFront console and click **Create Distribution**. Click **Get Started** for a Web distribution again. Click on the "i" information icon for each field that interests you or you are not sure what it might mean:

Origin Settings

Origin Domain Name	<input type="text"/>	 	Click in the field and specify the domain name for your origin - the Amazon S3 bucket or web server from which you want CloudFront to get your web content. The dropdown list enumerates the AWS resources associated with the current AWS account. To use a resource from a different AWS account, type the domain name of the resource. For example, for an Amazon S3 bucket, type the name in the format bucketname.s3.amazonaws.com. The files in your origin must be publicly readable.
Origin Path	<input type="text"/>	 	Optional. If you want CloudFront to request your content from a directory in your Amazon S3 bucket or your custom origin, enter the directory name here, beginning with a /. CloudFront appends the directory name to the value of Origin Domain Name when forwarding the request to your origin, for example, myawsbucket/production. Do not include a / at the end of the directory name.
Origin ID	<input type="text"/>	 	Enter a description for the origin. This value lets you distinguish multiple origins in the same distribution from one another. The description for each origin must be unique within the distribution.
Origin Custom Headers	Header Name <input type="text"/>	Value <input type="text"/>	 All custom header keys and values you specify here will be included in every request to this origin. If a header was already supplied in the client request, it is overridden.

Default Cache Behavior Settings

Path Pattern	Default (*) <input type="text"/>	
Viewer Protocol Policy	<input checked="" type="radio"/> HTTP and HTTPS <input type="radio"/> Redirect HTTP to HTTPS <input type="radio"/> HTTPS Only	

The context sensitive help text provides quick, informative descriptions for each field. Spend a few minutes looking over the descriptions. When through, click **Cancel** and return to the CloudFront console. (Another CloudFront distribution is not needed.)

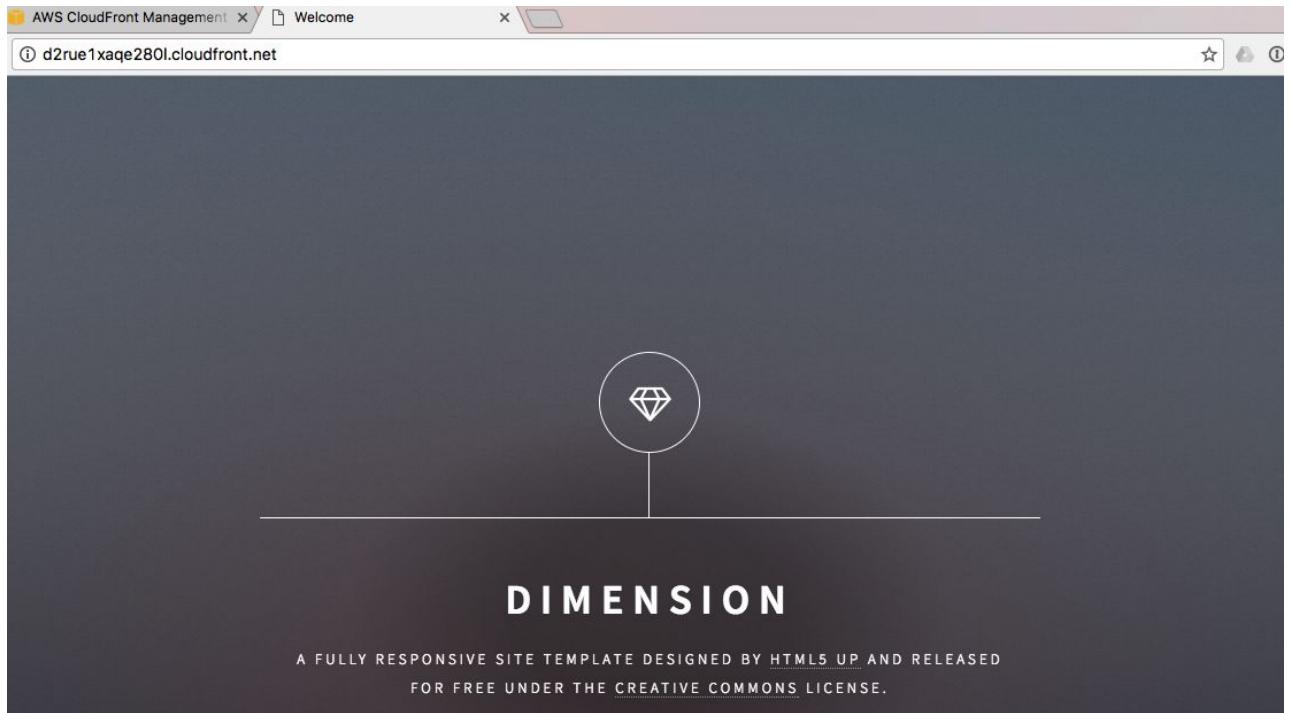
Once the deployment is completed you can continue with the Instructions below.

7. Click the actionable, random alphabetic **ID** of your CloudFront distribution. The **General** tab is displayed:

CloudFront Distributions > EZUOHHVWUWNGJ

General	Origins	Behaviors	Error Pages	Restrictions	Invalidations	Tags
Edit						
Distribution ID	EZUOHHVWUWNGJ					
ARN	arn:aws:cloudfront:::91943274478 :distribution/EZUOHHVWUWNGJ					
Log Prefix	-					
Delivery Method	Web					
Cookie Logging	Off					
Distribution Status	Deployed					
Comment	-					
Price Class	Use All Edge Locations (Best Performance)					
AWS WAF Web ACL	-					
State	Enabled					
Alternate Domain Names (CNAMEs)	-					
SSL Certificate	Default CloudFront Certificate (*.cloudfront.net)					
 Domain Name	d1lhsq6epm7431.cloudfront.net					
Custom SSL Client Support	-					
Supported HTTP Versions	HTTP/2, HTTP/1.1, HTTP/1.0					
IPv6	Enabled					
Default Root Object	-					
Last Modified	2017-07-31 09:01 UTC-7					
Log Bucket	-					

8. Copy the **Domain Name** and paste it into a separate browser window or tab. You should see the same website from the S3 static website previously created:

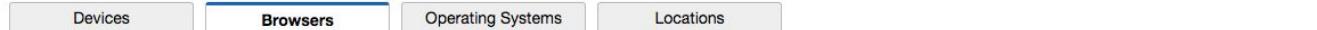


Navigating the website from either CloudFront or the S3 static website URL will generate traffic that is captured for you by Amazon.

Note: The Instructions below are optional, perform them if there is enough lab time left and interest permitting.

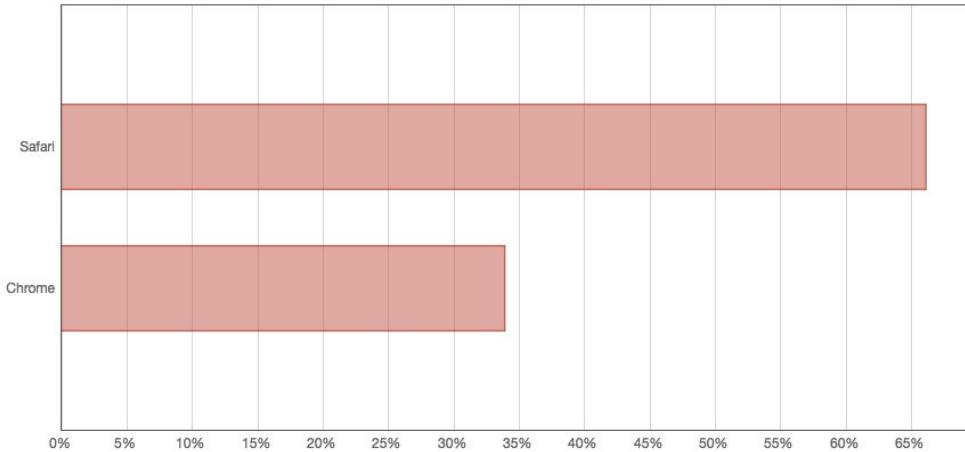
9. Spend a few minutes navigating the website. Open more than one browser type. (For example, navigate the website with both Safari and Chrome, or whatever other type of browser you have already installed.)

10. Open the **Viewers** page from the left navigation pane, then click the **Browsers** tab:



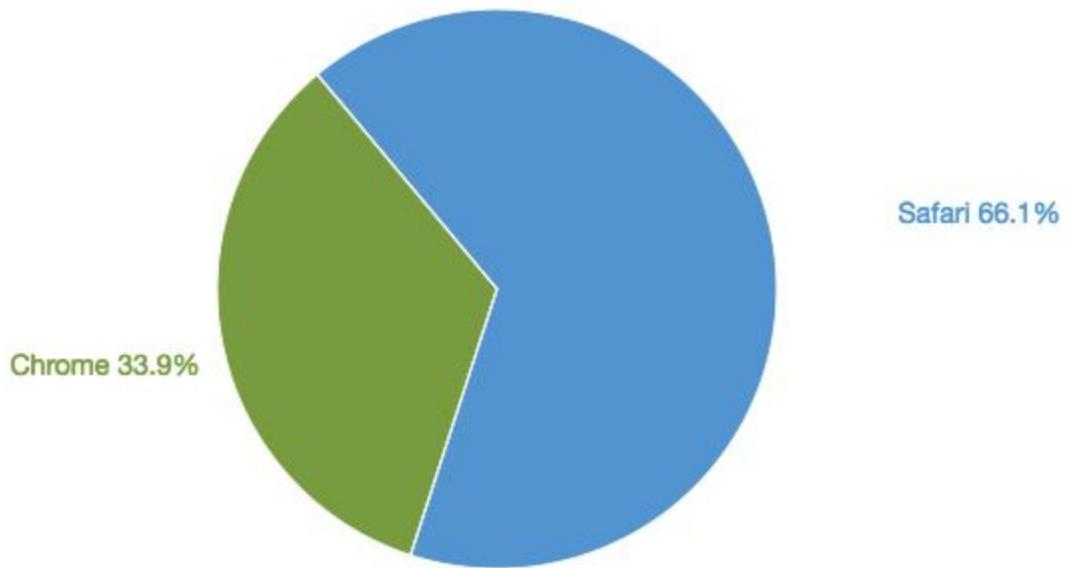
The following charts show information about the web browsers that CloudFront receives requests from for the selected distribution. The Browsers charts are available only for web distributions that had activity during the specified period and that have not been deleted.

Browsers [Show Details](#)  [Pie Chart](#)



Each browser that you navigated the website with should be captured. (*Note:* There is a variable delay, often about 15 minutes.)

11. Click Pie Chart above the bar graph to switch display types:



Of course, there are other analytics at your disposal captured by CloudFront, such as the type of device (desktop or mobile), operating system, location (country) of access, and so on. Most of

the data is collected and made available on a daily basis, but the granularity can be turned up to hourly for some types of data.

Summary

Congratulations! You have created a static S3 website accessible to the world with low latency due to a deployment using Amazon CloudFront CDN.