



lab



lab title

**Bulletproof HTML5 Websites with AWS
in a Nutshell
V1.15**



Course title

**BackSpace Academy
Nutshell Series**



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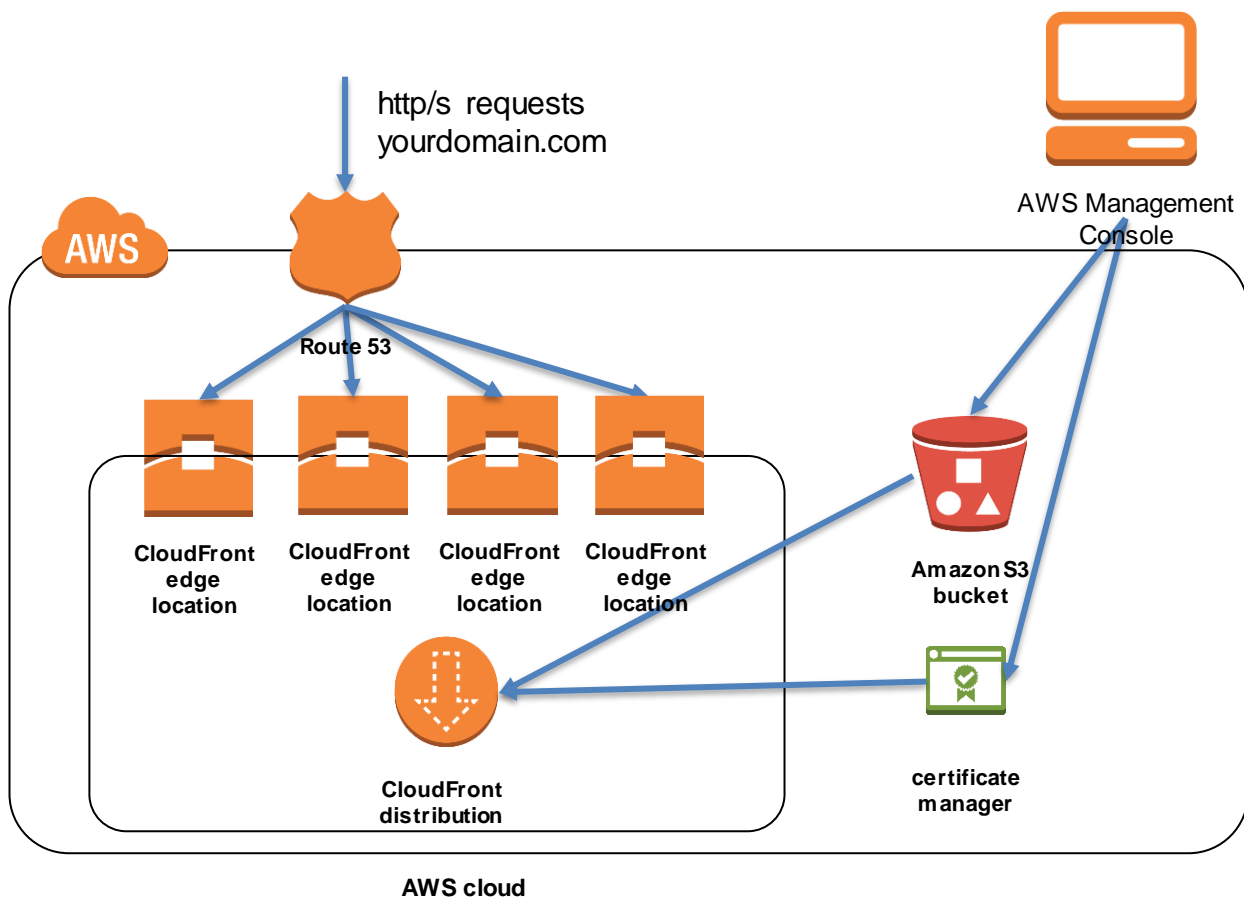
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▶ About the Lab

Please note that not all AWS services are supported in all regions. Please use the US-East-1 (North Virginia) region for this lab.

These lab notes are to support the instructional videos on Bulletproof HTML5 Websites with AWS in a Nutshell Course.

This is a typical use case for S3 and CloudFront to deliver highly available static websites that can handle heavy traffic.



Please note that AWS services change on a weekly basis and it is extremely important you check the version number on this document to ensure you have the latest version with any updates or corrections.

▶ Purchasing a Custom Domain Name

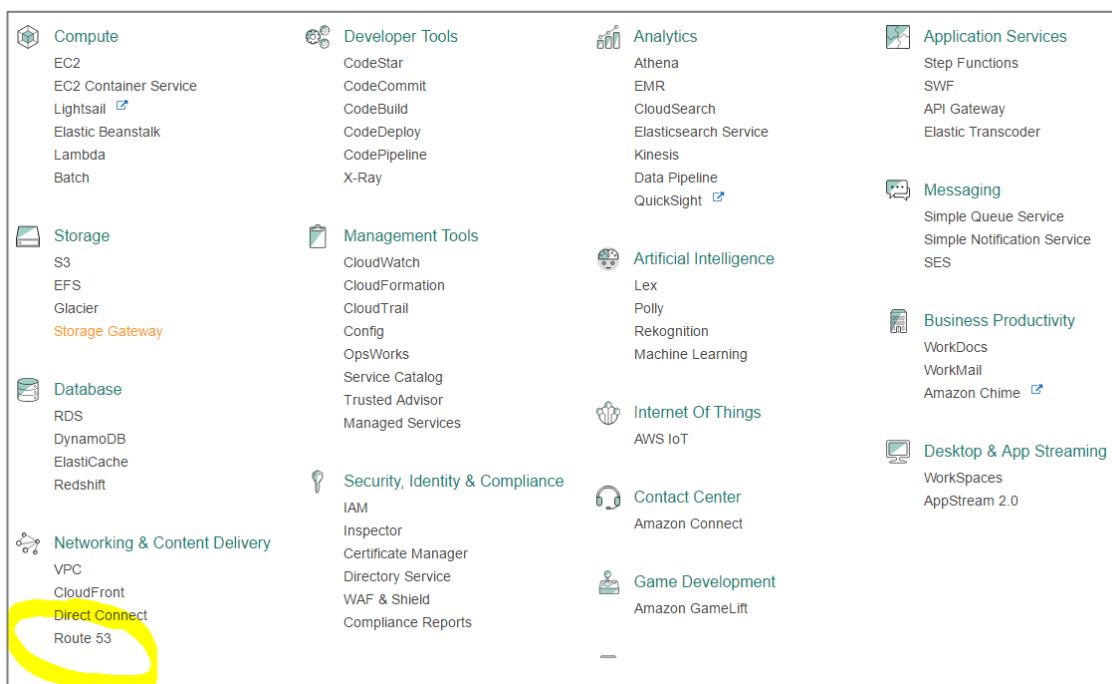
In this section, we will purchase a domain name through AWS Route 53.

*Please note this process will involve paying for a domain name with AWS.

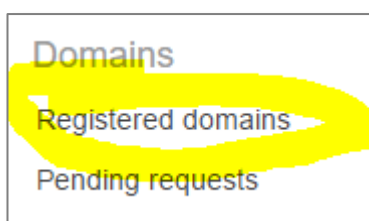
Our S3 bucket must have the same name as our domain name in order for it to be hosted by S3. So, our first task is to purchase a domain name.

This part involves purchasing a domain through the Route 53 service.

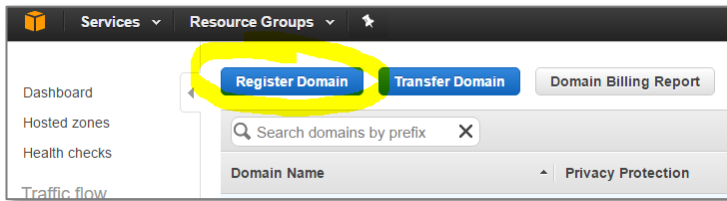
Click on the services menu and Route 53.



Click on Registered Domains from the menu



Click on Register Domain



Type in the domain name you would and like and click *Check* to see if it is available.

A screenshot of the 'Choose a domain name' form. The input field contains 'backspaceacademy' and the dropdown menu shows '.com - \$12.00'. The 'Check' button is highlighted with a yellow circle. The form has three steps: '1: Domain Search', '2: Contact Details', and '3: Review & Purchase'.

1: Domain Search

2: Contact Details

3: Review & Purchase

Choose a domain name

backspaceacademy .com - \$12.00 Check

To register a domain name, start by finding one that's available. Enter the first part of the name (such as example in example.com), choose an extension (such as .com or .org), and click Check. We'll tell you whether it's available and whether you can get it with other extensions. [Learn more](#).

If it is available continue through the process to purchase and register your domain name. Make sure the contact details use a current email address as this is required for the confirmation email from AWS (it can be changed later on by selecting "edit contacts" after the certificate has been set up).

A screenshot of the 'Choose a domain name' form showing the results of the domain search. The input field contains 'backspaceacademy' and the dropdown menu shows '.com - \$12.00'. The 'Check' button is highlighted with a yellow circle. Below the input field, there is a table titled 'Availability for 'backspaceacademy.com'' showing the domain name, status, price, and action. The status is 'Available' with a green checkmark. Below the table, there is a section titled 'Related domain suggestions' showing suggestions like 'backblankacademy.com'.

1: Domain Search

2: Contact Details

3: Review & Purchase

Choose a domain name

backspaceacademy .com - \$12.00 Check

Availability for 'backspaceacademy.com'

Domain Name	Status	Price /1 Year	Action
backspaceacademy.com	✓ Available	\$12.00	Add to cart

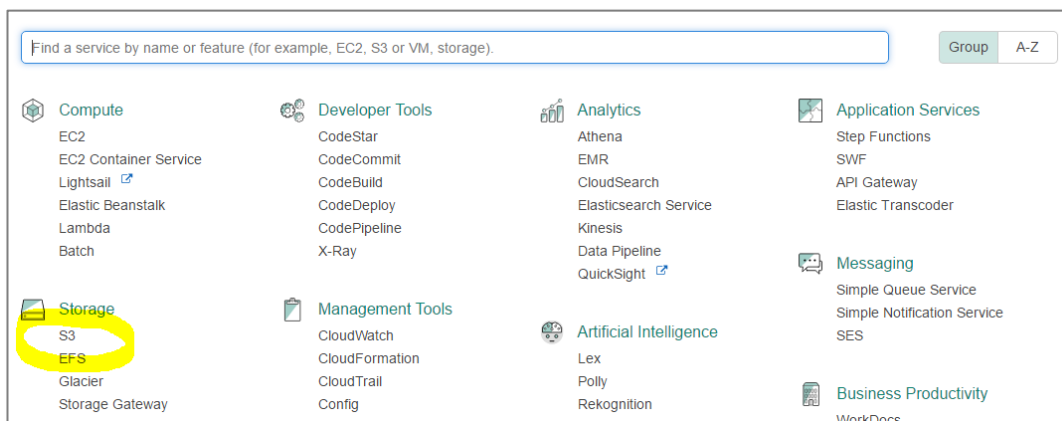
Related domain suggestions

Domain Name	Status	Price /1 Year	Action
backblankacademy.com	✓ Available	\$12.00	Add to cart

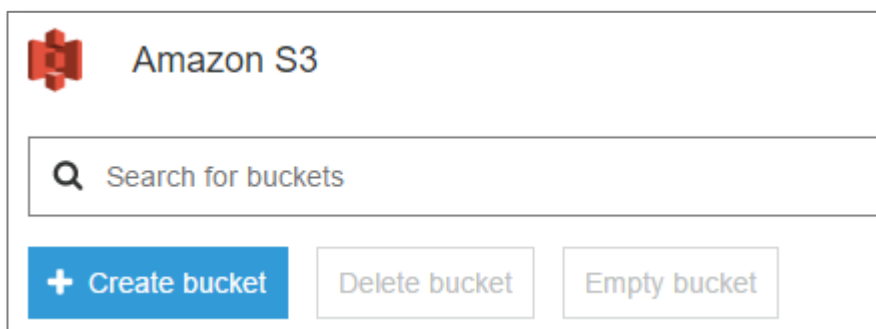
▶ Creating an S3 Bucket and Uploading our Website

In this section we will create an S3 bucket and upload our HTML5 website.

Click on the services menu and select S3.



Click on Create Bucket



The create bucket dialog box will appear.

The screenshot shows the 'Create bucket' dialog box with a progress bar at the top indicating four steps: 1. Name and region, 2. Set properties, 3. Set permissions, and 4. Review. Step 1 is currently active. The 'Name and region' section contains a 'Bucket name' field with the text 'backspaceacademy.com', a 'Region' dropdown menu set to 'US East (N. Virginia)', and a 'Copy settings from an existing bucket' section with a dropdown menu set to '15 Buckets'. At the bottom, there are 'Create', 'Cancel', and 'Next' buttons.

Enter your custom domain name.

Select US East (N. Virginia).

Click Next

The screenshot shows the 'Create bucket' dialog box with the progress bar updated to show Step 2, 'Set properties', as the active step. The 'Name and region' step is now completed. The 'Set properties' section contains three cards: 'Versioning' (Keep multiple versions of an object in the same bucket, Disabled), 'Logging' (Set up access log records that provide details about access requests, Disabled), and 'Tags' (Use tags to track your cost against projects or other criteria). Each card has a 'Learn more' link. At the bottom, there are 'Previous' and 'Next' buttons.

Click Next

Select *Manage public permissions*

Create bucket

✓ Name and region

✓ Set properties

3 Set permissions

4 Review

Manage users

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

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

Select *Grant public read access to this bucket*

Click Next

Create bucket

✓ Name and region ✓ Set properties ✓ Set permissions ④ Review

Name and region [Edit](#)

Bucket name backspaceacademy.com **Region** US East (N. Virginia)

Properties [Edit](#)

Versioning Disabled

Logging Disabled

Tagging 0 Tags

Permissions [Edit](#)

Users 1

Public permissions Enabled

[Previous](#) [Create bucket](#)

Click *Create Bucket* to create the bucket.

Our bucket has been created, now repeat the process to create the www subdomain bucket (www.yourdomain.com)

Create bucket

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

Name and region

Bucket name ⓘ

www.backspaceacademy.com

Region

US East (N. Virginia) ▼

Copy settings from an existing bucket

Select bucket (optional) 15 Buckets ▼

[Create](#) [Cancel](#) [Next](#)

Now it is time to upload our website.

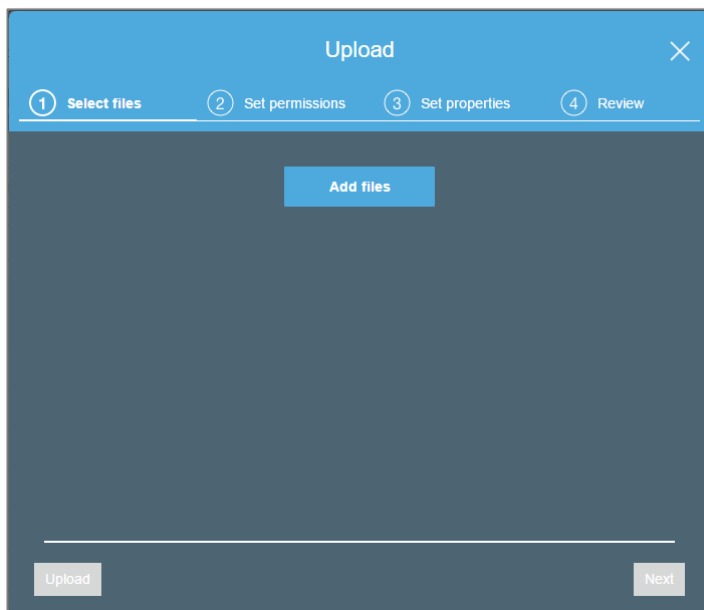
Select the root domain bucket (yourdomain.com)

Click *Upload*

PLEASE NOTE THE METHOD FOR UPLOADING ENTIRE DIRECTORIES WASN'T MENTIONED IN THE VIDEO.

You have two options for uploading files:

1. If you want to upload individual files Click *Add Files* and select the files to upload
2. If you want to upload an entire directory, including contents, do not Click *Add Files*. Open a Windows File Explorer window and drag the folder from File Explorer and place on top of the Upload form.

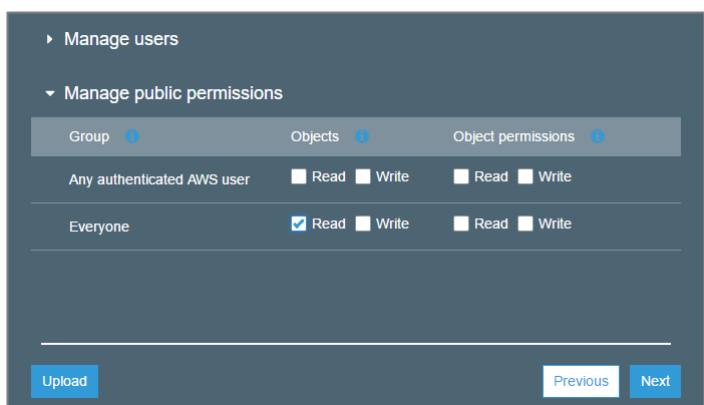


The screenshot shows a modal window titled 'Upload' with a close button (X) in the top right corner. Below the title bar is a progress indicator with four steps: 1. Select files (active), 2. Set permissions, 3. Set properties, and 4. Review. The main area of the dialog is dark blue and contains a large 'Add files' button in the center. At the bottom, there are two buttons: 'Upload' on the left and 'Next' on the right.

Click *Next*

Select *Manage Public Permissions*

Check *Everyone – Read*



The screenshot shows the 'Manage public permissions' section of the upload dialog. It has a header with three tabs: 'Group', 'Objects', and 'Object permissions'. Below the tabs is a table with two rows of permissions. The first row is for 'Any authenticated AWS user' and the second row is for 'Everyone'. The 'Everyone' row has the 'Read' checkbox checked. At the bottom, there are three buttons: 'Upload' on the left, 'Previous' in the center, and 'Next' on the right.

Group	Objects	Object permissions
Any authenticated AWS user	<input type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write
Everyone	<input checked="" type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write

Click *Next*

Select *Standard* for Storage Class and *None* for encryption

Storage class
Choose one depending on your use case scenario and performance access requirements.

☒ Standard ☐ Standard-IA ☐ Reduced redundancy

Encryption
Protect data at rest by using Amazon S3 master-key or by using AWS KMS master-key.

☒ None ☐ Amazon S3 master-key ☐ AWS KMS master-key

Upload **Previous** **Next**

Click Next

Upload

✓ Select files ✓ Set permissions ✓ Set properties **4 Review**

Files [Edit](#)

1 Files Size: 15.5 KB

Permissions [Edit](#)

2 grantees

Properties [Edit](#)

Encryption No	Storage class Standard
-------------------------	----------------------------------

Metadata

Previous **Upload**

Click Upload

Your files will now be uploaded.

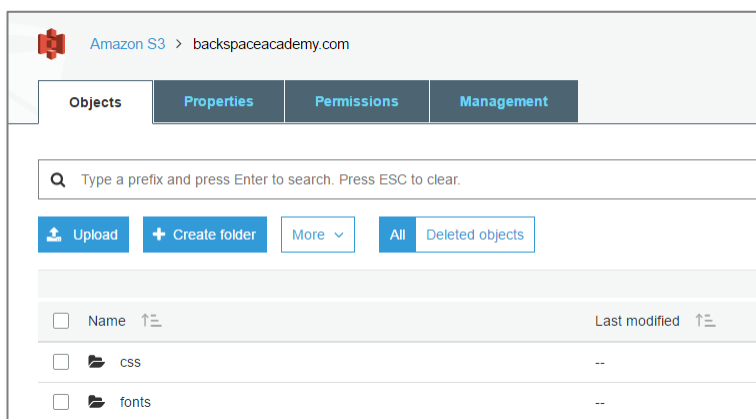
Create folders and upload the rest of your website files into their respective folders.

*Note this process is quite tedious. If you use S3 regularly, CloudBerry Explorer for S3 can help speed this up. It can be downloaded from cloudberrylabs.com.

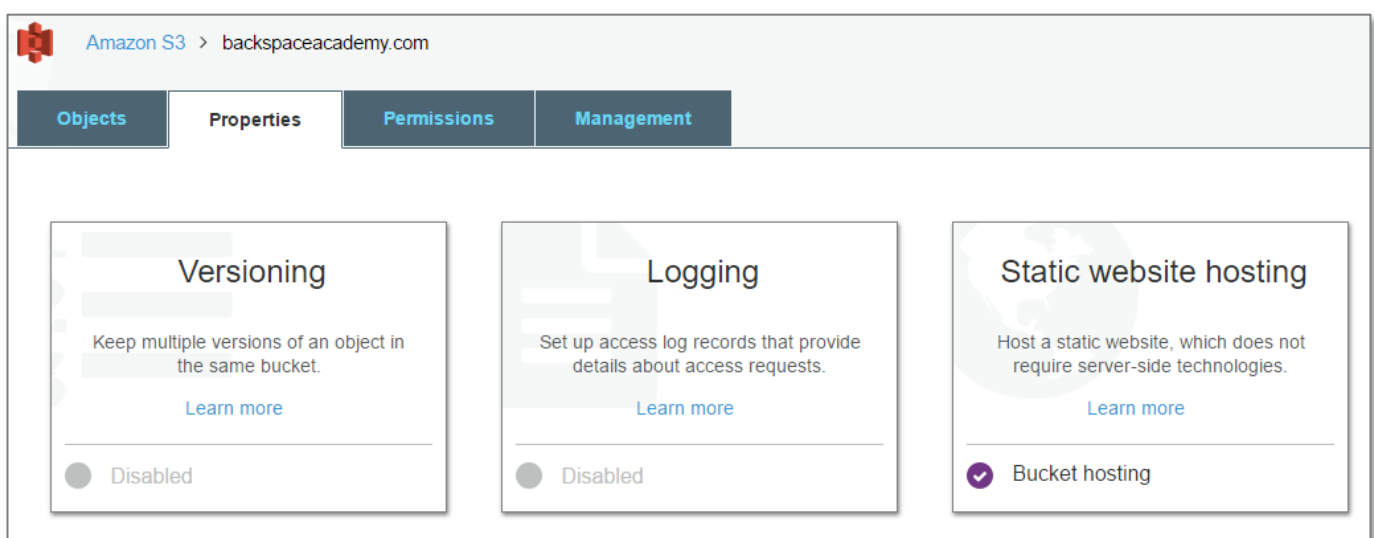
▶ Enabling S3 Website Hosting

In this section we will enable website hosting for our root domain (yourdomain.com) and also redirect requests to the www subdomain (www.yourdomain.com) to our root domain.

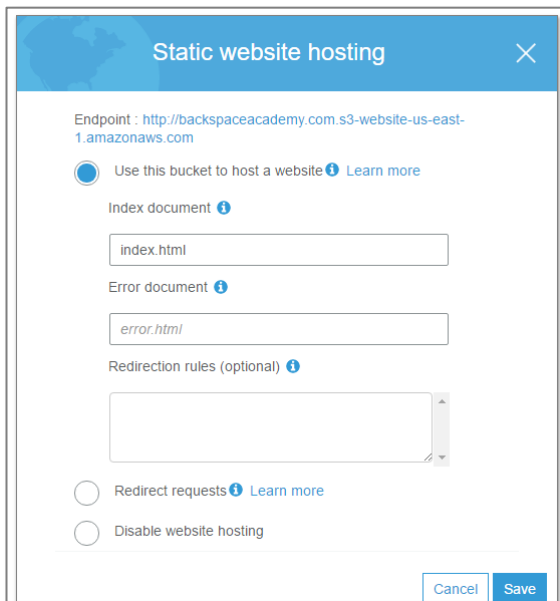
Select the root domain bucket (yourdomain.com)



Now select *Properties*



Now Select *Static Website Hosting*



The image shows a 'Static website hosting' configuration window. At the top, it displays the endpoint: `http://backspaceacademy.com.s3-website-us-east-1.amazonaws.com`. Below this, there are two radio buttons. The first, 'Use this bucket to host a website', is selected. The second is 'Redirect requests'. Under the first option, there are three text input fields: 'Index document' with 'index.html', 'Error document' with 'error.html', and 'Redirection rules (optional)' which is empty. At the bottom, there are 'Cancel' and 'Save' buttons.

Now Select *Use this bucket to host a website*

Enter the *Index Document* (required)

Enter *Error Document* if available or else enter just *index.html*

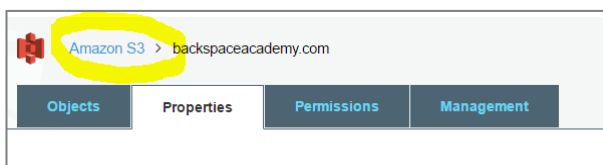
Click *Save*

If you go back into *Static Website Hosting* you will see the public endpoint for the S3 website.

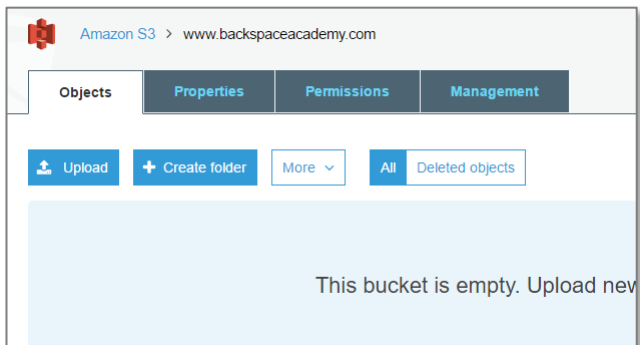
Endpoint : `http://yourdomain.com.s3-website-us-east-1.amazonaws.com`

Redirecting www Subdomain Requests

Now go back to the S3 dashboard

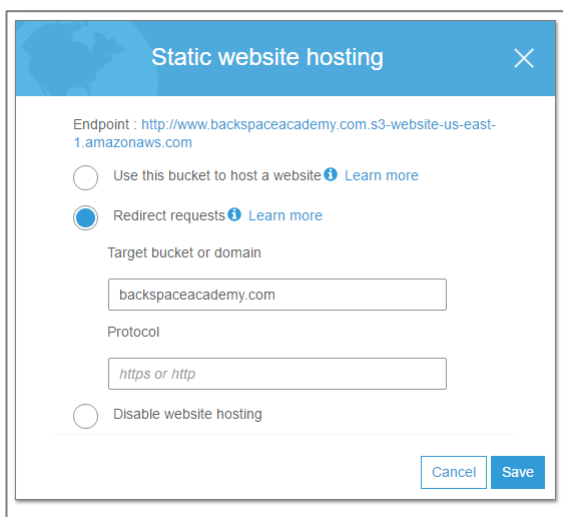


Now select the *www* subdomain bucket (`www.yourdomain.com`)



Select *Properties*

Select *Static Website Hosting*



Redirect all requests to the target root domain (yourdomain.com)

Click **Save**

Troubleshooting

If you get the following message your permissions are not set to public.



If you find svg images are not showing on your website it is most probably incorrect header information. Upload the specific files again but add Content-type "image/svg+xml" in the Metadata section (you need to scroll down to see it).

The screenshot shows the 'Upload' console in the AWS S3 management interface, specifically the 'Set properties' step. The 'Metadata' section is highlighted with a yellow circle. It contains a table with two columns: 'Header' and 'Value'. The first row shows 'Content-Type' as the header and 'image/svg+xml' as the value. The second row shows 'x-amz-meta-' as the header and 'Header value' as the value. The 'Save' button is also highlighted with a yellow circle.

Header	Value
Content-Type	image/svg+xml
x-amz-meta-	Header value

If you find svg images are not showing on your website and you used CloudBerry Explorer to upload, the http headers for svg files are incorrect.

If you are using Cloudberry then right click on the image and select *Set HTTP Headers*. Content-Type should be image/svg+xml

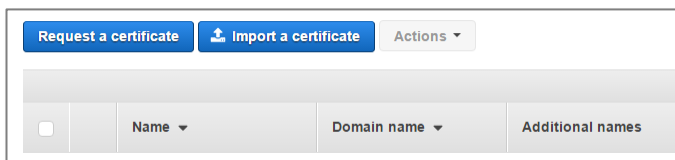
If you need to change multiple files then set up an upload rule (requires paid version) for svg files in CloudBerry or use the S3 management console to upload the files.

▶ Creating an SSL Certificate with AWS Certificate Manager

In this section we will use the **AWS Certificate Manager** to create an SSL certificate we can use to enable HTTPS with CloudFront.

Please note that to require HTTPS between viewers and CloudFront, you must change the AWS region to US East (N. Virginia) before you request or import a certificate.

Click on the services menu and select AWS Certificate Manager.



Click *Request a Certificate*

A screenshot of the 'Request a certificate' wizard in the AWS Certificate Manager console. The wizard has three steps: 'Step 1: Add domain names', 'Step 2: Review and request', and 'Step 3: Validation'. The first step is active. A blue box at the top says: 'You can use AWS Certificate Manager certificates only with Elastic Load Balancing and Amazon CloudFront. [Learn more.](#)'. Below this is the 'Add domain names' section. It includes a text input field with 'www.example.com' and a 'Remove' button. Below the input field is a blue button that says 'Add another name to this certificate'. A note below the button says: 'You can add additional names to this certificate. For example, if you're requesting a certificate for "www.example.com", you might want to add the name "example.com" so that customers can reach your site by either name. [Learn more.](#)'. At the bottom, there is a red asterisk warning: '*At least one domain name is required'. On the right side of the bottom bar are 'Cancel' and 'Review and request' buttons.

Enter the root domain (yourdomain.com)

Click *Add another name to this certificate*

Enter the root domain prefixed with *. (*.yourdomain.com)

Add domain names

Type the fully qualified domain name of the site you want to secure with an SSL/TLS certificate (for example, `www.example.com`). Use an asterisk (*) to request a wildcard certificate to protect several sites in the same domain. For example: `*.example.com` protects `www.example.com`, `site.example.com` and `images.example.com`.

Domain name*	Remove
<input type="text" value="backspaceacademy.com"/>	
<input type="text" value="*.backspaceacademy.com"/>	

[Add another name to this certificate](#)

You can add additional names to this certificate. For example, if you're requesting a certificate for `www.example.com`, you might want to add the name `example.com` so that customers can reach your site by either name. [Learn more](#).

*At least one domain name is required

[Cancel](#) [Review and request](#)

When you receive the validation email, open the link and validate the certificate.

After you click the validation link in the email the certificate will be marked as issued.

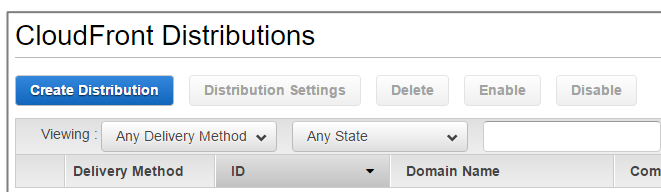
« < Viewing 1 to 4 of 4 certificates > »						
<input type="checkbox"/>	Name ▾	Domain name ▾	Additional names	Status ▾	Type ▾	In use? ▾
<input type="checkbox"/>	▶	backspaceacademy.com	*.backspaceacademy.com	Issued	Amazon Issued	Yes

Creating a CloudFront Distribution

In this section we will use the **AWS CloudFront Content Delivery Network (CDN)** to cache our site to edge locations across the Globe.

Click on the services menu and select CloudFront.

Click on *Create Distribution*



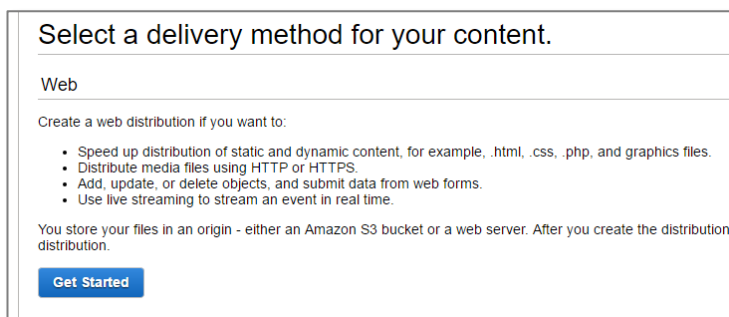
CloudFront Distributions

Buttons: Create Distribution, Distribution Settings, Delete, Enable, Disable

Viewing: Any Delivery Method, Any State

Delivery Method	ID	Domain Name	Com
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Select *Web – Get Started*



Select a delivery method for your content.

Web

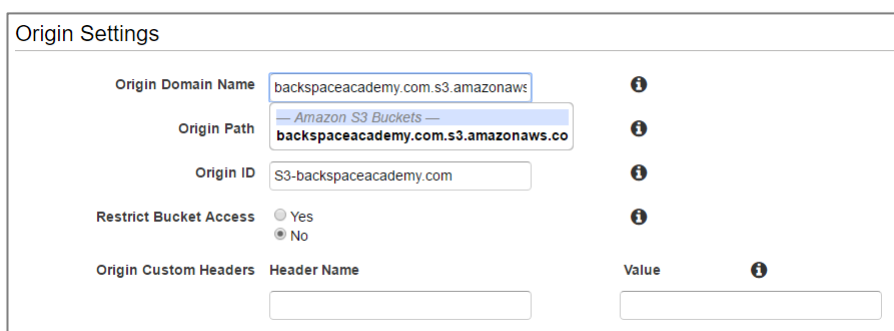
Create a web distribution if you want to:

- Speed up distribution of static and dynamic content, for example, .html, .css, .php, and graphics files.
- 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 the distribution, you can update the origin.

Get Started

In *Origin Settings* select your s3 bucket as the *Origin Domain Name*



Origin Settings

Origin Domain Name: backspaceacademy.com.s3.amazonaws.com ⓘ

Origin Path: — Amazon S3 Buckets —
backspaceacademy.com.s3.amazonaws.com ⓘ

Origin ID: S3-backspaceacademy.com ⓘ



Restrict Bucket Access: ☐ Yes ☒ No ⓘ

Origin Custom Headers	Header Name	Value

In *Default Cache Behavior Settings*

Set *Viewer Protocol Policy* to *Redirect HTTP to HTTPS*

Default Cache Behavior Settings

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

Under *Distribution Settings* enter your domain name and wildcard for subdomains (*.yourdomain.com) into *Alternate Domain Names (CNAMEs)*

Distribution Settings

Price Class	Use All Edge Locations (Best Performance) ▾	?
AWS WAF Web ACL	None ▾	?
Alternate Domain Names (CNAMEs)	backspaceacademy.com *.backspaceacademy.com	?

Under *Distribution Settings* enter/select your SSL certificate

SSL Certificate ☒ Default CloudFront Certificate (*.cloudfront.net)

Choose this option if you want your users to use HTTPS or HTTP to access your content with the CloudFront domain name (such as `https://d111111abcdef8.cloudfront.net/logo.jpg`).

Important: If you choose this option, CloudFront requires that browsers or devices support TLSv1 or later to access your content.

☐ Custom SSL Certificate (example.com):

Choose this option if you want your users to access your content by using an alternate domain name, such as `https://www.example.com/logo.jpg`. You can use a certificate stored in AWS Certificate Manager (ACM) in the US East (N. Virginia) Region, or you can use a certificate stored in IAM.

backspaceacademy.com (900ce1fd-7cb8-4d39... ▾)

↻

Request or Import a Certificate with ACM

[Learn more](#) about using custom SSL/TLS certificates with CloudFront.
[Learn more](#) about using ACM.

Under *Distribution Settings* enter the index file for your website

Default Root Object

Under *Distribution Settings* uncheck “Enable IPv6”

Logging

☐ On
☒ Off

Bucket for Logs

Log Prefix

Cookie Logging

☐ On
☒ Off

Enable IPv6

☐

[Learn more](#)

Click *Create Distribution*

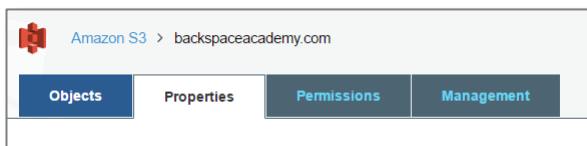
The Status of the distribution will change when it has been distributed to the edge locations.

Requiring HTTPS for Communication Between CloudFront and Your Amazon S3 Origin

If you are creating a secure site you can also require HTTPS for communication between your S3 bucket and CloudFront. This is achieved by disabling website hosting for the S3 bucket. It will then only be possible to view the website through CloudFront.

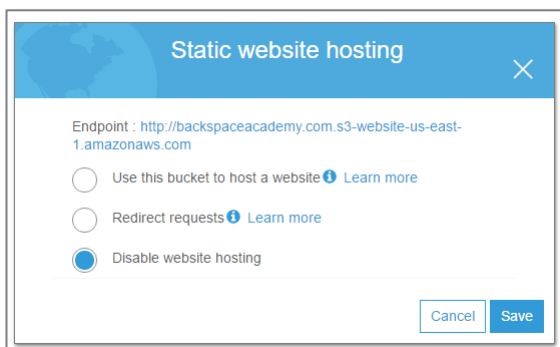
Go to the S3 management console and select the bucket.

Select the *Properties* tab



Select *Static website hosting*

Select *Disable website hosting* and then click *Save*

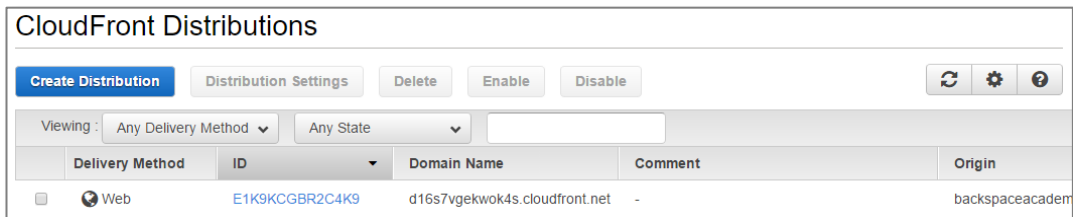


Invalidating a CloudFront Distribution

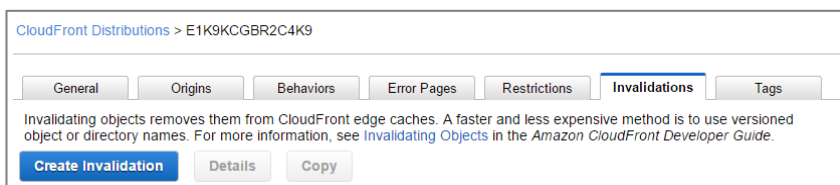
If you need to change your website and update your CloudFront distribution you can force CloudFront to fetch and update the distribution using invalidations.

To invalidate/update a CloudFront distribution:

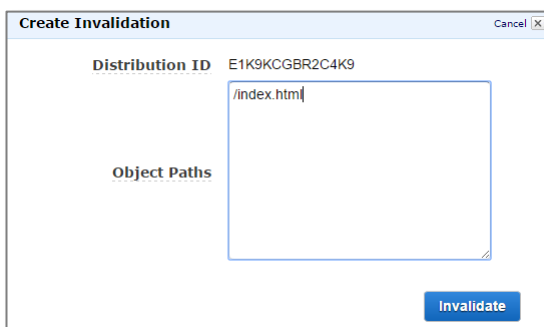
Click on the distribution from the list of distributions



Click on the *Invalidations* tab
Click *Create Invalidation*



Enter the object path to the file you want to invalidate/update (e.g. `/index.html`) or use a wildcard symbol to invalidate all the files (e.g. `/*`)



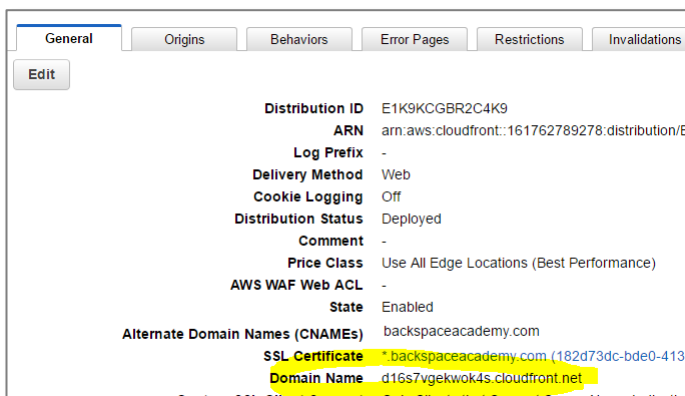
Click *Invalidate*

This will take some time to complete.

Routing Traffic with AWS Route 53

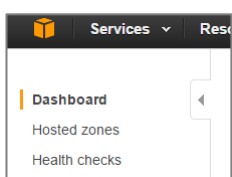
In this section we will direct all requests to our domain name and www subdomain to CloudFront using Route 53 Domain Name Service (DNS).

Go back to the CloudFront Distribution page and copy the distribution domain name

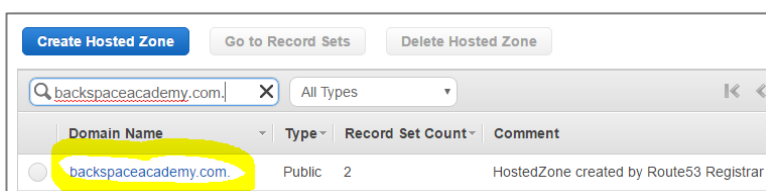


Now go back to the Route 53 Management Console:

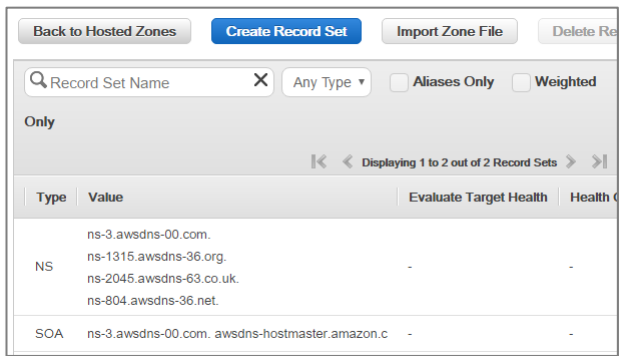
Click on the services menu and select Route 53.



Click on Hosted Zones



Click on the hosted zone created by the Route 53 Registrar



Click on *Create Record Set*

Select *A-IPv4 address* as Type

Check Alias: Yes

Leave *Name* empty

Enter the distribution domain name as Alias Target:

Create Record Set

Name:

backspaceacademy.com

Type:

A - IPv4 address

Alias:

☒ Yes ☐ No

Alias Target:

d16s7vgekwok4s.cloudfront.net

Alias Hosted Zone ID:

Z2FDTDNATAQYW2

You can also type the domain name for the resource. Examples:

- CloudFront distribution domain name: d111111abcdfe8.cloudfront.net
- Elastic Beanstalk environment CNAME: example.elasticbeanstalk.com
- ELB load balancer DNS name: example-1-us-east-1.elb.amazonaws.com
- S3 website endpoint: s3-website-us-east-2.amazonaws.com
- Resource record set in this hosted zone: www.example.com

Learn More

Click *Create*

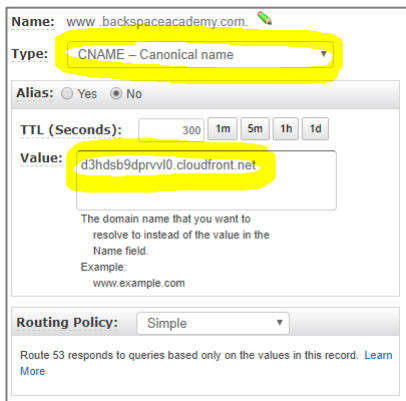
Route Requests for www Subdomain

Click on *Create Record Set*

Select *CNAME* as Type

Enter www for *Name*

Enter the CloudFront domain for the www subdomain as Value (without the http:// at the start)



The screenshot shows the AWS Route 53 console interface for creating a new record set. The 'Name' field is set to 'www.backspaceacademy.com'. The 'Type' is set to 'CNAME - Canonical name'. The 'Alias' is set to 'No'. The 'TTL (Seconds)' is set to '300'. The 'Value' is set to 'd3hdsb9dprvv0.cloudfront.net'. The 'Routing Policy' is set to 'Simple'. Below the form, there is a note: 'Route 53 responds to queries based only on the values in this record. [Learn More](#)'.

Click on *Create Record Set*

After some time the changes will be propagated to the Internet and you will be able to navigate to your domain name in your browser and see your website.

Checking DNS Propagation Status

The Route 53 entries detailed above will take a while to propagate across the Internet. This could be anywhere from a couple of minutes to an hour. You can check the status of DNS propagation using the following site:

[Global DNS Propagation Checker](#)