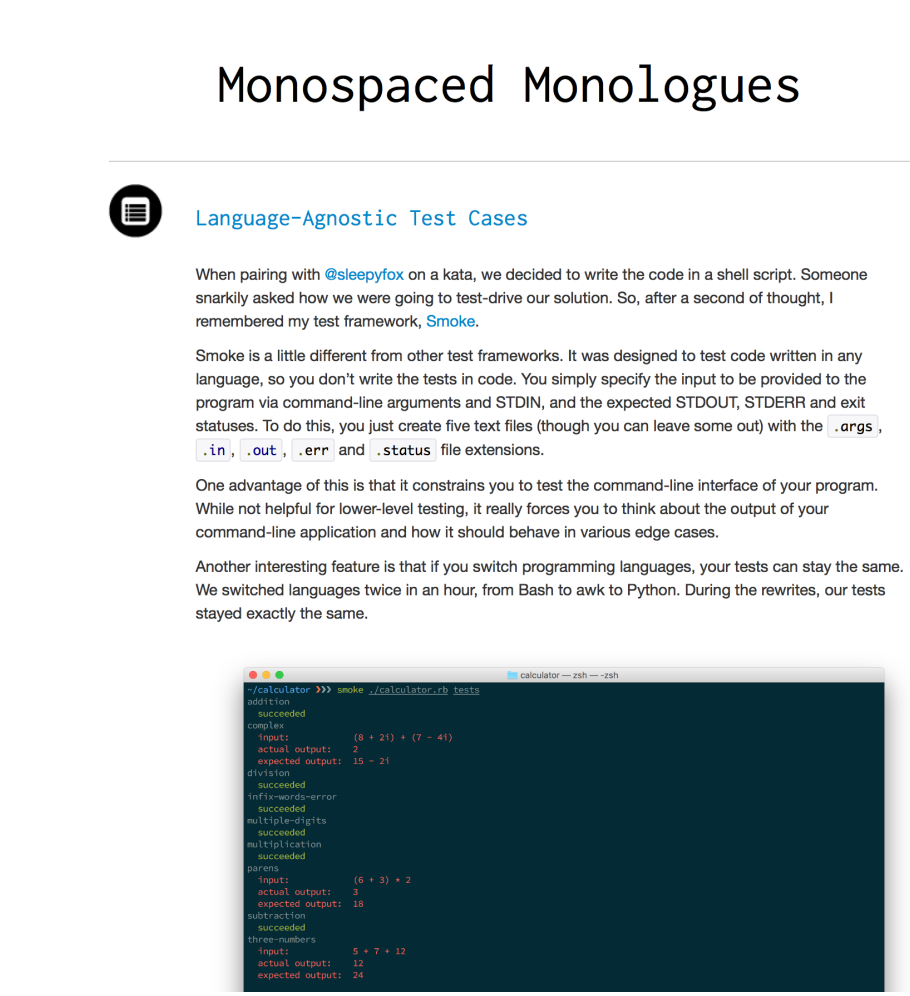
Tutorial: How to use Amazon S3 and CloudFront CDN to serve images fast and cheap

(/users/samirtalwar) **Samir Talwar (/users/samirtalwar)** 03 May 2016

*This is a guest post by **Samir Talwar** **(https://noodlesandwich.com/)**, a software developer based in London. Samir cares deeply about software quality and craftsmanship. You can read more of his writing on his **excellent blog** **(http://monospacedmonologues.com/)** and follow him on **Twitter** **(https://twitter.com/SamirTalwar)**.*

In my last tutorial, we figured out **how to host static web pages for free on GitHub pages (https://learnetto.com/blog/tutorial-how-to-host-your-websites-for-free-using-github-pages)**. However, if you tried to host images or other large assets in the same fashion, you may have noticed that it's pretty slow. GitHub Pages was never designed to handle large files. In this article, we'll explore a much faster, yet extremely cost-effective solution for dealing with non-text data.

My blog, ***monospacedmonologues.com*** **(http://monospacedmonologues.com/)**, is pretty text-heavy, but gets a sprinkling of pictures once in a while. The blog itself is really just a **Tumblr (https://www.tumblr.com/)** blog, and so I don't host it anywhere I can store files. But that doesn't matter, because the images can be hosted anywhere.



Even the pictures on my blog are code-heavy (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/1462388093679-blog.png)

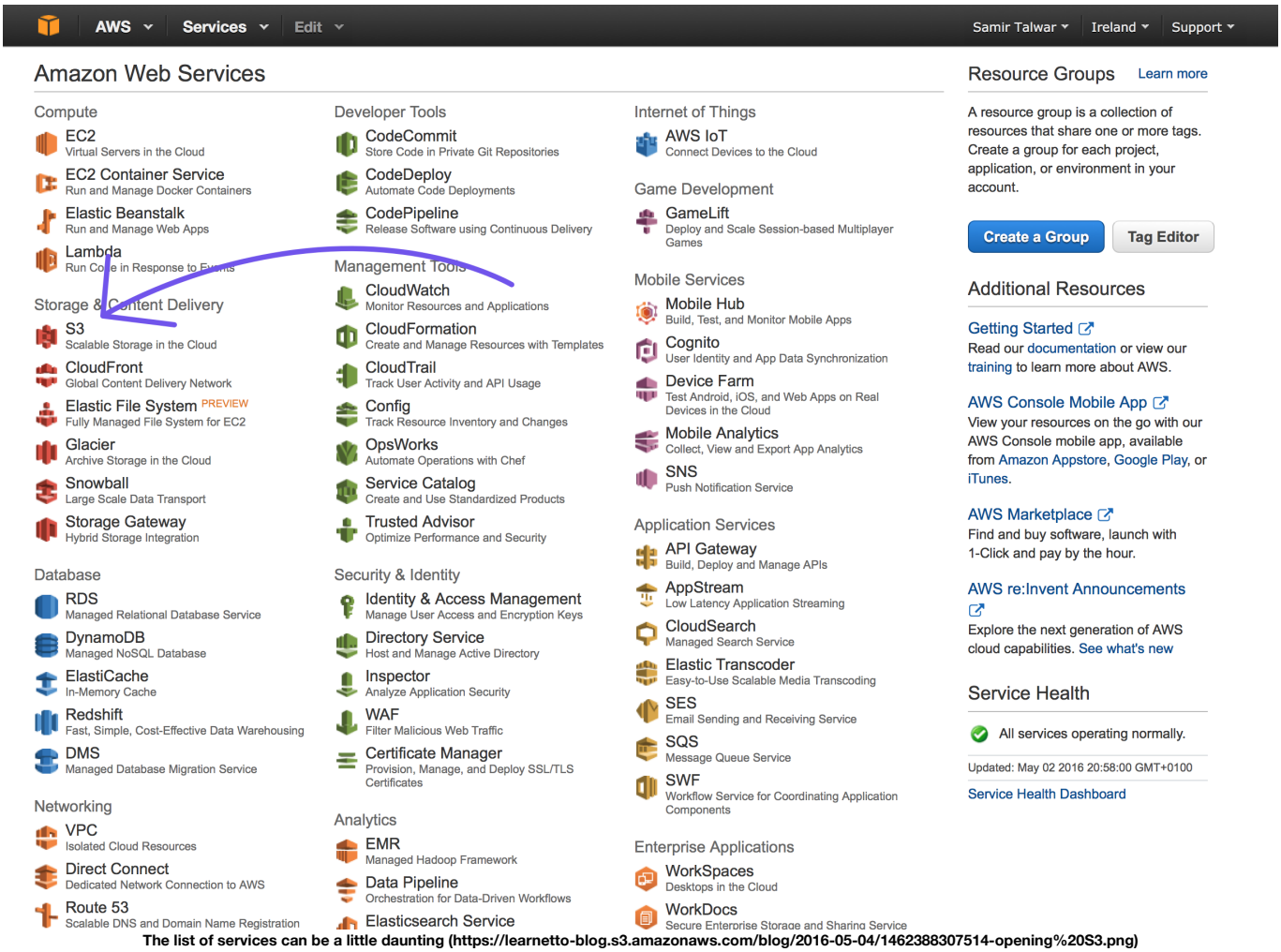
Personally, I use **Amazon Web Services (https://aws.amazon.com/)** to host my images, but there are lots of other storage providers, such as **Rackspace Cloud (https://www.rackspace.com/cloud)**, **Google Cloud (https://cloud.google.com/)** and **Microsoft Azure (https://azure.microsoft.com/)**. The important thing is to pick one that isn't going away any time soon, so I'd suggest sticking to the big players.

If you want to follow along, you'll first need an **Amazon Web Services (https://aws.amazon.com/)** account. The process is pretty similar for all of the above cloud providers though.

Buckets of assets

Amazon, along with a few of the other cloud providers, use the term "bucket" to refer to a lot of related files. You can pretty much consider it a folder that belongs to you.

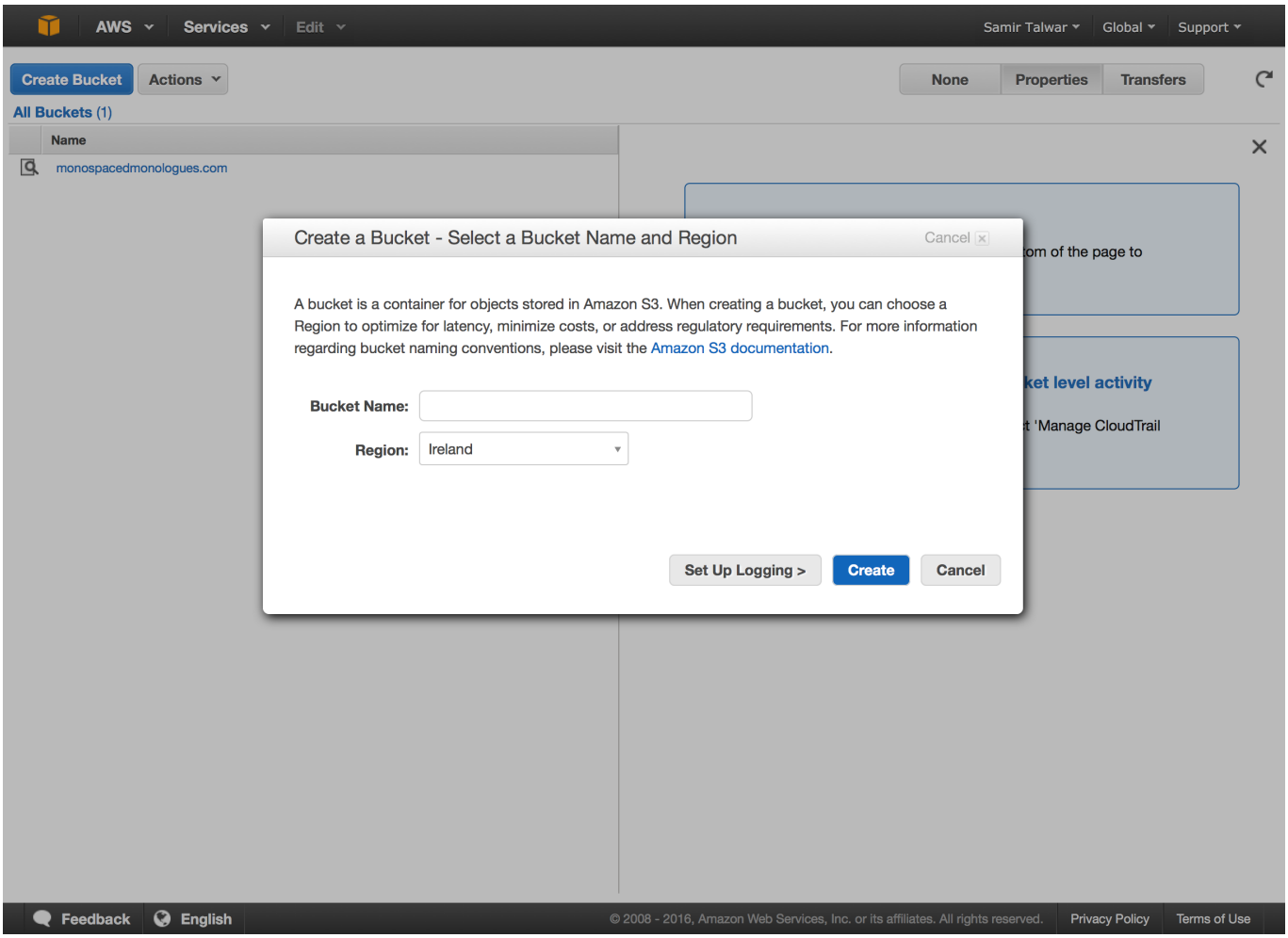
Open up the *S3* service.



The list of services can be a little daunting (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/1462388307514-opening%20S3.png)

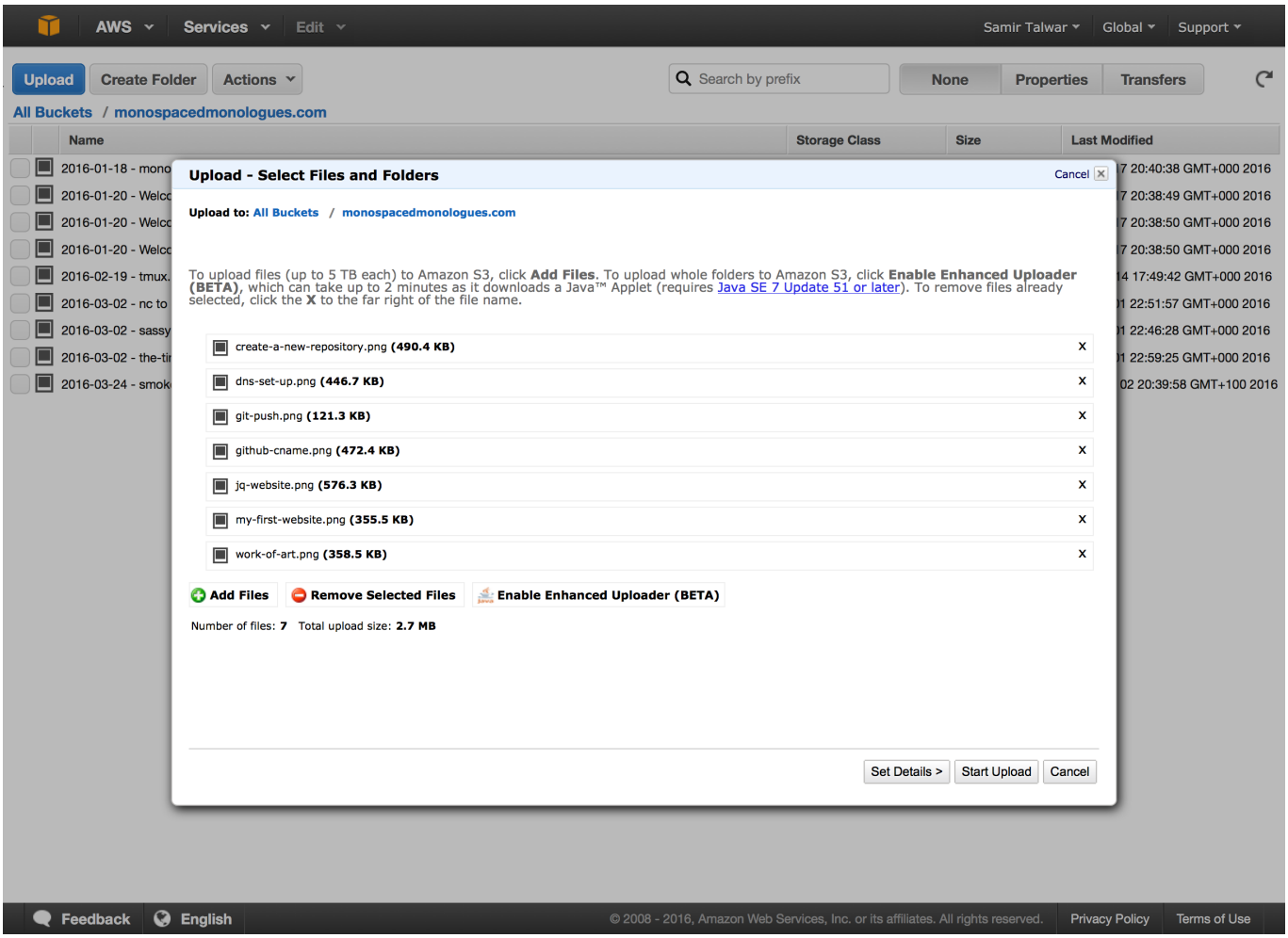
Once we're on the S3 home page, create your bucket. If you have a domain name already, I'd recommend naming it the same as your domain — it'll stop you getting confused later if you end up with multiple buckets for multiple purposes. I named mine "monospacedmonologues.com". Your bucket name needs to be globally unique, so if you don't own a domain name, you may have to be fairly inventive.

As for the location, I picked the one closest to me. If your friends/readers/customers are all in one spot, then you could pick the location closest to them. Don't fret about it too much though. We're going to distribute our files all over the world soon.



Create an S3 bucket (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/1462389182096-create%20an%20S3%20bucket.png)

Once you have a bucket, you can upload files. Click the big blue *Upload* button, then *Add Files*, and select the files you want to upload. You can rename them later in the S3 interface if you need.



Upload files to S3 (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/1462389500497-upload%20files%20to%20S3.png)

Once they're up on Amazon's servers, select one of your newly-uploaded files and click *Properties* in the top-right. You'll see a link to the file. The structure looks something like this:

```
https://s3-<location>.amazonaws.com/<bucket>/<file>
```

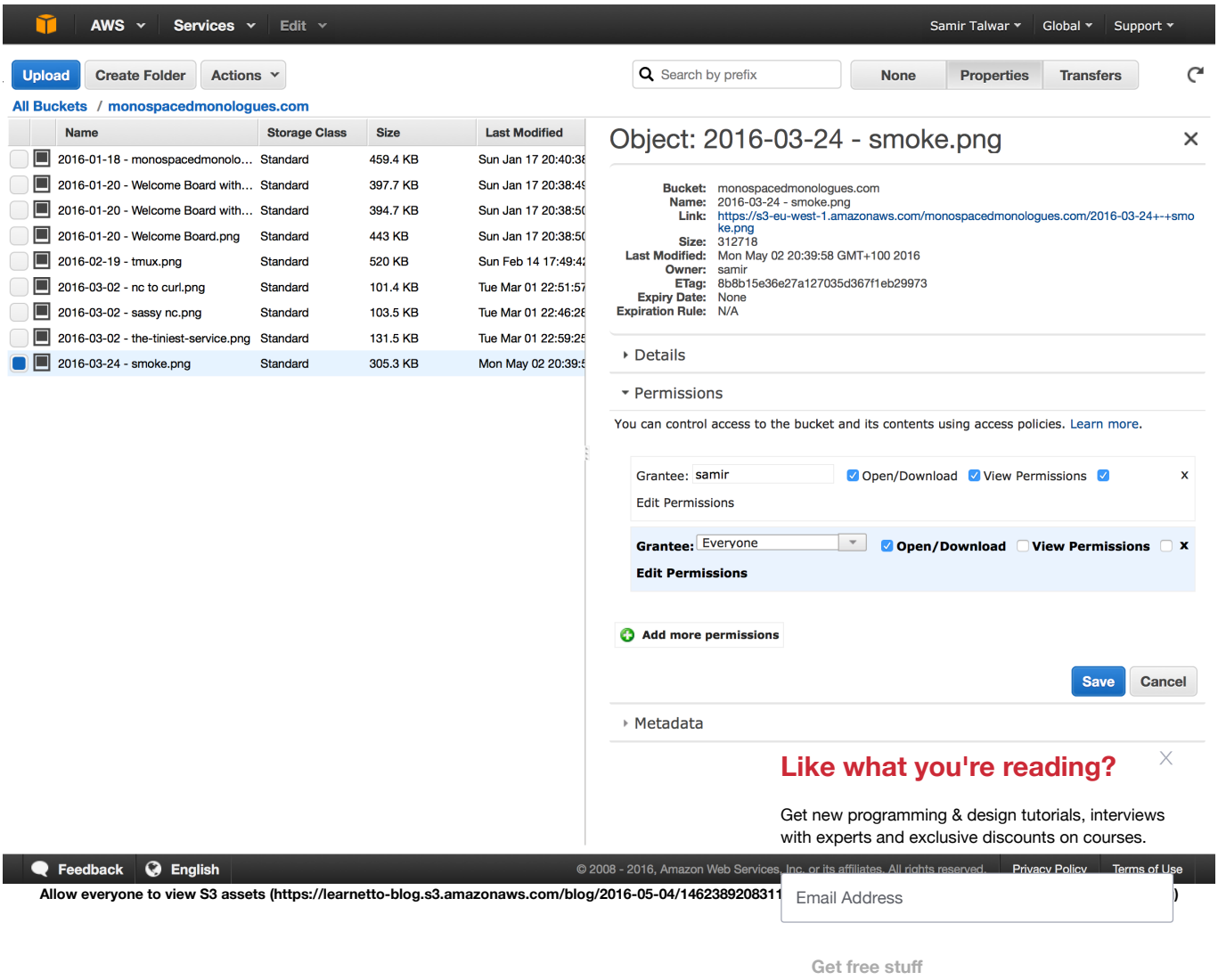
You can also access your assets through a nicer-looking link that has this structure:

```
https://<bucket>.s3.amazonaws.com/<file>
```

They're basically the same thing, but having a domain name specific to your bucket has a bunch of advantages we'll see later.

For now, open it up using whichever URL you like. Either way, you'll see an "Access Denied" message. This is because S3 files are private by default, as many people use it to store sensitive data. In order to host your website files there, you'll need to change the permissions of the files so they can be accessed by the outside world.

To do so, first select a file and click *Properties* on the top right. then open the *Permissions* section and add an item. We're going to grant "Everyone" the right to *Open/Download* the file.



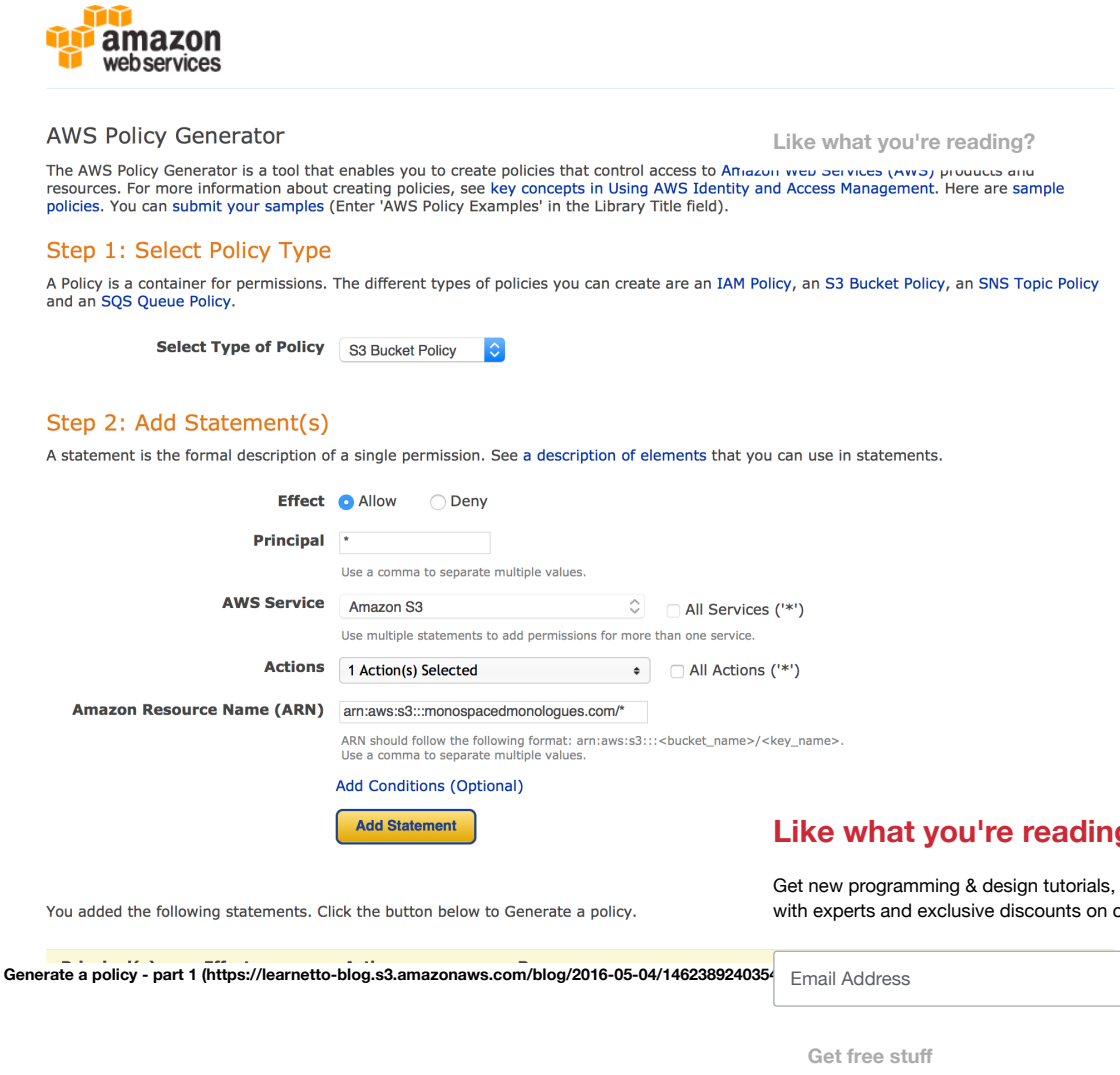
Of course, this could get tedious if we have more than a few files. An alternative is to specify a *policy* for the bucket. These are quite complicated, but we can do it by using the **AWS Policy Generator (https://awspolicygen.s3.amazonaws.com/)**.

First of all, select "S3 Bucket Policy" as the type of policy. It'll then prompt you for a few pieces of information.

- The *Principal* is the user who will be accessing the object. As we want everyone to access it, enter *.
- As for *Actions*, we would like everyone to be able to execute the *GetObject* action and nothing else.
- Just like the example below, the *Amazon Resource Name* should be something like:

```
arn:aws:s3:::<bucket_name>/*
```

Our key name is * because we want people to access everything in this bucket.

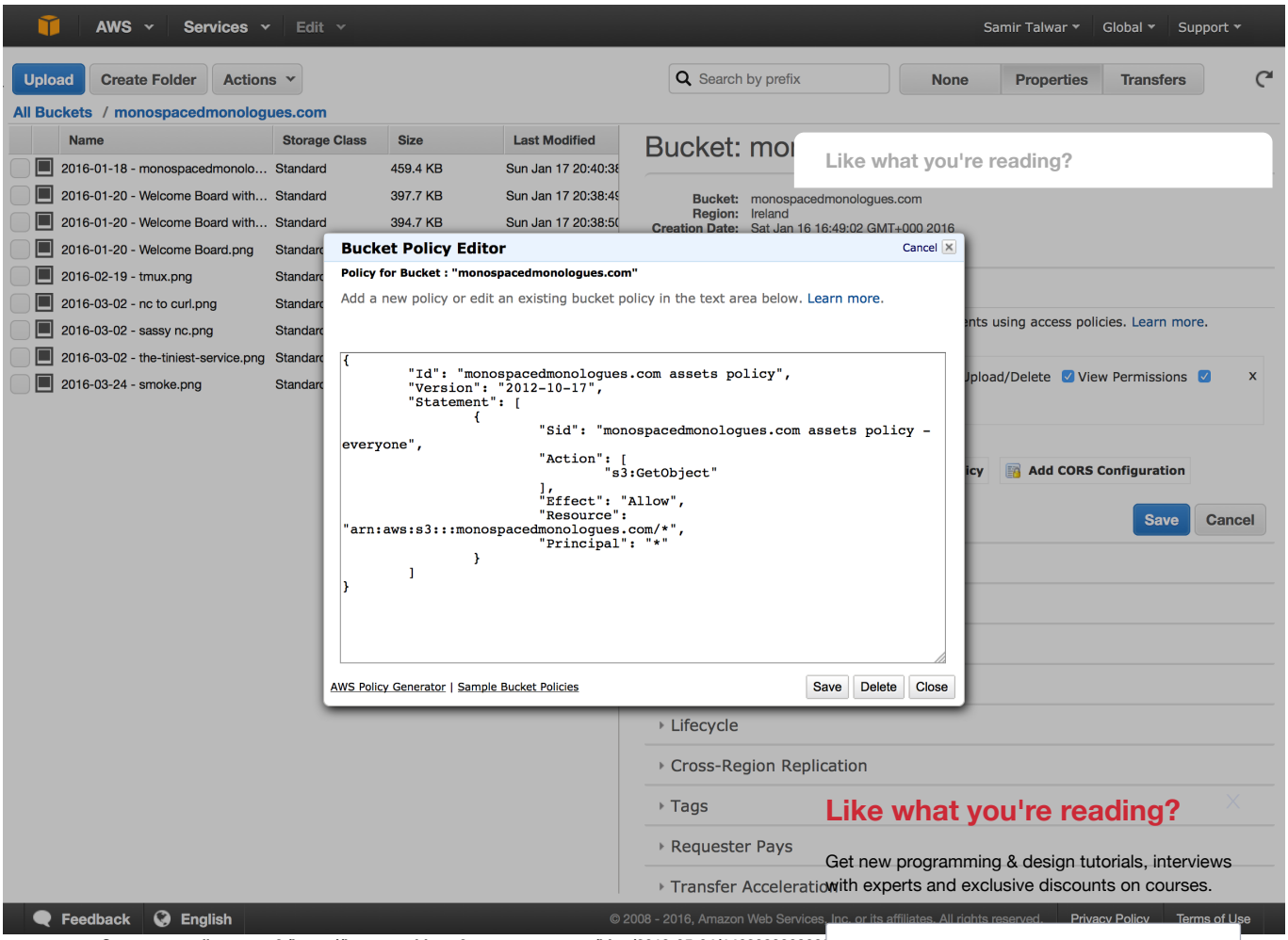


Generate a policy - part 1 (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/1462389240354

Once you're done, click *Add Statement*, then *Generate Policy*. You'll end up with a policy that looks something like this:

```
{
    "Id": "Policy1462221401547",
    "Version": "2012-10-17",
    "Statement": [
      {
        "Sid": "Stmt1462221025865",
        "Action": [
          "s3:GetObject"
        ],
        "Effect": "Allow",
        "Resource": "arn:aws:s3:::monospacedmonologues.com/*",
        "Principal": "*"
      }
    ]
}
```

Copy the code you see in the policy generator and Head back to S3. Deselect all files and open the *Properties* view to check out the bucket's properties. Open up the *Permissions* section, click *Add bucket policy* and paste in the policy you generated, then save.



Generate a policy - part 2 (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/1462389268360

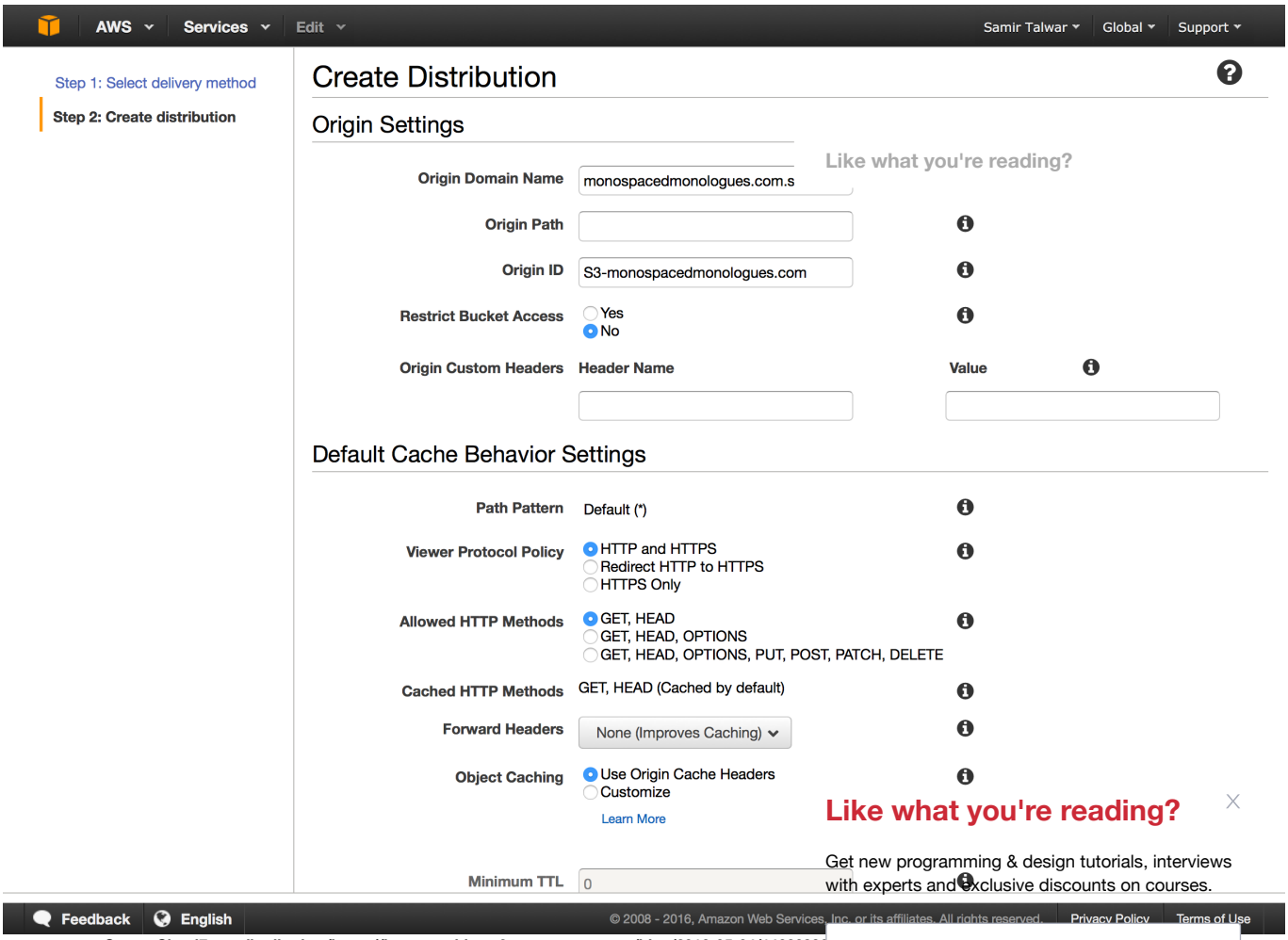
Finally, click on that link again to view your file. It should be rendering nicely now! You can use those links everywhere. Instead of hosting your assets with your code where they take up valuable bandwidth, let someone else do the heavy lifting.

CDNs, because files are big and not your problem

S3 is a great place to put your files, but a bucket still lives in one place. This means that transferring your assets to someone on the other side of the world will still be slow.

A *Content Delivery Network*, or *CDN*, solves this problem by storing copies of your files all over the planet in lots of data centres. This means that your files are physically close to your customers no matter where they are, increasing transfer speed and improving their experience. We can set up a CDN to copy the contents of our S3 bucket everywhere we need.

Amazon's CDN service is called *CloudFront*. Open up the CloudFront home page and click *Create Distribution*, then select the *Web* distribution. In the *Origin Domain Name*, enter your bucket's domain name in the form *<bucket>.s3.amazonaws.com* (it should auto-complete). Everything else will be filled in for you. Scroll to the bottom and click *Create Distribution*.



Create CloudFront distribution (https://learnetto-blog.s3.amazonaws.com/blog/2016-05-04/14623892

Copying your content to servers all over Amazon's gigantic network will take a while. You'll see a table with a spinner in the *Status* column. Go make some tea, and hopefully it'll say *Deployed* instead when you come back.

Now all you need to do is get your distribution's domain name. Click on its ID (which will be a big long string of letters and numbers) to view the distribution details. You'll see a domain name — for my CDN distribution, it's "d1ilac42nshdfi.cloudfront.net". Now all you need to do is replace the bucket's domain name with that new one:

```
https://<distribution domain>/<file>
```