Increasing Website Bandwidth Using Cloud Services

BRUCE MOMJIAN

This talk shows how you can use cloud storage for these files to greatly increase your website's bandwidth and responsiveness.

https://momjian.us/presentations

Creative Commons Attribution License

Last updated: November 2021

Network Bandwidth

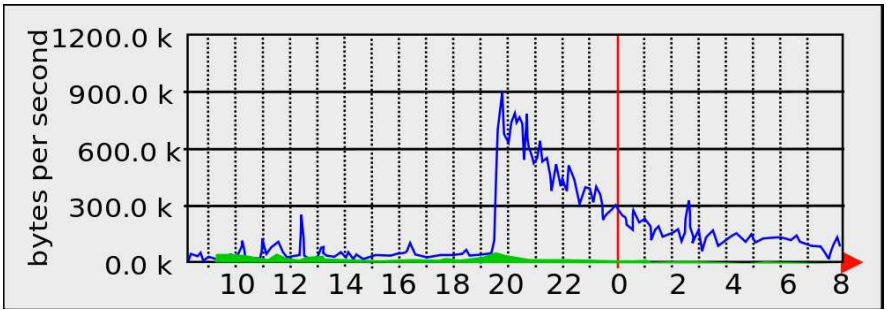
- Symetric or different up/down speeds
- Consistent or uneven
- Always available or sometimes offline

My Setup

- 50 megabits per second (Mbs) down and up
- Sometimes offline due to upgrades, power failure
- Occasional heavy demand

Managing Heavy Demand

The “Slashdot” Effect, https://en.wikipedia.org/wiki/Slashdot_effect



https://commons.wikimedia.org/wiki/File:SlashdotEffectGraph.svg

You Need a Spillway

https://commons.wikimedia.org/wiki/File:Hoover_Dam_and_Arizona_Spillway,_1983.jpg

Increasing Bandwidth

- Dynamically increasing bandwidth is usually difficult
- You need to repoint your content to another location that always has more bandwidth
- Cloud providers usually have high bandwidth

Some Terms

- Subdomains
  - www.momjian.us is a subdomain of momjian.us
  - pickle.momjian.us is a subdomain of momjian.us
- DNS (domain name service) maps domain names to IP addresses
  - momjian.us maps to IP address 72.94.173.45
  - a CNAME record maps one hostname to another
- Apache is a daemon that serves web pages

Let's Use Amazon Web Services (AWS)

- Lots of acronyms
- Simple Storage Service (S3)
- CloudFront
- ~~EC2~~
- ~~EBS~~

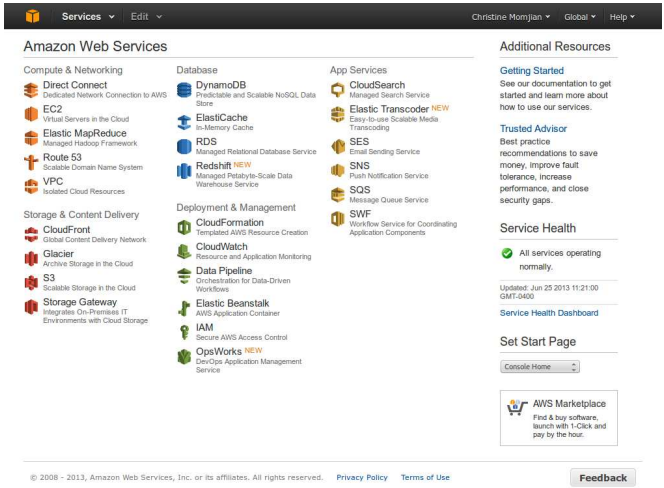
How Do We Reroute Our Content?

- Create an Amazon S3 bucket
- Create a subdomain for the content
- Copy our content to the S3 bucket
- Setup disabled webserver rules to reroute subdomain requests to S3
- Setup disabled DNS rules to reroute subdomain content to S3

Hostnames

- external.momjian.us
- external.momjian.us.s3.amazonaws.com
- download.momjian.us
- d2mt7vdv560udp.cloudfront.net

Aws Services



Example

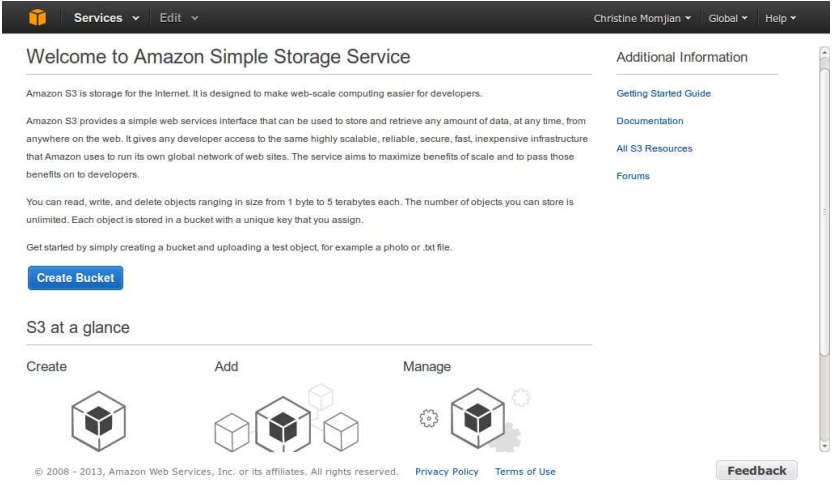
```
<img src="flower.jpg" width="25%" align="middle">
<img src="http://external.momjian.us/flower.jpg" width="25%" align="middle">
```

Local Flowers Only

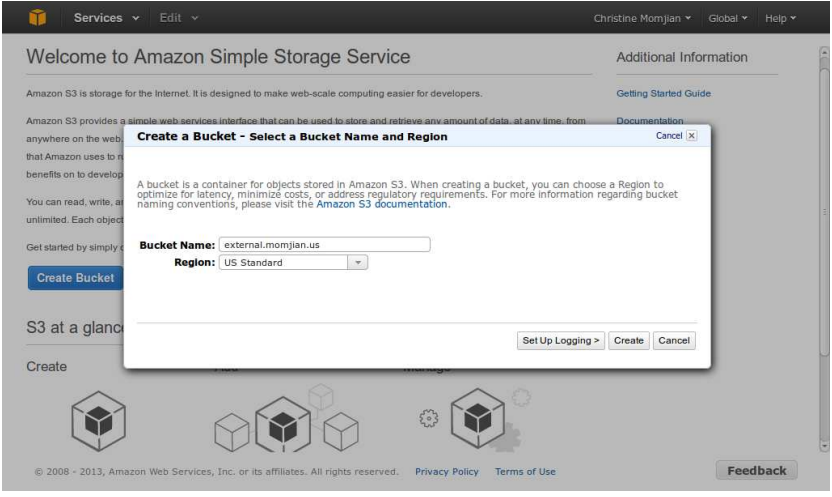
Local

S3

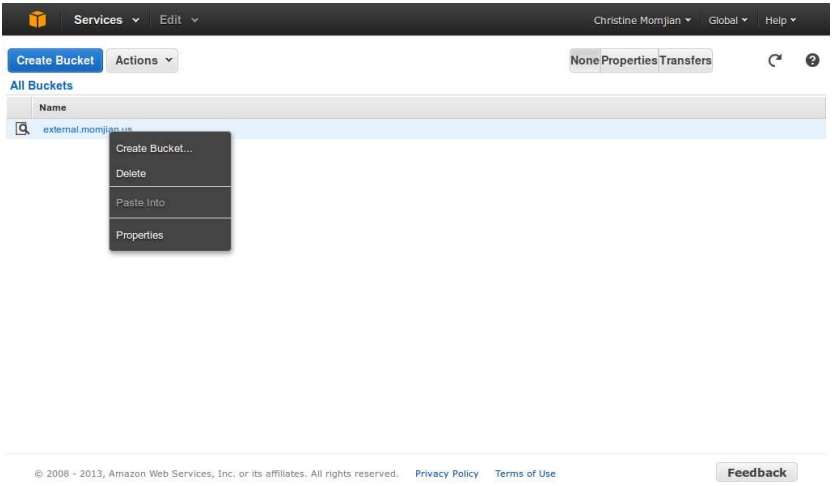
Create Bucket



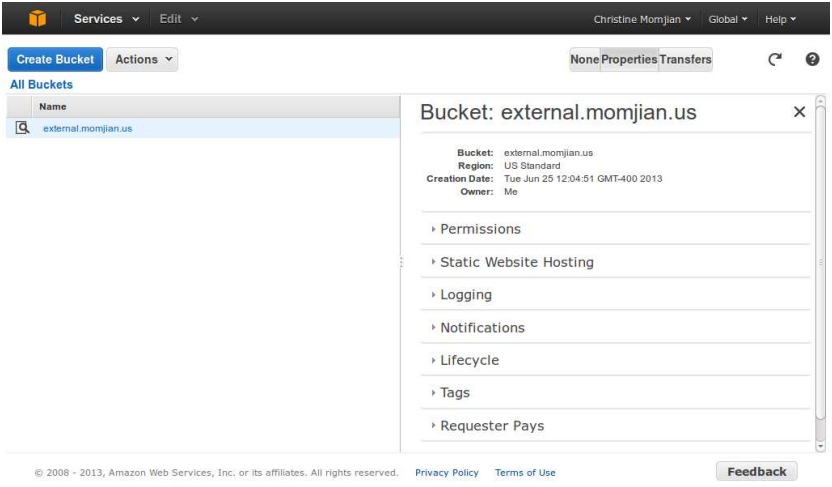
Bucket Name


Services
Edit
Christine Momjian
Global
Help
Welcome to Amazon Simple Storage Service
Amazon S3 is storage for the Internet. It is designed to make web-scale computing easier for developers.
Amazon S3 provides a simple web services interface that can be used to store and retrieve any amount of data, at any time, from
anywhere on the web.
that Amazon uses to r
benefits on to develop
You can read, write, a
unlimited. Each object
Get started by simply
Create Bucket
S3 at a glanc
Create
Additional Information
Getting Started Guide
Documentation
Create a Bucket - Select a Bucket Name and Region
Cancel
A bucket is a container for objects stored in Amazon S3. When creating a bucket, you can choose a Region to optimize for latency, minimize costs, or address regulatory requirements. For more information regarding bucket naming conventions, please visit the Amazon S3 documentation.
Bucket Name: external.momjian.us
Region: US Standard
Set Up Logging >
Create
Cancel
© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved.
Privacy Policy
Terms of Use
Feedback

Bucket Properties



Bucket Created



DNS for S3

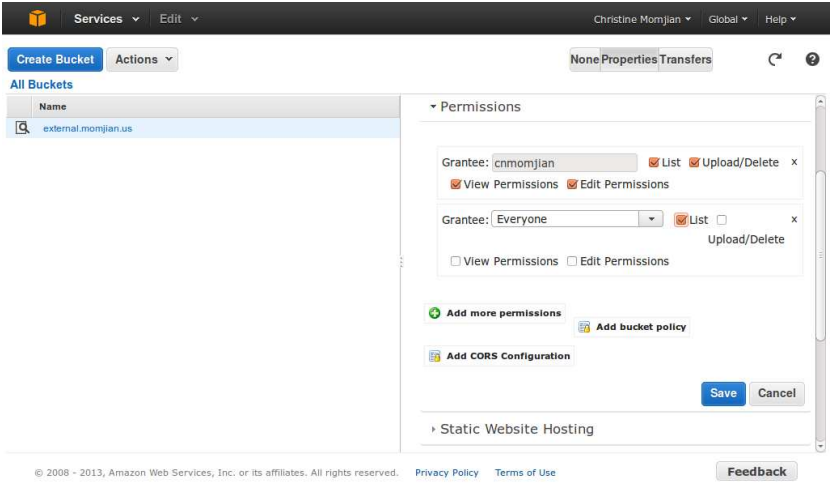
```
external        IN      CNAME   external.momjian.us.s3.amazonaws.com.
```

S3 Permission Failure

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
– <Error>
    <Code>AccessDenied</Code>
    <Message>Access Denied</Message>
    <RequestId>41F9EEB772A6A0F4</RequestId>
  – <HostId>
      3MLjMX9ojZL9PrasHy2aKS8iLKDJ3xc64CvGVaSKiATvTJmjiZVQPUOmfr5Xo6FL
    </HostId>
  </Error>
```

Bucket List Permission



S3 Permission Success

This XML file does not appear to have any style information associated with it. The document tree is shown below.


```
– <ListBucketResult>
    <Name>external.momjian.us</Name>
    <Prefix/>
    <Marker/>
    <MaxKeys>1000</MaxKeys>
    <IsTruncated>false</IsTruncated>
  </ListBucketResult>
```

Copy Image File to S3

```
$ s3cmd --acl-public put flower.jpg s3://external.momjian.us
flower.jpg -> s3://external.momjian.us/flower.jpg  [1 of 1]
 3342844 of 3342844   100% in    3s   903.64 kB/s  done
Public URL of the object is: http://external.momjian.us.s3.amazonaws.com/flower.jpg
```

Bucket Contents

This XML file does not appear to have any style information associated with it. The document tree is shown below.

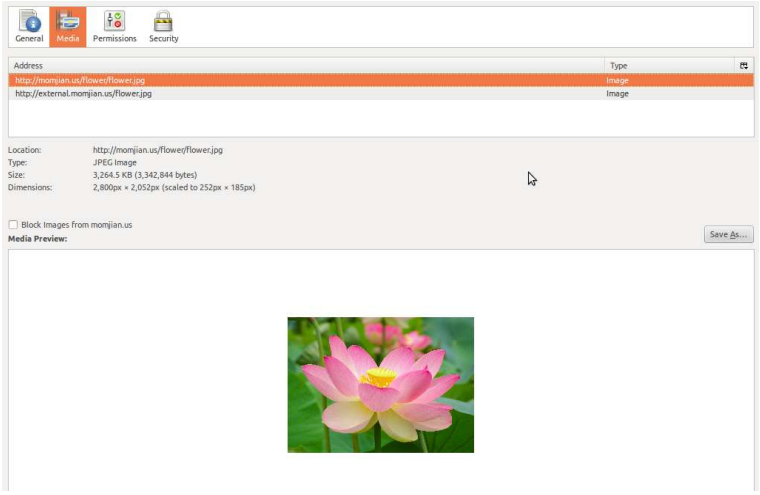

```
– <ListBucketResult>
    <Name>external.momjian.us</Name>
    <Prefix/>
    <Marker/>
    <MaxKeys>1000</MaxKeys>
    <IsTruncated>false</IsTruncated>
  – <Contents>
      <Key>flower.jpg</Key>
      <LastModified>2013-06-25T16:55:35.000Z</LastModified>
      <ETag>"5543cdef6dbb1e5b0895a8481ce89f56"</ETag>
      <Size>3342844</Size>
      <StorageClass>STANDARD</StorageClass>
    </Contents>
  </ListBucketResult>
```

Local and S3 Flowers

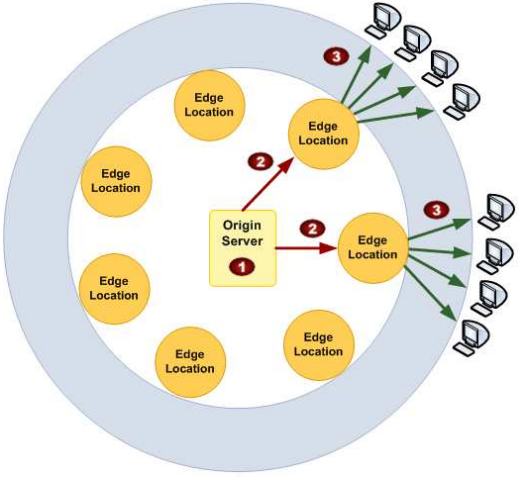
Local

S3

Webpage URLs

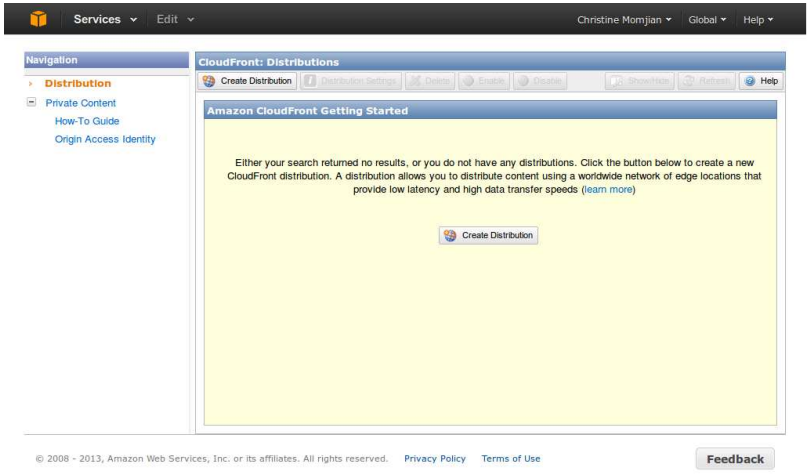


Content Delivery Network (CDN)

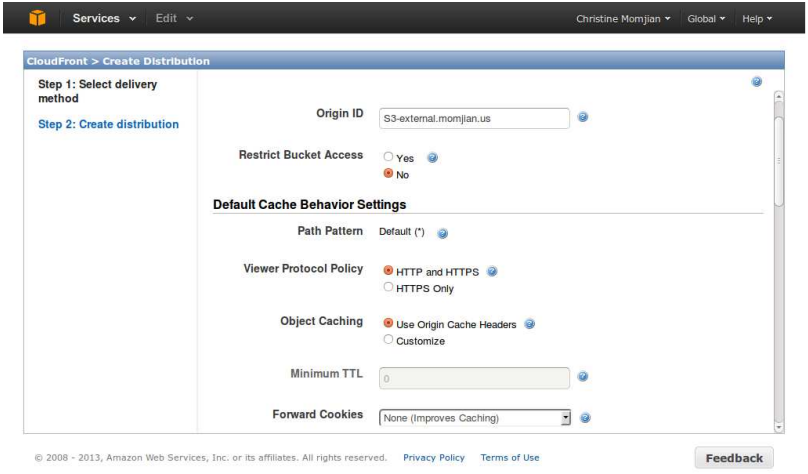


http://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/Paying.html

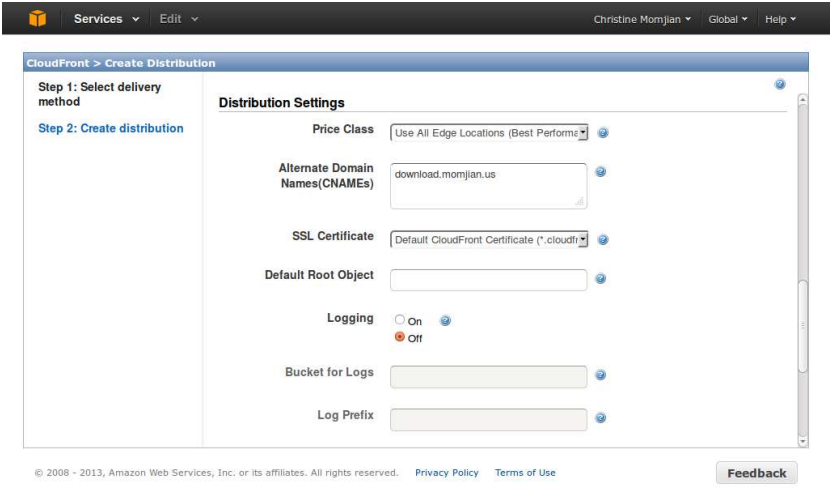
Create Cloudfront Distribution



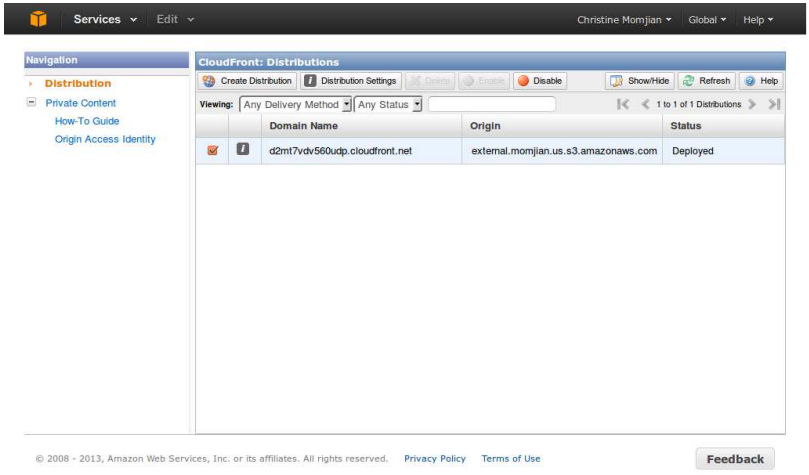
Distribution Settings



Distribution CNAME



Distribution Created



DNS for Cloudfront

```
download        IN      CNAME   d2mt7vdv560udp.cloudfront.net.
```

Individual DNS lines can be adjusted to disable the caching of results, and DNS can be hosted on remote servers.

Hostname download.momjian.us

This XML file does not appear to have any style information associated with it. The document tree is shown below.


```
– <ListBucketResult>
    <Name>external.momjian.us</Name>
    <Prefix/>
    <Marker/>
    <MaxKeys>1000</MaxKeys>
    <IsTruncated>false</IsTruncated>
  – <Contents>
      <Key>flower.jpg</Key>
      <LastModified>2013-06-25T16:55:35.000Z</LastModified>
      <ETag>"5543cdef6dbb1e5b0895a8481ce89f56"</ETag>
      <Size>3342844</Size>
      <StorageClass>STANDARD</StorageClass>
    </Contents>
  </ListBucketResult>
```

Cloudfront Example

```
<img src="flower.jpg" width="25%" align="middle">
<img src="http://external.momjian.us/flower.jpg" width="25%" align="middle">
<img src="http://download.momjian.us/flower.jpg" width="25%" align="middle">
```

Local, S3, Cloudfront

Local

S3

Cloudfront

Apache Redirect to Local Storage

```
        ServerName download.momjian.us
        DocumentRoot /var/www/s3-download
</VirtualHost>
```

Apache Redirect to Cloudfront

```
RewriteCond %{HTTP_HOST} ^download\.momjian\.us
RewriteRule ^(.*)$ http://d2mt7vdv560udp\.cloudfront\.net/$1 [redirect=302,la
```

Conclusion

https://momjian.us/presentations

https://www.flickr.com/photos/usfwspacific/