

Increasing Website Bandwidth Using Cloud Services

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

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<http://momjian.us/presentations>

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Network Bandwidth

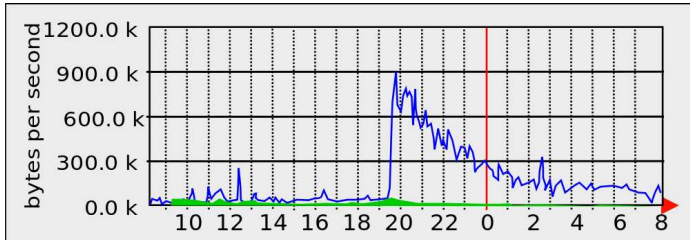
- ▶ Symetric or different up/down speeds
- ▶ Consistent or uneven
- ▶ Always available or sometimes offline

My Setup

- ▶ 50 megabits per second (Mbps) 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
- ▶ d2mt7v560udp.cloudfront.net

AWS Services

Services Edit Christine Momjian Global Help

Amazon Web Services

Compute & Networking

- Direct Connect**
Dedicated Network Connection to AWS
- EC2**
Virtual Servers in the Cloud
- Elastic MapReduce**
Managed Hadoop Framework
- Route 53**
Scalable Domain Name System
- VPC**
Isolated Cloud Resources

Storage & Content Delivery

- CloudFront**
Global Content Delivery Network
- Glacier**
Archive Storage in the Cloud
- S3**
Scalable Storage in the Cloud
- Storage Gateway**
Integrates On-Premises IT Environments with Cloud Storage

Database

- DynamoDB**
Predictable and Scalable NoSQL Data Store
- ElastiCache**
In-Memory Cache
- RDS**
Managed Relational Database Service
- Redshift** **NEW**
Managed Petabyte-Scale Data Warehouse Service

Deployment & Management

- CloudFormation**
Templated AWS Resource Creation
- CloudWatch**
Resource and Application Monitoring
- Data Pipeline**
Orchestration for Data-Driven Workflows
- Elastic Beanstalk**
AWS Application Container
- IAM**
Secure AWS Access Control
- OpsWorks** **NEW**
Dev/Ops Application Management Service

App Services

- CloudSearch**
Managed Search Service
- Elastic Transcoder** **NEW**
Easy-to-use Scalable Media Transcoding
- SES**
Email Sending Service
- SNS**
Push Notification Service
- SQS**
Message Queue Service
- SWF**
Workflow Service for Coordinating Application Components

Additional Resources

- Getting Started**
See our documentation to get started and learn more about how to use our services.
- Trusted Advisor**
Best practice recommendations to save money, improve fault tolerance, increase performance, and close security gaps.
- Service Health**
 - All services operating normally.
 - Updated: Jun 25 2013 11:21:00 GMT-0400
 - [Service Health Dashboard](#)
- Set Start Page**
 - Console Home
- AWS Marketplace**
Find & buy software, launch with 1-Click and pay by the hour.

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Example

```
  

```

Local Flowers Only



Local



S3

Create Bucket



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. It gives any developer access to the same highly scalable, reliable, secure, fast, inexpensive infrastructure that Amazon uses to run its own global network of web sites. The service aims to maximize benefits of scale and to pass those benefits on to developers.

You can read, write, and delete objects ranging in size from 1 byte to 5 terabytes each. The number of objects you can store is unlimited. Each object is stored in a bucket with a unique key that you assign.

Get started by simply creating a bucket and uploading a test object, for example a photo or .txt file.

[Create Bucket](#)

S3 at a glance

Create



Add



Manage



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Additional Information

[Getting Started Guide](#)

[Documentation](#)

[All S3 Resources](#)

[Forums](#)



Bucket Name

Services Edit Christine Momjian Global Help

Welcome to Amazon Simple Storage Service

Additional Information

Amazon S3 is storage for the Internet. It is designed to make web-scale computing easier for developers.

Getting Started Guide

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.

Documentation

Create a Bucket - Select a Bucket Name and Region

Cancel X

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:

Region:

S3 at a glance

Create

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Bucket Properties

The screenshot shows the Amazon S3 console interface. At the top, there is a navigation bar with the Amazon logo, 'Services' and 'Edit' dropdown menus, and user information for 'Christine Momjian', 'Global', and 'Help'. Below this, there are buttons for 'Create Bucket' and 'Actions', and tabs for 'None', 'Properties', and 'Transfers'. The main content area is titled 'All Buckets' and contains a table with a single row for the bucket 'external.momjian.us'. A context menu is open over this row, showing options: 'Create Bucket...', 'Delete', 'Paste Into', and 'Properties'.

Services ▾ Edit ▾ Christine Momjian ▾ Global ▾ Help ▾

Create Bucket Actions ▾ None Properties Transfers ↻ ?

All Buckets

Name
external.momjian.us

- Create Bucket...
- Delete
- Paste Into
- Properties

Bucket Created

The screenshot displays the Amazon S3 console interface. At the top, there is a navigation bar with the Amazon logo, 'Services' and 'Edit' dropdown menus, and user information for 'Christine Momjian' with 'Global' and 'Help' dropdowns. Below the navigation bar, there are buttons for 'Create Bucket' and 'Actions'. A breadcrumb trail shows 'None Properties Transfers'. The main content area is titled 'All Buckets' and contains a table with one entry: 'external.momjian.us'. To the right of the table, a detailed view for the selected bucket is shown, titled 'Bucket: external.momjian.us'. This view includes the following information: Bucket: external.momjian.us, Region: US Standard, Creation Date: Tue Jun 25 12:04:51 GMT-400 2013, and Owner: Me. Below this information are several expandable sections: Permissions, Static Website Hosting, Logging, Notifications, Lifecycle, Tags, and Requester Pays.

Services ▾ Edit ▾ Christine Momjian ▾ Global ▾ Help ▾

Create Bucket Actions ▾ None Properties Transfers ↻ ?

All Buckets

Name
external.momjian.us

Bucket: external.momjian.us ✕

Bucket: external.momjian.us
Region: US Standard
Creation Date: Tue Jun 25 12:04:51 GMT-400 2013
Owner: Me

- Permissions
- Static Website Hosting
- Logging
- Notifications
- Lifecycle
- Tags
- Requester Pays

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

The screenshot shows the Amazon S3 console interface. At the top, there is a navigation bar with the Amazon logo, 'Services' and 'Edit' dropdown menus, and user information for 'Christine Momjian'. Below the navigation bar, there are buttons for 'Create Bucket' and 'Actions'. The main content area is titled 'All Buckets' and shows a list of buckets with a search bar containing 'external.momjian.us'. The 'Permissions' tab is selected, displaying a list of permissions. The first permission is for 'cnmomjian' with 'List', 'Upload/Delete', 'View Permissions', and 'Edit Permissions' checked. The second permission is for 'Everyone' with 'List' checked and 'Upload/Delete', 'View Permissions', and 'Edit Permissions' unchecked. Below the permissions list are buttons for 'Add more permissions', 'Add bucket policy', and 'Add CORS Configuration'. At the bottom right of the permissions panel are 'Save' and 'Cancel' buttons. Below the permissions panel is a section for 'Static Website Hosting'.

Services ▾ Edit ▾ Christine Momjian ▾ Global ▾ Help ▾

Create Bucket Actions ▾ None Properties Transfers ↻ ?

All Buckets

Name
external.momjian.us

Permissions

Grantee: cnmomjian List Upload/Delete View Permissions Edit Permissions

Grantee: Everyone List Upload/Delete View Permissions Edit Permissions

[Add more permissions](#) [Add bucket policy](#) [Add CORS Configuration](#)

[Save](#) [Cancel](#)

Static Website Hosting

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


General Media Permissions Security

Address	Type
http://momjian.us/flower/flower.jpg	Image
http://external.momjian.us/flower.jpg	Image

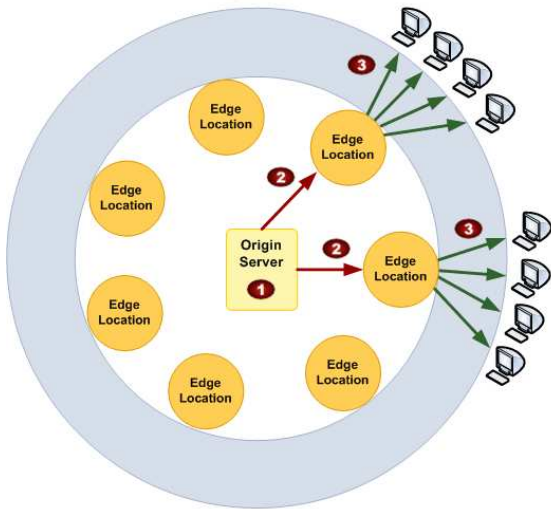
Location: http://momjian.us/flower/flower.jpg
Type: JPEG Image
Size: 3,264.5 KB (3,342,044 bytes)
Dimensions: 2,800px × 2,052px (scaled to 252px × 185px)

Block Images from momjian.us

Media Preview: Save As...



Content Delivery Network (CDN)



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

Create CloudFront Distribution

The screenshot shows the Amazon CloudFront console interface. At the top, there is a navigation bar with the Amazon logo, 'Services' and 'Edit' dropdown menus, and user information for 'Christine Momjian' with 'Global' and 'Help' dropdowns. On the left, a 'Navigation' sidebar lists 'Distribution' (selected), 'Private Content', 'How-To Guide', and 'Origin Access Identity'. The main content area is titled 'CloudFront: Distributions' and contains a toolbar with buttons for 'Create Distribution', 'Distribution Settings', 'Delete', 'Enable', 'Disable', 'Show/Hide', 'Refresh', and 'Help'. Below the toolbar is a section titled 'Amazon CloudFront Getting Started' with a yellow background. The text in this section reads: 'Either your search returned no results, or you do not have any distributions. Click the button below to create a new CloudFront distribution. A distribution allows you to distribute content using a worldwide network of edge locations that provide low latency and high data transfer speeds ([learn more](#))'. A 'Create Distribution' button is centered below the text.

Distribution Settings

Services ▾ Edit ▾ Christine Momjian ▾ Global ▾ Help ▾

CloudFront > Create Distribution

Step 1: Select delivery method

[Step 2: Create distribution](#)

Origin ID

Restrict Bucket Access Yes No

Default Cache Behavior Settings

Path Pattern Default (*)

Viewer Protocol Policy HTTP and HTTPS HTTPS Only

Object Caching Use Origin Cache Headers Customize

Minimum TTL

Forward Cookies

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Distribution CNAME



Services ▾

Edit ▾

Christine Momjian ▾

Global ▾

Help ▾

CloudFront > Create Distribution

Step 1: Select delivery method

Step 2: Create distribution

Distribution Settings

Price Class

Alternate Domain Names(CNAMEs)

SSL Certificate

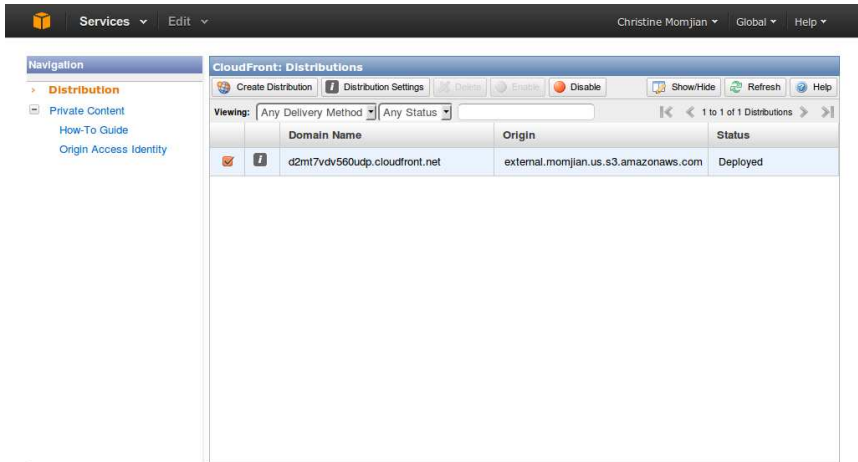
Default Root Object

Logging On Off


Bucket for Logs

Log Prefix

Distribution Created



The screenshot shows the Amazon CloudFront console interface. At the top, there is a navigation bar with the Amazon logo, 'Services' and 'Edit' dropdown menus, and the user's name 'Christine Momjian' along with 'Global' and 'Help' dropdown menus. On the left, a 'Navigation' sidebar lists 'Distribution' (expanded), 'Private Content', 'How-To Guide', and 'Origin Access Identity'. The main content area is titled 'CloudFront: Distributions' and contains a toolbar with 'Create Distribution', 'Distribution Settings', 'Delete', 'Enable', 'Disable', 'Show/Hide', 'Refresh', and 'Help' buttons. Below the toolbar, there are filters for 'Any Delivery Method' and 'Any Status', and a search box. A table displays the distribution details:

	Domain Name	Origin	Status
<input checked="" type="checkbox"/>	 d2mt7vdv560udp.cloudfront.net	external.momjian.us.s3.amazonaws.com	Deployed

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

```
  
  

```

Local, S3, Cloudfront



Local



S3



Cloudfront

Apache Redirect to Local Storage

```
<VirtualHost *:80>  
    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,last]
```

Conclusion



<http://momjian.us/presentations>

<https://www.flickr.com/photos/usfivspacific/>