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Rails on AWS

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RubyFools Copenhagen, 2008

Starting Point

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One machine:

- Apache
- Ruby / Rails
- MySQL

Worst Case Populariy

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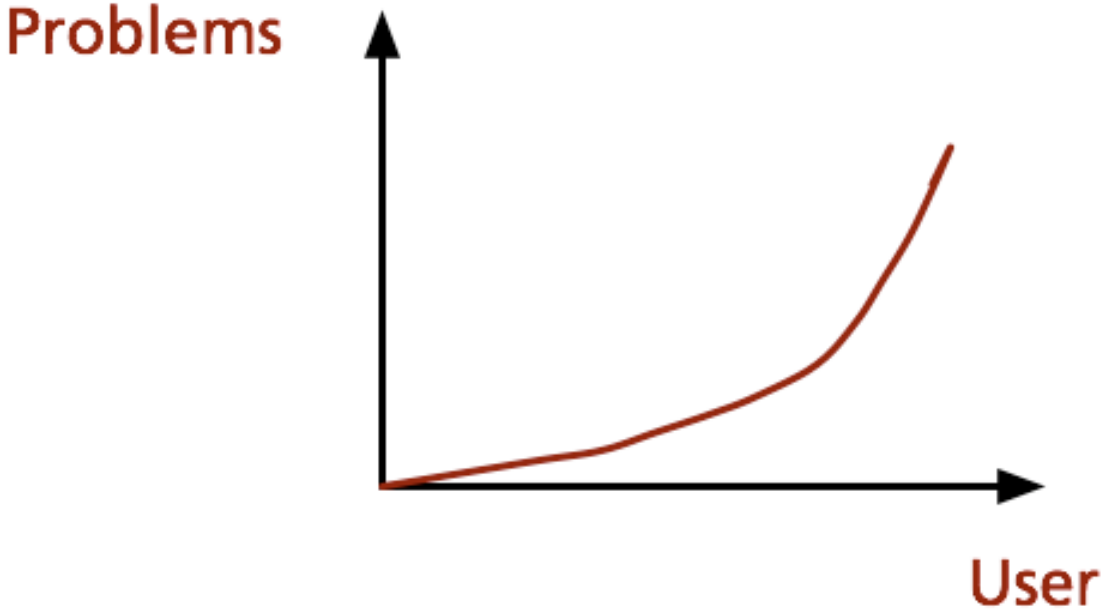

A Difficult Path

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Problem: Backup

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- High availability
- Redundancy
- Very big data sets

Problem: File System

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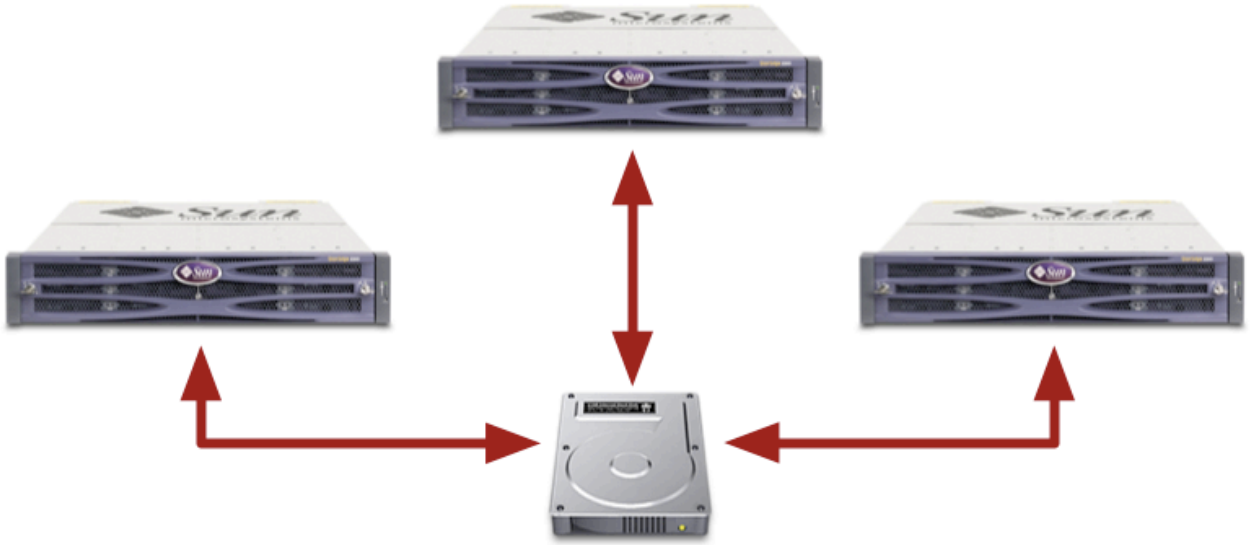
- Important files have to be accessed by many servers
- NFS / Samba not practical



Problem: Spontaneous Traffic

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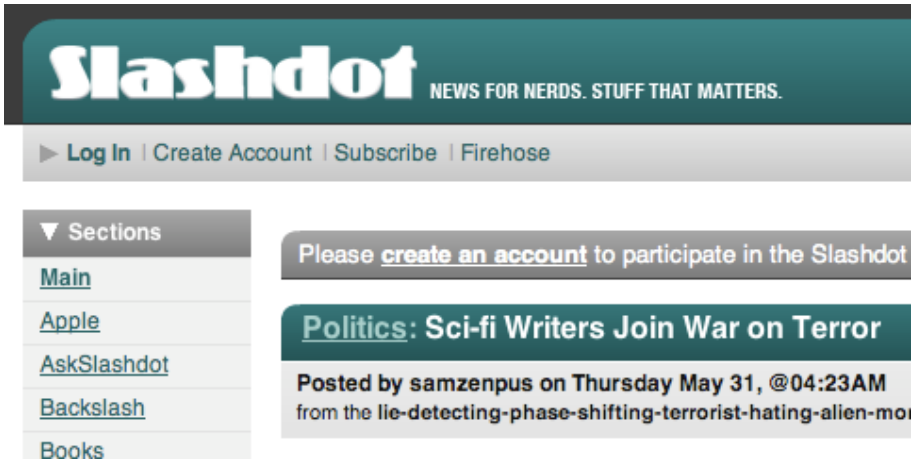

Problem: Load Fluctuation

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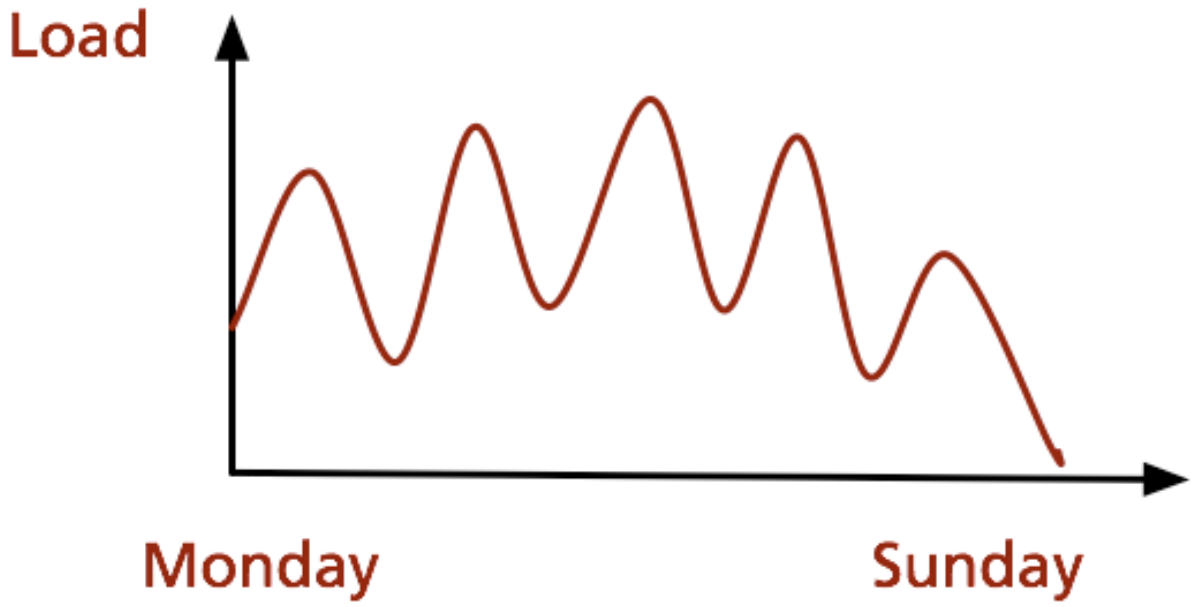

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Don‘t reinvent the wheel!

Amazon Web Services

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Simple Storage Service - S3	Elastic Compute Cloud - EC2	E-Commerce S..
Redundant Data Store	Virtual server per hour	.....
$0,15 per GB data per month	$0,10 per CPU hour	
$0,10 - $0,20 per GB traffic	$0,10 - $0,20 per GB traffic	

S3 - Simple Storage Service

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- Redundant storage - as much as you like
- max. 5 GB per object
- Organized in „Buckets“
- Web Service API for uploads
- Downloads via
  - Web Service
  - HTTP / HTTPS
  - BitTorrent

S3 - Buckets

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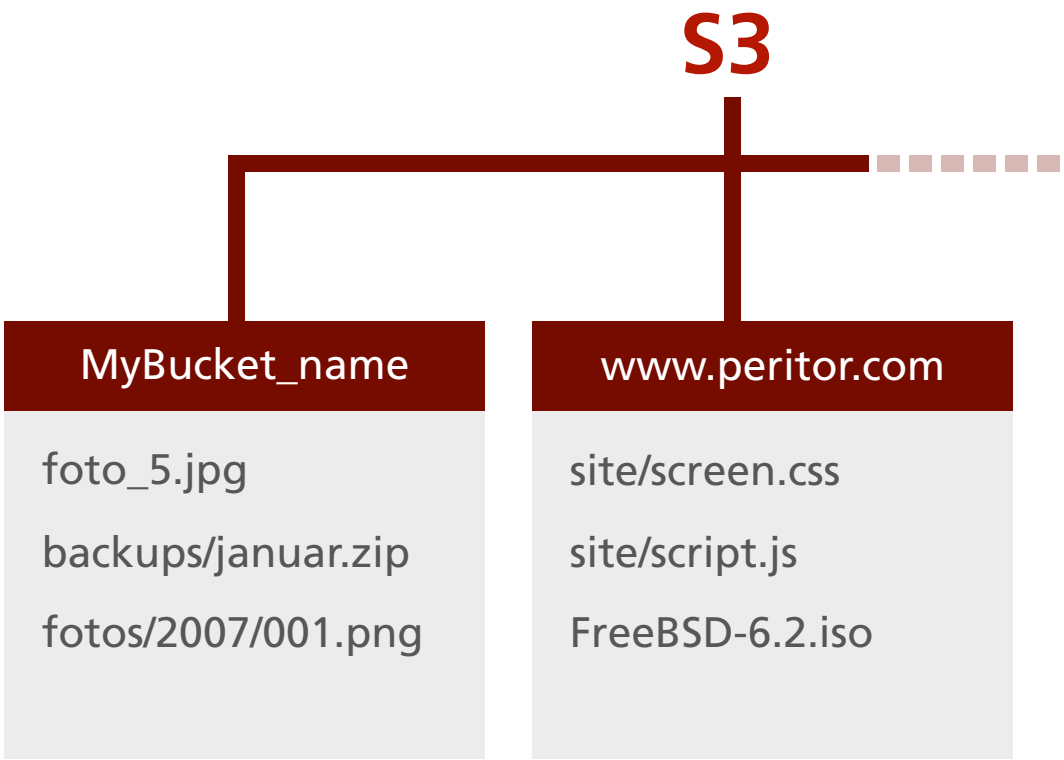
- Unique over all S3
- Contains many key-value-metadata tupel
- Cannot contain other buckets!
- Key can contain „/“



S3 with AWS::S3

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Upload

```
S3Object.store('vid.mpeg', open('/tmp/vid.mpeg'), 'my_bucket')
```

Download

```
picture = S3Object.find 'headshot.jpg', 'photos'

# raw data
picture.value

# http(s) download
picture.url # http://s3.amazonaws.com/photos/headshot.jpg

# http://s3.amazonaws.com/photos/headshot.jpg?torrent
picture.torrent
```

EC2 - Elastic Compute Cloud

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- Based on XEN virtualization
- On demand virtual servers - controlled with Web Service API

	Small	Large	Extra Large
CPU / EC2 Compute Units	1 x 1	2 x 2	4 x 2
RAM	1.75 GB	7.5 GB	15 GB
HDD	160 GB	850 GB	1690 GB

- Use your favorite Linux distro (Linux 2.6.16), Amazon Machine Images (AMI) are stored on S3
- ACLs for hosts/ports access control

EC2 Tools

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List availabe images

```
> ec2-describe-images
```

Start a new instance

```
> ec2-run-instances ami-5bae4b32 -k $RSA_KEY
```

Login with SSH

```
> ssh root@domU-12-34-31-00-00-05.usma1.compute.amazonaws.com
```

Shutdown instance

```
> ec2-terminate-instances i-10a64379
```

amazon-ec2 gem

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Setup

```
require 'EC2'

ACCESS_KEY_ID = '--YOUR AWS ACCESS KEY ID--'
SECRET_ACCESS_KEY = '--YOUR AWS SECRET ACCESS KEY--'

ec2 = EC2::Base.new(
  :access_key_id => ACCESS_KEY_ID,
  :secret_access_key => SECRET_ACCESS_KEY )
```

Usage

```
ec2.run_instances(:image_id => 'ami-0cf61365')

ec2.describe_instances

ec2.terminate_instances(:instance_id => 'i-5229c123')
```

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And now?

How does this solve my problems?

S3 - Backup

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- s3sync.rb
- Brackup
- Jungle Disk
- S3 FUSE
- s3DAV
- Duplicity
- S3Browser
- Firefox S3 Organizer extension
- …

s3sync.rb

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Backup

```
export AWS_ACCESS_KEY_ID='AAAAAAAAAAAAAAAAAA'
export AWS_SECRET_ACCESS_KEY='BBBBBBBBBBBBBBBBBBBBBBBBBBB'
export SSL_CERT_FILE='/home/amazon/s3sync/ssl.crt'

./s3sync.rb -v -r --ssl /usr/local/backup  MyBucket:/www.example.com/backup
```

Restore

```
./s3sync.rb -v -r --ssl MyBucket:/www.example.com/backup  /usr/local/backup
```

S3 Asset Host

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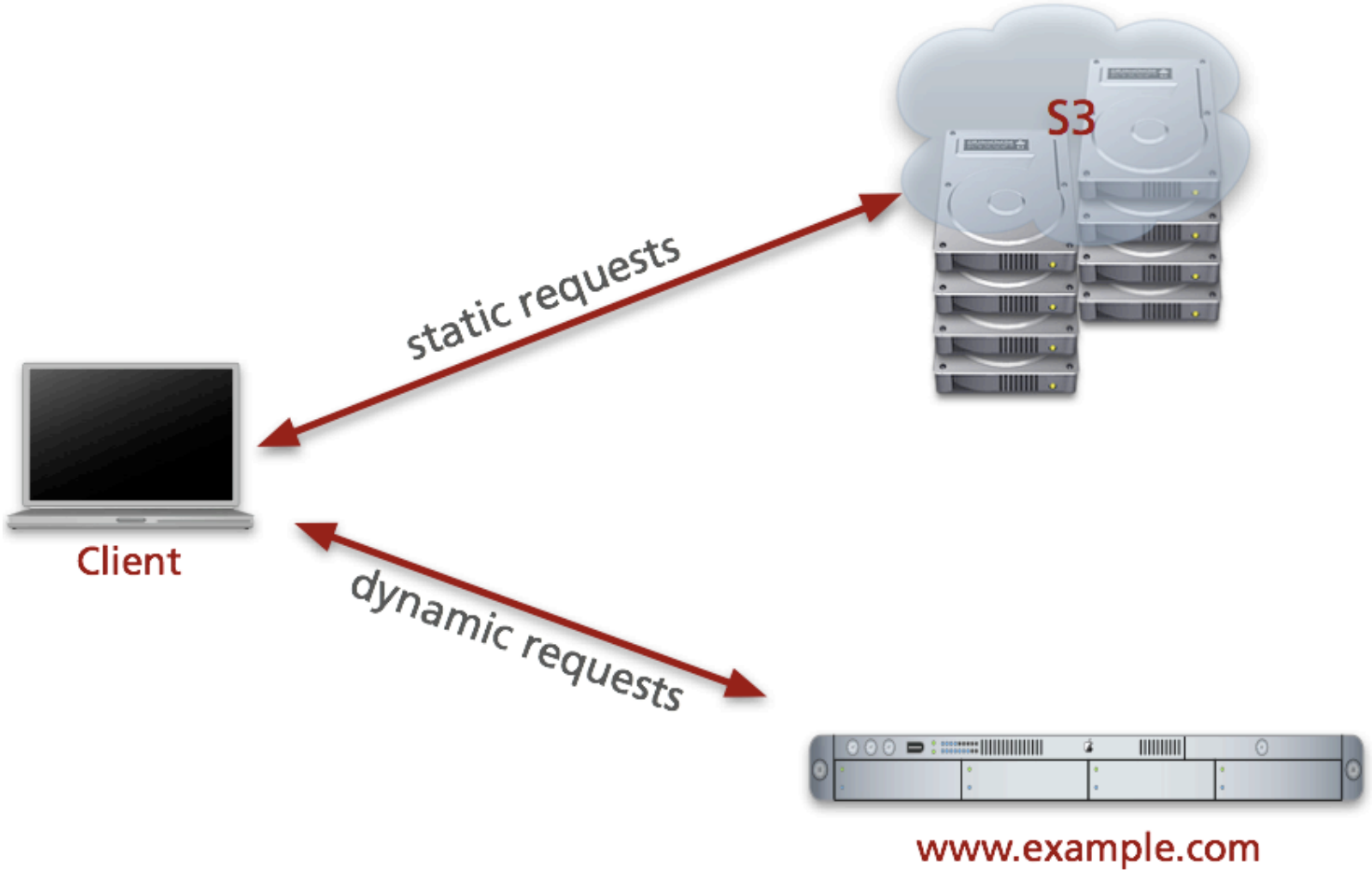

S3 Asset Host

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Setup DNS

```
> dig static.example.com

static.example.com.     86400   IN      CNAME   s3.amazonaws.com.
s3.amazonaws.com.       86400   IN      A       72.21.203.129
```

Rails configuration

```
config.action_controller.asset_host = "http://static.example.com"
```

S3 Asset Host

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welcome.rhtml template

```
<%= image_tag('logo.gif') %> <br />

<strong> Welcome! </strong>
```

Output

```
<img src="http://static.example.com/images/logo.gif"> <br />

<strong> Welcome! </strong>
```

S3 - Authenticated User Data

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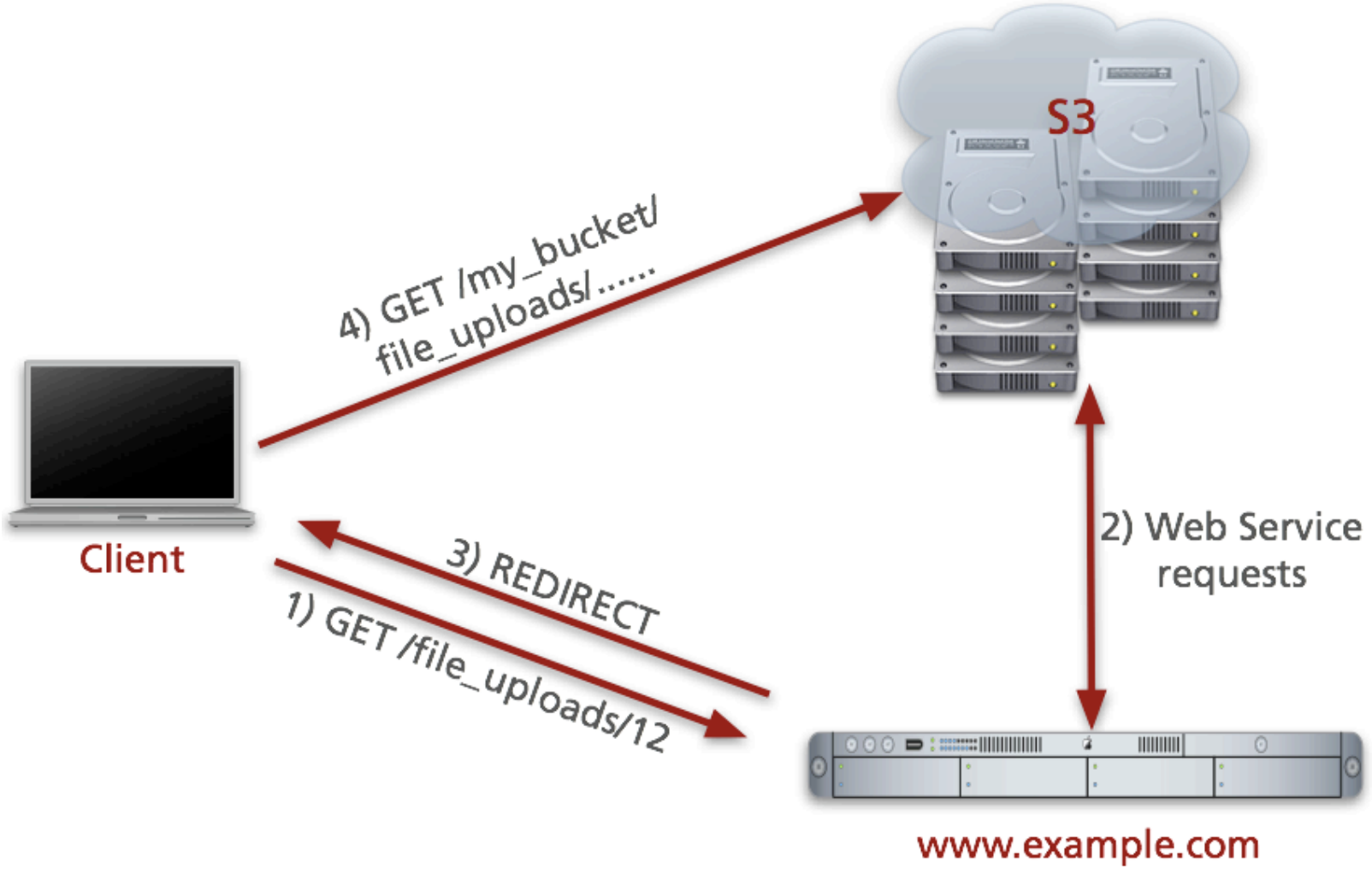

attachment_fu Rails plugin

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Setup

```
class FileUpload < ActiveRecord::Base
  has_attachment :storage => :s3, :s3_access => :private, :max_size => 15.megabytes

  def public_s3_url(ttl_seconds=10)
    AWS::S3::S3Object.url_for(self.full_filename,
                              self.bucket_name, {
                                :use_ssl => true,
                                :expires_in => ttl_seconds
                              })
  end

end
```

attachment_fu Rails plugin

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Upload

```
file_upload = FileUpload.new(params[:file_upload])
file_upload.save
```

Download

```
file_upload = FileUpload.find(params[:id])

file_upload.public_s3_url
# https://s3.amazonaws.com/my_bucket/file_uploads/12/README.txt?AWSAccessKeyId=XXXXXXX

file_upload.value
# raw data
```

On-Demand Computing with EC2

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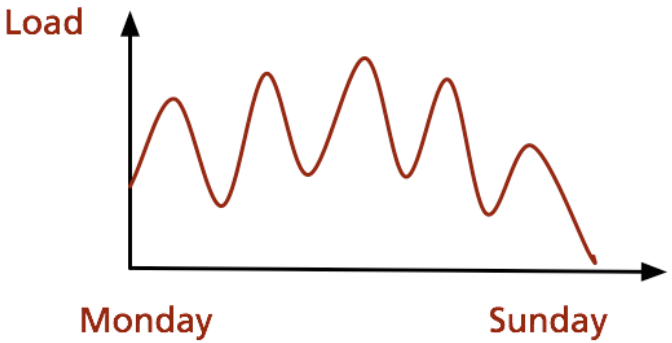

Time based, e.g. with cron

```
> crontab -l -u ec2

0 8 * * *     /home/ec/start_additional_instances.sh

0 18 * * *     /home/ec/stop_additional_instances.sh
```

On-Demand Computing with EC2

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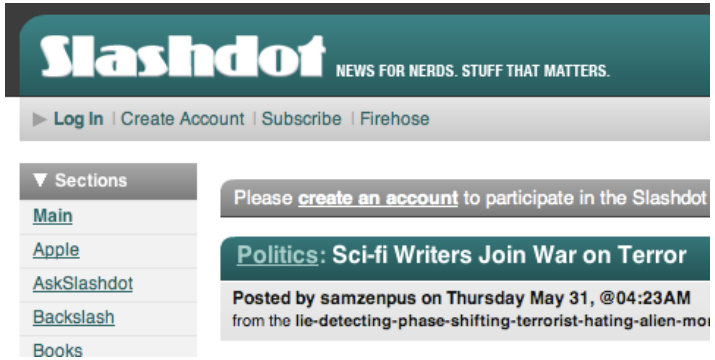

Load based, e.g. with Monit

```
> tail /etc/monitrc

check system example.com
    if cpu usage (user) > 70% for 5 cycles then
      exec "/home/ec2/add_additional_instance.sh"
    if cpu usage (user) < 50% for 10 cycles then
      exec "/home/ec2/remove_additional_instance.sh"
```

On-Demand Computing with EC2

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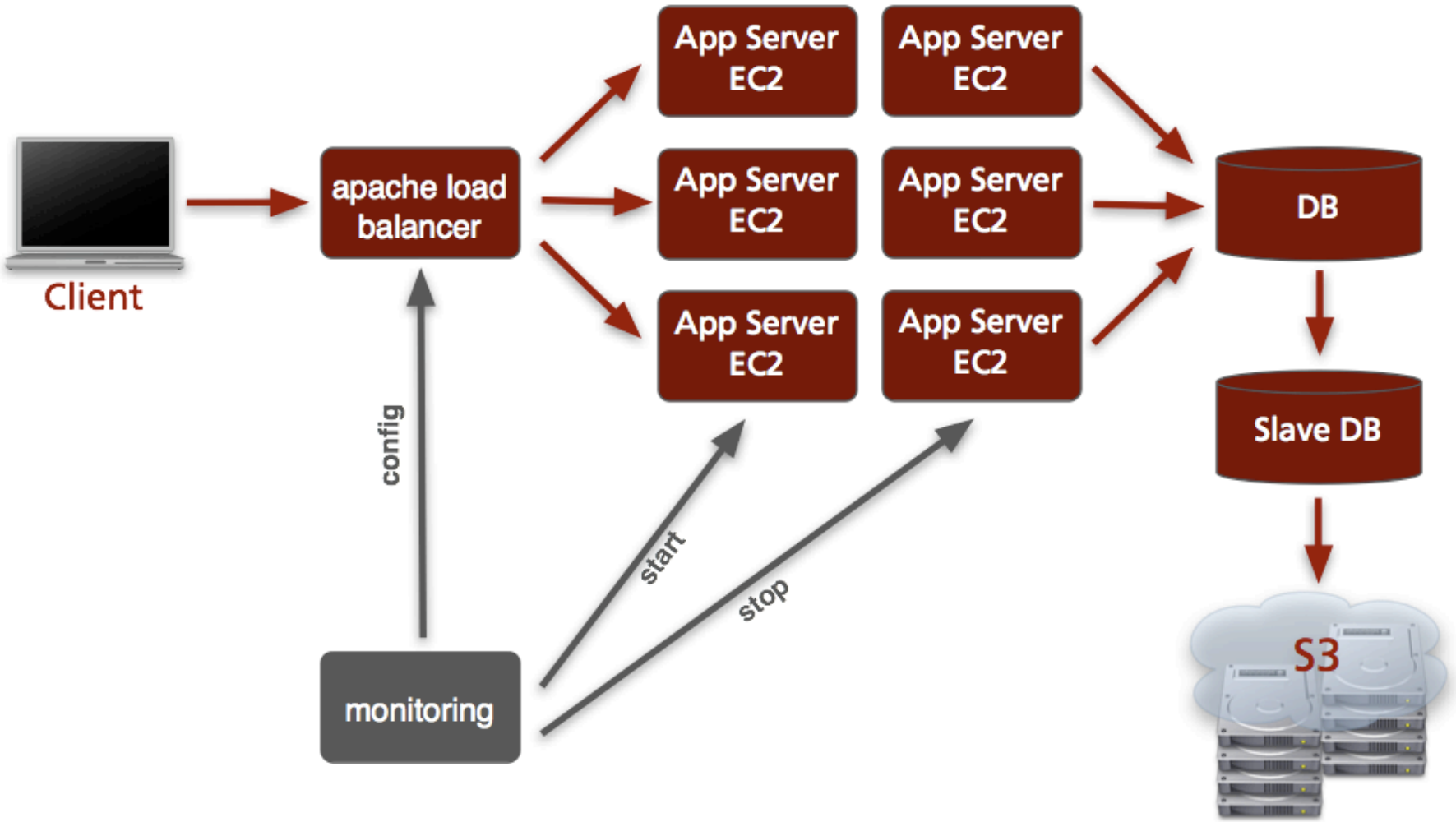
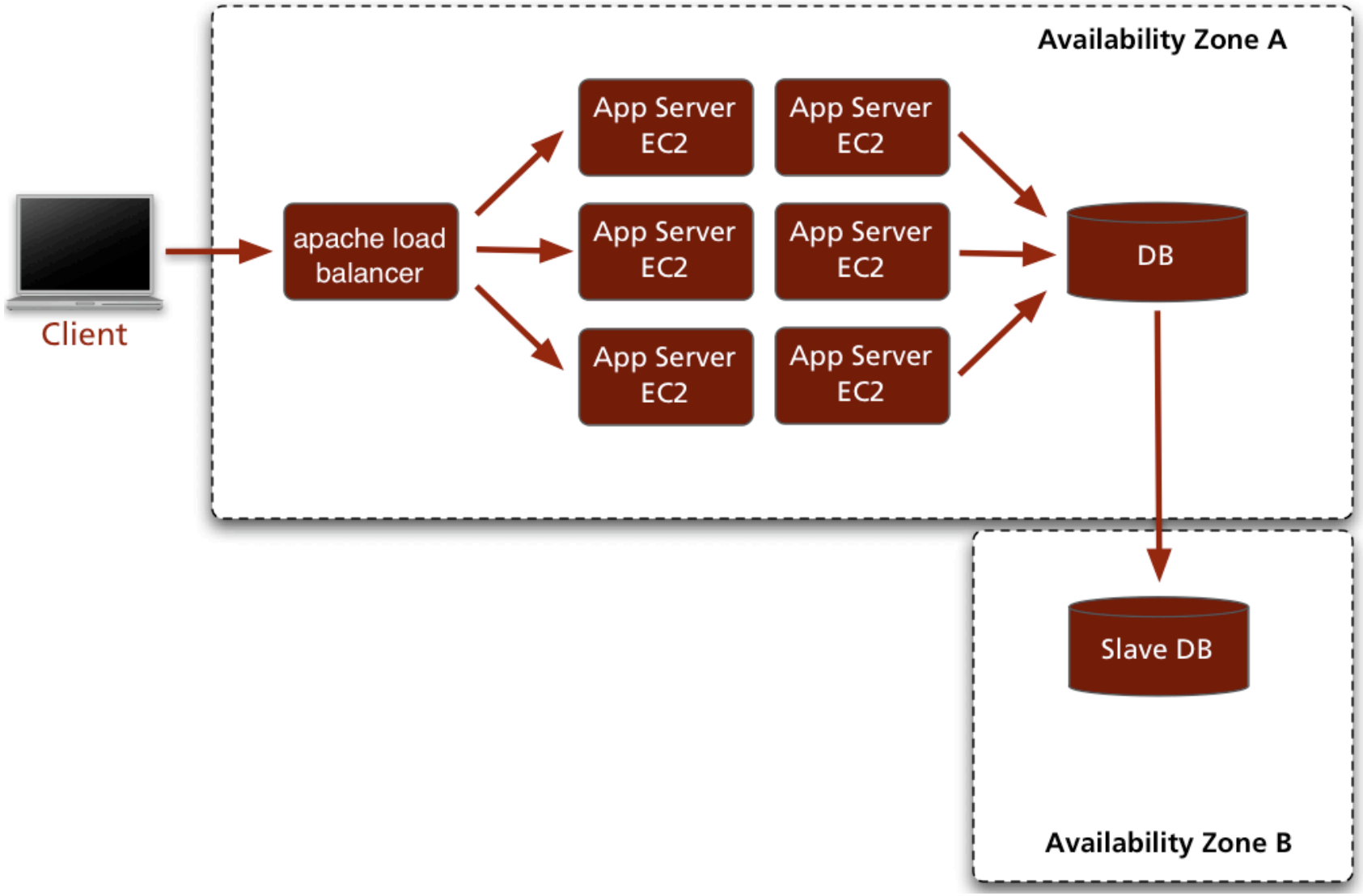
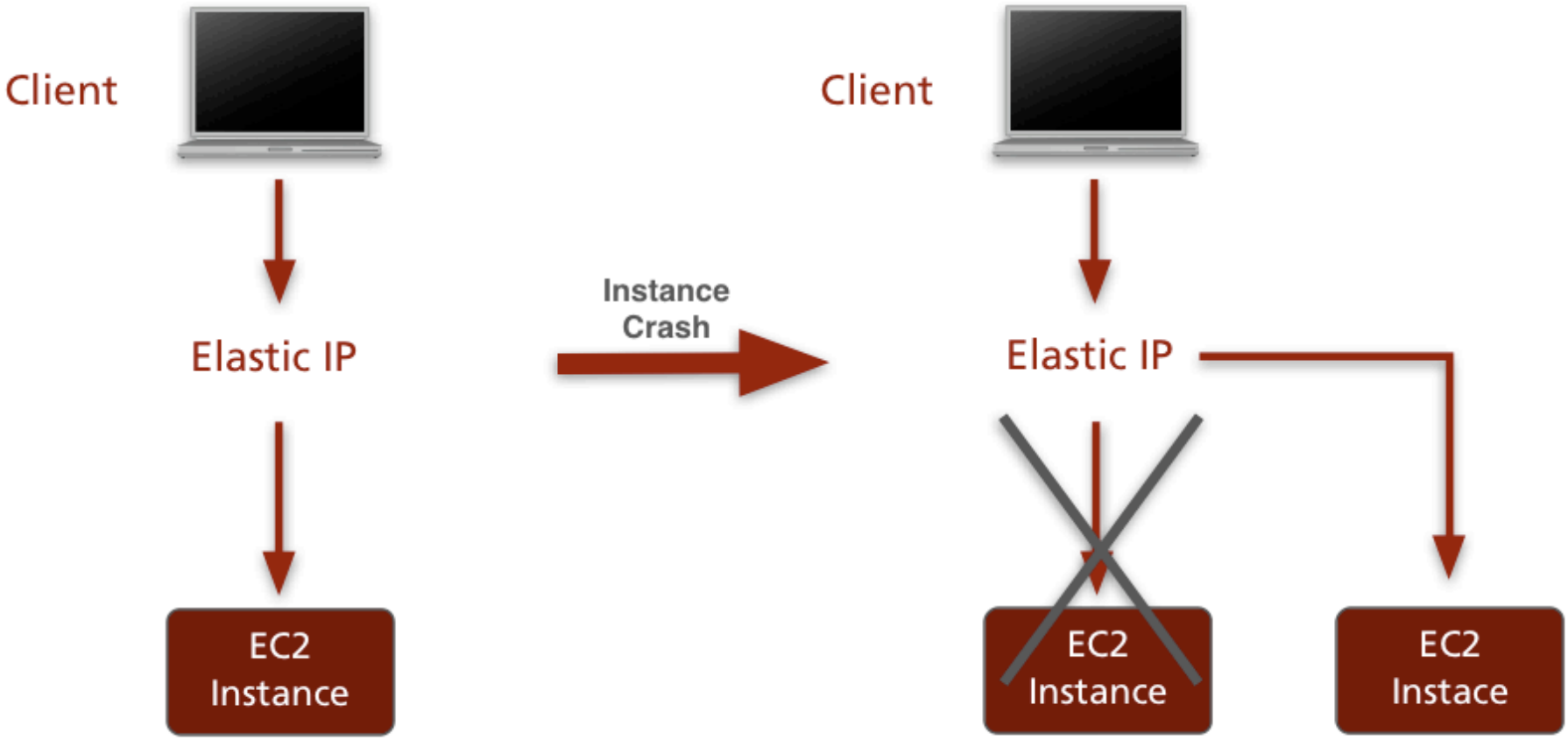


Availability Zones



Elastic IPs


Client
Elastic IP
EC2
Instance
Instance
Crash
Client
Elastic IP
EC2
Instance
EC2
Instace

EC2 for extra capacity

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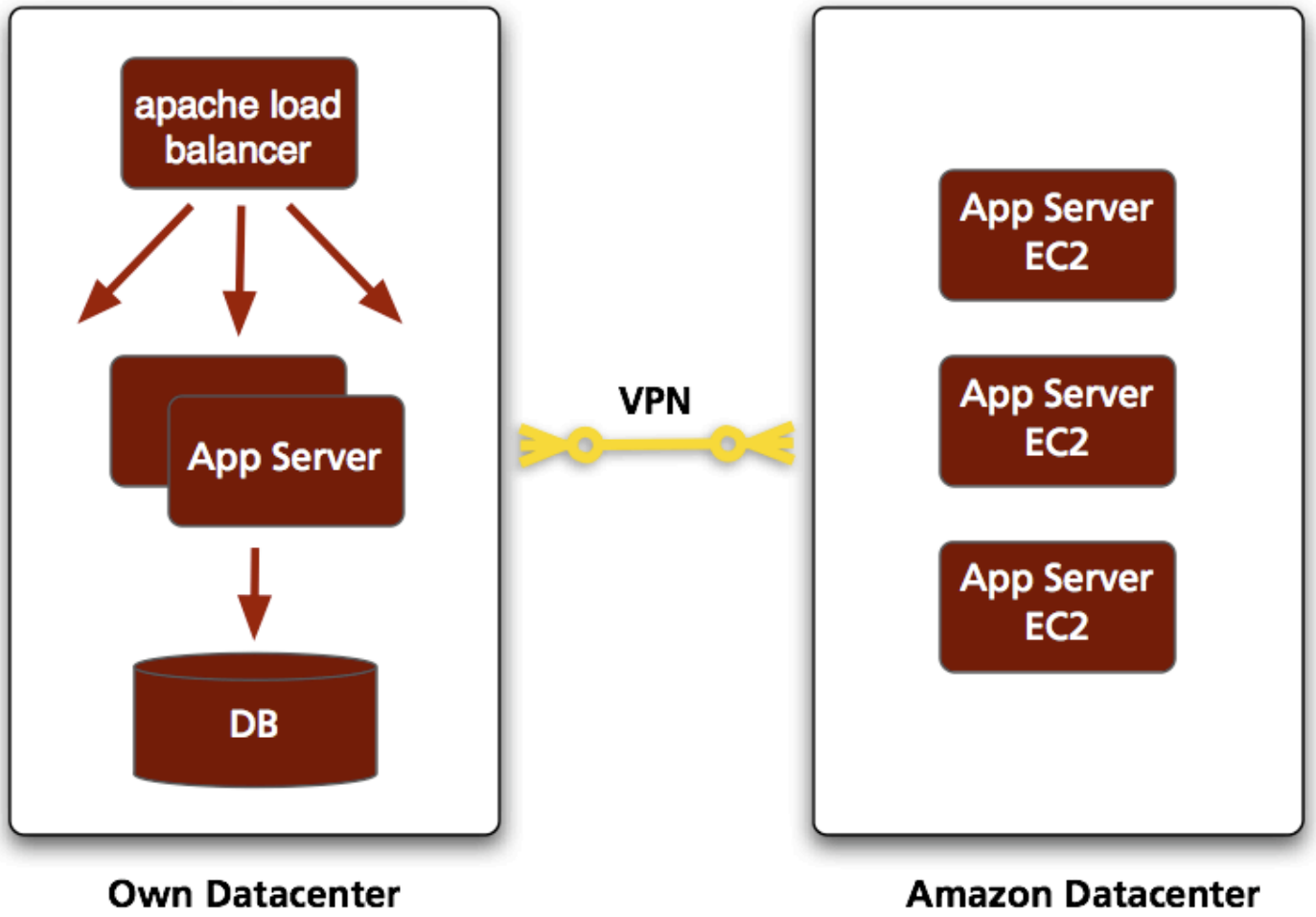

Load Balancer / Proxy

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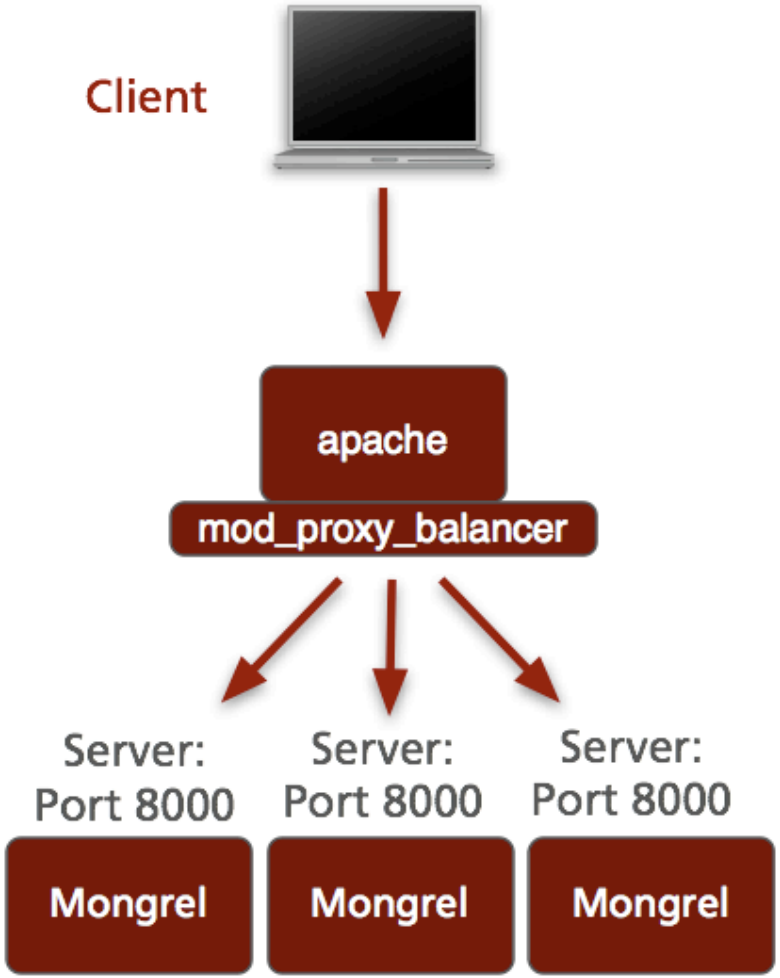

Example mod_proxy_blancer:

- Talks to multiple backend servers (Mongrel)
- Central Proxy/Load-Balancer configuration that has knowledge about nodes
- Typically proxy restart on config change

Swiftiply

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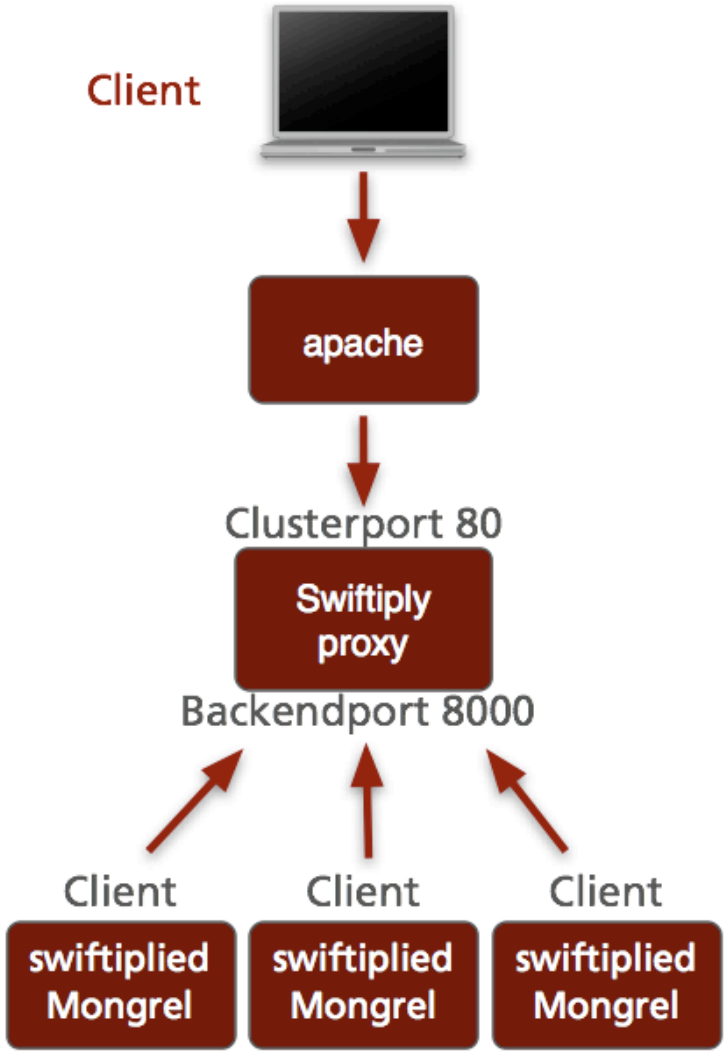

Swiftiply Proxy:

- Multiple backend clients have a persistent connection to the backend port
- Proxy listens on cluster port for requests and forwards them

No re-configuration

Swiftiply Proxy

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Installation

```
> gem install swiftiply -y
```

Start

```
> swiftiply -c swiftiply.yml
```

Configuration

```
> cat swiftiply.yml

cluster_address: 0.0.0.0
cluster_port: 80
daemonize: true
map:
  - incoming:
    - example.com
    - www.example.com
    outgoing: 127.0.0.1:30000
    default: true
  - incoming: www.meinprof.de
    outgoing: 127.0.0.1:30010
```

Swiftiplied Mongrel

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- Gem plugin that patches Mongrel
- Transforms Mongrel in Swiftiply client
- Experimental

Start

```
> env SWIFT=1 mongrel_rails start -p 8000
```

or

```
> swiftiply_mongrel_rails -C config/mongrel.yml
```

EC2 on Demand before Swiftiply

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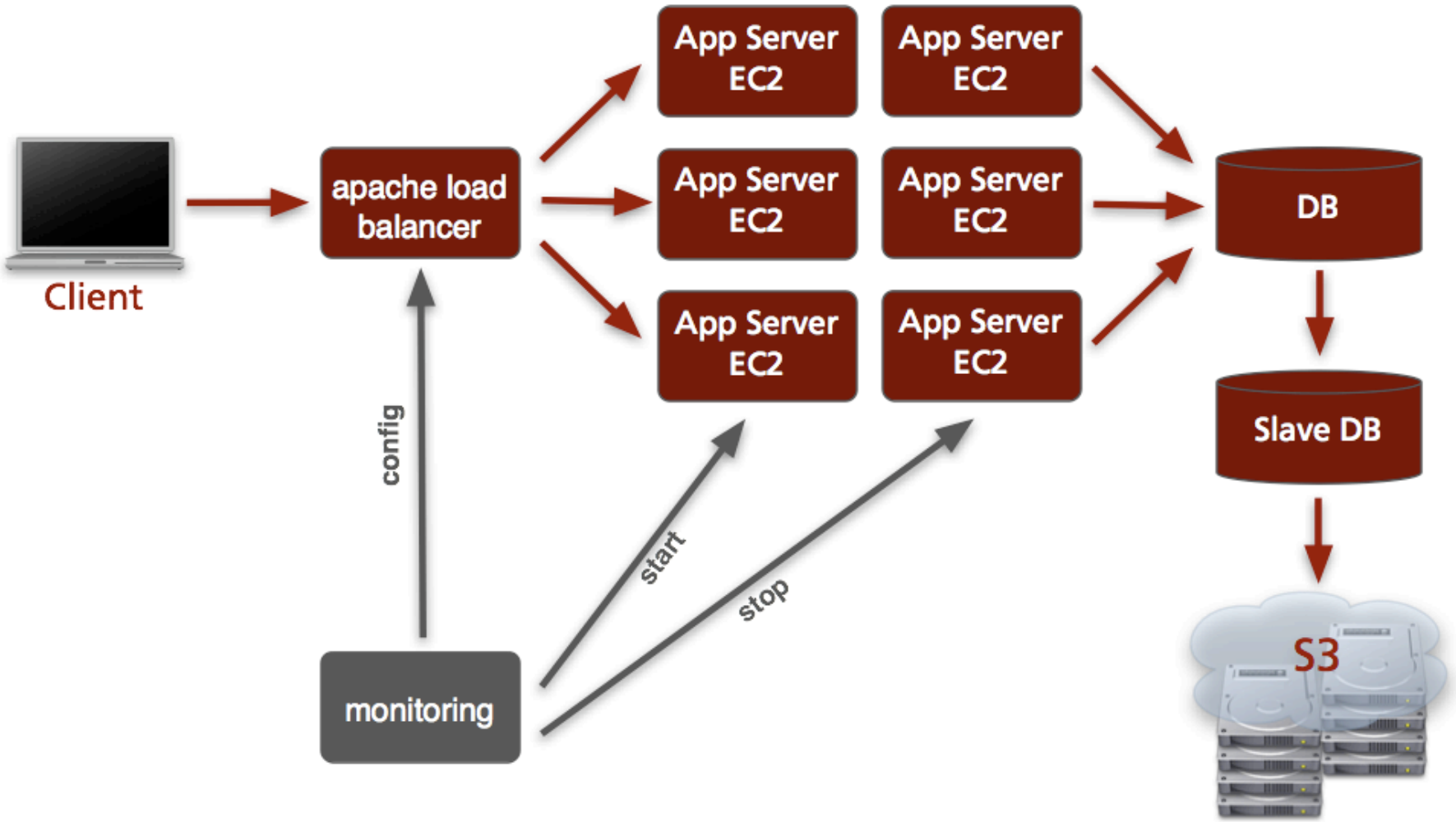

EC2 on Demand with Swiftiply

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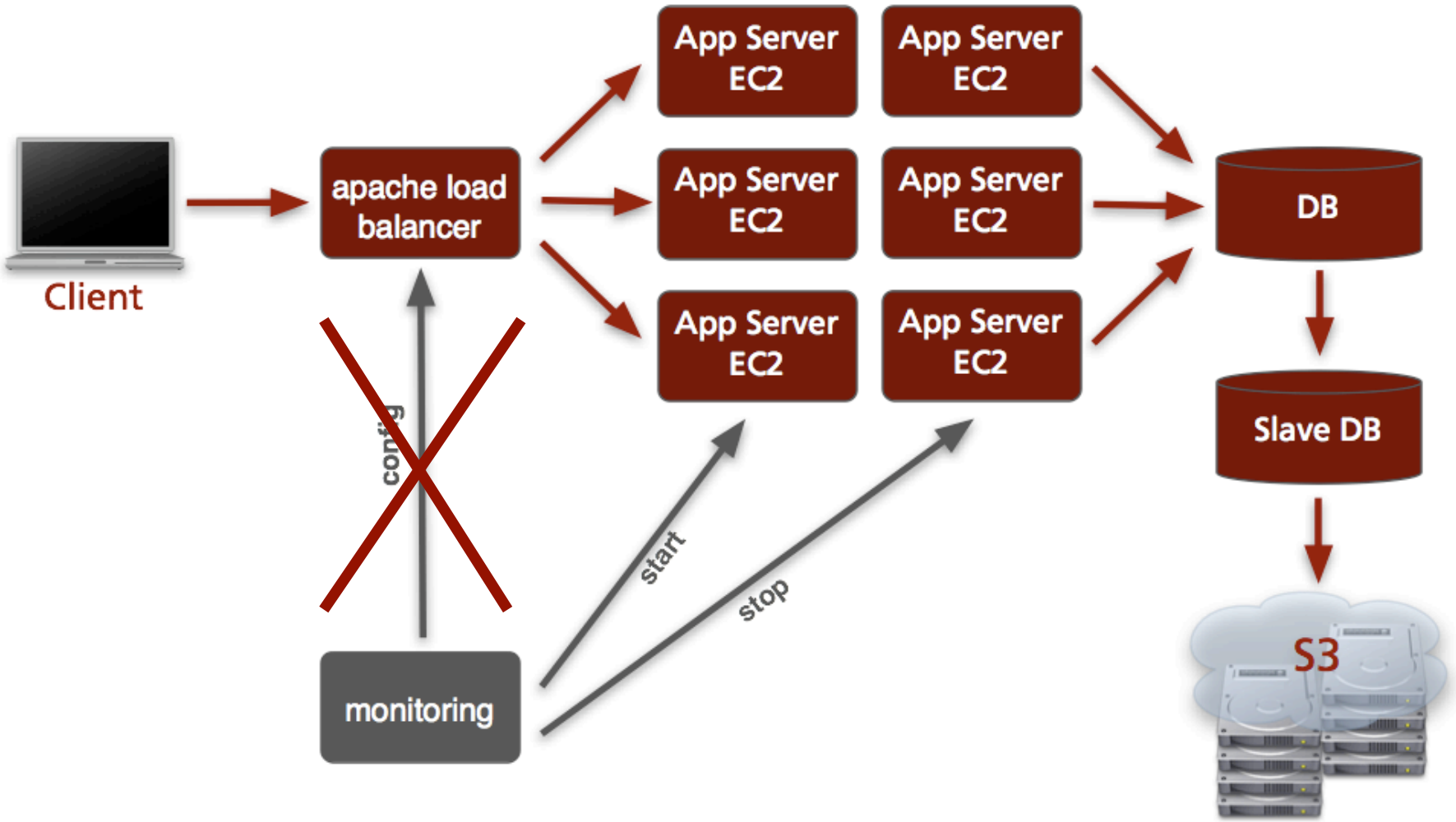

EC2 on Demand with Swiftiply

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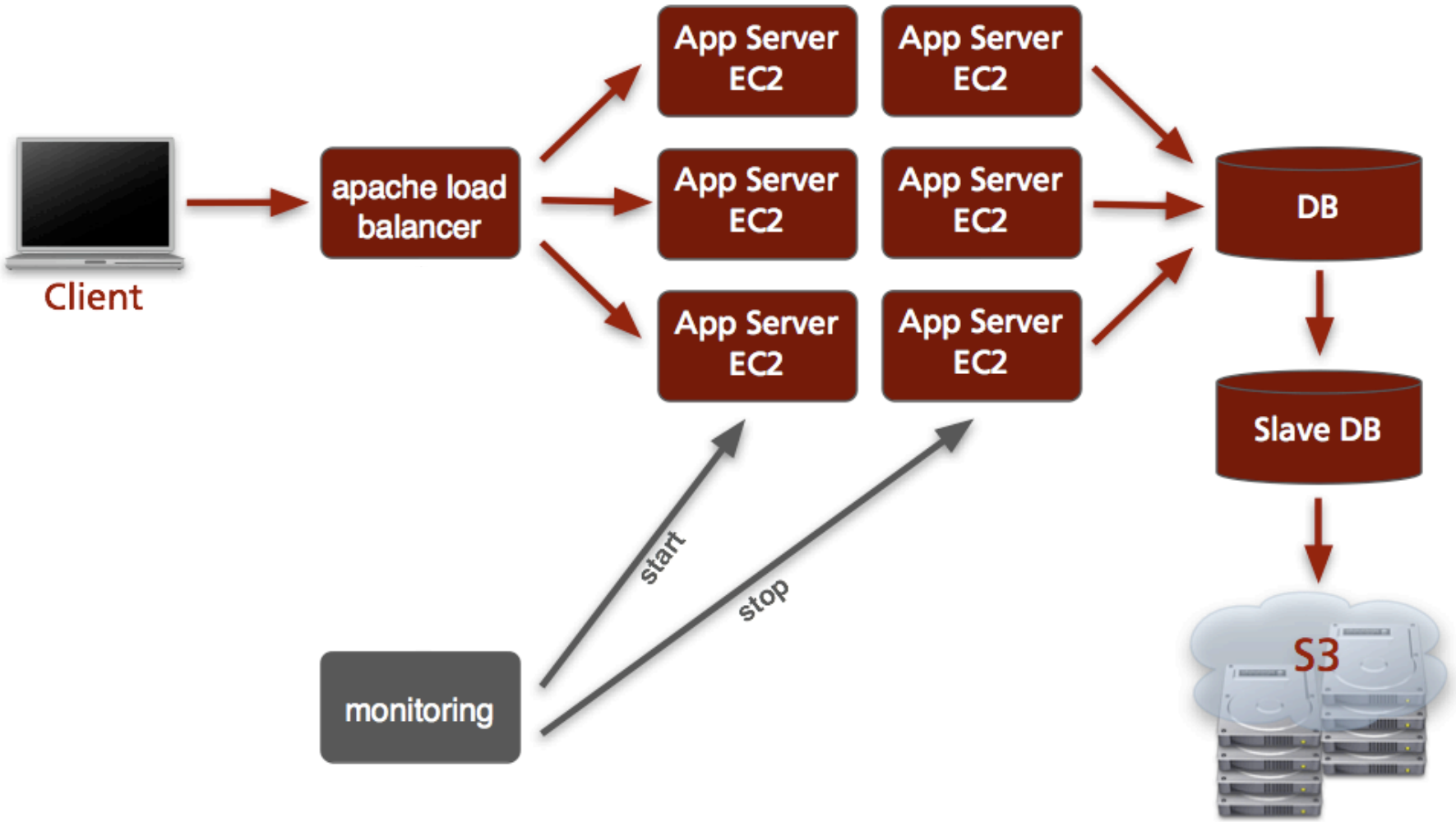

Ressources

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- Amazon Web Services
  http://aws.amazon.com
- Swiftiply
  http://swiftiply.swiftcore.org
- Attachment_fu
  http://svn.techno-weenie.net/projects/plugins/attachment_fu/
- Elastic Rails
  http://www.elasticrails.com
- Capazon
  http://capazon.rubyforge.org
- Rubber
  http://rubber.rubyforge.org
- RightScale
  http://www.rightscale.com

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