



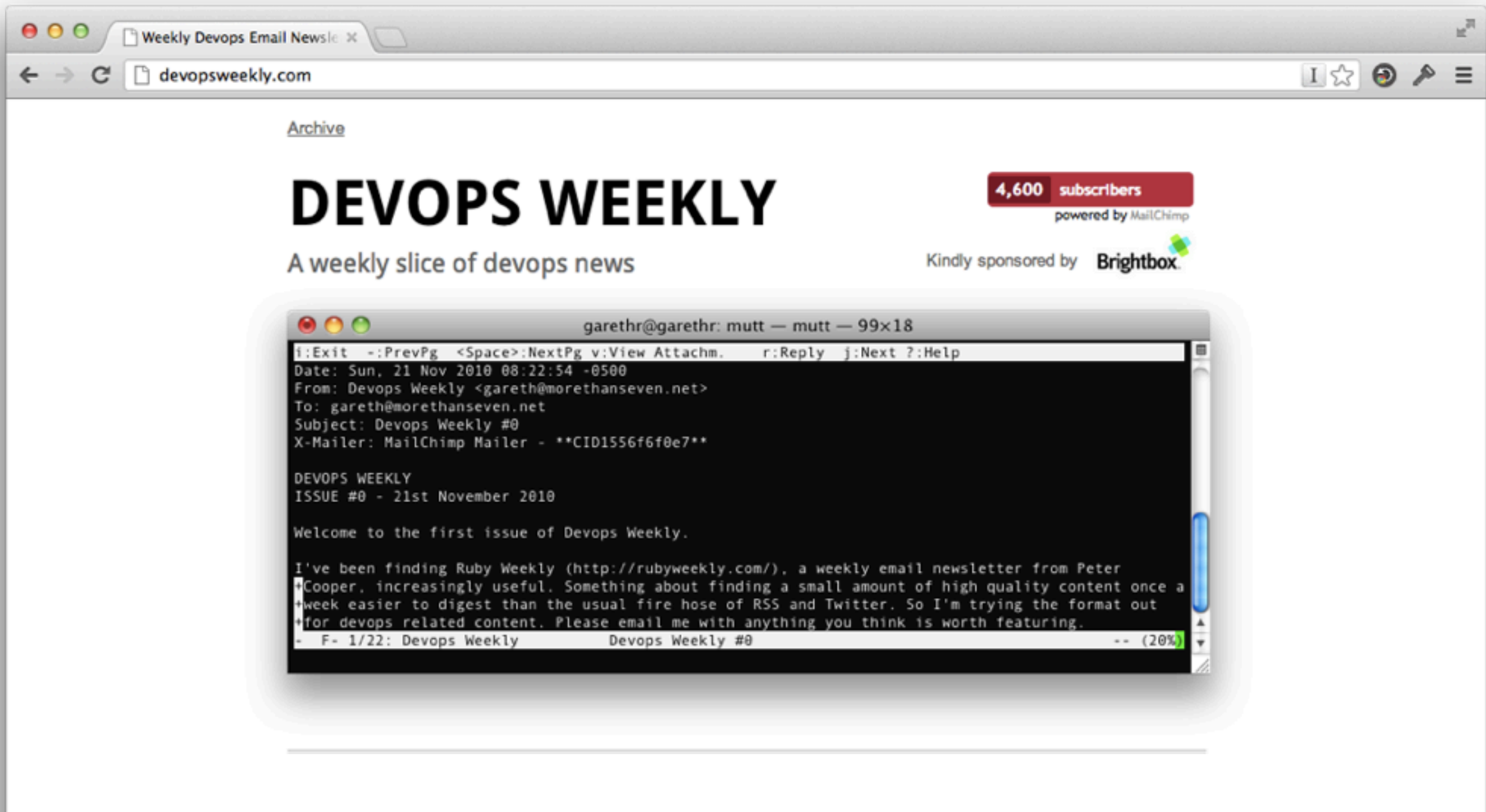
Clouds in Government Perils of Portability

QCon 6th February 2013

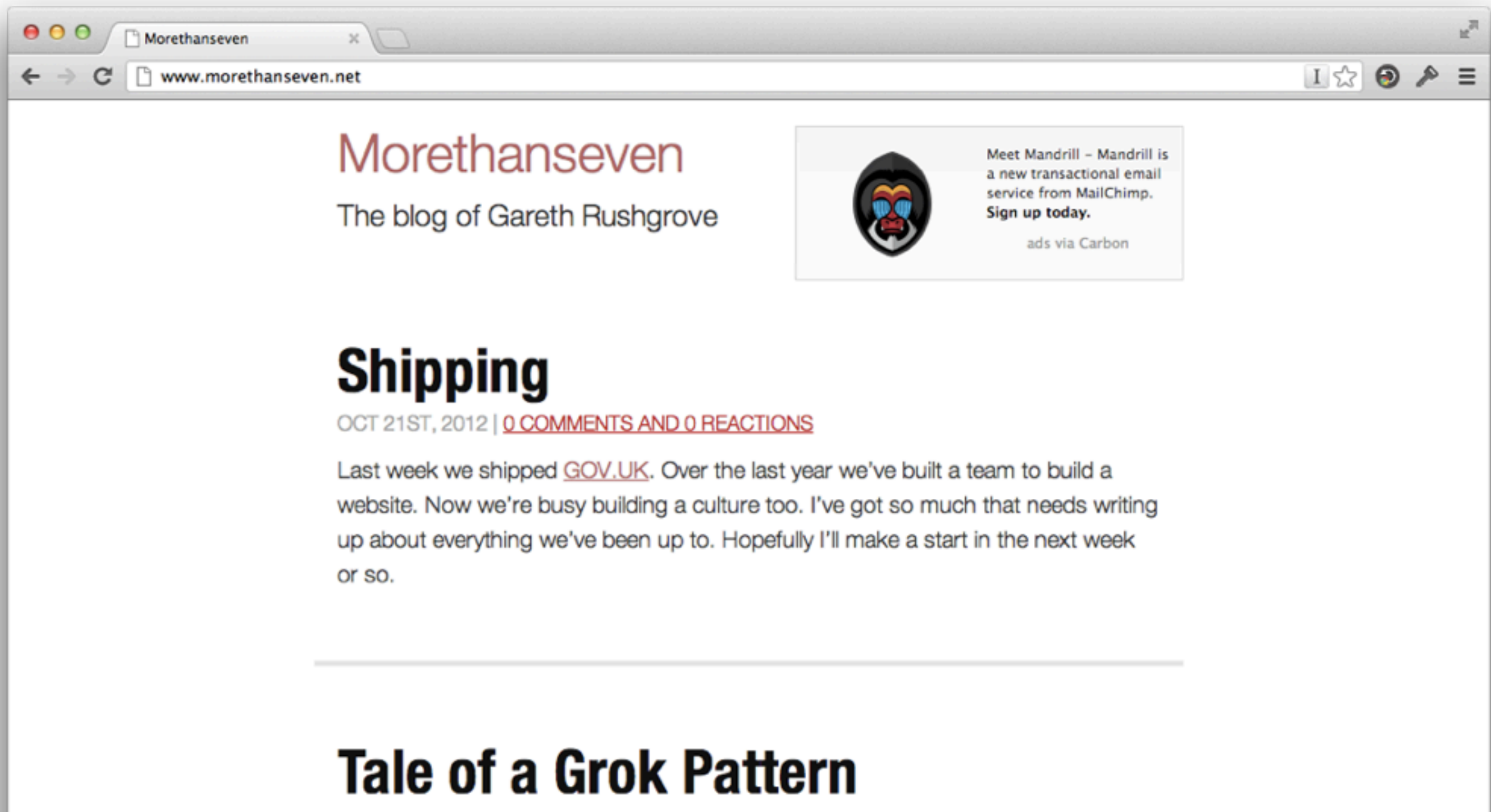
Me



Gareth Rushgrove @garethr



Curate devopsweekly.com



Blog at morethanseven.net



Work at UK Government Digital Service

CIVIL SERVICE — CLUB —

MEMBERSHIP AVAILABLE TO ALL
WORKING & RETIRED CIVIL SERVANTS
— SEE INFO —

I am a Civil Servant

Perils

Clouds and portability

per·il

/'perəl/

Noun

1. Serious and immediate danger.
2. The dangers or difficulties that arise from a particular situation or activity.

The 2nd definition

Peril 1

Caring about Image formats

amazon

Microsoft®

vmware®

AMI, VMDK, OVF, VHD, VDI, etc.

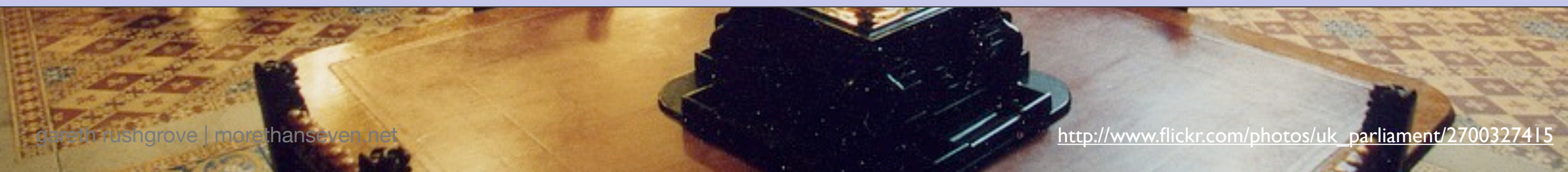


But I have many machines





And my infrastructure is more than just machines



Peril 2

API proliferation

AssignPrivateIpAddresses - / X

docs.aws.amazon.com/AWSEC2/latest/APIReference/ApiReference-query-AssignPrivateIpAddresses.html

awsdocumentation

Amazon Elastic Compute Cloud
API Reference (API Version 2012-12-01)

Search: Documentation

« Previous Next »
Did this page help you? Yes | No | Tell us about it...

Actions

- AllocateAddress
- AssignPrivateIpAddresses**
- AssociateAddress
- AssociateDhcpOptions
- AssociateRouteTable
- AttachInternetGateway
- AttachNetworkInterface
- AttachVolume
- AttachVpnGateway
- AuthorizeSecurityGroupEgress
- AuthorizeSecurityGroupIngress
- BundleInstance
- CancelBundleTask
- CancelConversionTask
- CancelExportTask
- CancelReservedInstancesListing

AssignPrivateIpAddresses

Description

Assigns one or more secondary private IP addresses to the specified network interface. You can specify one or more specific secondary IP addresses, or you can specify the number of secondary IP addresses to be automatically assigned within the subnet's CIDR block range. The number of secondary IP addresses that you can assign to an instance varies by instance type. For information about instance types, see [Available Instance Types](#) in the *Amazon Elastic Compute Cloud User Guide*. For more information about Elastic IP addresses, see [Elastic IP Addresses](#) in the *Amazon Elastic Compute Cloud User Guide*.

This action is available only in VPC.

Request Parameters

Name	Description	Required
<code>NetworkInterfaceId</code>	The network interface to which the IP address is assigned. Type: String Default: None	Yes
<code>PrivateIpAddress.n</code>	The IP address to be assigned as a secondary private IP address to the network interface.	Conditional

Amazon EC2

160+ actions

Big API (Just EC2)

Google™

vmware®



Joyent®



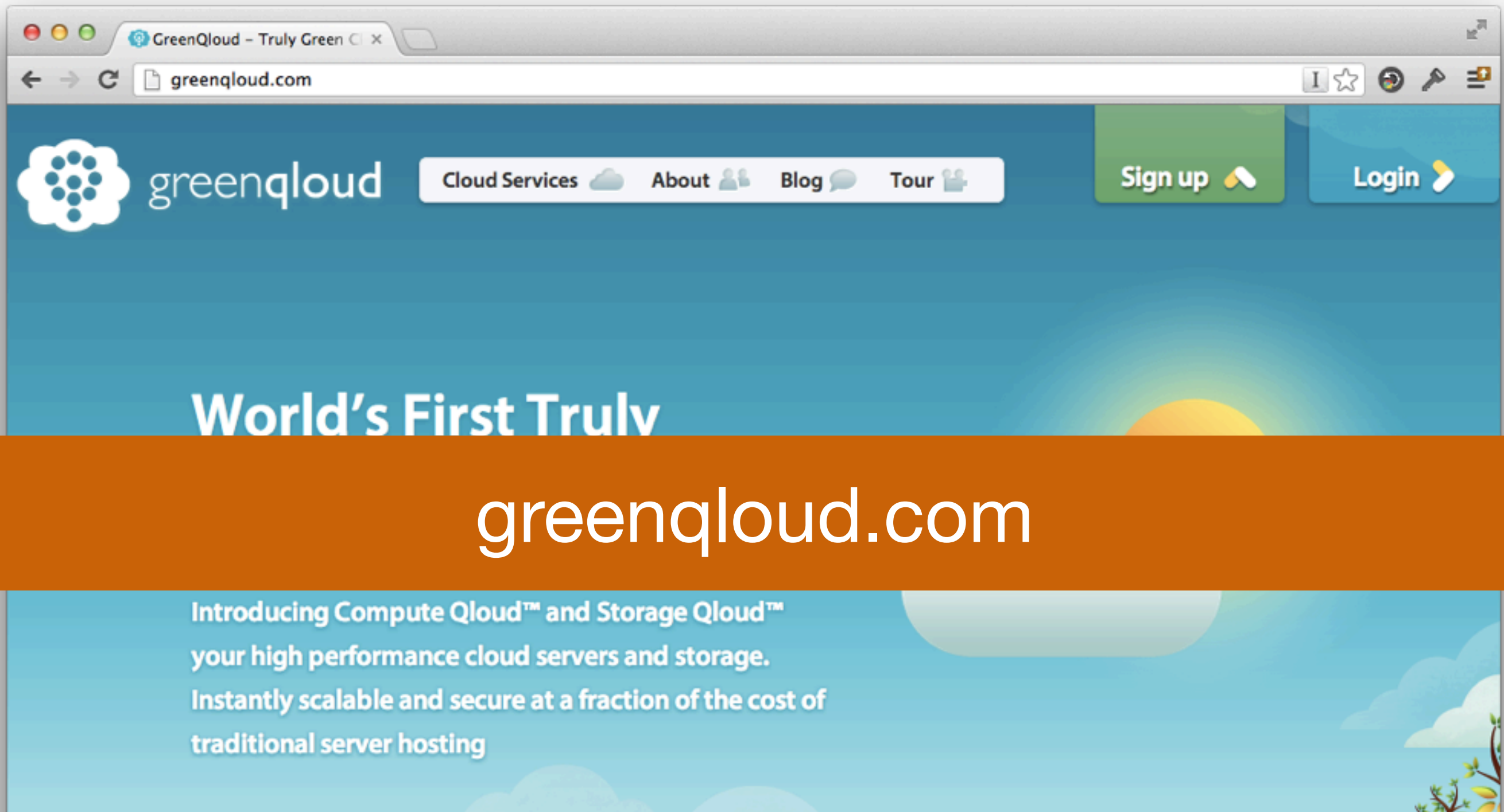
rackspace®

Brightbox™

Lots more APIs



API compatibility and de facto standards



Greenqcloud is EC2 compatible

Windows® utility computing with metered
greenqloud.com/computeqloud/

Storage and Content Delivery with metered
billing

GreenQloud! Truly Green™ is a challenge
take seriously and requires us to



www.eucalyptus.com

Eucalyptus

EUCALYPtUS

Funny story

Elastic Utility Computing Architecture for Linking Your Programs to Useful Systems

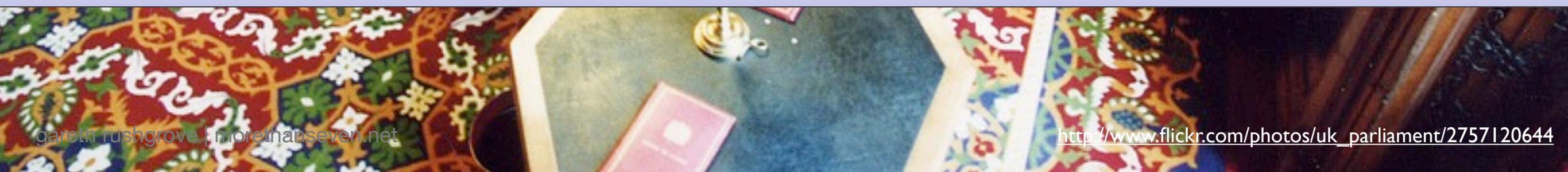
Eucalyptus is an acronym

Elastic Utility Computing Architecture for Linking Your Programs to Useful Systems

Ta da



It's not all about the APIs



Peril 3

Cloud primitives

- Instance
- Images
- Elastic Compute Cloud (EC2)
- Elastic IP (EIP)
- Elastic Network Interfaces (ENI)
- Elastic Block Store (EBS)
- Simple Storage Service (S3)
- Elastic Load Balancers (ELB)

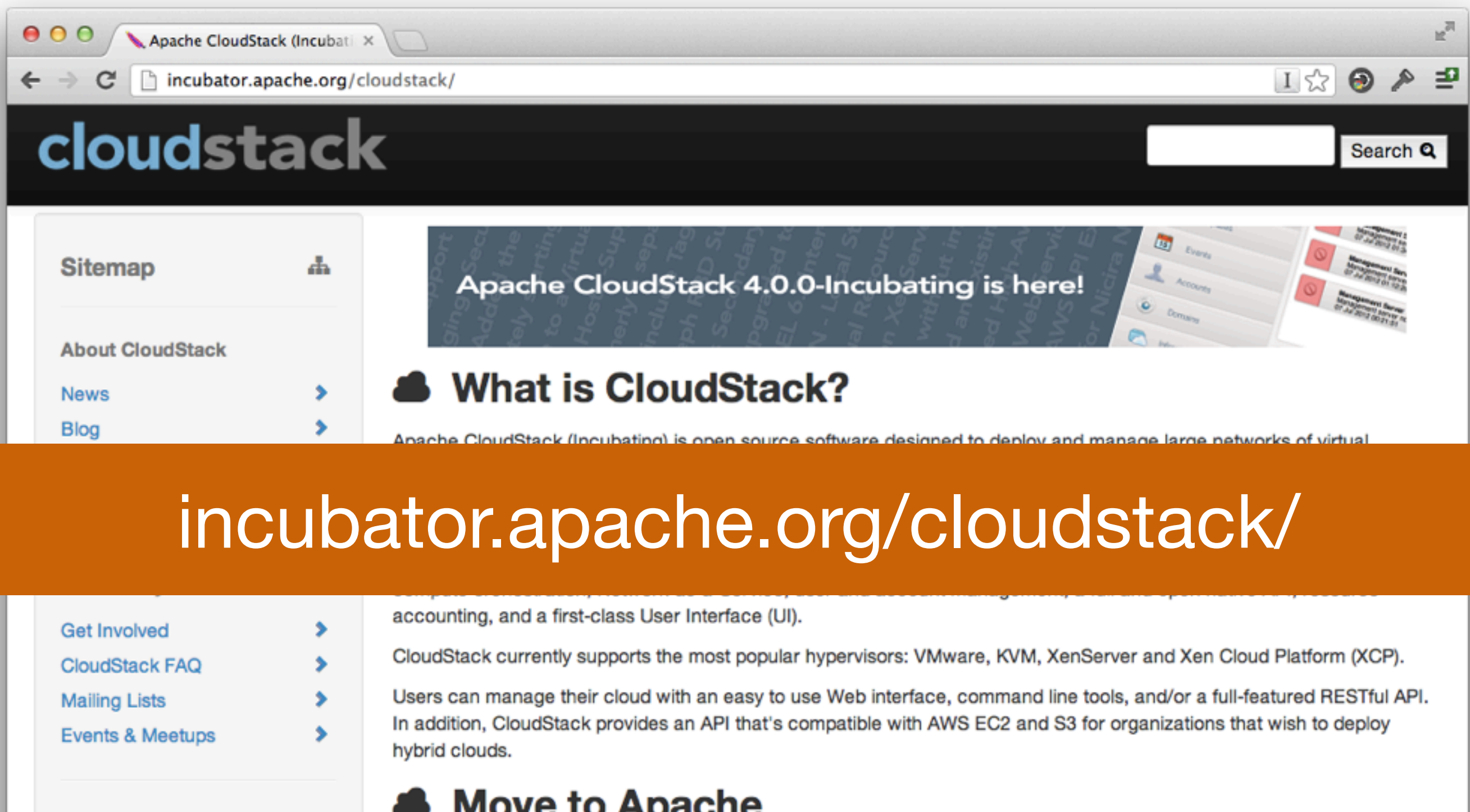
AWS - All the acronyms!



OpenStack

- Compute
- Storage
- Networking
- Instance
- Security group
- Object store
- Block store

OpenStack



incubator.apache.org/cloudstack/

CloudStack

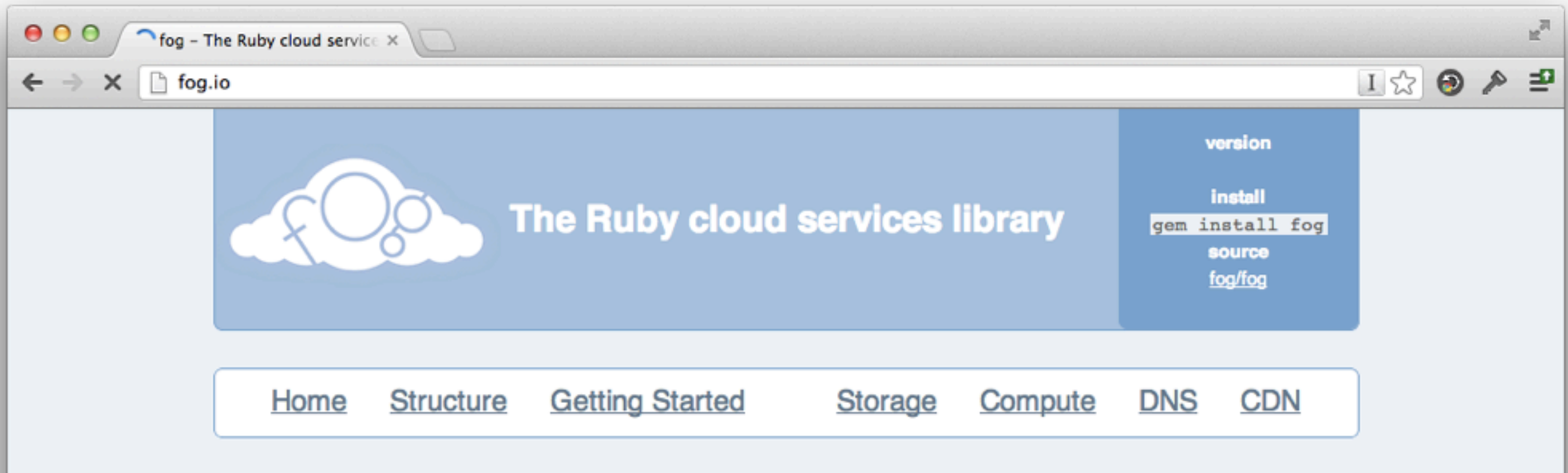
- Network
- VPC
- Virtual machine
- VPN
- Load balancer
- Router
- Project
- Network
- ISO
- Volume
- Template
- Security group
- User
- Snapshot
- Firewall
- Account
- NAT
- VM group
- Resource tag
- Address
- Zone
- Disk offering
- Hypervisor
- Guest OS

CloudStack



Abstractions to the rescue?





fog.io

as your own expertise develops.

By coding with fog from the start you avoid vendor lock-in and give yourself more flexibility to provide value. Whether you are writing a library, designing a software as a service product or just hacking on the weekend this flexibility is a huge boon.

With a rapidly expanding community and codebase the advantages of fog just keep coming. Join us and together we will realize the future of cloud computing.

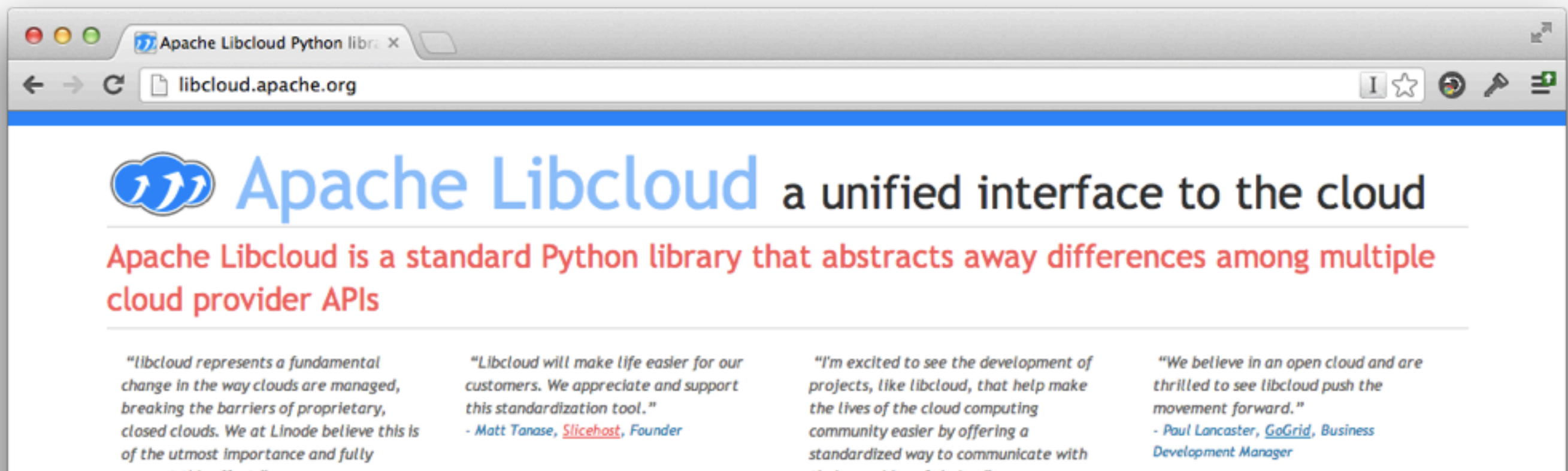
Prerequisites

Fog (Ruby)

Sending request...

- Compute
- Storage
- CDN
- DNS

Fog primitives



libcloud.apache.org

[news](#)

[about](#)

[getting started](#)

[documentation](#)

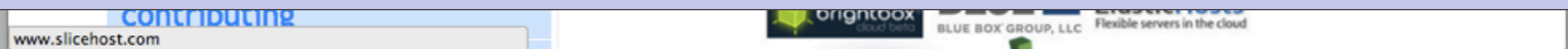
[who's using libcloud?](#)

Apache Libcloud is a standard Python library that abstracts away differences among multiple cloud provider APIs.

The current version allows users to manage four different cloud resources:

- Cloud Servers - services such as Amazon EC2 and Rackspace CloudServers (libcloud.compute.*)

libcloud (Python)



- Compute
- Storage
- Load balancers
- DNS

libcloud primitives



jclouds (Java)

- Computeservice
- Blob store

jclouds primitives

“ There are only two hard things in
Computer Science: cache invalidation
and naming things. ”

Phil Karlton

Naming things is hard

Peril 4

Slippery slope of
Platform as a Service

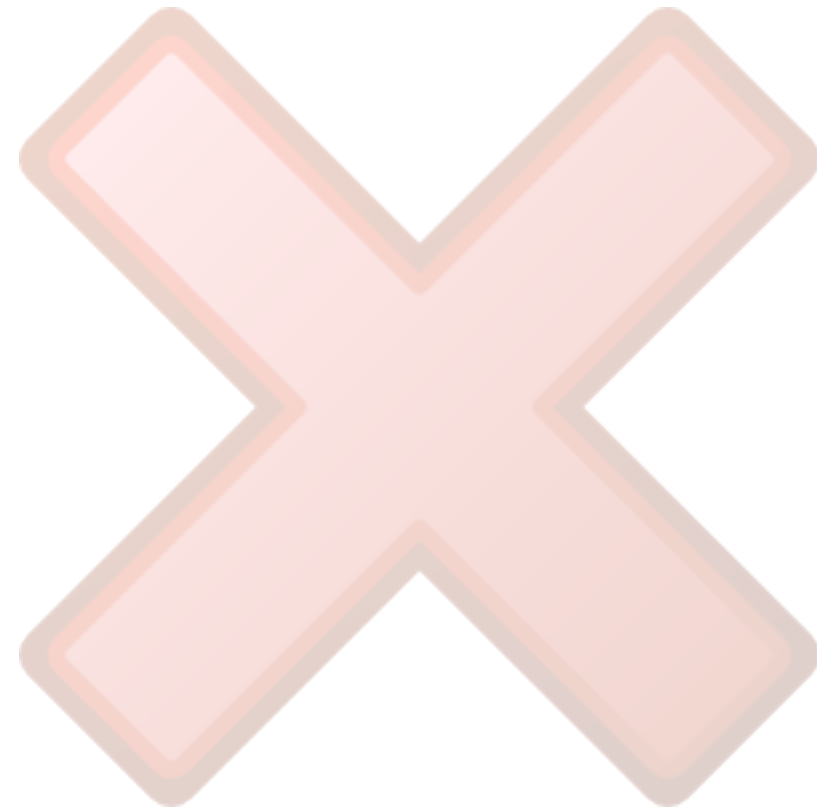
PaaS

...does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage...

IaaS

...does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components...

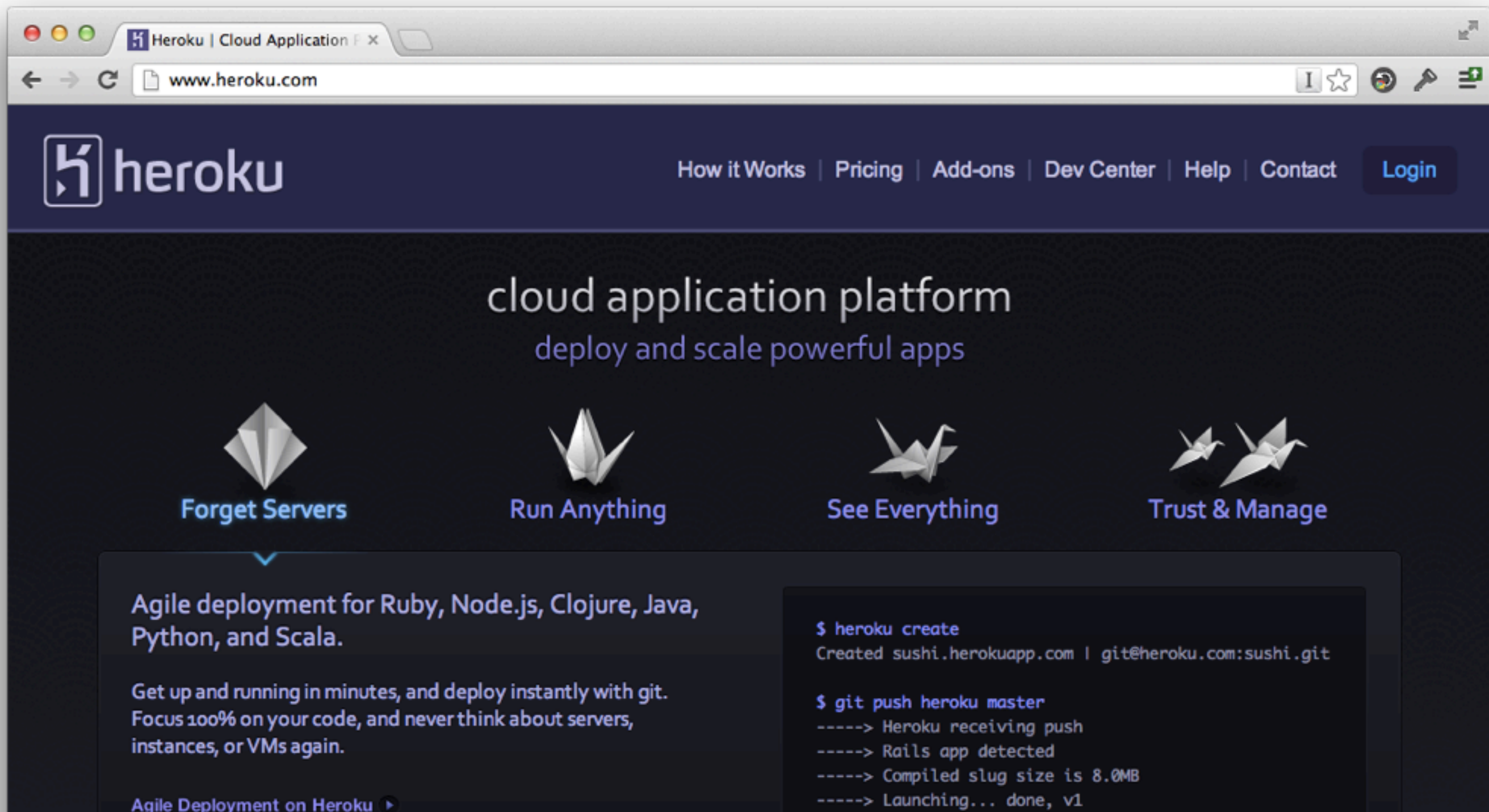
Definitions



Platform as a Service



Not PaaS

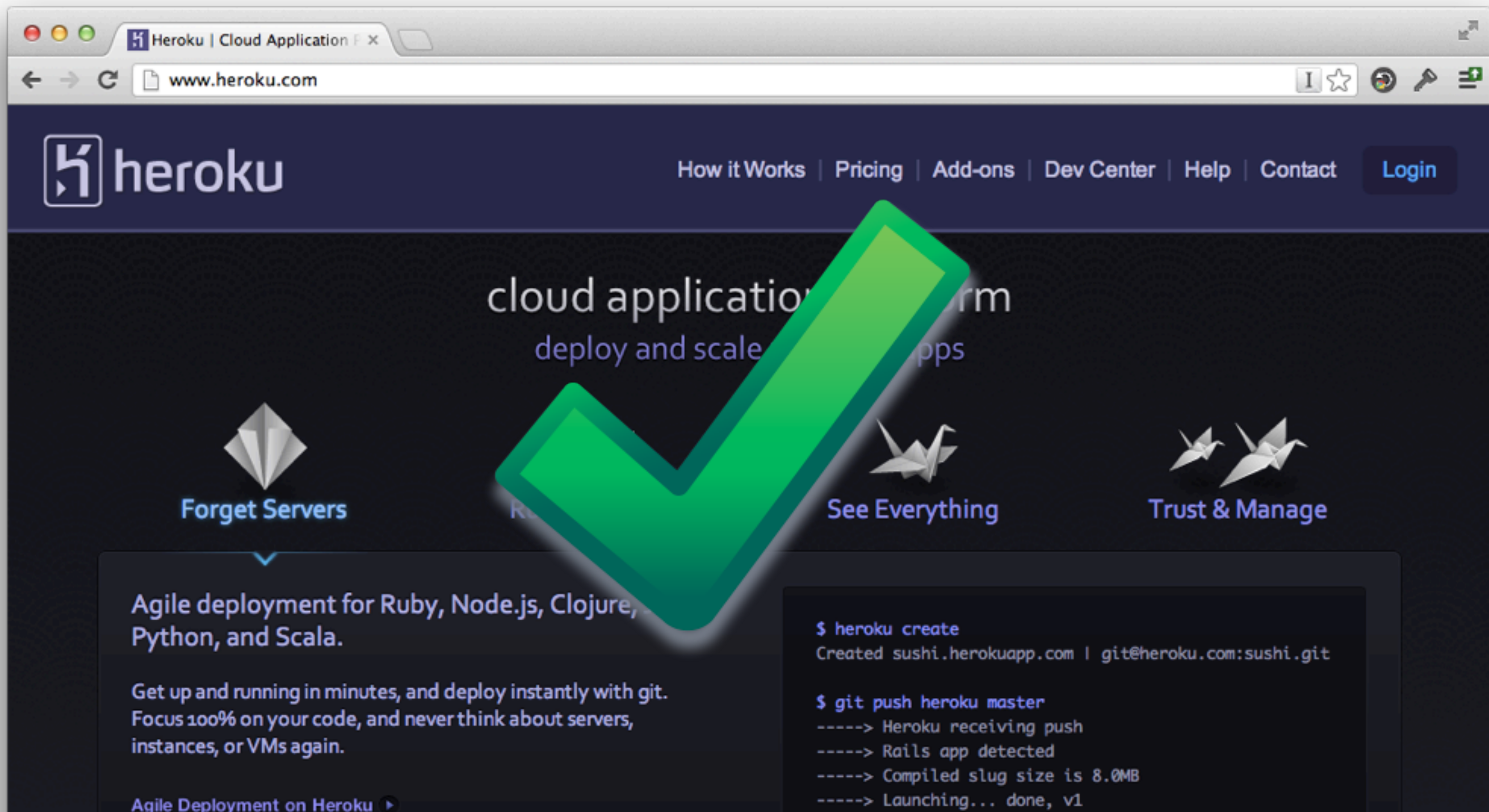


Heroku

How it Works

It's free to get started and sign up is instant.

Sign Up



Heroku

How it Works

It's free to get started and sign up is instant.

Sign Up

The screenshot shows the AWS Elastic Beanstalk (beta) page. The browser address bar displays `aws.amazon.com/elasticbeanstalk/`. The page header includes the Amazon Web Services logo, a 'Sign Up' button, and links for 'My Account / Console' and 'English'. A navigation bar contains 'AWS Products & Solutions', a search bar with 'AWS Product Information', and links for 'Developers' and 'Support'.

AWS Elastic Beanstalk

- Elastic Beanstalk Overview
- FAQs

Related Resources

- AWS Management Console
- Git Deployment and The Command Line Interface
- AWS Toolkit for Visual Studio
- AWS Toolkit for Eclipse
- Documentation

AWS Elastic Beanstalk (beta)

Easy to begin, Impossible to outgrow

AWS Elastic Beanstalk is an even easier way for you to quickly deploy and manage applications in the AWS cloud. You simply upload your application, and Elastic Beanstalk automatically handles the deployment details of capacity provisioning, load balancing, auto-scaling, and application health monitoring. At the same time, with Elastic Beanstalk, you retain full control over the AWS resources powering your application and can access the underlying resources at any time. Elastic Beanstalk leverages AWS services such as Amazon Elastic Cloud Compute (Amazon EC2), Amazon Simple Storage Service (Amazon S3), Amazon Simple Notification Service (Amazon SNS), Elastic Load Balancing, and Auto Scaling to deliver the same highly reliable, scalable, and cost-effective infrastructure that hundreds of thousands of businesses depend on today. AWS Elastic Beanstalk is easy to begin and impossible to outgrow.

Most existing application containers or platform-as-a-service solutions, while reducing the amount of programming required, significantly diminish

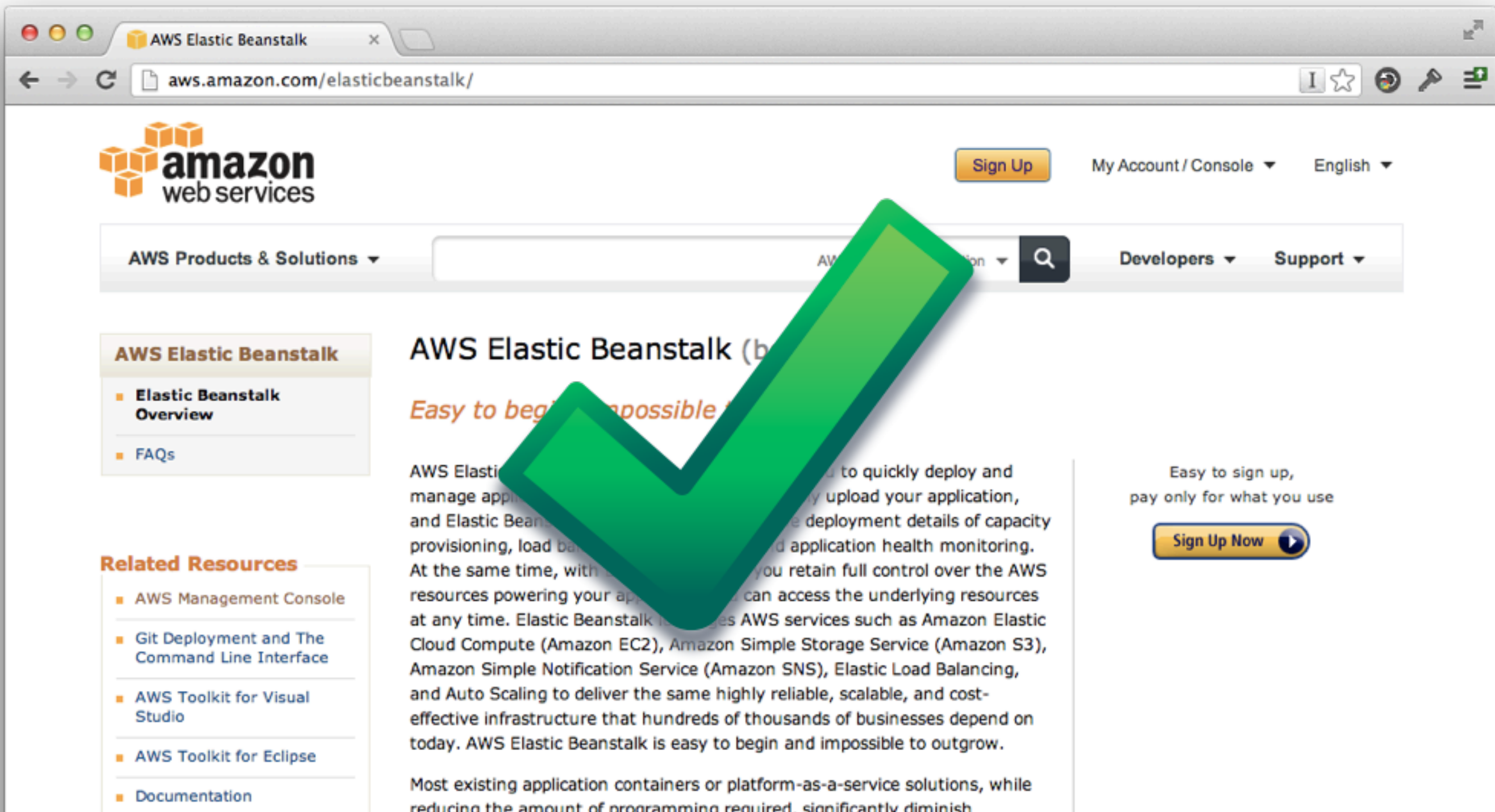
Easy to sign up, pay only for what you use

Sign Up Now

Amazon Elastic Beanstalk

Beanstalk's management capabilities.

To ensure easy portability of your application, Elastic Beanstalk is built using



The screenshot shows the AWS Elastic Beanstalk landing page. At the top, the Amazon Web Services logo is on the left, and navigation links for 'Sign Up', 'My Account / Console', and 'English' are on the right. Below this is a search bar and links for 'Developers' and 'Support'. The main content area features the title 'AWS Elastic Beanstalk' and the tagline 'Easy to begin, impossible to outgrow'. A large green checkmark is superimposed over the central text. To the left, a sidebar lists 'AWS Elastic Beanstalk' resources, including 'Elastic Beanstalk Overview' and 'FAQs', followed by 'Related Resources' like 'AWS Management Console' and 'Git Deployment and The Command Line Interface'. On the right, a call to action states 'Easy to sign up, pay only for what you use' with a 'Sign Up Now' button. The main text describes how Elastic Beanstalk simplifies deployment and management of applications on AWS, mentioning services like EC2, S3, SNS, and Auto Scaling.

aws.amazon.com/elasticbeanstalk/

amazon web services

Sign Up

My Account / Console

English

AWS Products & Solutions

AWS Elastic Beanstalk

Elastic Beanstalk Overview

FAQs

Related Resources

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Easy to sign up, pay only for what you use

Sign Up Now

Amazon Elastic Beanstalk

Beanstalk's management capabilities.

To ensure easy portability of your application, Elastic Beanstalk is built using

Amazon Elastic Compute Cloud x

aws.amazon.com/ec2/

amazon web services

Sign Up

My Account / Console ▾ English ▾

AWS Products & Solutions ▾ AWS Product Information ▾ Developers ▾ Support ▾

Amazon EC2 Details

- EC2 Overview
- EC2 FAQs
- EC2 Pricing
- Amazon EC2 SLA
- EC2 Instance Types
- EC2 Instance Purchasing Options
- Reserved Instances
- Spot Instances
- Windows Instances

Amazon Elastic Compute Cloud (Amazon EC2)


Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers.

Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use. Amazon EC2 provides developers the tools to build failure resilient applications and isolate themselves from common failure scenarios.

Sign into the Console »

Not an AWS customer? [Create a Free Account.](#)

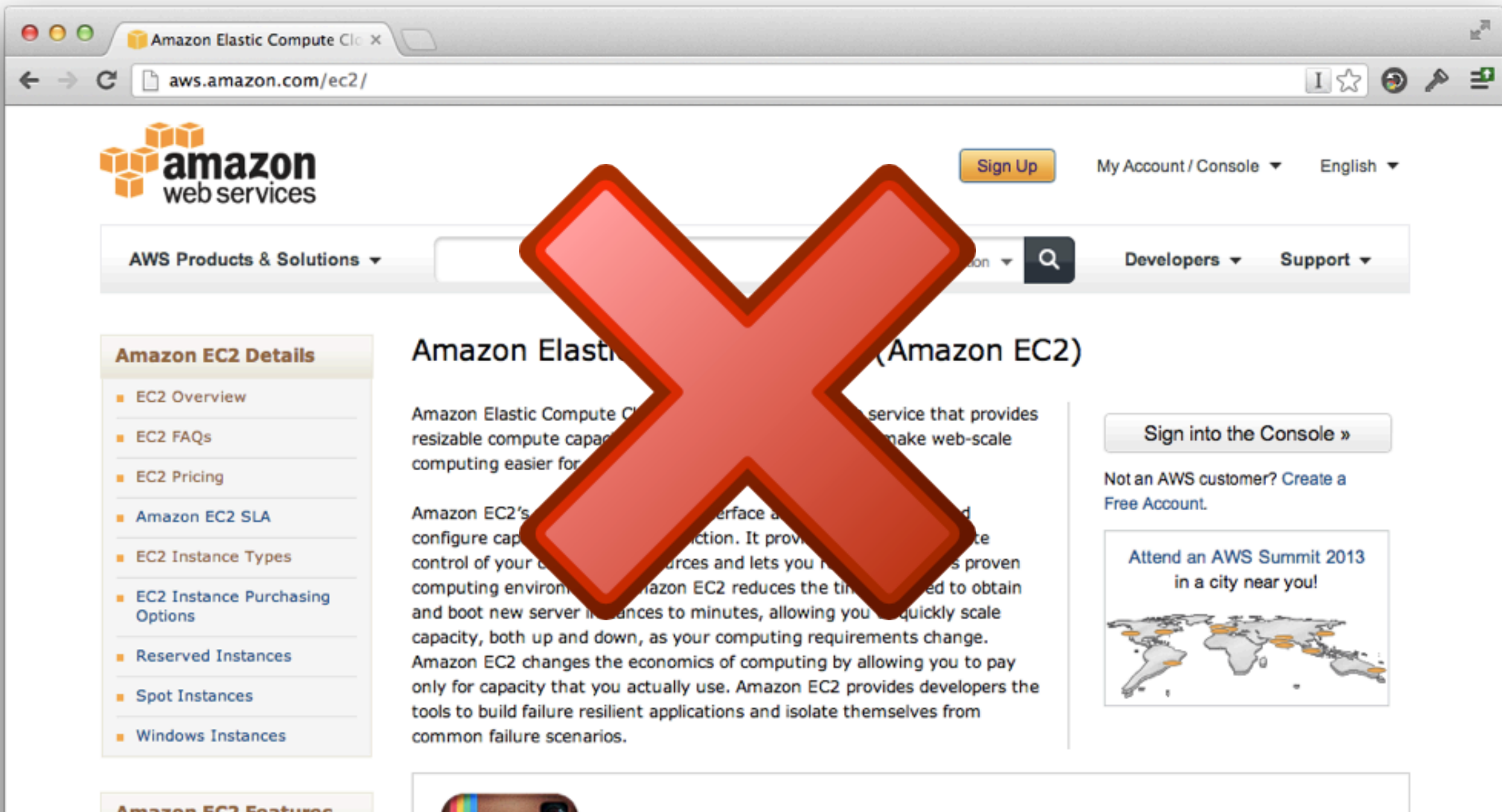
Attend an AWS Summit 2013 in a city near you!



Amazon EC2 Features

- Elastic Load Balancing
- High Performance

Amazon EC2



Amazon EC2

- Elastic Load Balancing
- High Performance

This page contains the following categories of information. Click to jump down:

vmware vCloud Director: Sec X

← → ↺ <https://www.vmware.com/products/vcloud-director/overview.html>      

United States [\[change\]](#)

vmware®

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Cloud Computing

Virtualization

Solutions

Products

Services

Support & Downloads

Partners

Company

Home > Products > Datacenter Products > VMware vCloud Director

Questions? 1-877-486-9273

Email Us 

Deliver Complete Virtual Datacenters for Consumption in Minutes

Orchestrate the provisioning of software-defined datacenter services as complete virtual datacenters that are ready for consumption in a matter of minutes. Virtual datacenters provide virtualized compute, networking, storage, and security. Administrators can provision the complete set of services necessary to make workloads operational in minutes. Software-defined datacenter service and the virtual datacenters fundamentally simplify infrastructure provisioning, and enable IT to move at the speed of business.



The diagram illustrates the VMware vCloud Director architecture. At the top, a green box labeled 'VMware vCloud Director' contains two 'Catalogs' sections, each with icons for 'Virtual Appliance', 'VM', and 'Virtual Machine'. Below these, two 'Virtual Datacenter' boxes are shown: 'Virtual Datacenter 1 (Gold)' and 'Virtual Datacenter 2 (Silver)'. Each datacenter box contains icons for compute (server racks), storage (disk drives), and networking (network switch). A central box labeled 'vCloud Networking and Security' connects the two datacenters. The entire architecture is presented within a light blue border.

Download Free Trial

Contact Sales

Find A Partner

vCloud Director

gareth rushgrove | morethanseven.net



The image is a screenshot of a web browser displaying the VMware vCloud Director overview page. The browser's address bar shows the URL <https://www.vmware.com/products/vcloud-director/overview.html>. The page features the VMware logo at the top left, followed by navigation links for Cloud Computing, Virtualization, and others. A large, semi-transparent red 'X' is overlaid across the center of the page, obscuring the main content. Below the 'X', the heading 'VMware vCloud™ Director' is visible, along with the tagline 'COMPLETE SOFTWARE-DEFINED DATACENTER SERVICES IN MINUTES'. To the right of the heading, there is a search bar and a 'My VMware' dropdown menu. Below the heading, the text 'Deliver Complete Virtual Datacenter Consumption in Minutes' is displayed, followed by a paragraph describing the service. To the right of the text, there is a diagram illustrating the VMware vCloud Director architecture, showing two virtual datacenters (Gold and Silver) connected by a central VMware vCloud Networking and Security component. At the bottom of the page, there are three buttons: 'Download Free Trial', 'Contact Sales', and 'Find A Partner'.

United States [change] Search

vmware®

Cloud Computing Virtualization

Home > Products > Datacenter Products > VMware vCloud Director

VMware vCloud™ Director

COMPLETE SOFTWARE-DEFINED DATACENTER SERVICES IN MINUTES

Questions? 1-877-486-9273

Email Us

Deliver Complete Virtual Datacenter Consumption in Minutes

Orchestrate the provisioning of software-defined datacenter services as complete virtual datacenters that are ready for consumption in a matter of minutes. Virtual datacenters provide virtualized compute, networking, storage, and security. Administrators can provision the complete set of services necessary to make workloads operational in minutes. Software-defined datacenter service and the virtual datacenters fundamentally simplify infrastructure provisioning, and enable IT to move at the speed of business.

VMware vCloud Director

Virtual Datacenter 1 (Gold) Virtual Datacenter 2 (Silver)

VMware vCloud Networking and Security

Download Free Trial Contact Sales Find A Partner

vCloud Director

Amazon DynamoDB

aws.amazon.com/dynamodb/

amazon web services

Sign Up

My Account / Console English

AWS Products & Solutions AWS Product Information Developers Support

Amazon DynamoDB

- Amazon DynamoDB Overview
- Testimonials
- Pricing
- FAQs

Amazon DynamoDB (beta)

Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability. With a few clicks in the AWS Management Console, customers can launch a new Amazon DynamoDB database table, scale up or down their request capacity for the table without downtime or performance degradation, and gain visibility into resource utilization and performance metrics. Amazon DynamoDB enables customers to offload the administrative burdens of operating and scaling distributed databases to AWS, so they don't have to worry about hardware provisioning, setup and configuration, replication, software patching, or cluster scaling.

Amazon DynamoDB is designed to address the core problems of database management, performance, scalability, and reliability. Developers can create a database table that can store and retrieve any amount of data, and serve any level of request traffic. DynamoDB automatically spreads the data and traffic for the table over a sufficient number of servers to handle the request capacity specified by the customer and the amount of data stored, while maintaining consistent, fast performance. All data items are stored on Solid State Drives (SSDs) and are automatically replicated across three Availability Zones in a

Get Started with AWS for Free

Sign Up Now »

AWS Free Tier includes **100MB of Storage, 5 Units of Write Capacity, and 10 Units of Read Capacity** with Amazon DynamoDB.

[View AWS Free Tier Details »](#)

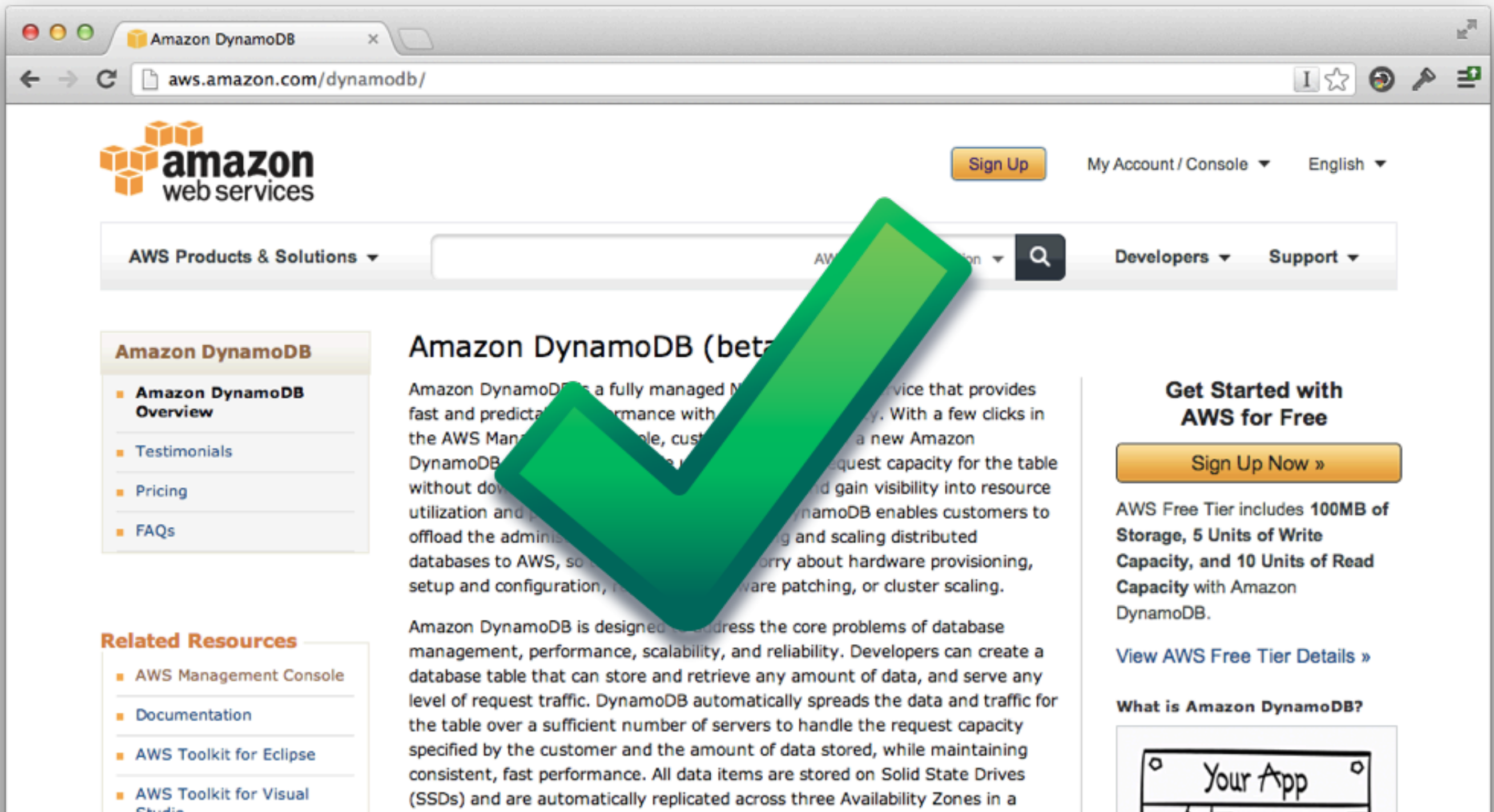
What is Amazon DynamoDB?

Your App

Amazon DynamoDB

Testimonials

Read Amazon CTO Werner Vogels' [announcement](#) that DynamoDB is the fastest growing new service in AWS history.



The screenshot shows the Amazon DynamoDB website in a web browser. The browser's address bar displays 'aws.amazon.com/dynamodb/'. The page features the Amazon Web Services logo at the top left, a 'Sign Up' button, and links for 'My Account / Console' and 'English'. A navigation bar includes 'AWS Products & Solutions', a search bar, and links for 'Developers' and 'Support'. On the left, a sidebar lists 'Amazon DynamoDB' links: 'Overview', 'Testimonials', 'Pricing', and 'FAQs'. Below this, 'Related Resources' include 'AWS Management Console', 'Documentation', 'AWS Toolkit for Eclipse', and 'AWS Toolkit for Visual Studio'. The main content area is titled 'Amazon DynamoDB (beta)' and describes it as a fully managed NoSQL database service. It highlights features like fast and predictable performance, ease of use via the AWS Management Console, and automatic scaling. A large green checkmark is overlaid on the main text. To the right, a 'Get Started with AWS for Free' section offers a 'Sign Up Now »' button and details the AWS Free Tier: 100MB of Storage, 5 Units of Write Capacity, and 10 Units of Read Capacity. Below this is a link to 'View AWS Free Tier Details »' and a section titled 'What is Amazon DynamoDB?' with a diagram showing 'Your App' connected to the database.

Amazon DynamoDB (beta)

Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with inherent scalability. With a few clicks in the AWS Management Console, customers can create a new Amazon DynamoDB table and specify the request capacity for the table without doing any capacity planning. Customers can also gain visibility into resource utilization and performance metrics. Amazon DynamoDB enables customers to offload the administrative tasks of managing and scaling distributed databases to AWS, so they can focus on building and deploying their applications. They don't have to worry about hardware provisioning, setup and configuration, software patching, or cluster scaling.

Amazon DynamoDB is designed to address the core problems of database management, performance, scalability, and reliability. Developers can create a database table that can store and retrieve any amount of data, and serve any level of request traffic. DynamoDB automatically spreads the data and traffic for the table over a sufficient number of servers to handle the request capacity specified by the customer and the amount of data stored, while maintaining consistent, fast performance. All data items are stored on Solid State Drives (SSDs) and are automatically replicated across three Availability Zones in a

Get Started with AWS for Free

[Sign Up Now »](#)

AWS Free Tier includes **100MB of Storage, 5 Units of Write Capacity, and 10 Units of Read Capacity** with Amazon DynamoDB.

[View AWS Free Tier Details »](#)

What is Amazon DynamoDB?

Your App

Amazon DynamoDB

Testimonials

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Amazon ElastiCache

aws.amazon.com/elasticache/

amazon web services

Sign Up

My Account / Console

English

AWS Products & Solutions

AWS Product Information


Developers

Support

Amazon ElastiCache

- Overview
- Features
- Testimonials
- FAQs
- Pricing
- Reserved Cache Nodes
- Getting Started Guide

Amazon ElastiCache (beta)



New to Amazon ElastiCache?

Activate your **free 60 day trial** today.

See below for details.

Easy to sign up,
pay only for what you
use

Sign Up Now

Amazon ElastiCache is a web service that makes it easy to deploy, operate, and scale an in-memory cache in the cloud. The service improves the performance of web applications by allowing you to retrieve information from a fast, managed, in-memory caching system, instead of relying entirely on slower disk-based databases. Amazon ElastiCache is protocol-compliant with Memcached, a widely adopted memory object caching system, so code, applications, and popular tools that you use today with existing Memcached environments will work seamlessly with the service.

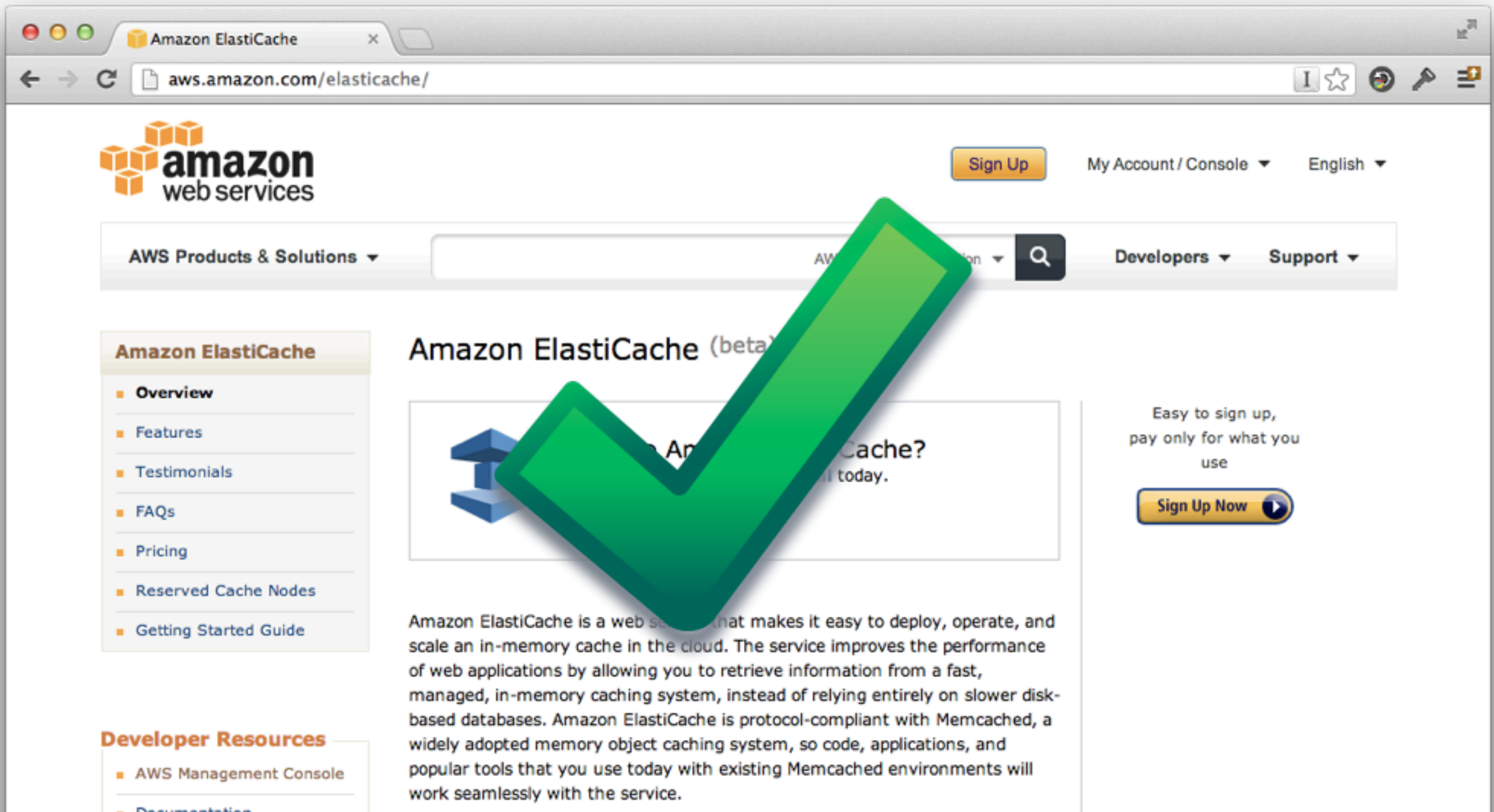
Developer Resources

- AWS Management Console
- Documentation

Amazon ElastiCache

What is Amazon ElastiCache?





The screenshot shows the Amazon ElastiCache website in a browser window. The browser's address bar displays 'aws.amazon.com/elasticache/'. The page features the Amazon Web Services logo at the top left, a 'Sign Up' button, and links for 'My Account / Console' and 'English'. A navigation bar includes 'AWS Products & Solutions', a search bar, and links for 'Developers' and 'Support'. On the left, a sidebar lists 'Amazon ElastiCache' resources: Overview, Features, Testimonials, FAQs, Pricing, Reserved Cache Nodes, and Getting Started Guide. Below this, 'Developer Resources' includes links to the AWS Management Console and Documentation. The main content area is titled 'Amazon ElastiCache (beta)' and features a large blue 3D cube icon. A large green checkmark is superimposed over the page. To the right of the icon, text asks 'What is Amazon ElastiCache?' and 'Why use Amazon ElastiCache today?'. Below this, a paragraph describes the service: 'Amazon ElastiCache is a web service that makes it easy to deploy, operate, and scale an in-memory cache in the cloud. The service improves the performance of web applications by allowing you to retrieve information from a fast, managed, in-memory caching system, instead of relying entirely on slower disk-based databases. Amazon ElastiCache is protocol-compliant with Memcached, a widely adopted memory object caching system, so code, applications, and popular tools that you use today with existing Memcached environments will work seamlessly with the service.' To the right of the main text, a call to action states 'Easy to sign up, pay only for what you use' with a 'Sign Up Now' button.

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Easy to sign up, pay only for what you use

Sign Up Now

Amazon ElastiCache

What is Amazon ElastiCache?



Peril 5

Vendor lock-in

aws.amazon.com/elasticbeanstalk/

amazon
web services

AWS Products & Solutions ▼

AWS Product Information

AWS Elastic Beanstalk

- **Elastic Beanstalk Overview**
- [FAQs](#)

AWS Elastic Beanstalk (beta)

Easy to begin, Impossible to outgrow

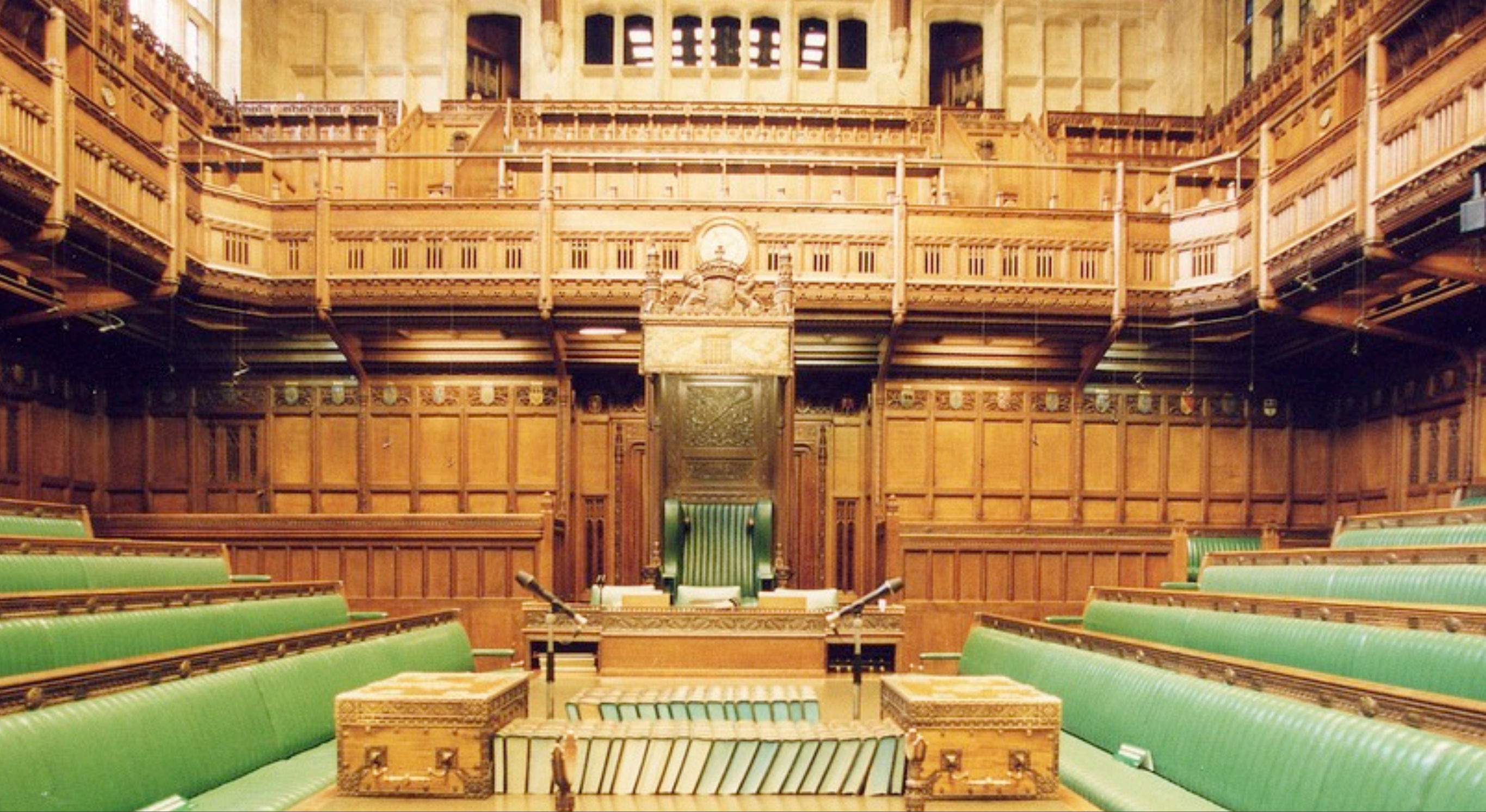
AWS Elastic Beanstalk is an even easier way for you to quickly deploy and manage applications in the AWS cloud. You simply upload your application code and Elastic Beanstalk automatically handles the deployment details for you across multiple availability zones for high availability and automatic scaling from zero to thousands of EC2 instances.

Capability lock-in

underlying resources at any time. Elastic Beanstalk leverages AWS

NETFLIX

Capacity lock-in

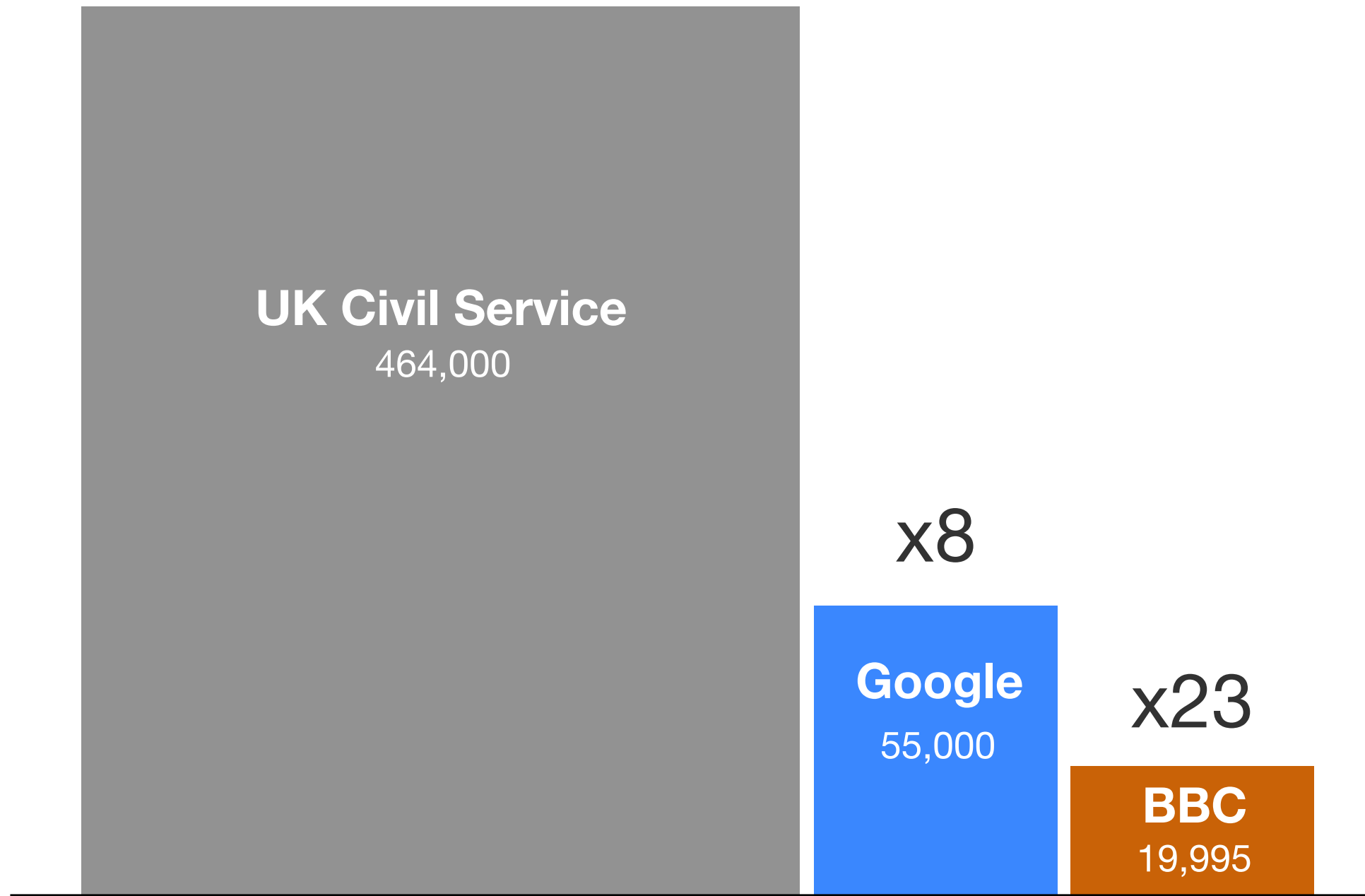


Ecosystem lock-in

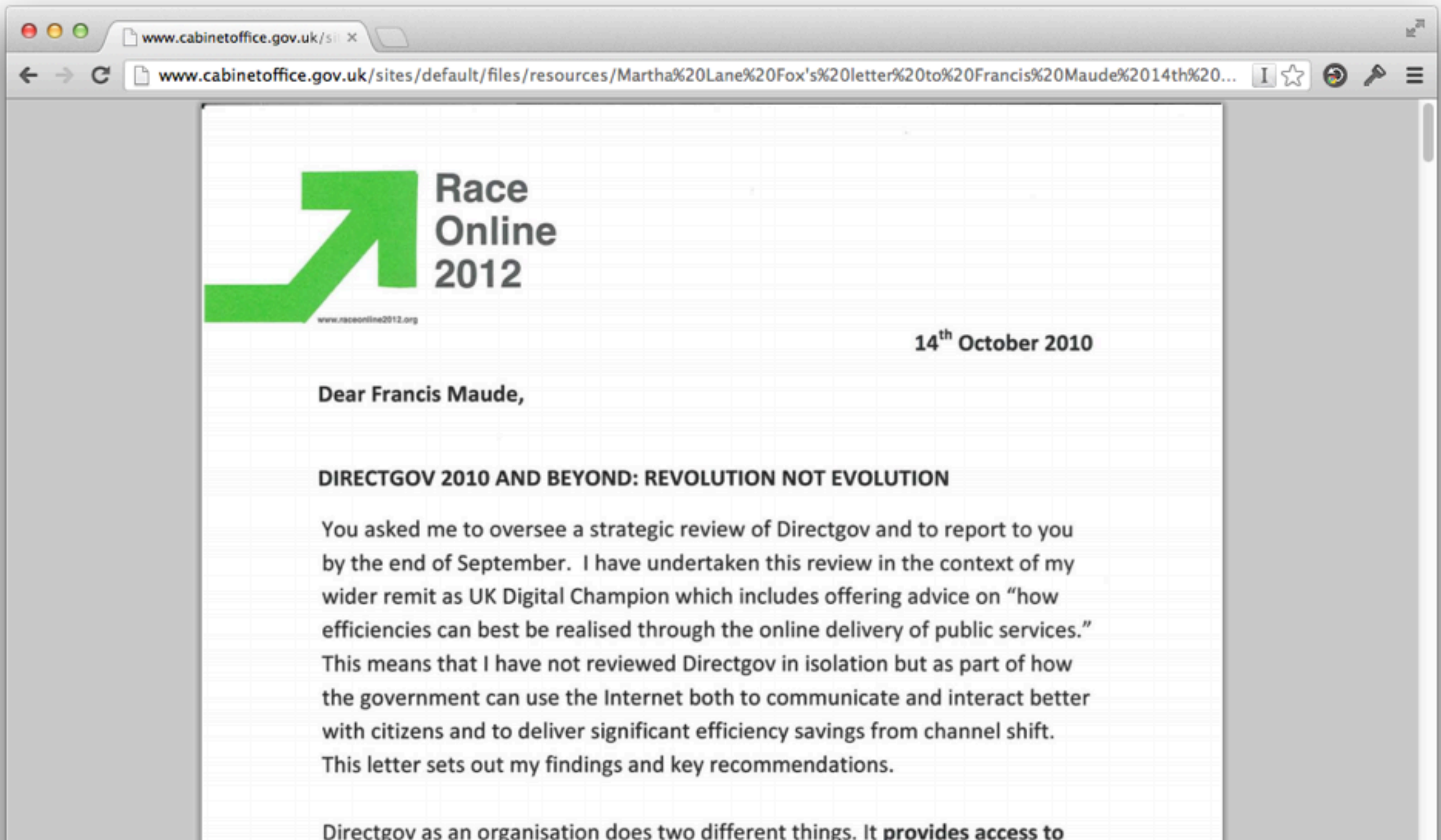


Interlude

The story of GOV.UK

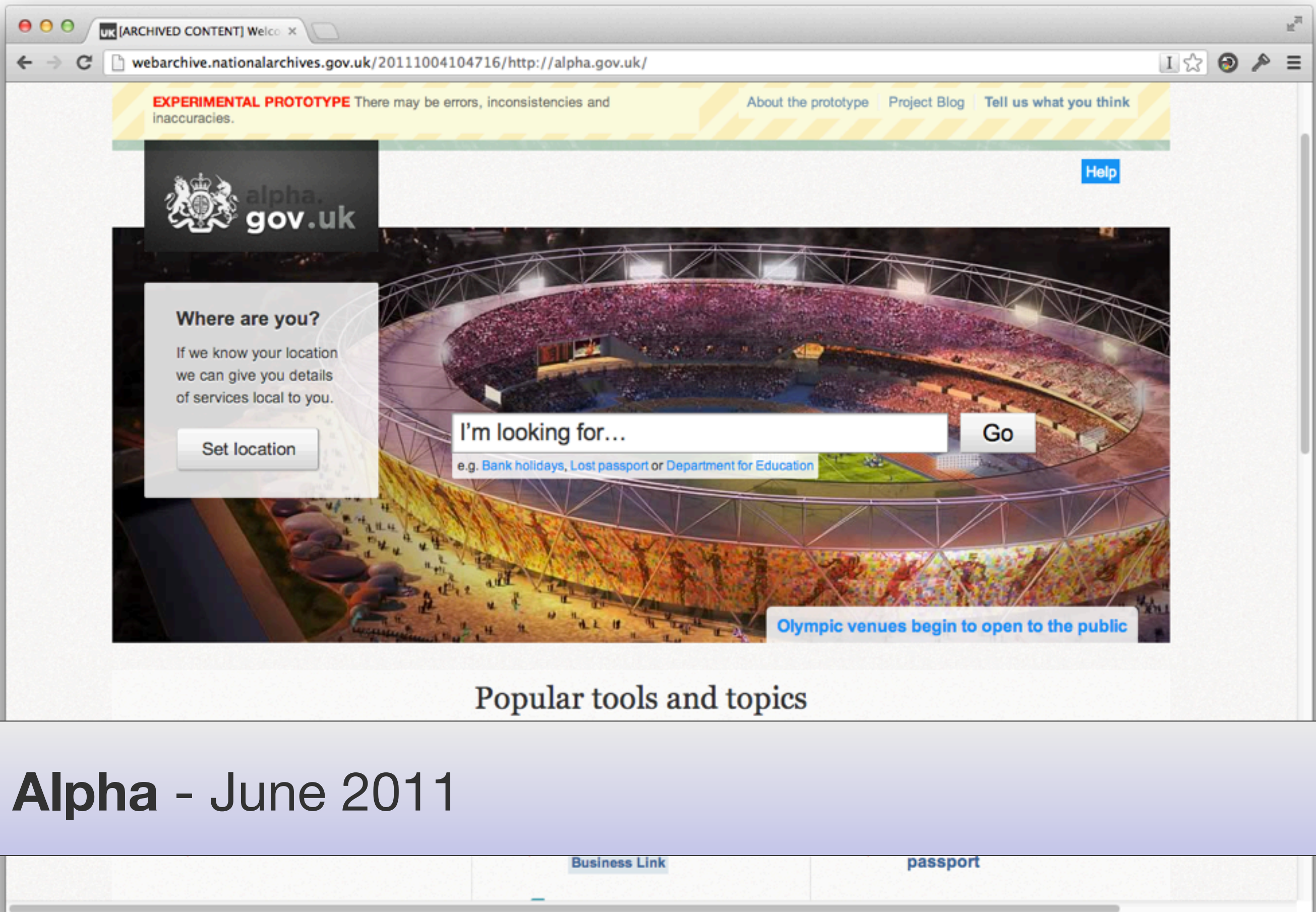


Government is Big



Martha Lane-Fox Report - October 2010

government news, campaigns, and engagement. For me, the acid test for Directgov is whether it can **empower, and make life simpler for, citizens** and at the same time allow government to **turn other things off**. A focus on vastly increasing the range, usage and quality of online transactions will deliver the



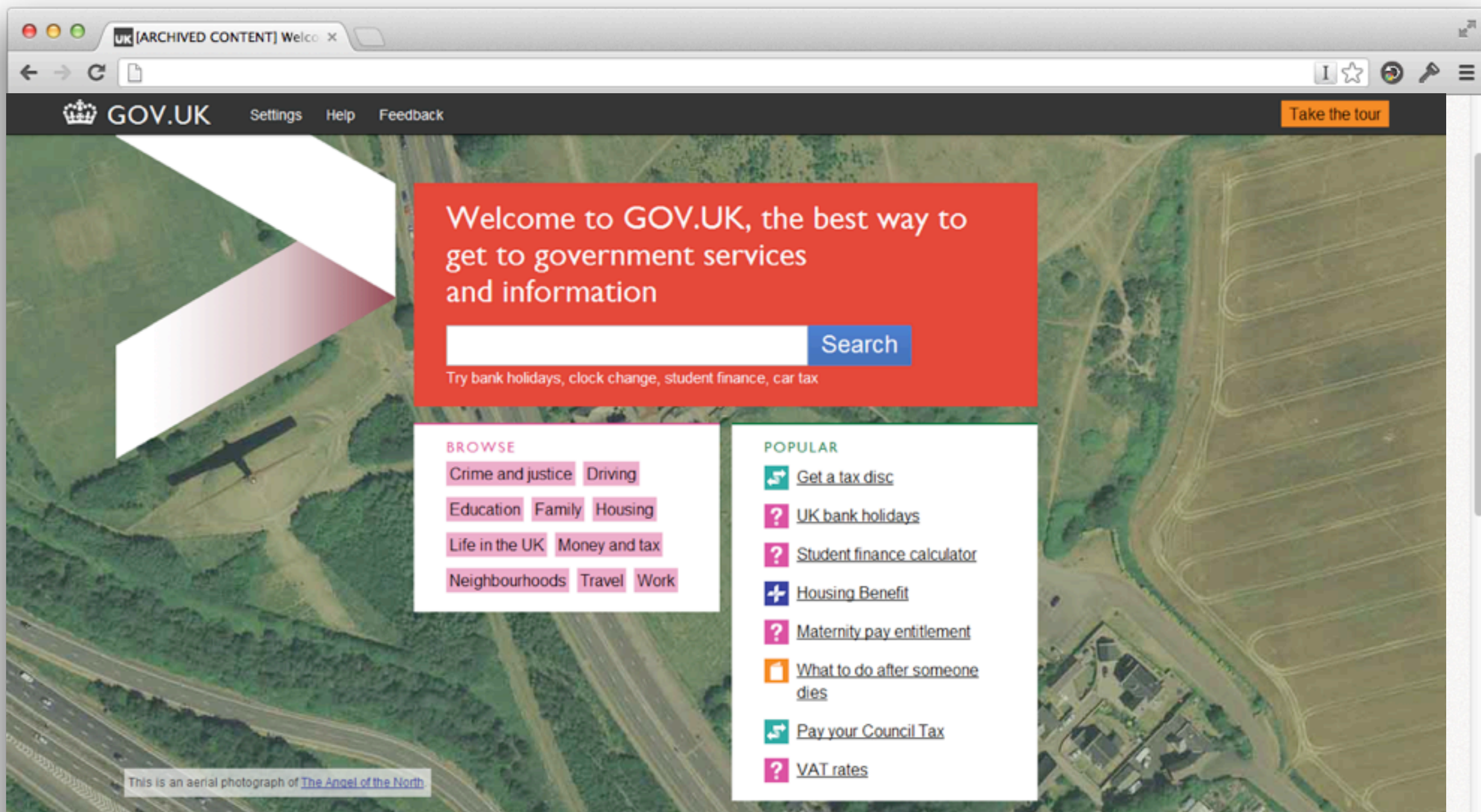
Alpha - June 2011



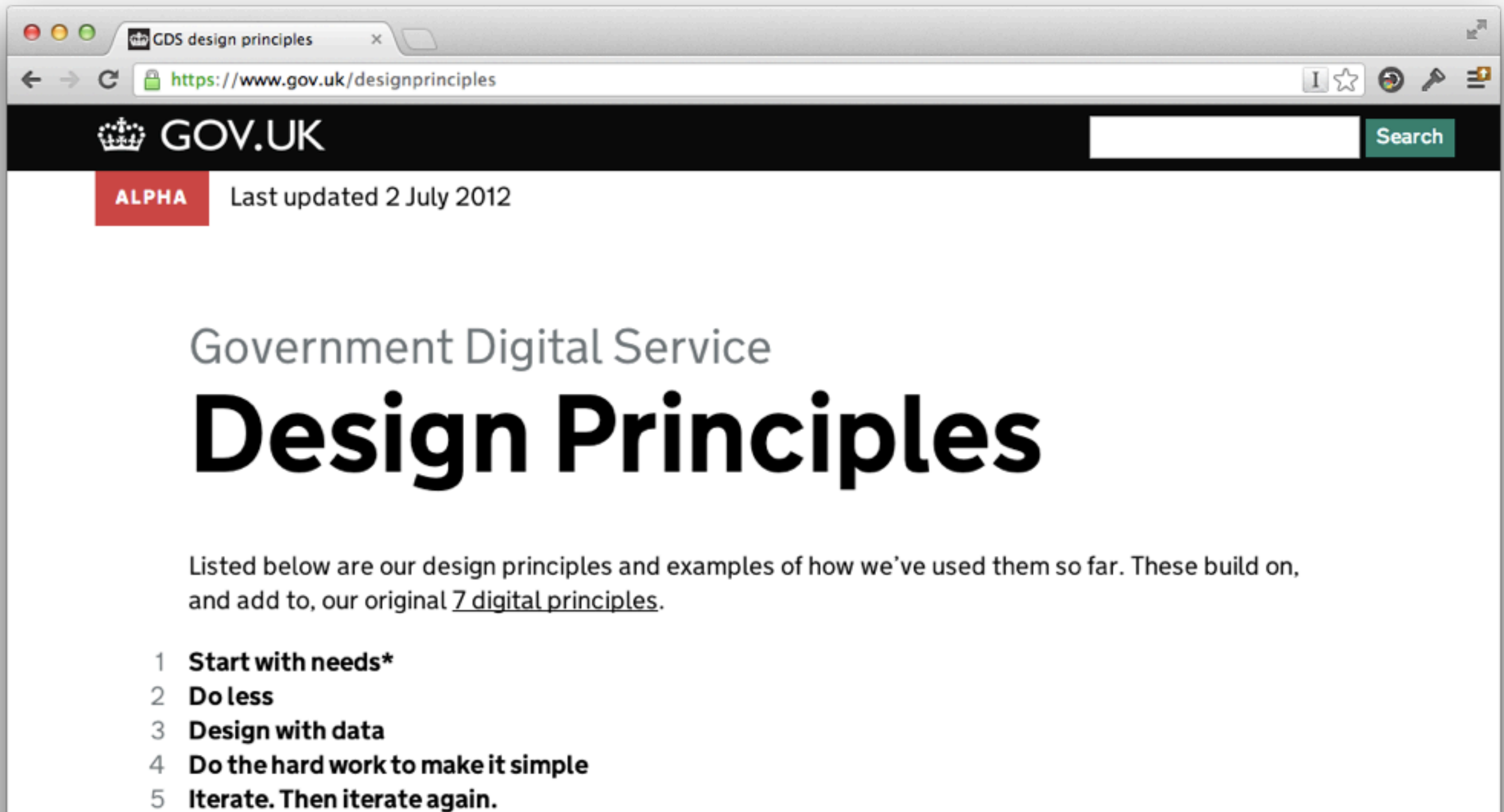
Me - September 2011

GDS

Government Digital Service - December 2011

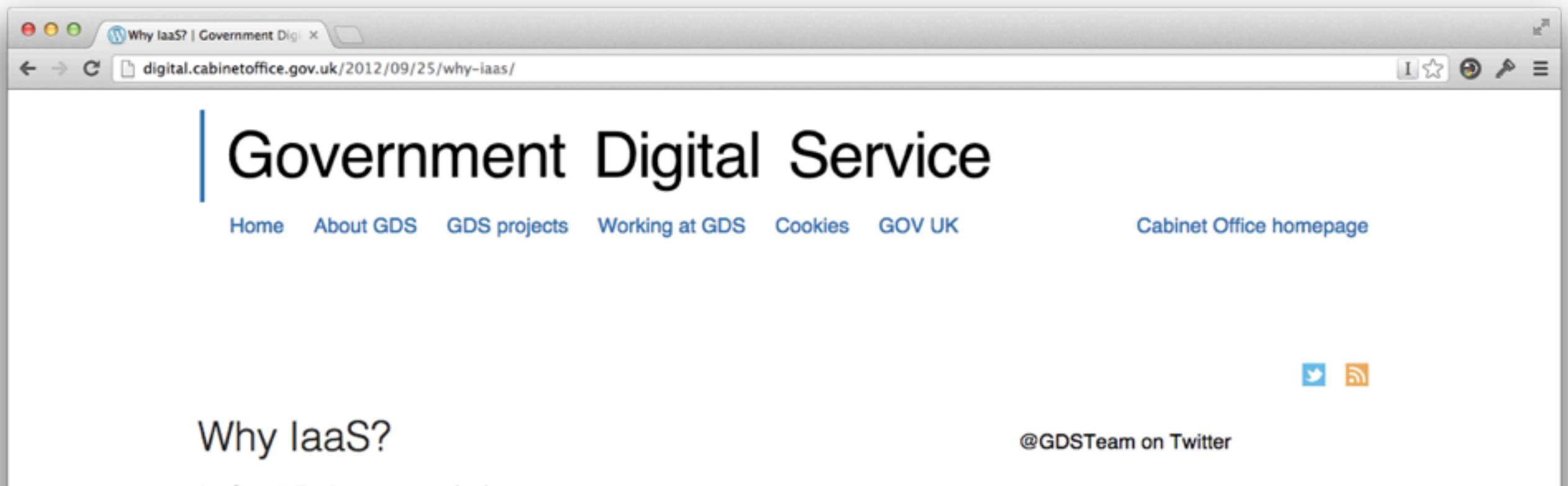


Beta - January 2012

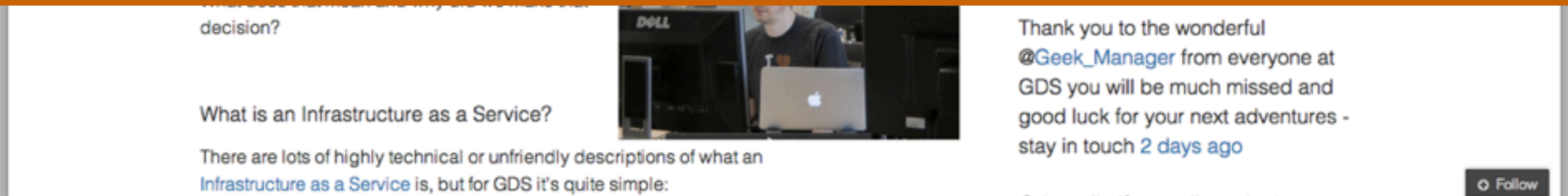


Design Principles - April 2012

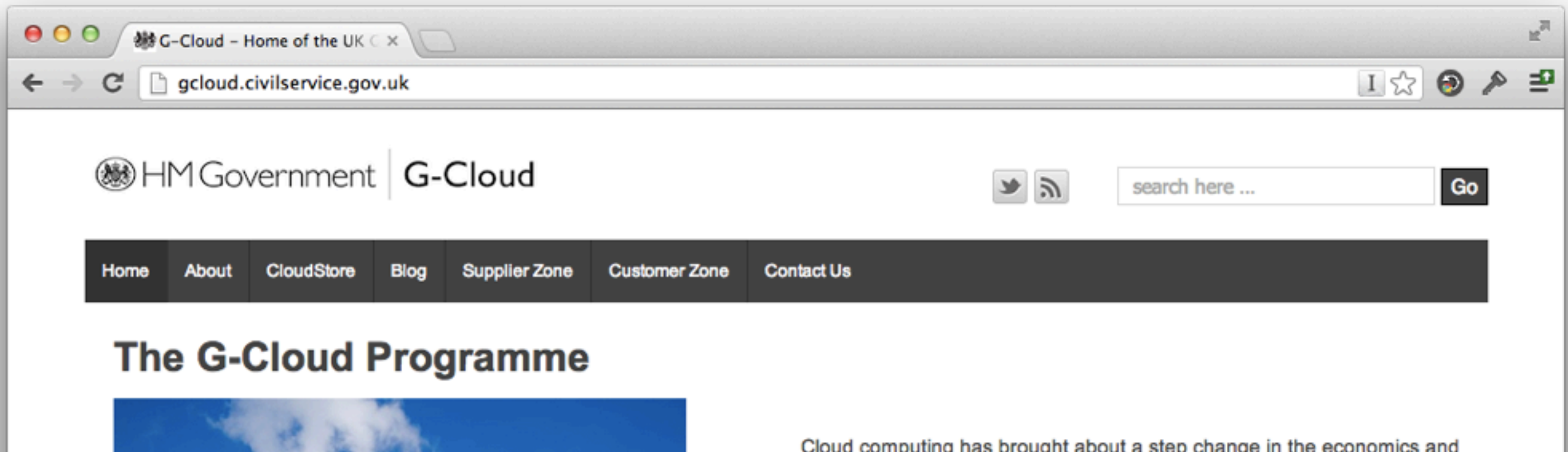
10 Make things open: it makes things better



digital.cabinetoffice.gov.uk/2012/09/25/why-iaas/



Why Infrastructure as a Service?



gcloud.civilservice.gov.uk



The G-Cloud strategy outlines in more detail how we will:

- achieve large, cross government economies of scale;
- deliver ICT systems that are flexible and responsive to demand in order to support government policies and strategies;

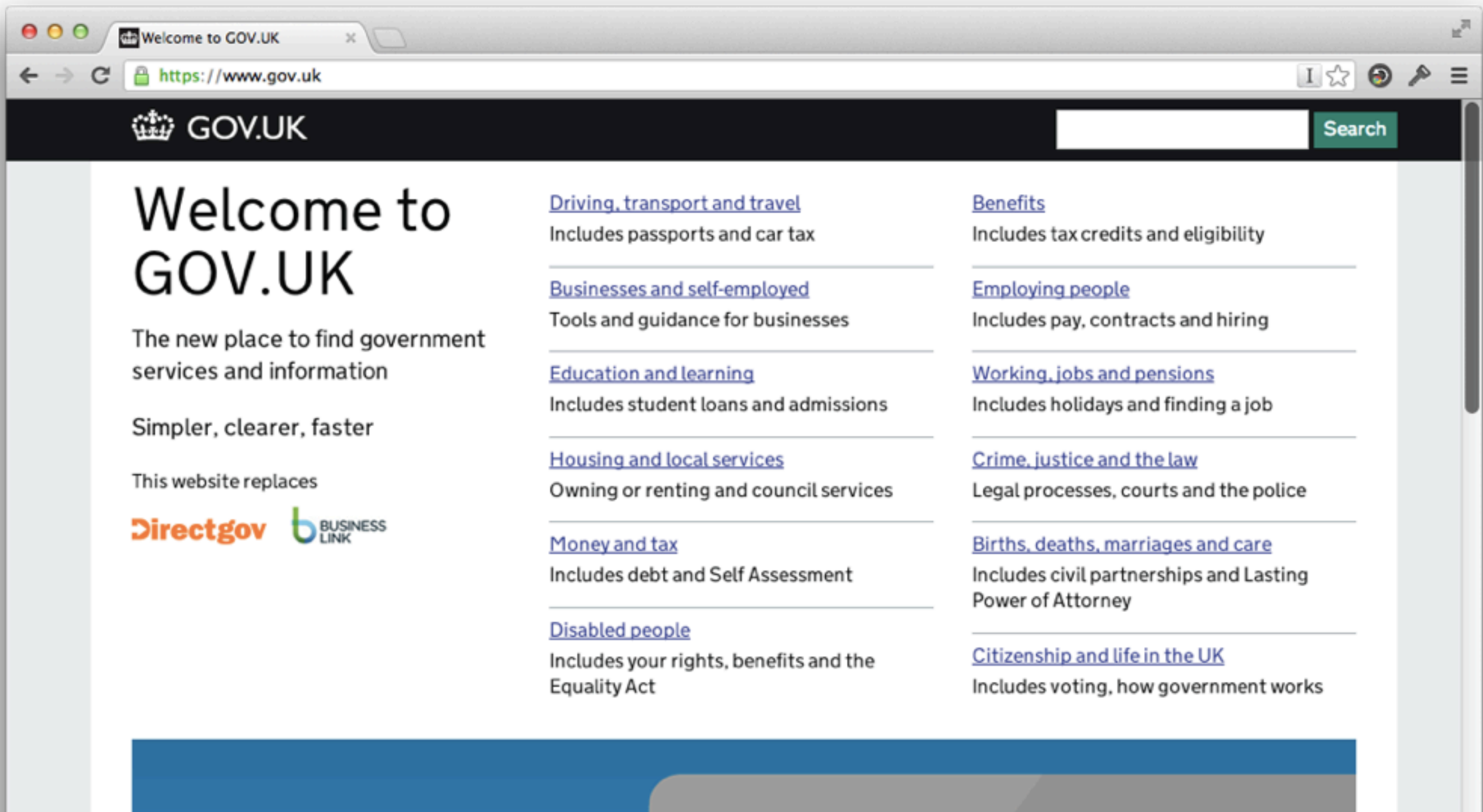
G-Cloud Procurement Framework

- allow government to procure in a way that encourages a dynamic and responsive supplier marketplace and supports emerging

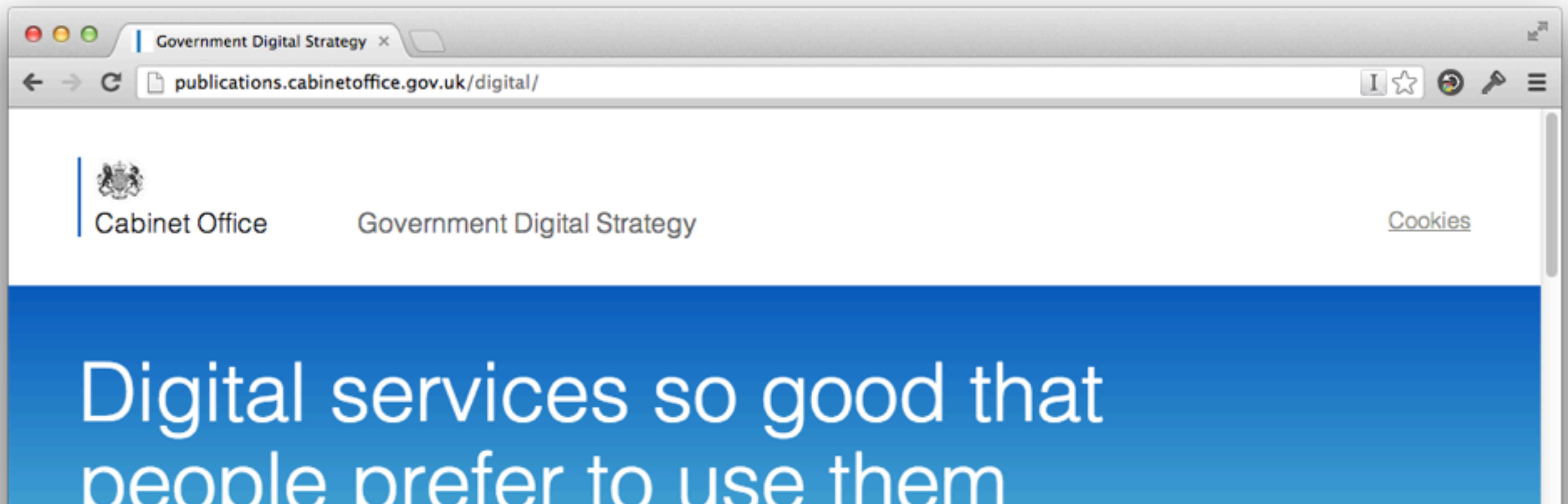


EC2 to VMWare





GOV.UK - October 2012



publications.cabinetoffice.gov.uk/digital/

The [Government Digital Strategy](#) sets out how government will redesign its digital services to make them so straightforward and convenient that all those who can use them prefer to do so. This strategy:

- follows the March 2012 [Budget](#) commitment to digital services being the default



With a foreword by

Government Digital Strategy - November 2012

- is supported by a cross-government approach to [assisted digital](#) provision

The strategy also describes how delivering services digitally will result in savings of [£1.7 to £1.8](#)

Inside Government – GOV.UK x

https://www.gov.uk/government

GOV.UK


GOV.UK uses cookies to make the site simpler. [Find out more about cookies](#)

Inside Government How government works Departments Topics Content by type ▼

13 of 24 ministerial departments have moved their corporate websites to GOV.UK.

Inside Government

By 2014, websites of all government departments and many other public bodies will be merged into the Inside Government section of www.gov.uk. Some have already moved, and more will be joining soon.



13 of 24 Departments - So far

13 of 24

16 of 300+

Solutions?

What can we do

Solution 1

Infrastructure as code



CFEngine® Chef

Configuration Management



Chef

Chef opscode.com

```
cookbook_file "#{home_dir}/.ssh/authorized_keys" do
  source "authorized_keys"
  mode "0600"
  owner username
  group username
end
```

```
group "sysadmin" do
  members ["garethr"]
end
```

Chef code example

CFEngine®

CFEngine cfengine.com

```
bundle agent test
{
  packages:
    redhat::
      "wget"
      package_policy => "addupdate",
      package_method => yum,
      package_select => ">=",
      package_version => "1.11.4-2.el5_4.1",
      package_architectures => { "x86_64" };
}
```

CFEngine code example



Puppet puppetlabs.com


```
package { 'apache2':  
  ensure => latest,  
}
```

```
service { 'apache2':  
  ensure    => running,  
  provider  => upstart,  
  require    => Package[ 'apache2' ]  
}
```

Resources

```
class govuk::apps::calendars( $port = 3011 ) {  
  govuk::app { 'calendars':  
    app_type      => 'rack',  
    port          => $port,  
    health_check_path => '/bank-holidays',  
  }  
}
```

Applications

```
class govuk::node::s_frontend inherits govuk::node
  include govuk::node::s_ruby_app_server

  include govuk::apps::businesssupportfinder
  include govuk::apps::calendars
  include govuk::apps::canary_frontend
  include govuk::apps::datainsight_frontend
  include govuk::apps::designprinciples
  include govuk::apps::feedback
  include govuk::apps::frontend
```

Node types

```
include govuk::apps::smartanswers
include govuk::apps::static
include govuk::apps::tariff
```



```
class govuk::node::s_frontend inherits govuk::
```

```
  include govuk::node::s_ruby_app_server
```

```
  include govuk::apps::businesssupportfinder
```

```
  include govuk::apps::calendars
```

```
  include govuk::apps::canary_frontend
```

```
  include govuk::apps::datainsight_frontend
```

```
  include govuk::apps::designprinciples
```

```
  include govuk::apps::feedback
```

```
  include govuk::apps::frontend
```

Include software on nodes

```
  include govuk::apps::smartanswers
```

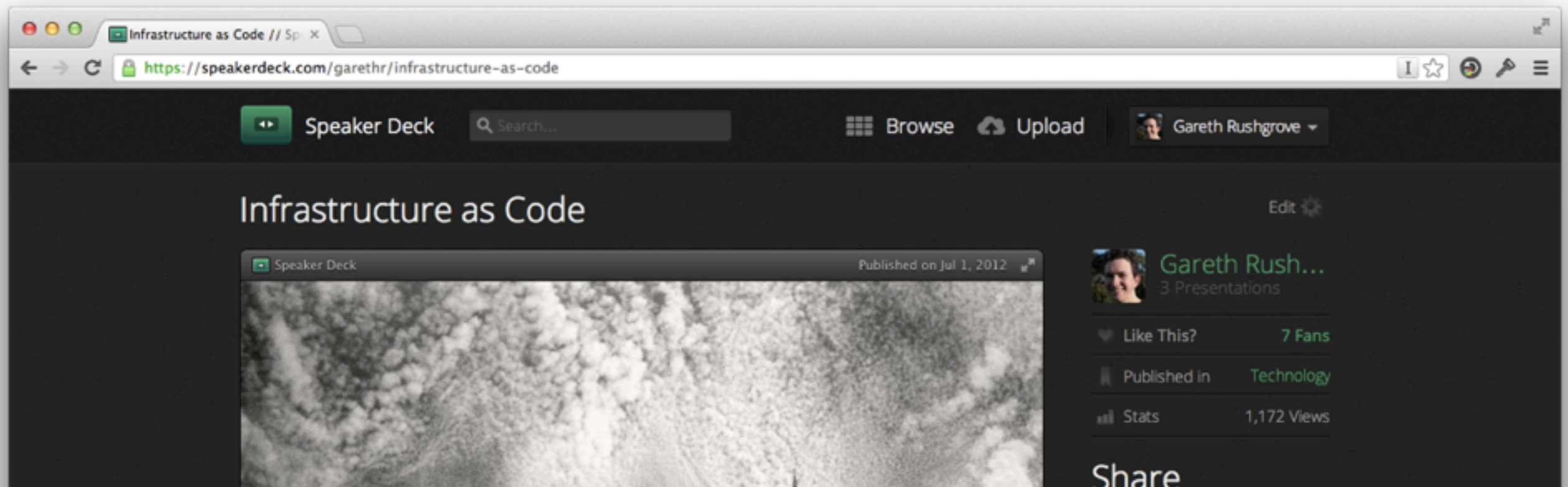
```
  include govuk::apps::static
```

```
  include govuk::apps::tariff
```

```
class govuk::node::s_frontend inherits govuk::  
  include govuk::node::s_ruby_app_server  
  
  include govuk::apps::businesssupportfinder  
  include govuk::apps::calendars  
  include govuk::apps::canary_frontend  
  include govuk::apps::datainsight_frontend  
  include govuk::apps::designprinciples  
  include govuk::apps::feedback  
  include govuk::apps::frontend
```

Include out applications on nodes

```
  include govuk::apps::smartanswers  
  include govuk::apps::static  
  include govuk::apps::tariff
```



speakerdeck.com/garethr

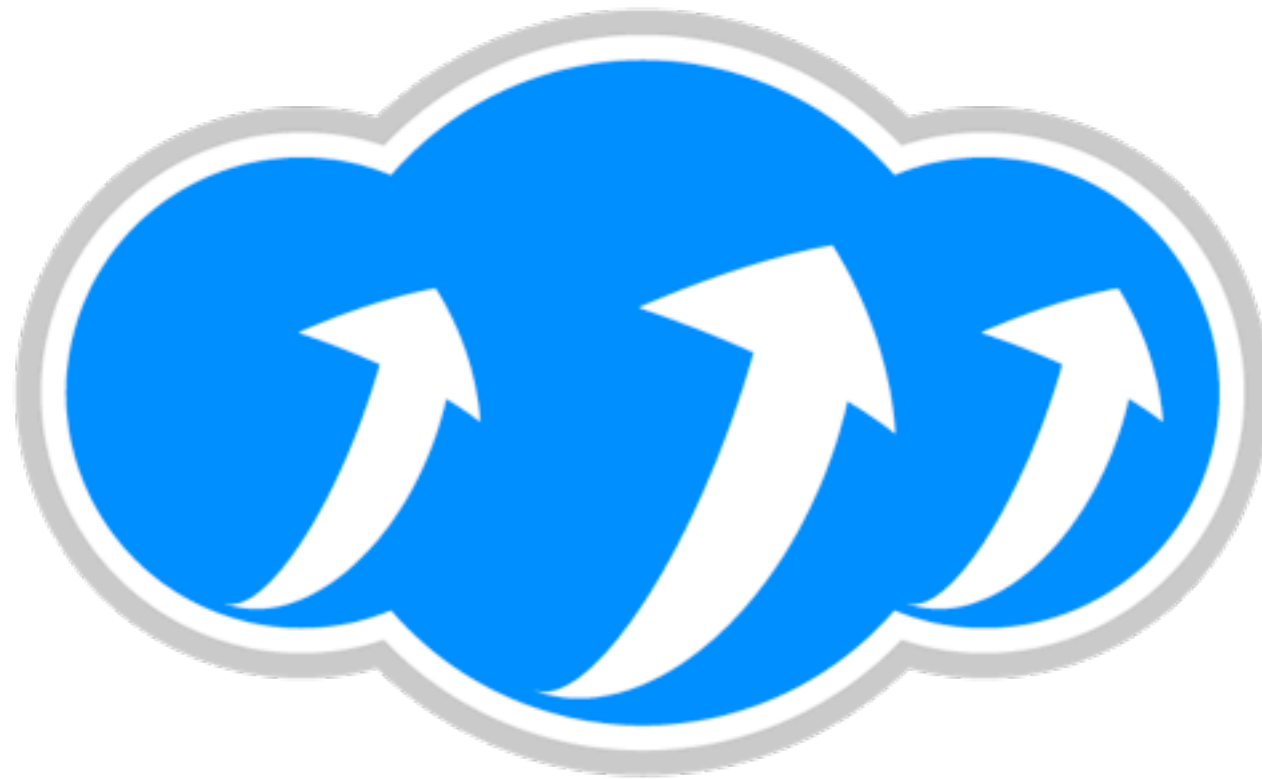
Infrastructure as Code

Cloud East 28th June 2012

More on Infrastructure as Code

Solution 2

API abstractions



libcloud

libcloud

```
from libcloud.compute.types import Provider
from libcloud.compute.providers import get_driver

OpenStack = get_driver(Provider.OPENSTACK)

driver = OpenStack('username', 'password',
                   ex_force_auth_url='https://nova-api.trystack.org:5041',
                   ex_force_auth_version='2.0_password')

nodes = driver.list_nodes()

images = driver.list_images()
```

libcloud OpenStack example


```
from libcloud.compute.types import Provider
from libcloud.compute.providers import get_driver

vcloud = get_driver(Provider.VCLOUD)

driver = vcloud('username', 'password',
               host='vcloud.local', api_version='1.5')

nodes = driver.list_nodes()

images = driver.list_images()
```

libcloud VCloud example

```
images = driver.list_images()
sizes = driver.list_sizes()
size = [s for s in sizes if s.ram == 512][0]
image = [i for i in images if i.name == 'natty-amd64'][0]

node = driver.create_node(name='test node',
                           image=image, size=size)
```

But abstractions leak

```
images = driver.list_images()
sizes = driver.list_sizes()
size = [s for s in sizes if s.ram == 512][0]
image = [i for i in images if i.name == 'natty-amd64'][0]

node = driver.create_node(name='test node',
                           image=image, size=size)
```

But abstractions leak


```
vcloud = get_driver(Provider.VCLOUD)

driver = vcloud('username', 'password',
               host='vcloud.local', api_version='1.5')

node = driver.create_node(name='test node 4',
                           image=image,
                           ex_vm_network='your vm net name',
                           ex_network='your org net name',
                           ex_vm_fence='bridged',
                           ex_vm_ipmode='DHCP')
```

But abstractions leak take two

```
vcloud = get_driver(Provider.VCLOUD)

driver = vcloud('username', 'password',
               host='vcloud.local', api_version='1.5')

node = driver.create_node(name='test node 4',
                          image=image,
                          ex_vm_network='your vm net name',
                          ex_network='your org net name',
                          ex_vm_fence='bridged',
                          ex_vm_ipmode='DHCP')
```

More capabilities, more leaks



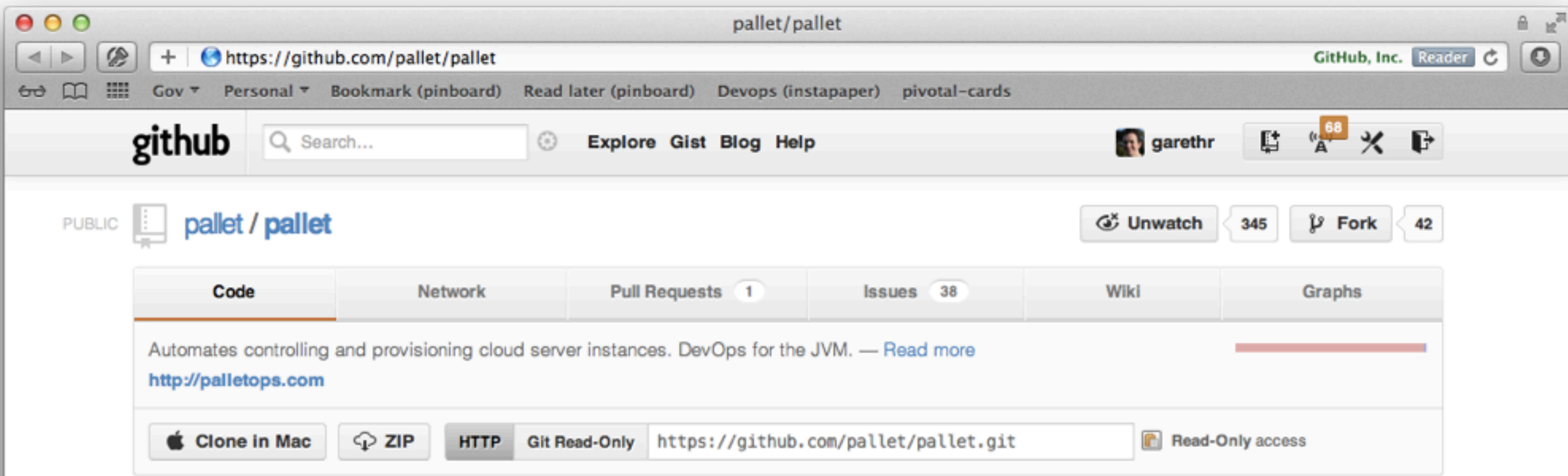
Fog

jclouds

jclouds

Solution 3

Config managent plus APIs



github.com/pallet/pallet

hugoduncan authored a month ago commit 4d47119cf4

pallet /

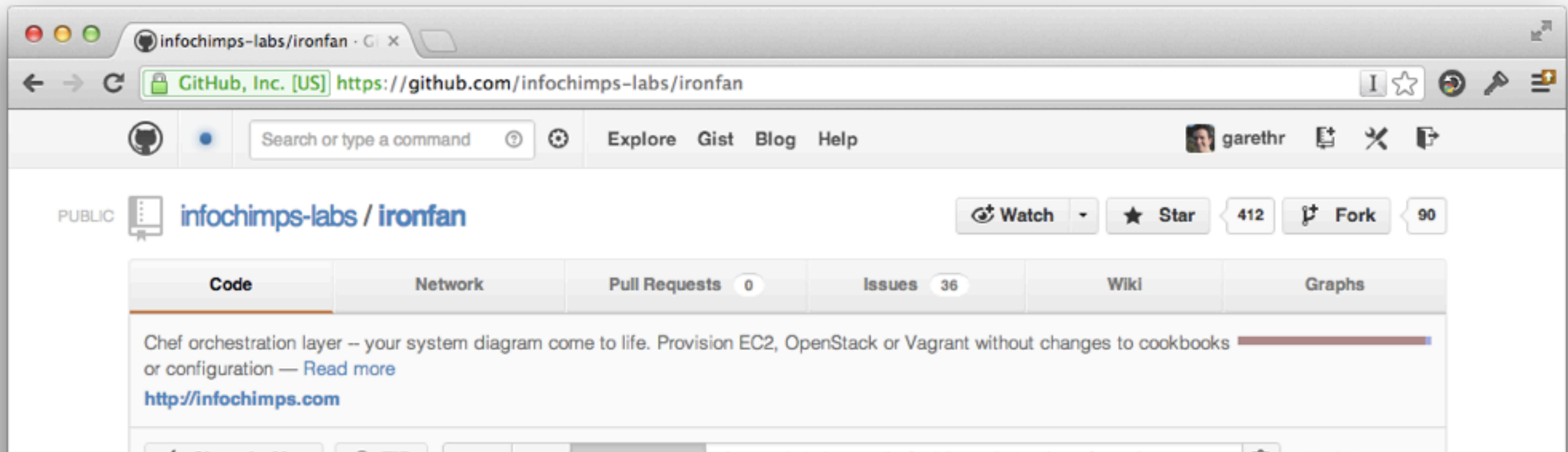
name	age	message	history
assembly	2 years ago	Added assembly plugin [hugoduncan]	
bin	2 years ago	fix subproject path [hugoduncan]	

Pallet








```
(use 'pallet.crate.java)
(defnode webserver
  {}
  :configure (phase (java :openjdk)))

(converge {webserver 10} :compute service)
```

Pallet code example



github.com/infochimps-labs/ironfan

Regenerate gems spec for version 4.8.6		
 temujin9	authored 2 days ago	latest commit fafd891532 
 config	4 months ago	pushing minor changes from before start of feature code session [schade]
 lib	2 days ago	Added the m3 flavors to ec2_flavor_info [rothmanj]
 spec	a month ago	Allow per-ephemeral-disk options using :disks attribute [nickmarden]
 .rspec	5 months ago	Deep merge code from @nickmarden – curing conflicts with my recent c... [mrflip]

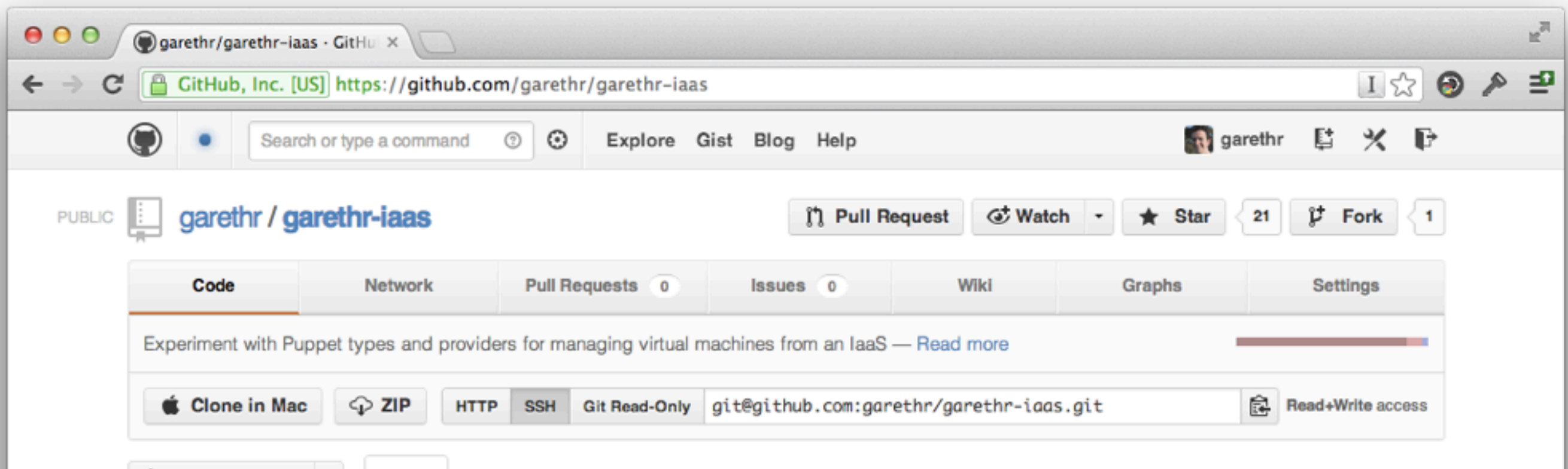
Ironfan

```
Ironfan.cluster 'web_demo' do
  cloud(:ec2) do
    flavor 't1.micro'
  end

  role :base_role

  facet :dbnode do
    instances 2
    role      :mysql_server
  end
end
```

Ironfan example



github.com/garethr/garethr-iaas

garethr authored a month ago latest commit b95567d51b

lib	a month ago	example passing user_data for bootstrapping machines [garethr]
spec	a month ago	initial working commit [garethr]
tests	a month ago	example passing user_data for bootstrapping machines [garethr]
.fixtures.yml	a month ago	initial working commit [garethr]

puppet-iaas

```
server { 'web-server':  
  ensure    => present,  
  count     => 5,  
  provider  => brightbox,  
  image     => 'img-q6gc8', # ubuntu 12.04  
}
```

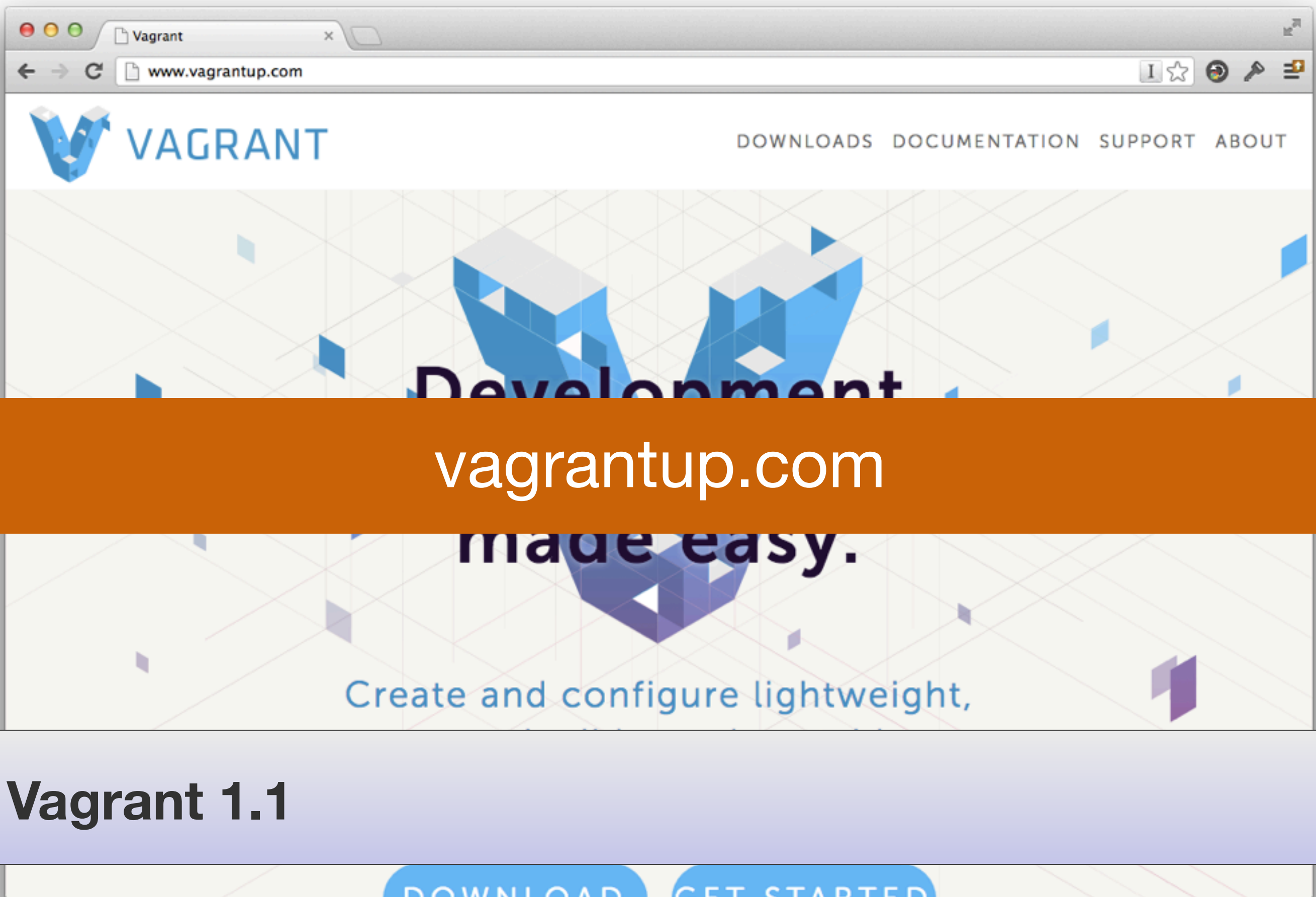
Cloud instances as resources

```
server { 'web-server':  
  ensure    => present,  
  count     => 5,  
  provider  => rackspace,  
  image     => 'img-q6gc8', # ubuntu 12.04  
}
```

Switch the provider


```
server { 'web-server':  
  ensure    => present,  
  count     => 5,  
  provider  => rackspace,  
  image     => '5cebb13a-f783-4f8c-8058 c4182c7'  
  flavor    => 2, # 512 MB  
}
```

Leaky interface



Vagrant 1.1

```
Vagrant::Config.run do |config|  
  config.vm.box = "precise64"  
  
  config.vm.forward_port 5555, 5555  
  config.vm.forward_port 5556, 5556  
  config.vm.forward_port 4567, 4567  
  
  config.vm.provision :puppet do |puppet|  
    puppet.manifests_path = "manifests"  
    puppet.module_path    = "modules"  
    puppet.manifest_file  = "site.pp"  
  end  
end
```

Define our instance


```
Vagrant.configure("2") do |config|  
  config.vm.box = "precise64"  
  
  config.vm.provider :vmware_fusion do |v|  
    v.vmx["memsize"] = "1024"  
  end  
  
  config.vm.provider :aws do |aws|  
    aws.instance_type = "m1.small"  
  end  
end
```

Configure different providers

```
$ vagrant up --provider=virtualbox
```

Choose your own provider

```
$ vagrant up --provider=ec2
```

Switch your provider

Solution 4

Software defined networks

```
require 'rubygems'
require 'nat'

nat do
  snat :interface => "Client Data",
      :original => { :ip => "10.0.0.0/xx" },
      :translated => { :ip => "xx.xx.xx.xx" },
      :desc => "Outbound internet traffic"
  dnat :interface => "Client Data",
      :original => { :ip => "xx.xx.xx.xx", :port => 22 },
      :translated => { :ip => "10.0.0.xx", :port => 22 },
      :desc => "jumpbox-1 SSH"
  dnat :interface => "Client Data",
      :original => { :ip => "xx.xx.xx.xx", :port => 80 },
      :translated => { :ip => "10.0.0.xx", :port => 80 },
      :desc => "jenkins, logging, monitoring HTTP"
```

Ruby DSL

```
require 'rubygems'
require 'firewall'

firewall do
  # internal rules
  rule "ssh access to jumpbox1" do
    source      :ip => "Any"
    destination :ip => "xx.xx.xx.xx", :port => 22
  end

  rule "http to backend applications" do
    source      :ip => "Any"
    destination :ip => "xx.xx.xx.xx", :port => 80
  end

  rule "https to backend applications" do
```

Including Firewall and Loadbalancer

Conclusions

if all you remember is



Solve the problem for the complex case



Focus on capabilities over APIs

The End



Thanks for the photos



TALK NERDY TO ME
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Questions?

4172

QCon session code