

Amazon EC2: Using AWS to host your web app

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Amazon Web Services

- Set of infrastructure and application services that let you run things in the cloud
 - Websites and mobile apps
 - Big data projects
 - Enterprise applications

EC2: Elastic Compute Cloud

- The computing part of AWS
- “Rent” virtual computers
- Create, launch and terminate as needed
- Buy computing power by the hour, bandwidth by the GB, space by GB/month
 - Amazon offers a “free tier” for your first 12 months
 - <http://aws.amazon.com/free/>

Benefits of EC2/Cloud Computing

- Let someone else manage the hardware and bandwidth
- Only pay for what you use
 - Rapidly scale up or down
 - Automatic scaling based on demand
- Get up and running in minutes

EC2 Micro Instances

- 613 MB memory
- Up to 2 EC2 compute units (for short periodic bursts)
 - Provide a small amount of consistent CPU resources and allow you to increase it in short bursts when additional cycles are available
- 32-bit or 64-bit platform
- Linux or Windows
- I/O performance: low
- Eligible for free tier pricing!
 - \$0.02 an hour after first year
 - Free or near-free way to learn your way around EC2



AMI: Amazon Machine Image

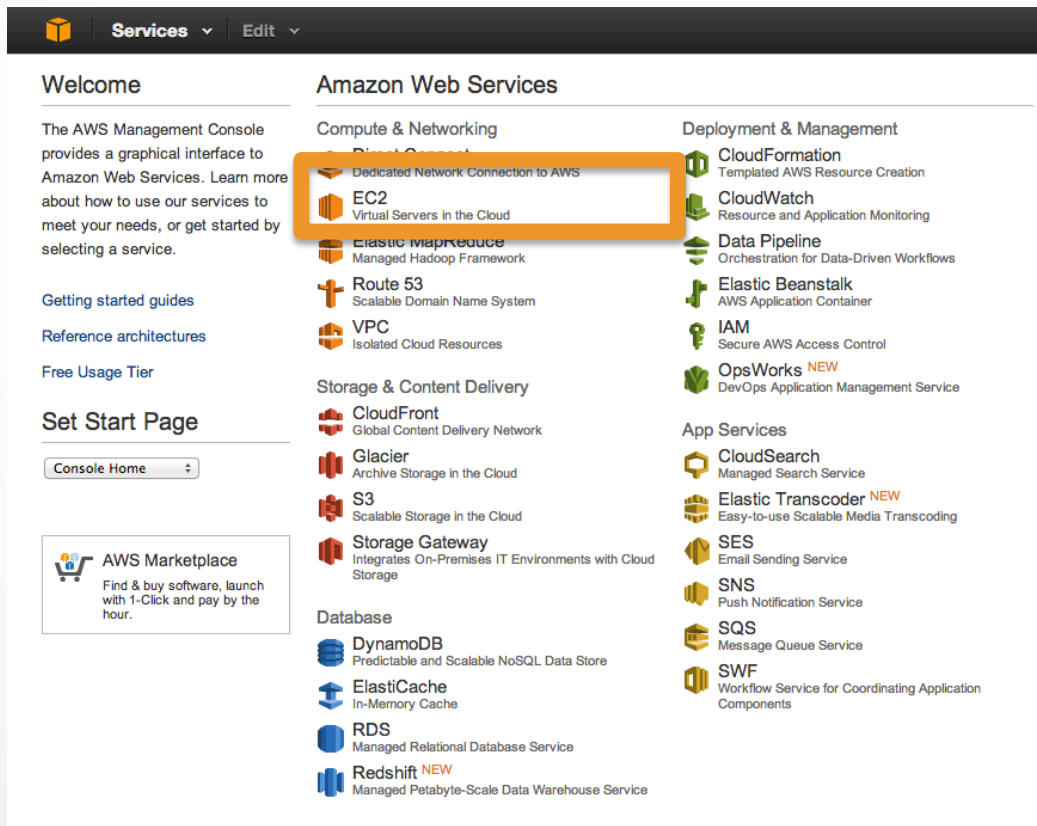
- A virtual machine with chosen OS and apps bundled together
- Create AMIs from scratch or choose from hundreds of public AMIs
- For this class, we have created an AMI (columbia-dste-class-image)
 - Includes php, mysql, apache, django already installed on an Ubuntu OS
 - Feel free to experiment with other AMIs too!

Demo!

- Create a micro instance using DSTE AMI
- Start it up
- Login
- Access the new server in the web browser
- Create an Elastic IP

Access EC2 dashboard

- AWS management console:
 - <https://console.aws.amazon.com/console/home>
 - Click on EC2



Launch a new instance

The screenshot displays the AWS Management Console's EC2 Dashboard. On the left is a navigation sidebar with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main content area is titled 'Resources' and shows a summary of EC2 resources in the US East (N. Virginia) region. A 'Launch Instance' button is highlighted with an orange border. Below this are sections for 'Create Instance', 'Service Health', and 'Scheduled Events'. The 'Service Health' section shows that the service is operating normally across all availability zones.

EC2 Dashboard

Events

INSTANCES

- Instances
- Spot Requests
- Reserved Instances

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

- Security Groups
- Elastic IPs
- Placement Groups
- Load Balancers
- Key Pairs
- Network Interfaces

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) region:

0 Running Instances	0 Elastic IPs
1 Volume	0 Snapshots
1 Key Pairs	0 Load Balancers
0 Placement Groups	2 Security Groups

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

Launch Instance

Note: Your instances will launch in the US East (N. Virginia) region

Service Health

Service Status:

- US East (N. Virginia): This service is operating normally

Availability Zone Status:

- us-east-1a: Availability zone is operating normally
- us-east-1b: Availability zone is operating normally
- us-east-1d: Availability zone is operating normally

[Service Health Dashboard](#)

Scheduled Events

US East (N. Virginia):

- No events

Additional Information

- [Getting Started Guide](#)
- [Documentation](#)
- [All EC2 Resources](#)
- [Find software on AWS Marketplace](#)
- [Forums](#)
- [Pricing](#)

Feedback

- [Feedback](#)
- [Report an Issue](#)

Create a new instance

- Use Quick Launch wizard
- Create a new key pair and download or select existing
 - Make sure the permissions are set properly on the downloaded private key
 - Read-only access for you, no access for others (chmod 400)
- Select “More Amazon Machine Images”

Create a New Instance Cancel X

Select an option below:

Classic Wizard
Launch an On-Demand or Spot instance using the classic wizard with fine-grained control over how it is launched.

Quick Launch Wizard
Launch an On-Demand instance using an editable, default configuration so that you can get started in the cloud as quickly as possible.

AWS Marketplace
AWS Marketplace is an online store where you can find and buy software that runs on AWS. Launch with 1-Click and pay by the hour.





Name Your Instance: Pick a meaningful name, e.g. Web Server

Choose a Key Pair:
Public/private key pairs allow you to securely connect to your instance after it launches.

Select Existing **Create New** **None**

Choose a Launch Configuration:

More Amazon Machine Images NEW!
Search through public and AWS Marketplace AMIs or choose from your own custom AMIs.

 Amazon Linux AMI 2012.09 The Amazon Linux AMI 2012.09 is an EBS-backed, PV-GRUB image. It includes Linux 3.2, AWS tools, and repository access to multiple versions of MySQL, PostgreSQL, Python, Ruby, and Tomcat.	64 bit <input checked="" type="radio"/> 32 bit <input type="radio"/> ★ Free tier eligible
 Red Hat Enterprise Linux 6.3 Red Hat Enterprise Linux version 6.3, EBS-boot.	64 bit <input checked="" type="radio"/> 32 bit <input type="radio"/>
 SUSE Linux Enterprise Server 11 SUSE Linux Enterprise Server 11 Service Pack 2 basic install, EBS boot with Amazon EC2 AMI Tools preinstalled; Apache 2.2, MySQL 5.0, PHP 5.3, and Ruby 1.8.7 available	64 bit <input checked="" type="radio"/> 32 bit <input type="radio"/>
 Ubuntu Server 12.04.1 LTS Ubuntu Server 12.04.1 LTS with support available from Canonical (http://www.ubuntu.com/cloud/services).	64 bit <input checked="" type="radio"/> 32 bit <input type="radio"/> ★ Free tier eligible

Note: You can customize your settings in the next step.

[Submit Feedback](#) [Getting Started Guide](#)

Select AMI

- Search for and select columbia-dste-class-image

The screenshot shows the 'Create a New Instance' page in the AWS Management Console. The search bar contains 'columbia-dste' and the search results show one AMI: 'columbia-dste-class-image' with ID 'ami-4c63f225'. The AMI description is 'Image for DSTE class at Columbia University, including php, mysql, apache, django, and vnc'. The architecture is '64 bit' and it is 'EBS Backed'. The platform is 'Other Linux paravirtual'. The console also shows a list of platforms and architectures on the left side.

Create a New Instance Cancel

Public AMIs (14839) My AMIs (0) ▶ Find and buy software from well known sellers. Search AMIs on awsmarketplace

Platform

- Amazon Linux
- Cent OS
- Debian
- Fedora
- Gentoo
- OpenSUSE
- Other Linux
- Red Hat
- SUSE Linux
- Ubuntu
- Windows

Architecture

- 32 bit
- 64 bit

Search: Found 1 AMI < previous Page 1 next >

columbia-dste-class-image ami-4c63f225

Image for DSTE class at Columbia University, including php, mysql, apache, django, and vnc

Other Linux paravirtual 64 bit EBS Backed [+more info](#)

[Go Back](#) Selected AMI: ami-4c63f225

Edit details

Create a New Instance Cancel

columbia-dste-class-image (ami-4c63f225)
Platform: Other Linux Image for DSTE class at Columbia University, including php, mysql, apache, django, and vnc
Architecture: x86_64

Please review your settings and click **Launch** to finish or **Edit details** to make changes.

Instance Details

Name:		Type:	t1.micro
Detailed Monitoring:	No	Availability Zone:	No preference
Shutdown Behaviour:	Stop	Termination Protection:	No
Launch into a VPC:	No		

Security Details

Key Pair:	morgan	Security Group:	quicklaunch-1
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Advanced Details

Kernel ID:	Default	Ramdisk ID:	Default
User Data:		IAM Role:	<input type="button" value="ⓘ"/>

[< Go Back](#)

Edit details**Launch**

Select instance type

- Make sure type is set to micro

Create a New Instance Cancel

columbia-dste-class-image (ami-4c63f225)
Platform: Other Linux Architecture: x86_64 Image for DSTE class at Columbia University, including php, mysql, apache, django, and vnc

Click **Save details** in order to save your changes and return to the review screen.

Instance Details

Name: <input type="text" value="e.g. Web Server"/>	Type: <input type="text" value="t1.micro"/>
Shutdown Behaviour: <input type="text" value="Stop"/>	Availability Zone: <input type="text" value="No preference"/>
Detailed Monitoring: <input type="checkbox"/> Additional charges will apply.	Termination Protection: <input type="checkbox"/>
Launch into a VPC: <input type="checkbox"/> No VPCs or subnets within your VPCs exist.	Launch as an EBS-Optimized instance (additional charges apply): <input type="checkbox"/> Not supported for this instance type

Modify Tags

Security Settings

Advanced Details

Storage Device Configuration

Edit security group

- Select security settings
- Select a group that allows HTTP and SSH access or create a new one

Create a New Instance Cancel

columbia-dste-class-image (ami-4c63f225)
Platform: Other Linux Image for DSTE class at Columbia University, including php, mysql, apache, django, and vnc
Architecture: x86_64

Click **Save details** in order to save your changes and return to the review screen.

Instance Details

Modify Tags

Security Settings

Security groups determine whether a network port is open or blocked on your instances. You may use an existing security group, or we can help you create a new security group to allow access to your instances.

Create new Security Group

Select Existing Security Groups

quicklaunch-1
default

(Selected groups: default)

Advanced Details

Storage Device Configuration

Launch!

Create a New Instance Cancel

columbia-dste-class-image (ami-4c63f225)
Platform: Other Linux Image for DSTE class at Columbia University, including php, mysql, apache, django, and vnc
Architecture: x86_64

Please review your settings and click **Launch** to finish or **Edit details** to make changes.

Instance Details

Name:		Type:	t1.micro
Detailed Monitoring:	No	Availability Zone:	No preference
Shutdown Behaviour:	Stop	Termination Protection:	No
Launch into a VPC:	No		

Security Details

Key Pair:	morgan	Security Group:	default
------------------	--------	------------------------	---------

Advanced Details

Kernel ID:	Default	Ramdisk ID:	Default
User Data:		IAM Role:	

[Go Back](#) [Edit details](#) **Launch**

Launch!

Create a New Instance Cancel

Your instance is now launching.
Instance: i-d868ceab

Note: Your instance may take a few minutes to launch, depending on the software you are running.
Note: Usage hours on your new instance will start immediately and continue to accrue until you stop or terminate your instance.

You can perform the following tasks while your instance is launching:

- > **Create Status Check Alarm**

You can use status check alarms to be notified if this instance fails status checks (additional charges may apply).

- > [Create EBS Volumes](#) (Additional charges may apply.)
- > [View your instances on the Instances page](#)
- > [Submit feedback](#)

This dialog has recently changed and we would greatly appreciate any feedback you have on the new process of launching an instance.

Close

Editing security groups

- We need a group that allows for HTTP and SSH access

The screenshot displays the AWS Management Console interface for the EC2 Dashboard. The left-hand navigation pane is visible, with the 'Security Groups' option highlighted by an orange rectangular box. The main content area is divided into several sections:

- Resources:** A summary of EC2 resources in the US East (N. Virginia) region, including 0 Running Instances, 1 Volume, 1 Key Pairs, 0 Placement Groups, 0 Elastic IPs, 0 Snapshots, 0 Load Balancers, and 2 Security Groups.
- Create Instance:** A section for launching a new Amazon EC2 instance, featuring a 'Launch Instance' button and a note that instances will launch in the US East (N. Virginia) region.
- Service Health:** A section showing the service status for US East (N. Virginia), indicating that the service is operating normally. It also includes an 'Availability Zone Status' section with three zones (us-east-1a, us-east-1b, us-east-1d) all operating normally.
- Scheduled Events:** A section showing no events for the US East (N. Virginia) region.
- Additional Information:** A section with links to 'Getting Started Guide', 'Documentation', 'All EC2 Resources', 'Find software on AWS Marketplace', 'Forums', and 'Pricing'.
- Feedback:** A section with links to 'Feedback' and 'Report an Issue'.

Editing security groups

- Create a new group or edit default group
- Select group and select Inbound tab

The screenshot shows the AWS Management Console interface for editing a security group. At the top, there are buttons for 'Create Security Group' and 'Delete'. Below this, the 'Viewing:' section shows 'EC2 Security Groups' and a search bar. A table lists two security groups: 'quicklaunch-1' and 'default'. The 'default' group is selected, indicated by a checkmark. Below the table, the '1 Security Group selected' section shows the configuration for the 'default' group. The 'Inbound' tab is highlighted with an orange box. The configuration panel on the left shows the 'Create a new rule' section with 'Port range' and 'Source' fields. The 'Add Rule' button is visible. The right panel shows the current rules for the group, categorized by protocol (ICMP, TCP, UDP).

Name	VPC ID	Description
<input type="checkbox"/> quicklaunch-1		quicklaunch-1
<input checked="" type="checkbox"/> default		default group

1 Security Group selected

Security Group: default

Details **Inbound**

Create a new rule: Custom TCP rule

Port range:
(e.g., 80 or 49152-65535)

Source:
(e.g., 192.168.2.0/24, sg-47ad482e, or 1234567890/default)

ICMP	Port (Service)	Source	Action
	ALL	sg-d3d0c6bb (default)	Delete
TCP	Port (Service)	Source	Action
	0 - 65535	sg-d3d0c6bb (default)	Delete
	22 (SSH)	0.0.0.0/0	Delete
	80 (HTTP)	0.0.0.0/0	Delete
UDP	Port (Service)	Source	Action
	0 - 65535	sg-d3d0c6bb (default)	Delete

Editing security groups

- Create new rules for HTTP and SSH
 - Source: 0.0.0.0/0
 - Remember to apply changes!

1 Security Group selected

Security Group: default

Details

Inbound

Create a new rule: HTTP

Source: 0.0.0.0/0
(e.g., 192.168.2.0/24, sg-47ad482e, or 1234567890/default)

+ Add Rule

Apply Rule Changes

ICMP	Port (Service)	Source	Action
	ALL	sg-d3d0c6bb (default)	Delete
TCP	Port (Service)	Source	Action
	0 - 65535	sg-d3d0c6bb (default)	Delete
	22 (SSH)	0.0.0.0/0	Delete
	80 (HTTP)	0.0.0.0/0	Delete
UDP	Port (Service)	Source	Action
	0 - 65535	sg-d3d0c6bb (default)	Delete

View your instances

The screenshot displays the AWS Management Console's EC2 Dashboard. The left-hand navigation pane is visible, with the 'Instances' link highlighted by an orange rectangular box. The main content area is divided into several sections: 'Resources' (listing EC2 resources in the US East (N. Virginia) region), 'Create Instance' (with a 'Launch Instance' button), 'Service Health' (showing normal status for the region and availability zones), and 'Scheduled Events' (showing no events for the region). On the right side, there are sections for 'Additional Information' (with links to guides and documentation) and 'Feedback' (with links to report issues).

EC2 Dashboard

- Events
- Instances**
- Spot Requests
- Reserved Instances
- IMAGES
 - AMIs
 - Bundle Tasks
- ELASTIC BLOCK STORE
 - Volumes
 - Snapshots
- NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Load Balancers
 - Key Pairs
 - Network Interfaces

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) region:

0 Running Instances	0 Elastic IPs
1 Volume	0 Snapshots
1 Key Pairs	0 Load Balancers
0 Placement Groups	2 Security Groups

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (N. Virginia) region

Service Health

Service Status:

- ✔ US East (N. Virginia): This service is operating normally

Availability Zone Status:

- ✔ us-east-1a Availability zone is operating normally
- ✔ us-east-1b Availability zone is operating normally
- ✔ us-east-1d Availability zone is operating normally

[Service Health Dashboard](#)

Scheduled Events

US East (N. Virginia):
No events

Additional Information

- [Getting Started Guide](#)
- [Documentation](#)
- [All EC2 Resources](#)
- [Find software on AWS Marketplace](#)
- [Forums](#)
- [Pricing](#)

Feedback

- [Feedback](#)
- [Report an Issue](#)

View instance details

- Find public DNS

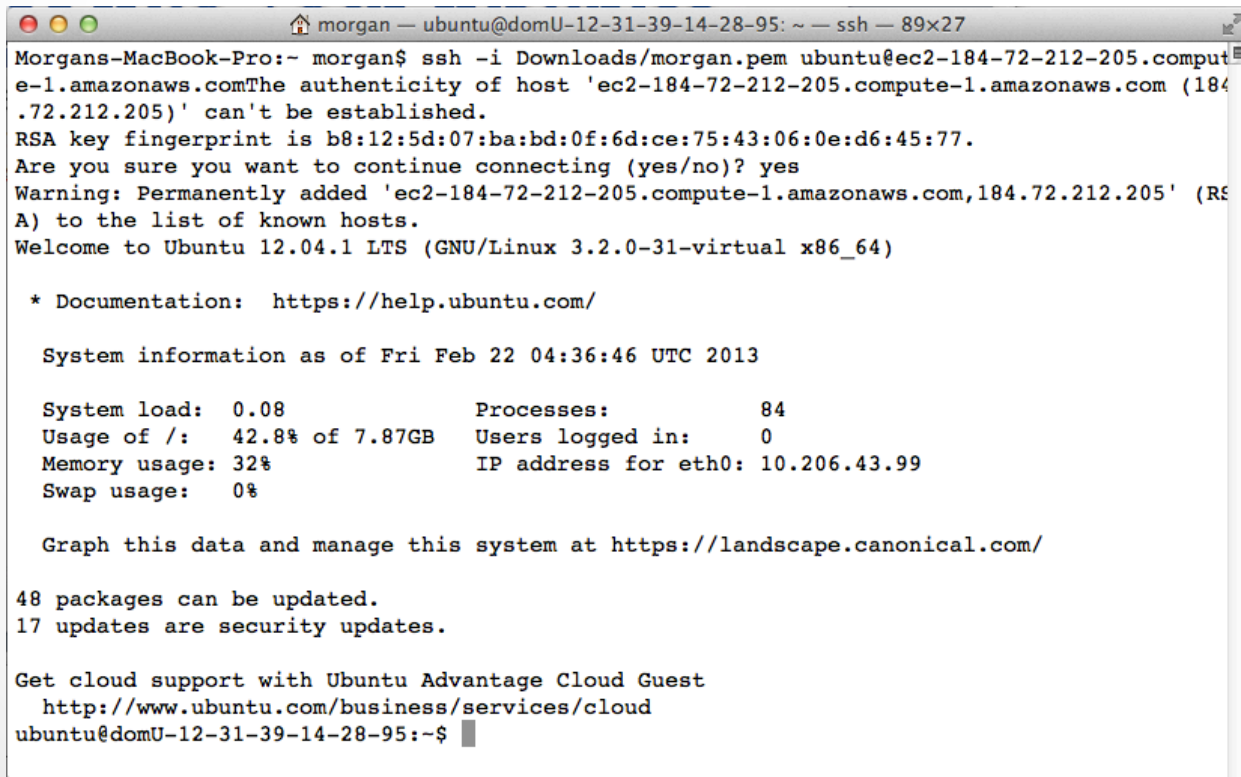
The screenshot displays the AWS Management Console interface for viewing instance details. At the top, there are buttons for 'Launch Instance' and 'Actions'. Below this, a navigation bar shows 'Viewing: All Instances' and 'All Instance Types' with a search field. A pagination indicator shows '1 to 2 of 2 Instances'. A table lists two instances: one stopped and one running. The running instance is selected, and its details are shown below. The 'Public DNS' field is highlighted with an orange box.

<input type="checkbox"/>	Name	Instance	AMI ID	Root Device	Type	State	Status Checks	Alarm Status	Monitoring
<input type="checkbox"/>	empty	i-2daebe5d	ami-4c63f225	ebs	t1.micro	stopped		none	basic
<input checked="" type="checkbox"/>	empty	i-d868ceab	ami-4c63f225	ebs	t1.micro	running	2/2 checks passed	none	basic

Elastic IP:	-	Root Device:	sda1
Root Device Type:	ebs	Tenancy:	default
IAM Role:	-	Lifecycle:	normal
EBS Optimized:	false		
Block Devices:	sda1		
Public DNS:	ec2-184-72-212-205.compute-1.amazonaws.com		
Private DNS:	domU-12-31-39-14-28-95.compute-1.internal		
Private IPs:	10.206.43.99		
Secondary Private IPs:			
Launch Time:	2013-02-21 23:21 EST (less than an hour)		
State Transition Reason:	-		
Termination Protection:	Disabled		

Log in to your instance

- SSH using the public DNS, username ubuntu and the private key you downloaded
 - `ssh -i your_key.pem ubuntu@public_dns`
 - E.g.: `ssh -i morgan.pem ubuntu@ec2-184-72-212-205.compute-1.amazonaws.com`

A terminal window showing an SSH connection from a Mac to an Ubuntu instance. The terminal output includes a warning about host authenticity, a confirmation to continue, and system information such as system load, memory usage, and package updates.

```
morgan — ubuntu@domU-12-31-39-14-28-95: ~ — ssh — 89x27
Morgans-MacBook-Pro:~ morgan$ ssh -i Downloads/morgan.pem ubuntu@ec2-184-72-212-205.compute-1.amazonaws.com
The authenticity of host 'ec2-184-72-212-205.compute-1.amazonaws.com (184.72.212.205)' can't be established.
RSA key fingerprint is b8:12:5d:07:ba:bd:0f:6d:ce:75:43:06:0e:d6:45:77.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-184-72-212-205.compute-1.amazonaws.com,184.72.212.205' (RSA) to the list of known hosts.
Welcome to Ubuntu 12.04.1 LTS (GNU/Linux 3.2.0-31-virtual x86_64)

* Documentation:  https://help.ubuntu.com/

System information as of Fri Feb 22 04:36:46 UTC 2013

System load:  0.08                Processes:            84
Usage of /:   42.8% of 7.87GB      Users logged in:     0
Memory usage: 32%                IP address for eth0: 10.206.43.99
Swap usage:   0%

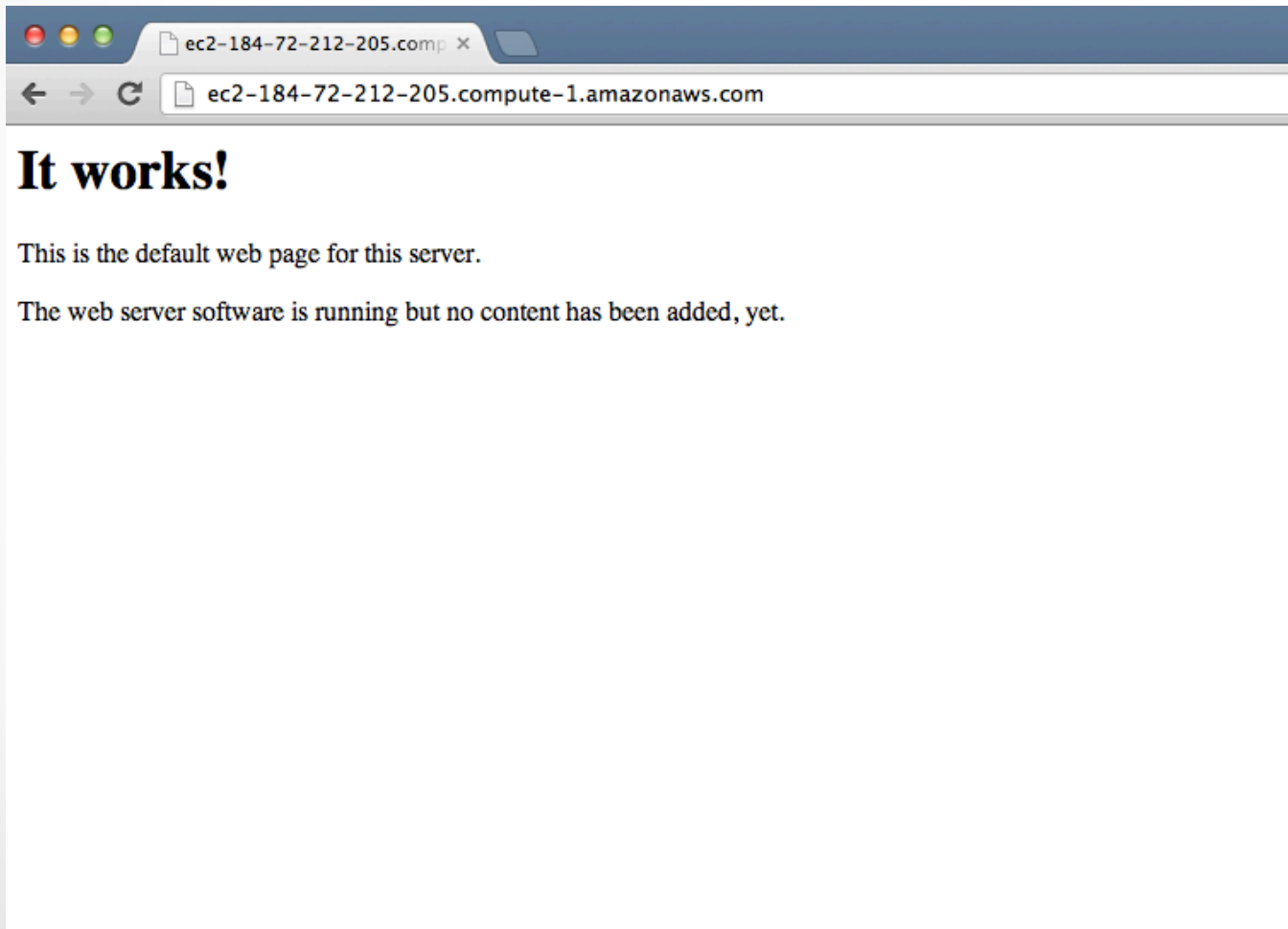
Graph this data and manage this system at https://landscape.canonical.com/

48 packages can be updated.
17 updates are security updates.

Get cloud support with Ubuntu Advantage Cloud Guest
http://www.ubuntu.com/business/services/cloud
ubuntu@domU-12-31-39-14-28-95:~$
```

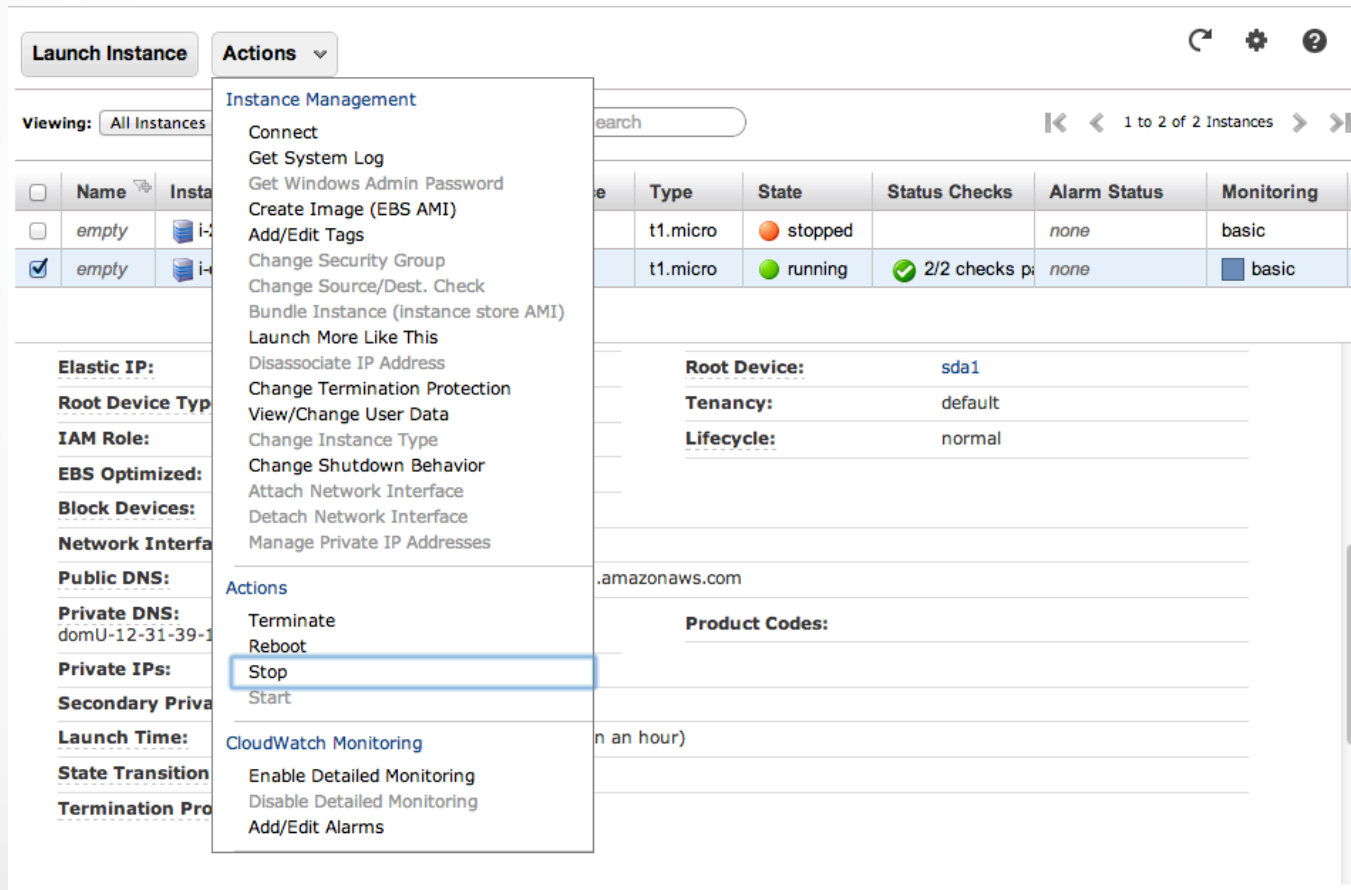
Access server in web browser

- Type public DNS into address bar



Stop your instance

- When you stop and restart your instance, it gets assigned a new IP/public DNS



The screenshot displays the AWS Management Console interface for an EC2 instance. The 'Actions' dropdown menu is open, showing various management options. The 'Stop' option is highlighted with a blue border. The instance details on the right show the instance is a t1.micro type, currently in a 'stopped' state, with 2/2 status checks passed. The instance has a public DNS address and is associated with a basic monitoring plan.

Name	Type	State	Status Checks	Alarm Status	Monitoring
empty	t1.micro	stopped		none	basic
empty	t1.micro	running	2/2 checks passed	none	basic

Instance Management Actions:

- Connect
- Get System Log
- Get Windows Admin Password
- Create Image (EBS AMI)
- Add/Edit Tags
- Change Security Group
- Change Source/Dest. Check
- Bundle Instance (instance store AMI)
- Launch More Like This
- Disassociate IP Address
- Change Termination Protection
- View/Change User Data
- Change Instance Type
- Change Shutdown Behavior
- Attach Network Interface
- Detach Network Interface
- Manage Private IP Addresses

Actions:

- Terminate
- Reboot
- Stop
- Start

CloudWatch Monitoring:

- Enable Detailed Monitoring
- Disable Detailed Monitoring
- Add/Edit Alarms

Elastic IPs

- A configurable IP address assigned to your account
- You assign the IP to any instance you might be running

The screenshot displays the AWS Management Console interface for the EC2 Dashboard. The left-hand navigation pane is visible, with the 'Elastic IPs' option highlighted by an orange rectangular box. The main content area is divided into several sections:

- Resources:** A summary of EC2 resources in the US East (N. Virginia) region, including 0 Running Instances, 1 Volume, 1 Key Pairs, 0 Placement Groups, 0 Elastic IPs, 0 Snapshots, 0 Load Balancers, and 2 Security Groups.
- Create Instance:** A section with a 'Launch Instance' button and a note that instances will launch in the US East (N. Virginia) region.
- Service Health:** A section showing the service status for US East (N. Virginia) as 'operating normally' and the availability zone status for us-east-1a, us-east-1b, and us-east-1d, all of which are 'operating normally'.
- Scheduled Events:** A section showing 'No events' for the US East (N. Virginia) region.
- Additional Information:** A section with links to 'Getting Started Guide', 'Documentation', 'All EC2 Resources', 'Find software on AWS Marketplace', 'Forums', and 'Pricing'.
- Feedback:** A section with links to 'Feedback' and 'Report an Issue'.

Allocate Elastic IP

The screenshot displays the AWS Elastic IP address management interface. At the top, there are four buttons: 'Allocate New Address' (highlighted with an orange border), 'Release Address', 'Associate Address', and 'Disassociate Address'. To the right of these buttons are icons for refresh, settings, and help. Below the buttons, there is a 'Viewing:' dropdown menu set to 'All Addresses' and a search input field. On the right side of the interface, there are navigation arrows: a double left arrow, a single left arrow, a single right arrow, and a double right arrow.

A modal dialog box titled 'Allocate New Address' is open in the center. It has a 'Cancel' button with a close icon (X) in the top right corner. The main text of the dialog asks, 'Are you sure you want to allocate a new IP address?'. Below this text, there is a label 'EIP used in:' followed by a dropdown menu currently showing 'EC2'. At the bottom of the dialog, there are two buttons: 'Cancel' and 'Yes, Allocate'.

Attach Elastic IP to your instance

The screenshot displays the AWS Management Console interface for managing Elastic IP addresses. At the top, there are four buttons: 'Allocate New Address', 'Release Address', 'Associate Address' (highlighted with an orange box), and 'Disassociate Address'. Below these buttons, there is a 'Viewing:' dropdown set to 'All Addresses' and a search bar. A table lists the available Elastic IP addresses. One address, 54.235.68.124, is selected. A modal dialog box titled 'Associate Address' is open, prompting the user to select an instance to associate the IP address (54.235.68.124) with. The 'Instance' dropdown menu is set to 'i-d868ceab'. At the bottom of the dialog, there are 'Cancel' and 'Yes, Associate' buttons. On the left side of the console, a sidebar shows '1 Address selected' and a summary of the selected address: Address: 54.235.68.124, Instance ID: i-d868ceab, Scope: standard, Public DNS: standard, Network Interface ID: -, Private IP Address: -, Network Interface Owner: -, and Allocation ID: -.

	Address	Instance ID	ENI ID	Scope	Public DNS
<input checked="" type="checkbox"/>	54.235.68.124			standard	

Associate Address Cancel ✕

Select the instance to which you wish to associate this IP address (54.235.68.124).

Instance:

Cancel Yes, Associate

1 Address selected

Address: 54.235.68.124

Instance ID: i-d868ceab

Scope: standard

Public DNS: standard

Network Interface ID: -

Private IP Address: -

Network Interface Owner: -

Allocation ID: -

The End!

...

