

# **Cloud e Datacenter Networking**

**Università degli Studi di Napoli Federico II**

**Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione DIETI**

**Laurea Magistrale in Ingegneria Informatica**

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**Introduzione ai servizi Amazon AWS:  
IAM, EC2 ed S3**



- ▶ Introduzione alla suite di servizi Amazon AWS
- ▶ Identity and Access Management (IAM)
- ▶ Il servizio Amazon *Elastic Compute Cloud* EC2
- ▶ Creazione ed accesso ad un'istanza EC2

# AWS: Identity and Access Management (IAM)



- ▶ *Identity and Access Management* is the security discipline that enables the right individuals to access the right resources at the right times for the right reasons
- ▶ In cloud computing IAM is crucial to securely control access to cloud resources
- ▶ *AWS Identity and Access Management (IAM)* is a web service that enables Amazon Web Services (AWS) customers to manage users and user permissions
- ▶ The service is targeted at organizations with multiple users or systems that use AWS products such as Amazon EC2, Amazon SimpleDB, and the AWS Management Console
- ▶ With IAM, you can centrally manage users, security credentials such as access keys, and permissions that control which AWS resources users can access
- ▶ In AWS a single person (e.g. a programmer) or a single company (e.g. a software house) can create several different IAM users in the system, with different capabilities
- ▶ Each user is identified in AWS by (User Name, Access Key Id, Secret Access Key)
- ▶ An IAM user may login to the AWS console

# AWS console: IAM

## Amazon Web Services

### Compute

- EC2**  
Virtual Servers in the Cloud
- EC2 Container Service**  
Run and Manage Docker Containers
- Elastic Beanstalk**  
Run and Manage Web Apps
- Lambda**  
Run Code in Response to Events

### Storage & Content Delivery

- S3**  
Scalable Storage in the Cloud
- CloudFront**  
Global Content Delivery Network
- Elastic File System** **PREVIEW**  
Fully Managed File System for EC2
- Glacier**  
Archive Storage in the Cloud
- Import/Export Snowball**  
Large Scale Data Transport
- Storage Gateway**  
Integrates On-Premises IT Environments with Cloud Storage

### Database

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

### Networking

- VPC**  
Isolated Cloud Resources
- Direct Connect**  
Dedicated Network Connection to AWS
- Route 53**  
Scalable DNS and Domain Name Registration

### Developer Tools

- CodeCommit**  
Store Code in Private Git Repositories
- CodeDeploy**  
Automate Code Deployments
- CodePipeline**  
Release Software using Continuous Delivery

### Management Tools

- CloudWatch**  
Monitor Resources and Applications
- CloudFormation**  
Create and Manage Resources with Templates
- CloudTrail**  
Track User Activity and API Usage
- Config**  
Track Resource Inventory and Changes
- OpsWorks**  
Automate Operations with Chef
- Service Catalog**  
Create and Use Standardized Products
- Trusted Advisor**  
Optimize Performance and Security

### Security & Identity

- Identity & Access Management**  
Manage User Access and Encryption Keys
- Directory Service**  
Host and Manage Active Directory
- Inspector** **PREVIEW**  
Analyze Application Security
- WAF**  
Filter Malicious Web Traffic

### Analytics

- EMR**  
Managed Hadoop Framework
- Data Pipeline**  
Orchestration for Data-Driven Workflows
- Elasticsearch Service**  
Run and Scale Elasticsearch Clusters
- Kinesis**  
Work with Real-time Streaming data
- Machine Learning**  
Build Smart Applications Quickly and Easily

### Internet of Things

- AWS IoT** **BETA**  
Connect Devices to the cloud

### Mobile Services

- Mobile Hub** **BETA**  
Build, Test, and Monitor Mobile apps
- Cognito**  
User Identity and App Data Synchronization
- Device Farm**  
Test Android, Fire OS, and iOS apps on real devices in the Cloud
- Mobile Analytics**  
Collect, View and Export App Analytics
- SNS**  
Push Notification Service

### Application Services

- API Gateway**  
Build, Deploy and Manage APIs
- AppStream**  
Low Latency Application Streaming
- CloudSearch**  
Managed Search Service
- Elastic Transcoder**  
Easy-to-use Scalable Media Transcoding
- SES**  
Email Sending Service
- SQS**  
Message Queue Service
- SWF**  
Workflow Service for Coordinating Application Components

### Enterprise Applications

- WorkSpaces**  
Desktops in the Cloud
- WorkDocs**  
Secure Enterprise Storage and Sharing Service
- WorkMail** **PREVIEW**  
Secure Email and Calendaring Service

# IAM user creation

- ▶ When a new IAM user is created, credentials are provided to let the user access AWS resources
- ▶ *Access Key Id* is public
- ▶ *Secret Access Key* is strictly private
- ▶ After a new user has been created, download the .csv key file, which contains:  
User Name, Access Key ID, Secret Access Key
- ▶ Store this key file securely, because this is the last time you'll be able to download the secret access key
- ▶ A user may also be identified by a password (for console login)

The screenshot shows the AWS IAM console interface. On the left is a navigation menu with options like Dashboard, Details, Groups, Users, Roles, Policies, Identity Providers, Account Settings, Credential Report, and Encryption Keys. The main area displays a table of users under the 'Users' section. The table has columns for 'User Name' and 'Groups'. Three users are listed: UtenteAT01, UtenteAT02, and UtenteAT03, each with 0 groups. A red arrow points from the 'User Name' column to a red-bordered box containing a CSV snippet: "UtenteAT01",AKIAIBCQ42ACDC56RPBQ,..... Below the table is a 'Create Access Key' dialog box with a 'Cancel' button. The dialog contains a success message and a 'Download Key File' button, which is highlighted with a red box.

<input type="checkbox"/>	User Name ↕	Groups
<input type="checkbox"/>	UtenteAT01	0
<input type="checkbox"/>	UtenteAT02	0
<input type="checkbox"/>	UtenteAT03	0

```
User Name,Access Key Id,Secret Access Key
"UtenteAT01",AKIAIBCQ42ACDC56RPBQ,.....
```

Create Access Key Cancel

You have successfully created a new Access Key and Secret Key with ID AKIAJH4QC2MO4BFAJNIQ.

Please download your key file now, which contains your new access key ID and secret access key. If you do not download the key file now, you will not be able to retrieve your Secret Key later.

For your protection, store your secret access key securely and do not share it.

Download Key File Close

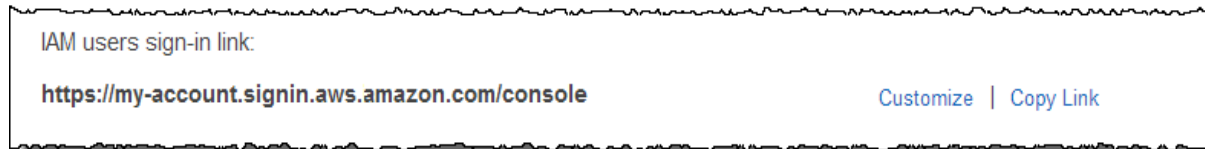
# AM user: console login



- ▶ After you create IAM users and passwords for each, users can sign in to the AWS Management Console for your AWS account with a special URL
- ▶ By default, the sign-in URL for your account includes your account ID
- ▶ You can create a unique sign-in URL for your account so that the URL includes a name instead of an account ID
- ▶ The sign-in endpoint follows this pattern:

```
https://AWS-account-ID-or-alias.signin.aws.amazon.com/console
```

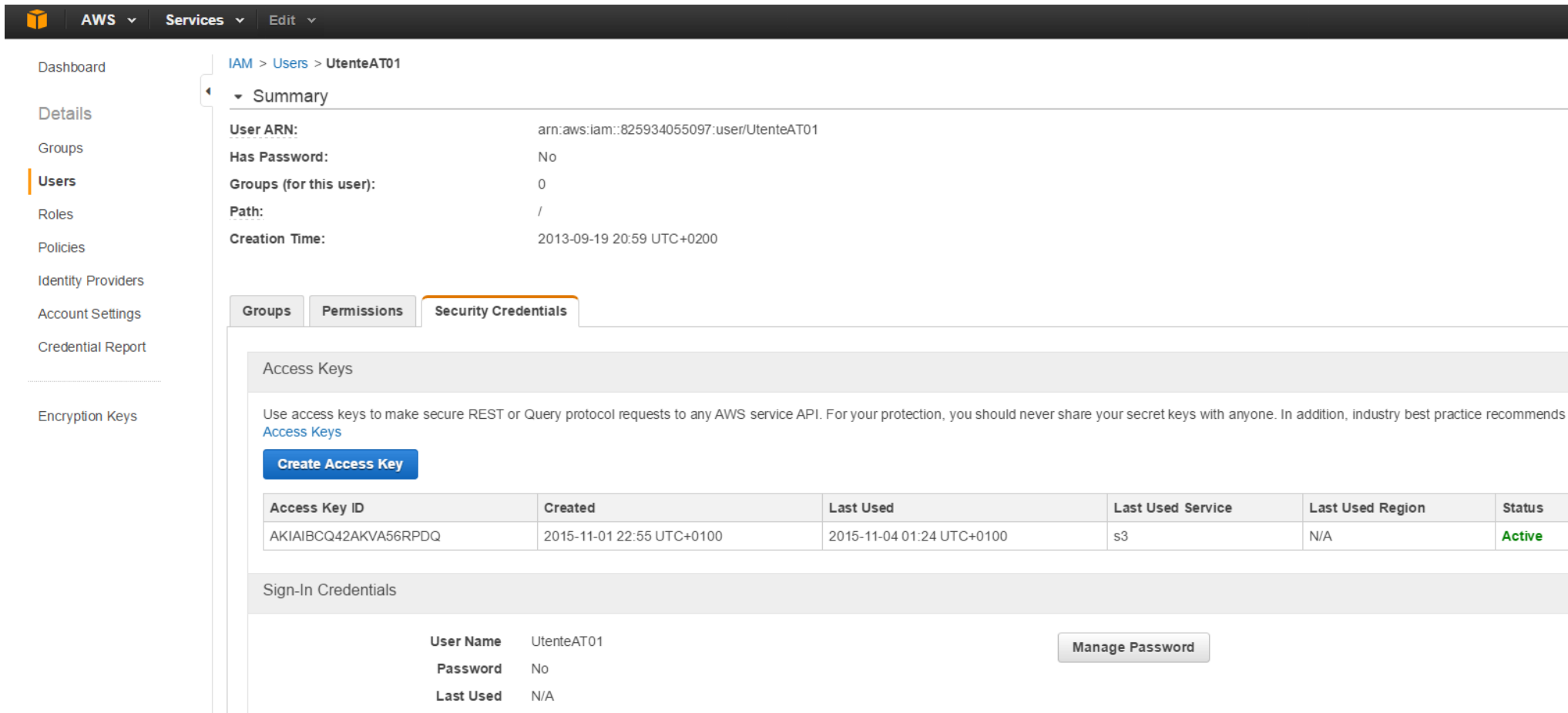
- ▶ You can find the global sign-in URL for an account on the IAM console dashboard



- ▶ IAM users in your account have access only to the AWS resources that you specify in the policy that is attached to the user or to an IAM group that the user belongs to
- ▶ To work in the console, users must have permissions to perform the actions that the console performs, such as listing and creating AWS resources

# IAM user: Access Key ID

Access Key ID and Secret Access Key are needed to access AWS resources within a program



The screenshot shows the AWS IAM console interface. The breadcrumb navigation is IAM > Users > UtenteAT01. The left-hand navigation menu includes Dashboard, Details, Groups, Users (highlighted), Roles, Policies, Identity Providers, Account Settings, Credential Report, and Encryption Keys. The main content area is divided into three tabs: Groups, Permissions, and Security Credentials (selected). Under the Security Credentials tab, there is a section for 'Access Keys' with a 'Create Access Key' button. Below this is a table of existing access keys. The table has columns for Access Key ID, Created, Last Used, Last Used Service, Last Used Region, and Status. One access key is listed with ID AKIAIBCQ42AKVA56RPDQ, created on 2015-11-01, last used on 2015-11-04, for the s3 service, and is in an 'Active' status. Below the Access Keys section is a 'Sign-In Credentials' section with fields for User Name (UtenteAT01), Password (No), and Last Used (N/A), along with a 'Manage Password' button.

Summary

**User ARN:** arn:aws:iam::825934055097:user/UtenteAT01

**Has Password:** No

**Groups (for this user):** 0

**Path:** /

**Creation Time:** 2013-09-19 20:59 UTC+0200

Groups Permissions **Security Credentials**

Access Keys

Use access keys to make secure REST or Query protocol requests to any AWS service API. For your protection, you should never share your secret keys with anyone. In addition, industry best practice recommends [Access Keys](#)

[Create Access Key](#)

Access Key ID	Created	Last Used	Last Used Service	Last Used Region	Status
AKIAIBCQ42AKVA56RPDQ	2015-11-01 22:55 UTC+0100	2015-11-04 01:24 UTC+0100	s3	N/A	Active

Sign-In Credentials

**User Name:** UtenteAT01 [Manage Password](#)





**Password:** No

**Last Used:** N/A

# AWS console: EC2

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-  **WorkMail** PREVIEW  
Secure Email and Calendaring Service





- ▶ Amazon Elastic Compute Cloud (Amazon EC2) è un servizio web che fornisce capacità computazionale nel cloud
- ▶ E' sostanzialmente un servizio di tipo IaaS
- ▶ Progettato per rendere più semplice agli sviluppatori l'accesso e l'utilizzo di risorse computazionali controllabili attraverso una semplice interfaccia web
- ▶ Permette di allocare macchine virtuali nei datacenter di Amazon
- ▶ Non comprende servizi di storage
- ▶ Amazon offre una serie di altri servizi che possono essere abbinati ad EC2:
  - ▶ S3 - servizio di storage
  - ▶ Elastic IP - servizio che assegna uno o più indirizzi IP pubblici che possono essere associati, in maniera statica o dinamica, alle istanze EC2
  - ▶ CloudWatch - servizio per il monitoraggio delle risorse Cloud
  - ▶ Elastic Beanstalk - un servizio di tipo PaaS per costruire applicazioni scalabili
  - ▶ ...



- ▶ Riduce il tempo richiesto per ottenere ed avviare una nuova istanza server
- ▶ Possibilità di scalare velocemente la quantità di risorse impiegate (a crescere o a diminuire) al variare delle esigenze computazionali
  - ▶ Possibilità di ottenere nuove istanze di server in pochi minuti
- ▶ Si pagano solo le risorse utilizzate
- ▶ Non ci sono costi di start-up
- ▶ Non ci sono costi fissi
- ▶ Non ci sono utilizzi minimi mensili richiesti
- ▶ Si paga solo la CPU ad ore ed il trasferimento di dati sulla rete



- ▶ Estratto da: <http://aws.amazon.com/ec2-sla/>
- ▶ Service Commitment
  - ▶ AWS will use commercially reasonable efforts to make Amazon EC2 and Amazon EBS each available with a Monthly Uptime Percentage of at least 99.95%, in each case during any monthly billing cycle.
  - ▶ In the event Amazon EC2 or Amazon EBS does not meet the Service Commitment, you will be eligible to receive a Service Credit.
- ▶ Service Credits
  - ▶ Service Credits are calculated as a percentage of the total charges paid by you ... for either Amazon EC2 or Amazon EBS in the Region affected for the monthly billing cycle in which the Region Unavailability occurred in accordance with the schedule below

## Monthly Uptime Percentage

**Less than 99.95%**

**but equal to or greater than 99.0%**

**Less than 99.0%**

## Service Credit Percentage

**10%**

**30%**



- ▶ Selezione di un'immagine pre-configurata da far girare immediatamente oppure la creazione di una Amazon Machine Image (AMI) contenente le applicazioni, librerie, dati e configurazione dell'utente.
- ▶ Attivazione dell'istanza
- ▶ Configurazione delle policy di sicurezza e di accesso alla rete (firewalling)
- ▶ Eventuale associazione ad un blocco di storage fisso per le istanze (Elastic Block Store EBS) che persiste indipendentemente dalla vita delle istanze
- ▶ Monitoraggio dell'istanza attraverso le API ed i tool di gestione forniti

# Amazon AWS: console

The screenshot displays the Amazon AWS Management Console for the EC2 service in the US West (Oregon) region. The interface is organized into several sections:

- EC2 Dashboard:** A sidebar menu on the left containing links to Events, Tags, INSTANCES (Instances, Spot Requests, Reserved Instances), IMAGES (AMIs, Bundle Tasks), ELASTIC BLOCK STORE (Volumes, Snapshots), and NETWORK & SECURITY (Security Groups, Elastic IPs, Placement Groups, Load Balancers, Key Pairs, Network Interfaces).
- Resources:** A central panel showing the current EC2 resources in the region:
  - 0 Running Instances
  - 0 Elastic IPs
  - 0 Volumes
  - 0 Snapshots
  - 0 Key Pairs
  - 0 Load Balancers
  - 0 Placement Groups
  - 1 Security GroupA blue callout box promotes the [AWS Trusted Advisor](#) to optimize resources' cost, performance, and security.
- Create Instance:** A section with a brief introduction and a prominent **Launch Instance** button. A note specifies that instances will launch in the US West (Oregon) region.
- Service Health:** A section with a **Service Status:** indicator showing "US West (Oregon): This service is operating normally" and an **Availability Zone Status:** section listing three zones (us-west-2a, us-west-2b) as operating normally.
- Scheduled Events:** A section showing "US West (Oregon): No events".
- Account Attributes:** A right-hand panel displaying account details such as Supported Platforms (VPC), Default VPC (vpc-f0d4c092), and links to Additional Information like Getting Started Guide, Documentation, and Pricing.
- Popular AMIs on AWS Marketplace:** A section listing available AMIs, including CentOS 6.4 and Couchbase Server, with their respective providers and ratings.

At the bottom of the console, there is a footer with copyright information (© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved.), links to Privacy Policy and Terms of Use, and a Feedback button.

# Amazon AWS: Financial statement

Amazon Web Services - Mozilla Firefox  
EC2 Management Console | Amazon Web Services  
https://portal.aws.amazon.com/gp/aws/developer/account/index.html

**Statement Period: September 1 - September 30, 2013**  
Select a different statement:

### Summary

You have no billable activity for this statement period.

<b>Total new charges for this statement</b>	<b>\$0.00</b>
No payments received to date.	
<b>Outstanding balance for this statement</b>	<b>\$0.00</b>

### Details

[Expand All Services](#) | [Collapse All Services](#) [Printer Friendly Version](#)

<b>AWS Service Charges</b>	<b>\$0.00</b>
<b>Amazon Elastic Compute Cloud</b> <a href="#">Download Usage Report »</a>	<b>\$0.00</b>
<b>US East (Northern Virginia) Region</b>	
<b>Amazon EC2 running Linux/UNIX</b>	
\$0.00 per Linux/RHEL Micro Instance (t1.micro) instance-hour (or partial hour) under monthly free tier	3 Hrs 0.00
<b>Amazon EC2 EBS</b>	
\$0.00 per GB-month of provisioned storage under monthly free tier	2,511 GB-Mo 0.00
\$0.00 for the first 2 million I/O requests under monthly free tier	18,045 IOs 0.00
<b>Amazon CloudWatch</b>	
\$0.00 per alarm-month - first 10 alarms	0.315 Alarms 0.00
<b>Amazon SimpleDB</b> <a href="#">Download Usage Report »</a>	<b>\$0.00</b>
<b>Amazon Simple Notification Service</b> <a href="#">Download Usage Report »</a>	<b>\$0.00</b>

# Amazon EC2: instance creation (1)

EC2 Management Console - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto

EC2 Management Console

https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#LaunchInstanceWizard:

Services Edit Roberto Canonico Oregon Help





1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

## Step 1: Choose an Amazon Machine Image (AMI) [Cancel and Exit](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

### Quick Start

- My AMIs
- AWS Marketplace
- Community AMIs
- Free tier only ⓘ

 <b>Amazon Linux</b> Free tier eligible	<b>Amazon Linux AMI 2013.09.1</b> - ami-be1c848e (64-bit) / ami-4c1c847c (32-bit) The Amazon Linux AMI is an EBS-backed, PV-GRUB image. It includes Linux 3.4, AWS tools, and repository access to multiple versions of MySQL, PostgreSQL, Python, Ruby, and Tomcat. Root device type: ebs Virtualization type: paravirtual	<input checked="" type="radio"/> 64-bit <input type="radio"/> 32-bit <a href="#">Select</a>
 <b>Red Hat</b> Free tier eligible	<b>Red Hat Enterprise Linux 6.4</b> - ami-b8a63b88 (64-bit) / ami-baa63b8a (32-bit) Red Hat Enterprise Linux version 6.4, EBS-boot. Root device type: ebs Virtualization type: paravirtual	<input checked="" type="radio"/> 64-bit <input type="radio"/> 32-bit <a href="#">Select</a>
 <b>SUSE Linux</b> Free tier eligible	<b>SUSE Linux Enterprise Server 11</b> - ami-d8b429e8 (64-bit) / ami-9eb429ae (32-bit) SUSE Linux Enterprise Server 11 Service Pack 3 basic install, EBS boot with Amazon EC2 AMI Tools preinstalled; Apache 2.2, MySQL 5.5, PHP 5.3, and Ruby 1.8.7 available Root device type: ebs Virtualization type: paravirtual	<input checked="" type="radio"/> 64-bit <input type="radio"/> 32-bit <a href="#">Select</a>
 <b>Ubuntu</b> Free tier eligible	<b>Ubuntu Server 12.04.3 LTS</b> - ami-6aad335a (64-bit) / ami-68ad3358 (32-bit) Ubuntu Server 12.04.3 LTS, with support available from Canonical ( <a href="http://www.ubuntu.com/cloud/services">http://www.ubuntu.com/cloud/services</a> ). Root device type: ebs Virtualization type: paravirtual	<input checked="" type="radio"/> 64-bit <input type="radio"/> 32-bit <a href="#">Select</a>

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# Amazon EC2: instance creation (2)

EC2 Management Console - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto

EC2 Management Console

https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#LaunchInstanceWizard:

Services Edit Roberto Canonico Oregon Help

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

## Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

**Currently selected:** t1.micro (up to 2 ECUs, 1 vCPUs, 0.613 GiB memory, EBS only)

All instance types

**Micro instances**

Free tier eligible

General purpose

Memory optimized

Storage optimized

Compute optimized

### Micro instances

Micro instances are a low-cost instance option, providing a small amount of CPU resources. They are suited for lower throughput applications, and websites that require additional compute cycles periodically, but are not appropriate for applications that require sustained CPU performance. Popular uses for micro instances include low traffic websites or blogs, small administrative applications, bastion hosts, and free trials to explore EC2 functionality.

Size	ECUs <small>(i)</small>	vCPUs <small>(i)</small>	Memory (GiB)	Instance Storage (GiB) <small>(i)</small>	EBS-Optimized Available <small>(i)</small>	Network Performance <small>(i)</small>
t1.micro	up to 2	1	0.613	EBS only	-	Very Low

Micro instances are eligible for the AWS free usage tier. For the first 12 months following your AWS sign-up date, you get up to 750 hours of micro instances each month. When your free usage tier expires or if your usage exceeds the free tier restrictions, you pay standard, pay-as-you-go service rates. [Learn more](#) about free usage tier eligibility and restrictions.

Cancel Previous **Review and Launch** Next: Configure Instance Details

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# Amazon EC2: instance creation (3)

The screenshot displays the Amazon EC2 Management Console in a Mozilla Firefox browser window. The page is titled "Step 3: Configure Instance Details" and is part of a 7-step wizard. The current step is "3. Configure Instance", with other steps being "1. Choose AMI", "2. Choose Instance Type", "4. Add Storage", "5. Tag Instance", "6. Configure Security Group", and "7. Review".

The main content area is titled "Step 3: Configure Instance Details" and includes the following configuration options:

- Number of instances:** 1
- Purchasing option:**  Request Spot Instances
- Network:** vpc-f0d4c092 (172.31.0.0/16) (default) [Create new VPC](#)
- Subnet:** No preference (default subnet in any Availability Zone) [Create new subnet](#)
- Public IP:**  Automatically assign a public IP address to your instances
- IAM role:** None
- Shutdown behavior:** Stop
- Enable termination protection:**  Protect against accidental termination
- Monitoring:**  Enable CloudWatch detailed monitoring  
[Additional charges apply.](#)
- Tenancy:** Shared tenancy (multi-tenant hardware)  
[Additional charges will apply for dedicated tenancy.](#)

Below the main configuration area is a section for "Advanced Details" which is currently collapsed. At the bottom of the page, there are navigation buttons: "Cancel", "Previous", "Review and Launch" (highlighted in blue), and "Next: Add Storage".

At the very bottom of the page, there is a copyright notice: "© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved." and links for "Privacy Policy" and "Terms of Use". A "Feedback" button is also present in the bottom right corner.

# Amazon EC2: instance creation (4)

The screenshot shows the Amazon EC2 Management Console in a Mozilla Firefox browser. The page is titled "Step 4: Add Storage" and is part of a 7-step wizard. The current step is "4. Add Storage", which is highlighted in the progress bar. The page content includes:

- A progress bar with steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage (active), 5. Tag Instance, 6. Configure Security Group, 7. Review.
- A heading "Step 4: Add Storage" followed by explanatory text: "Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2."
- A table with columns: Type, Device, Snapshot, Size (GB), Volume Type, IOPS, and Delete on Termination. The table contains one row for the root volume.
- An "Add New Volume" button.
- A blue callout box with a speech bubble icon: "Free tier eligible customers can get up to 30 GB of EBS storage. [Learn more](#) about free usage tier eligibility and usage restrictions."
- Navigation buttons at the bottom: "Cancel", "Previous", "Review and Launch" (highlighted), and "Next: Tag Instance".
- Footer text: "© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved. [Privacy Policy](#) [Terms of Use](#) [Feedback](#)"

Type	Device	Snapshot	Size (GB)	Volume Type	IOPS	Delete on Termination
Root	/dev/sda1	snap-911898ad	8	Standard	N/A	<input checked="" type="checkbox"/>

# Amazon EC2: instance creation (5)

The screenshot shows the Amazon EC2 Management Console in a Mozilla Firefox browser window. The page title is "EC2 Management Console - Mozilla Firefox". The browser address bar shows the URL: "https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#LaunchInstanceWizard:". The console header includes "Services" and "Edit" menus, and the user name "Roberto Canonico" with a dropdown arrow. The region is set to "Oregon".

The main content area displays a progress bar with seven steps: "1. Choose AMI", "2. Choose Instance Type", "3. Configure Instance", "4. Add Storage", "5. Tag Instance" (highlighted), "6. Configure Security Group", and "7. Review". Below the progress bar, the heading "Step 5: Tag Instance" is followed by a descriptive text: "A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. [Learn more](#) about tagging your Amazon EC2 resources."

The tagging interface consists of a table with two columns: "Key" (127 characters maximum) and "Value" (255 characters maximum). A single row is visible with the key "Name" and the value "prova". To the right of the value field is a close button (X). Below the table is a "Create Tag" button with the text "(Up to 10 tags maximum)".

At the bottom of the console, there are navigation buttons: "Cancel", "Previous", "Review and Launch" (highlighted in blue), and "Next: Configure Security Group".

The footer contains the copyright notice: "© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved." and links for "Privacy Policy" and "Terms of Use". A "Feedback" button is also present.

# Amazon EC2: instance creation (6)

EC2 Management Console - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto

EC2 Management Console

https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#LaunchInstanceWizard:

Services Edit Roberto Canonico Oregon Help

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

## Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

**Assign a security group:**  Create a new security group  
 Select an existing security group

**Security group name:**

**Description:**

Protocol <i>i</i>	Type <i>i</i>	Port Range (Code) <i>i</i>	Source <i>i</i>
SSH	TCP	22	Anywhere 0.0.0.0/0 <i>x</i>

**Add Rule**

**Warning**

Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

[Cancel](#) [Previous](#) [Review and Launch](#)

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# Amazon EC2: instance creation (7)

EC2 Management Console - Mozilla Firefox

EC2 Management Console

https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#LaunchInstanceWizard:

Services Edit Roberto Canonico Oregon Help

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

## Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

**⚠ Improve your instance's security. Your security group, launch-wizard-1, is open to the world.**

Your instance may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only.

You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

AMI Details [Edit AMI](#)

**Free tier eligible** **Ubuntu Server 12.04.3 LTS - ami-6aad335a**

Ubuntu Server 12.04.3 LTS, with support available from Canonical (<http://www.ubuntu.com/cloud/services>).  
Root Device Type: ebs Virtualization type: paravirtual

Instance Type [Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance
t1.micro	up to 2	1	0.613	EBS only	-	Very Low

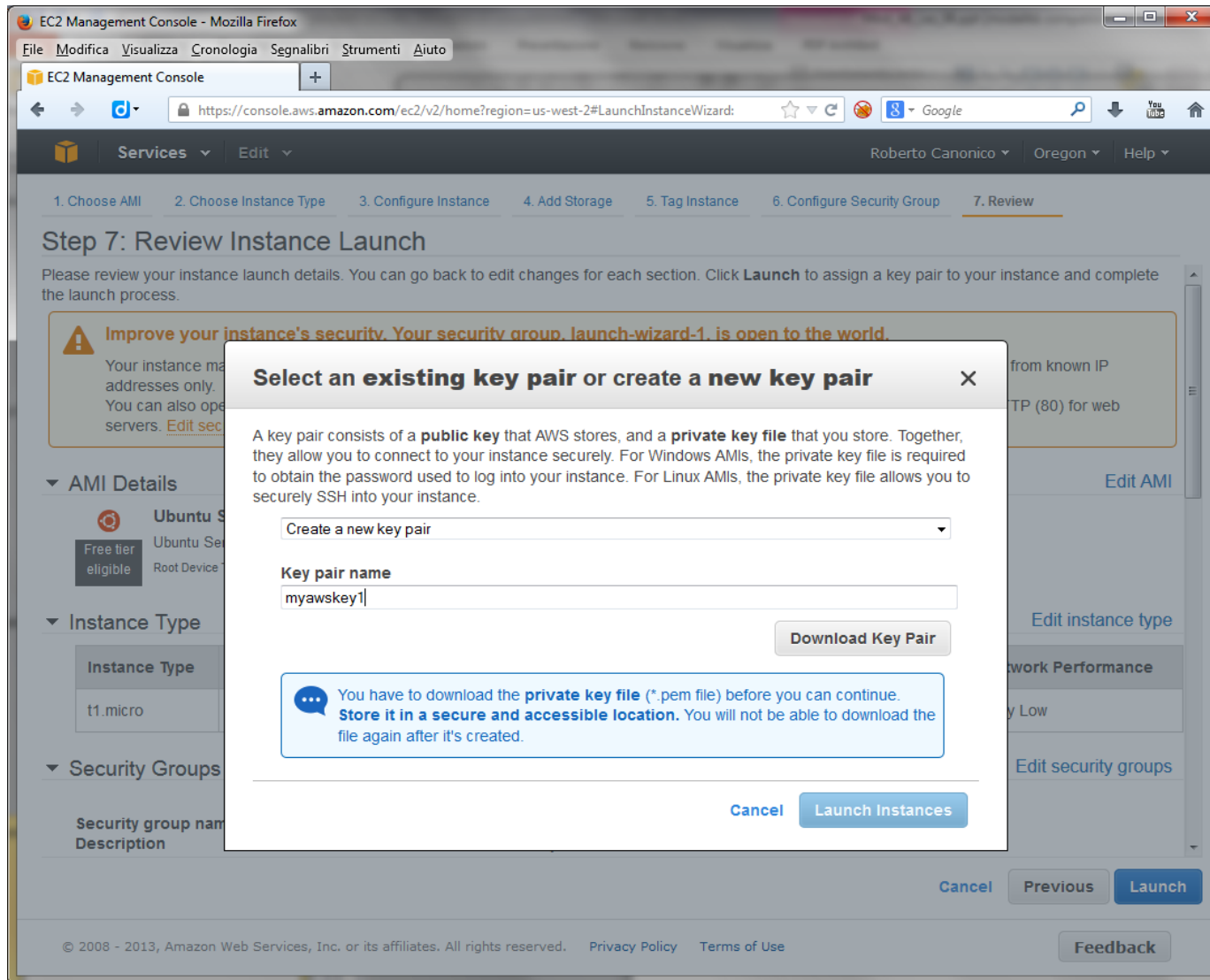
Security Groups [Edit security groups](#)

<b>Security group name</b>	launch-wizard-1
<b>Description</b>	launch-wizard-1 created on Saturday, December 7, 2013 6:50:44 PM UTC+1

[Cancel](#) [Previous](#) [Launch](#)

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# Amazon EC2: instance creation (8)



# Amazon EC2: instance creation (9)

EC2 Management Console - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto

EC2 Management Console Amazon Web Services

https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#LaunchInstanceWizard: Google

Services Edit Roberto Canonico Oregon Help

## Launch Status

**Your instance is now launching**

The following instance launch has been initiated: [i-13f24225](#) [Hide launch log](#)

Creating security group	Successful (sg-40776522)
Authorizing inbound rules	Successful
Initiating launch	Successful
Applying tag	Successful
Launch initiation complete	

**Get notified of estimated charges**

[Create billing alerts](#) to get an email notification when estimated charges on your AWS bill exceed \$0.0 (in other words, when you have exceeded the free usage tier).

### How to connect to your instance

Your instance is launching, and it may take a few minutes until it is in the **running** state, when it will be ready for you to use. Usage hours on your new instance will start immediately and continue to accrue until you stop or terminate your instance.

Click **View Instances** to monitor your instance's status. Once your instance is in the **running** state, you can **connect** to it from the Instances screen. [Find out](#) how to connect to your instance.

▼ **Here are some helpful resources to get you started**

- [How to connect to your Linux instance](#)
- [Amazon EC2: User Guide](#)
- [Learn about AWS Free Usage Tier](#)
- [Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

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# Amazon EC2: instance creation (10)

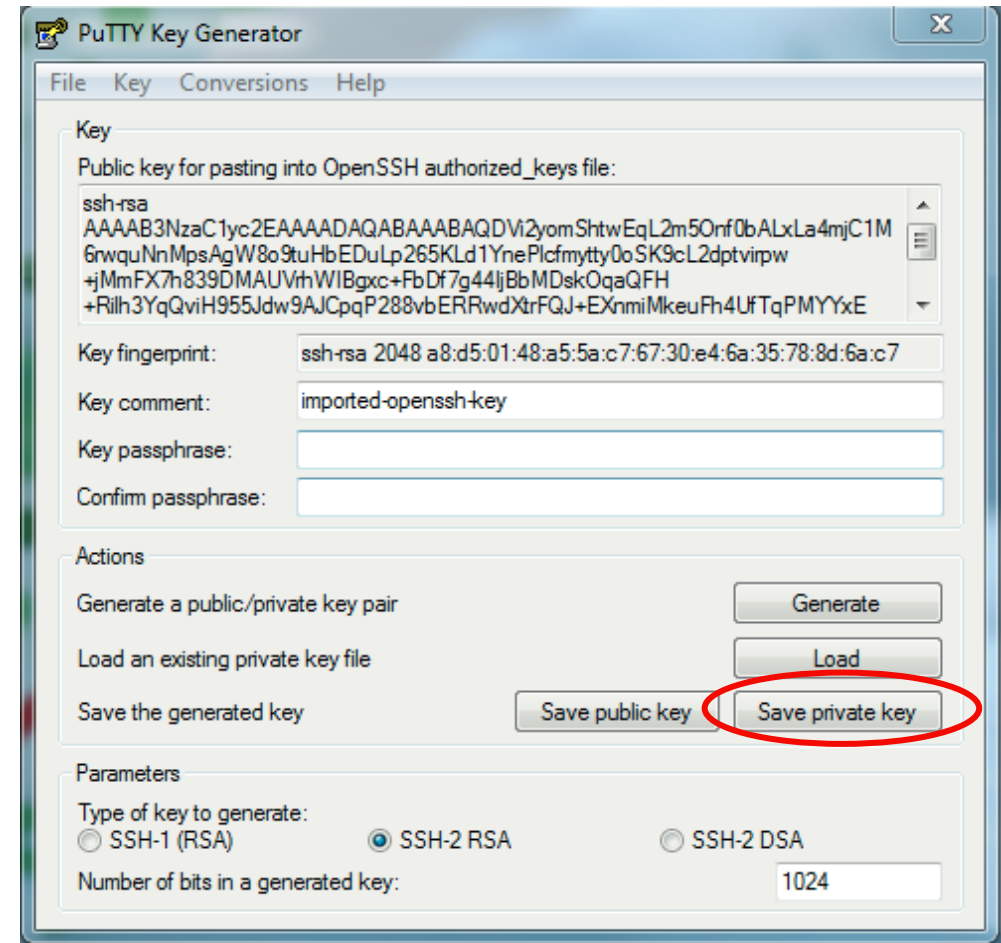
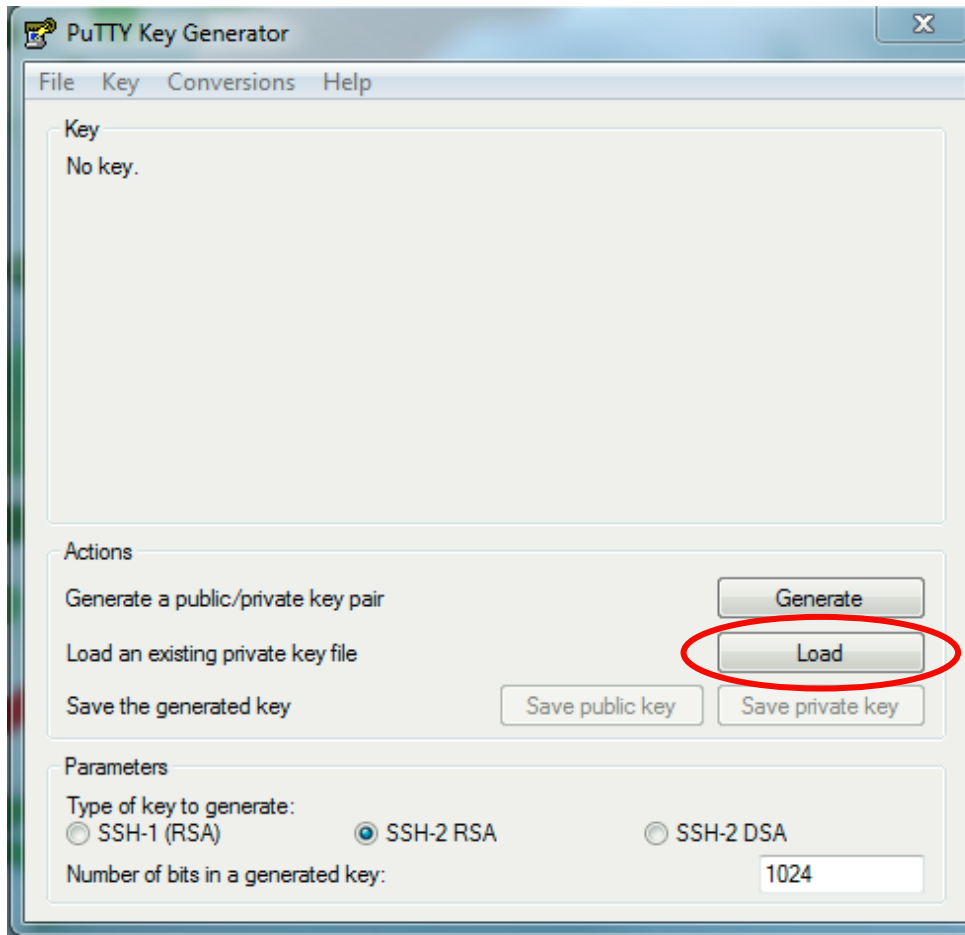
The screenshot displays the Amazon EC2 Management Console in a Mozilla Firefox browser. The page title is "EC2 Management Console - Mozilla Firefox". The browser address bar shows the URL: `https://console.aws.amazon.com/ec2/v2/home?region=us-west-2#Instances:search=i-13f24225`. The user is logged in as "Roberto Canonico" in the "Oregon" region. The left sidebar contains navigation options: EC2 Dashboard, Events, Tags, INSTANCES (highlighted), Spot Requests, Reserved Instances, IMAGES (AMIs, Bundle Tasks), ELASTIC BLOCK STORE (Volumes, Snapshots), and NETWORK & SECURITY (Security Groups, Elastic IPs, Placement Groups, Load Balancers, Key Pairs, Network Interfaces). The main content area shows a "Launch Instance" button, a "Connect" button, and an "Actions" dropdown. Below these is a filter bar with "All instances" and "All instance types" dropdowns, and a search box containing "i-13f24225". A table lists one instance: "prova" with ID "i-13f24225", type "t1.micro", availability zone "us-west-2b", state "running", and "2/2 check..." status. Below the table, the details for "Instance: i-13f24225 (prova)" are shown, including the public DNS: "ec2-54-200-175-229.us-west-2.compute.amazonaws.com". The "Description" tab is active, displaying a table of instance attributes:

Attribute	Value	Attribute	Value
Instance ID	i-13f24225	Public DNS	ec2-54-200-175-229.us-west-2.compute.amazonaws.com
Instance state	running	Public IP	54.200.175.229
Instance type	t1.micro	Elastic IP	-
Private DNS	ip-172-31-30-178.us-west-2.compute.internal	Availability zone	us-west-2b
Private IPs	172.31.30.178	Security groups	launch-wizard-1. <a href="#">view rules</a>
Secondary private IPs	-	Scheduled events	No scheduled events
VPC ID	vpc-f0d4c092	AMI ID	ubuntu-precise-12.04-amd64-server-20131003 (ami-6aad335a)
Subnet ID	subnet-e12e1a95	Platform	-
Network interfaces	eth0	IAM role	-
Source/dest. check	True	Key pair name	myawskey1
		Owner	825931055097

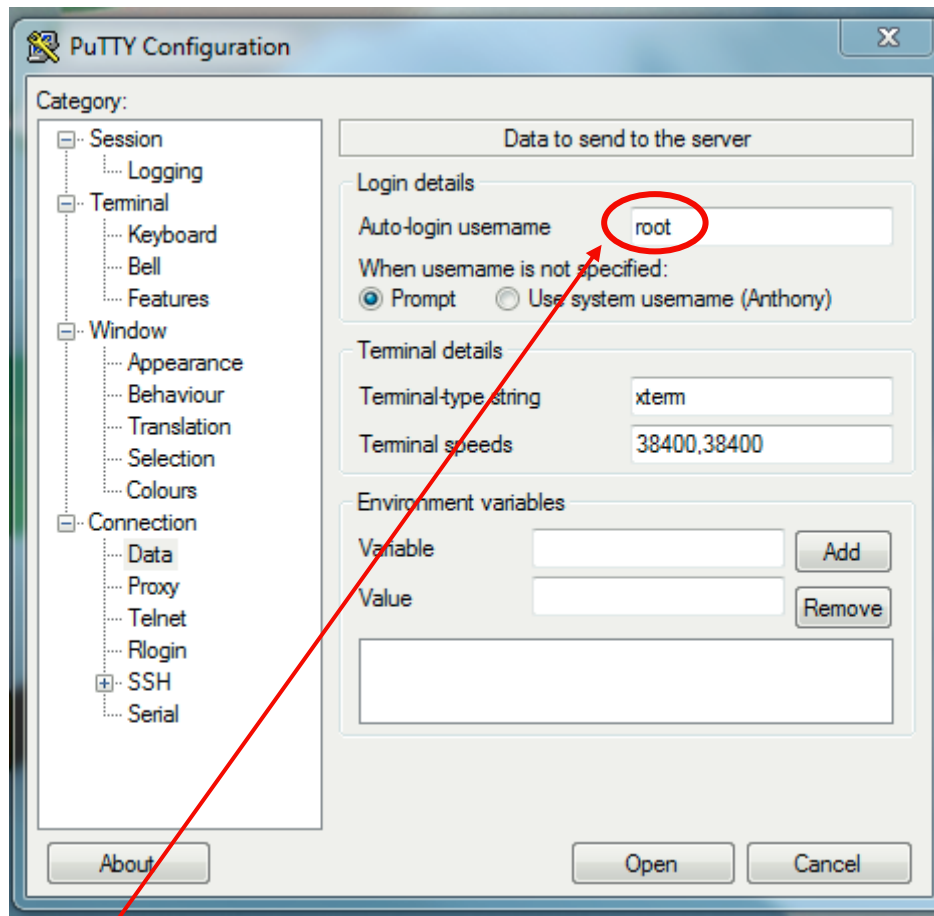
At the bottom of the console, there is a footer with copyright information: "© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved." and links for "Privacy Policy" and "Terms of Use". A "Feedback" button is also present.



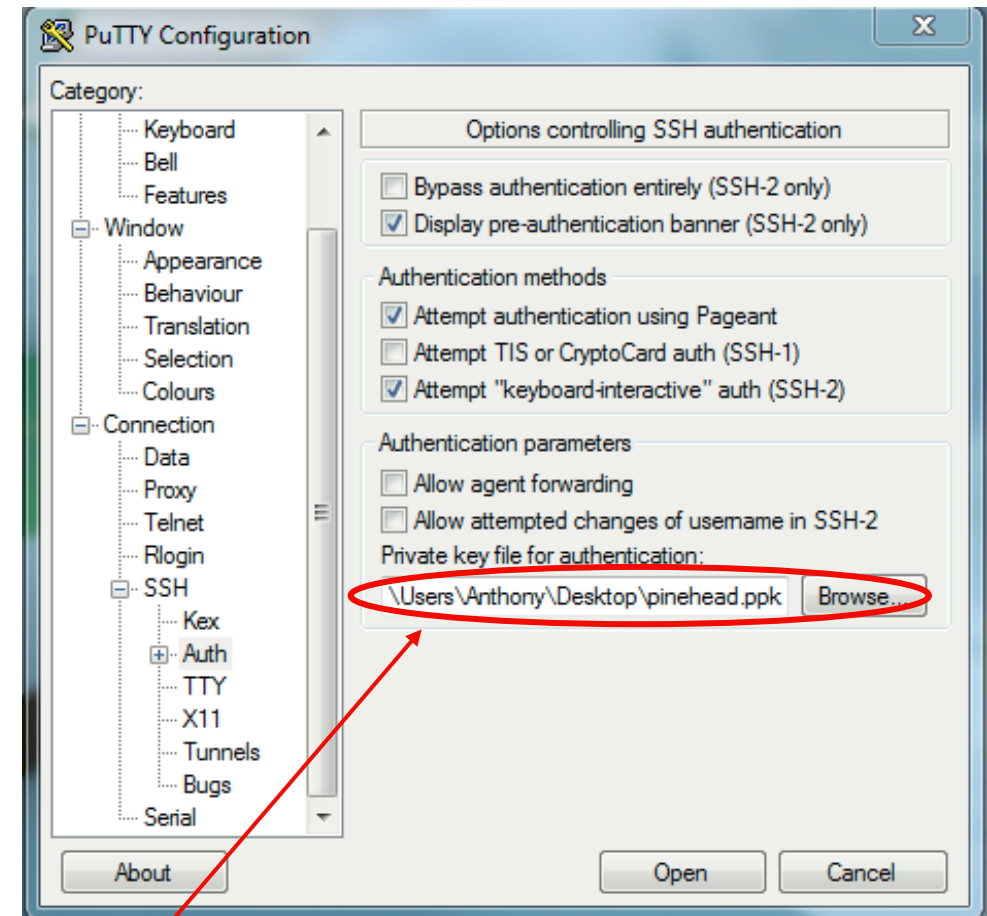
# Puttygen to transform .pem private key in .ppk format



# Configure PuTTY for automatic login with private key

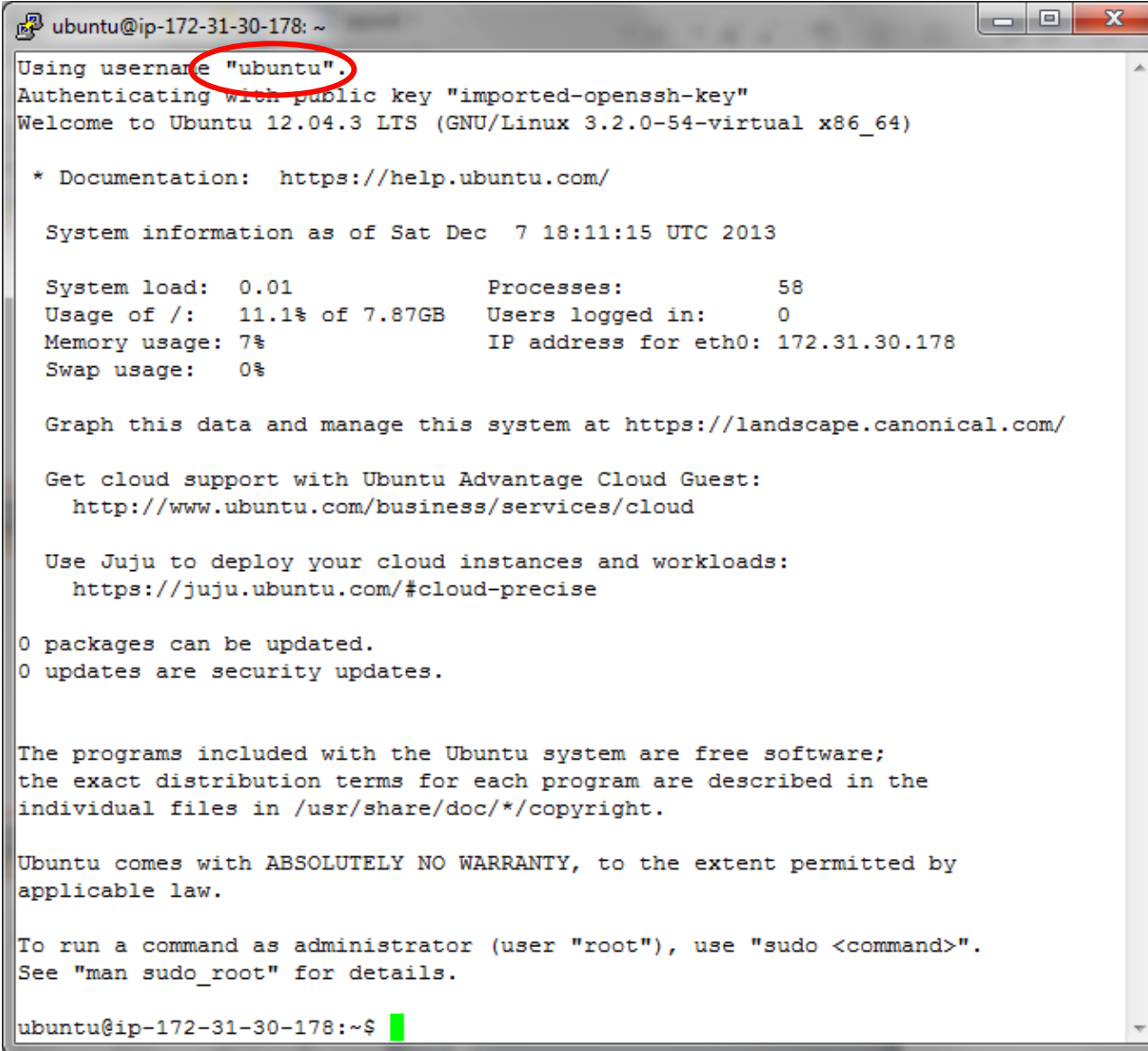


Lo username dipende dall'immagine attivata  
Per Ubuntu Linux è *ubuntu*



Selezionare il file .ppk prodotto precedentemente

# SSH session created with PuTTY



```
ubuntu@ip-172-31-30-178: ~
Using username "ubuntu".
Authenticating with public key "imported-openssh-key"
Welcome to Ubuntu 12.04.3 LTS (GNU/Linux 3.2.0-54-virtual x86_64)

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

System information as of Sat Dec  7 18:11:15 UTC 2013

System load:  0.01          Processes:            58
Usage of /:   11.1% of 7.87GB  Users logged in:    0
Memory usage: 7%           IP address for eth0: 172.31.30.178
Swap usage:   0%

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

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

Use Juju to deploy your cloud instances and workloads:
https://juju.ubuntu.com/#cloud-precise

0 packages can be updated.
0 updates are security updates.

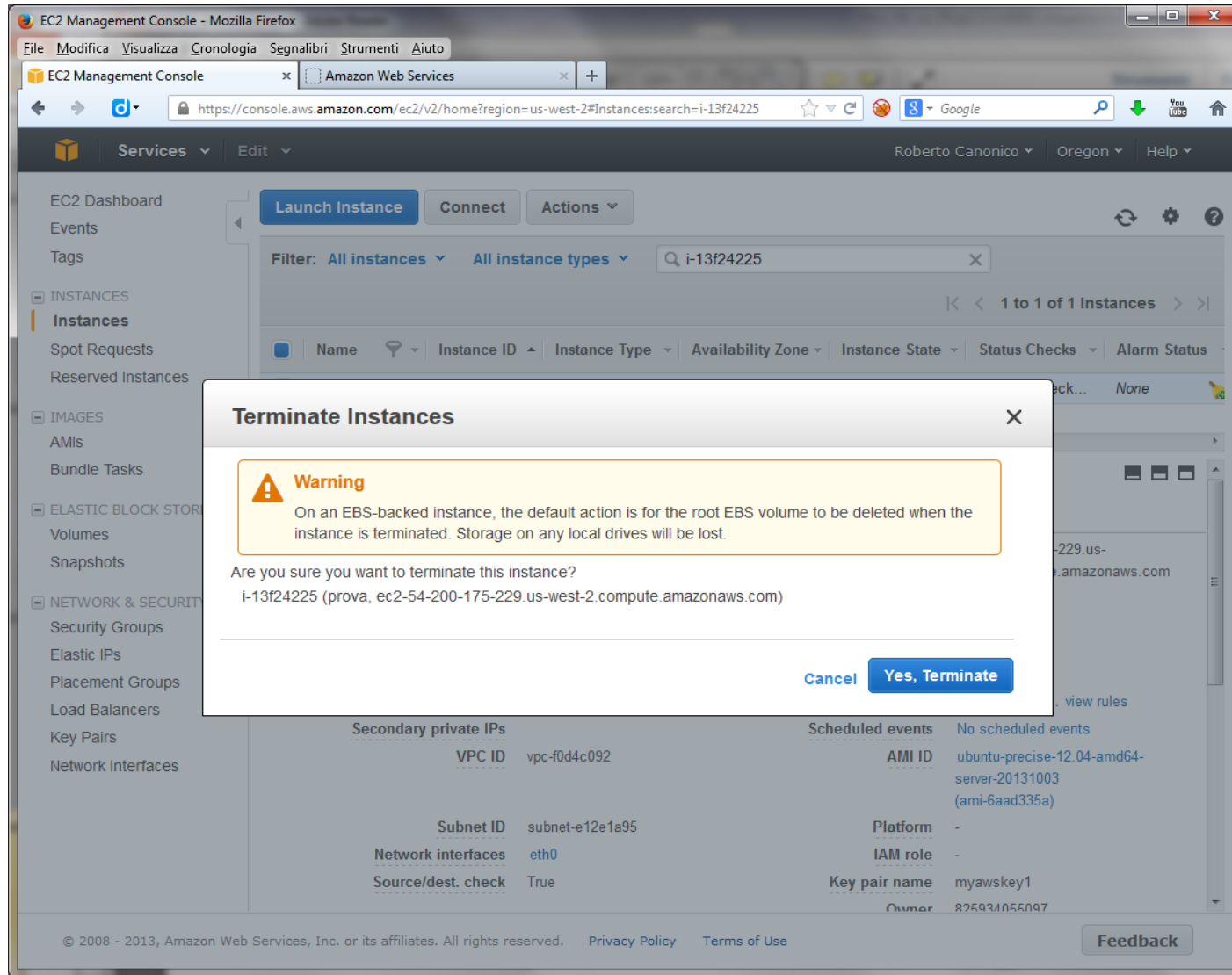
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-30-178:~$
```

# Amazon EC2: instance termination (1)



# Amazon EC2: terminazione dell'istanza (2)

The screenshot displays the Amazon EC2 Management Console interface. The left-hand navigation pane includes sections for INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main content area shows a list of instances with a table containing the following data:

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
prova	i-13f24225	t1.micro	us-west-2b	terminated		None

Below the table, the details for the instance 'i-13f24225 (prova)' are shown. The 'Description' tab is active, displaying the following information:





Property	Value
Instance ID	i-13f24225
Instance state	terminated
Instance type	t1.micro
Private DNS	-
Private IPs	-
Secondary private IPs	-
VPC ID	-
Subnet ID	-
Network interfaces	-
Source/dest. check	False
EBS-optimized	False
Public DNS	-
Public IP	-
Elastic IP	-
Availability zone	us-west-2b
Security groups	-
Scheduled events	-
AMI ID	ubuntu-precise-12.04-amd64-server-20131003 (ami-6aad335a)
Platform	-
IAM role	-
Key pair name	myawskey1
Owner	825934055097
Launch time	2013-12-07T17:57:20.000Z

At the bottom of the console, there is a footer with copyright information: © 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved. Links for Privacy Policy and Terms of Use are provided, along with a Feedback button.







# AWS console: S3

## Amazon Web Services





### Compute

-  **EC2**  
Virtual Servers in the Cloud
-  **EC2 Container Service**  
Run and Manage Docker Containers
-  **Elastic Beanstalk**  
Run and Manage Web Apps
-  **Lambda**  
Run Code in Response to Events




### Storage & Content Delivery

-  **S3**  
Scalable Storage in the Cloud
-  **CloudFront**  
Global Content Delivery Network
-  **Elastic File System** PREVIEW  
Fully Managed File System for EC2
-  **Glacier**  
Archive Storage in the Cloud
-  **Import/Export Snowball**  
Large Scale Data Transport
-  **Storage Gateway**  
Integrates On-Premises IT Environments with Cloud Storage

### Database

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








### Networking

-  **VPC**  
Isolated Cloud Resources
-  **Direct Connect**  
Dedicated Network Connection to AWS
-  **Route 53**  
Scalable DNS and Domain Name Registration



### Developer Tools

-  **CodeCommit**  
Store Code in Private Git Repositories
-  **CodeDeploy**  
Automate Code Deployments
-  **CodePipeline**  
Release Software using Continuous Delivery






### Management Tools

-  **CloudWatch**  
Monitor Resources and Applications
-  **CloudFormation**  
Create and Manage Resources with Templates
-  **CloudTrail**  
Track User Activity and API Usage
-  **Config**  
Track Resource Inventory and Changes
-  **OpsWorks**  
Automate Operations with Chef
-  **Service Catalog**  
Create and Use Standardized Products
-  **Trusted Advisor**  
Optimize Performance and Security

### Security & Identity

-  **Identity & Access Management**  
Manage User Access and Encryption Keys
-  **Directory Service**  
Host and Manage Active Directory
-  **Inspector** PREVIEW  
Analyze Application Security
-  **WAF**  
Filter Malicious Web Traffic






### Analytics

-  **EMR**  
Managed Hadoop Framework
-  **Data Pipeline**  
Orchestration for Data-Driven Workflows
-  **Elasticsearch Service**  
Run and Scale Elasticsearch Clusters
-  **Kinesis**  
Work with Real-time Streaming data
-  **Machine Learning**  
Build Smart Applications Quickly and Easily








### Internet of Things

-  **AWS IoT** BETA  
Connect Devices to the cloud




### Mobile Services

-  **Mobile Hub** BETA  
Build, Test, and Monitor Mobile apps
-  **Cognito**  
User Identity and App Data Synchronization
-  **Device Farm**  
Test Android, Fire OS, and iOS apps on real devices in the Cloud
-  **Mobile Analytics**  
Collect, View and Export App Analytics
-  **SNS**  
Push Notification Service

### Application Services

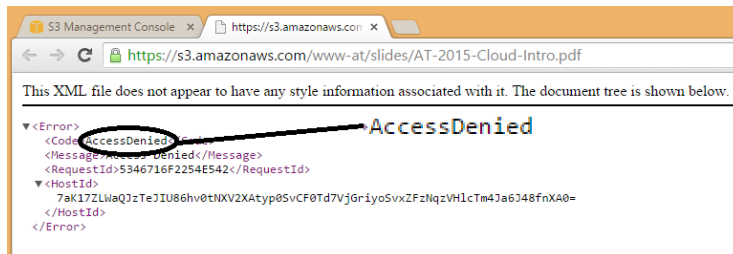
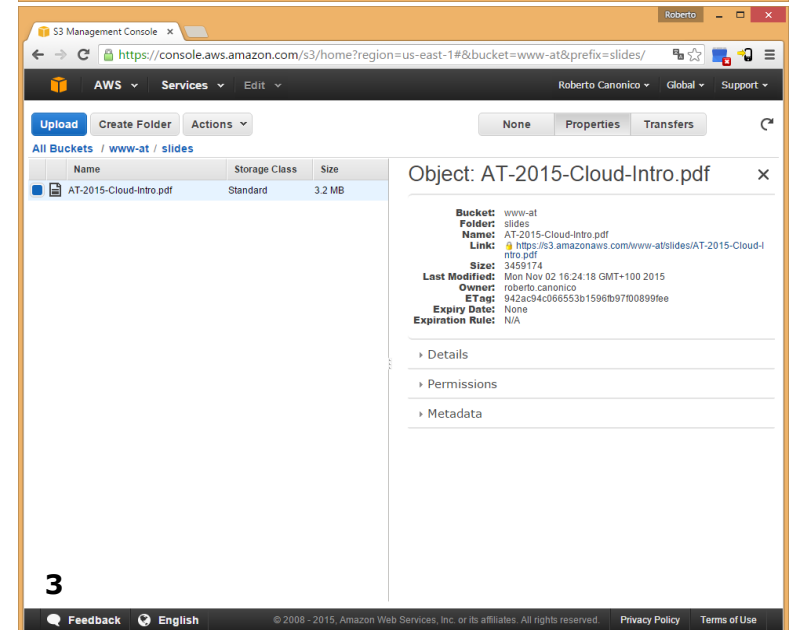
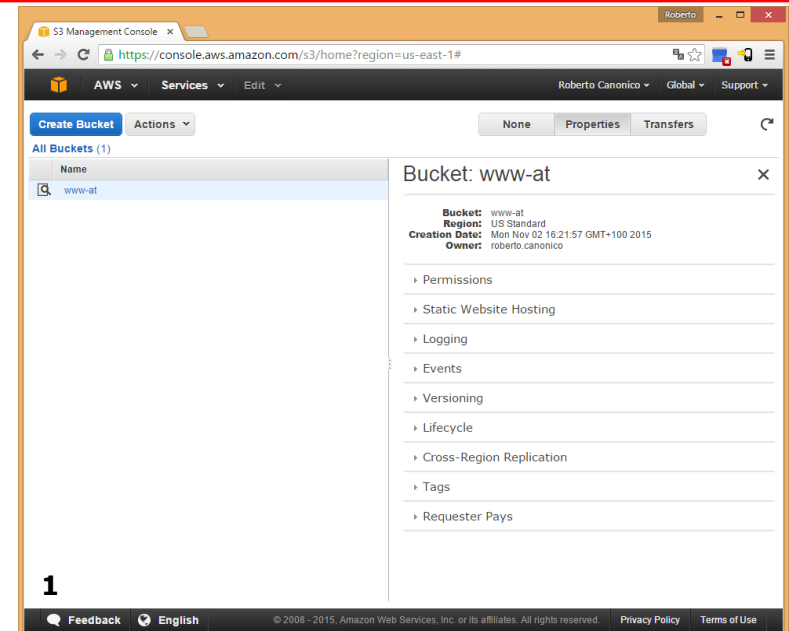
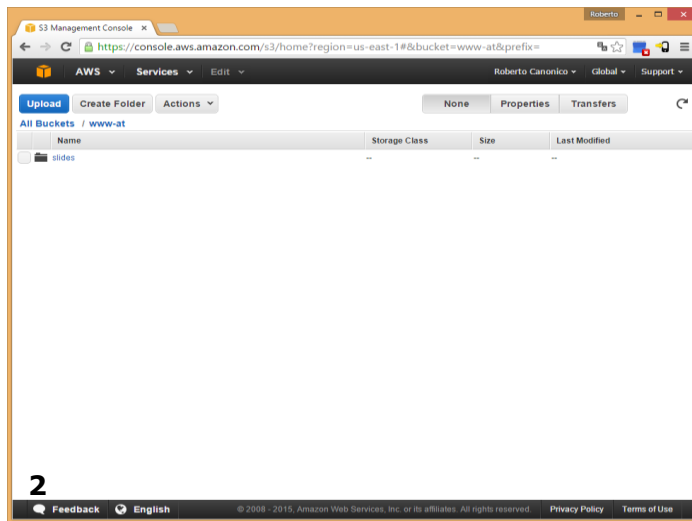
-  **API Gateway**  
Build, Deploy and Manage APIs
-  **AppStream**  
Low Latency Application Streaming
-  **CloudSearch**  
Managed Search Service
-  **Elastic Transcoder**  
Easy-to-use Scalable Media Transcoding
-  **SES**  
Email Sending Service
-  **SQS**  
Message Queue Service
-  **SWF**  
Workflow Service for Coordinating Application Components

### Enterprise Applications

-  **WorkSpaces**  
Desktops in the Cloud
-  **WorkDocs**  
Secure Enterprise Storage and Sharing Service
-  **WorkMail** PREVIEW  
Secure Email and Calendaring Service

# S3: buckets, folders and objects

1. Creation of a bucket in Amazon's AWS console
2. Creation of a folder in a bucket
3. Upload of a file in a folder
4. Retrieve file through URL → Access denied !



# S3: object permissions



- ▶ To make an object publicly accessible
  - ▶ grant permission to Open/Download to Everyone
- ▶ Permissions can be set for the whole bucket as well

## ▼ Permissions

You can control access to the bucket and its contents using access policies. [Learn more.](#)

Grantee:   Open/Download  x

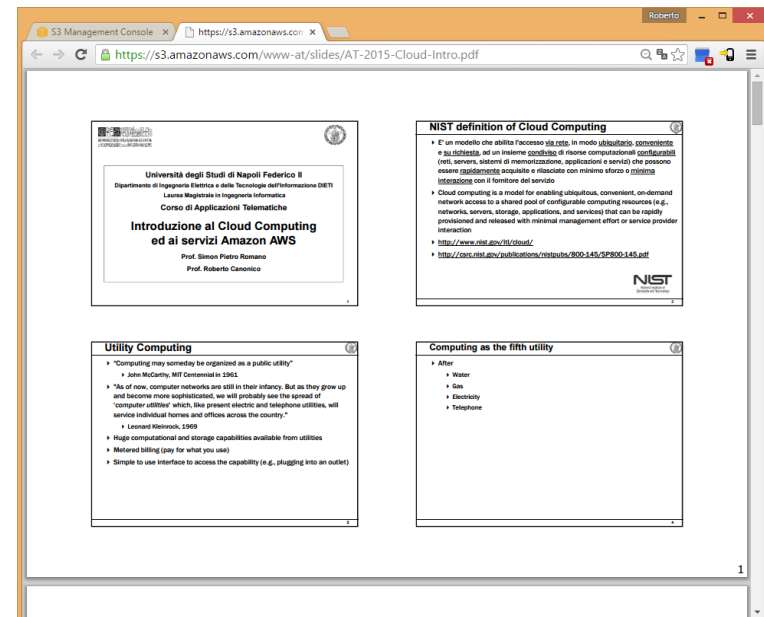
[View Permissions](#)  [Edit Permissions](#)

Grantee:   Open/Download x

[View Permissions](#)  [Edit Permissions](#)

[Add more permissions](#)

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





# S3 tools: S3 browser



- ▶ S3 Browser allows to navigate and operate on S3 objects and folders as in a File Explorer
- ▶ The tool requires the credentials of an user with proper permissions to operate on the S3 bucket
- ▶ Also supports upload/download operations

The screenshot shows the S3 Browser 5-5-3 interface. The main window displays a file explorer view for a bucket named 'www-at' with a path of '/ slides/'. A table lists the contents:

File	Size	Type	Last Modified	Storage Class
..				
AT-2015-Cloud-Intro.pdf	3,30 MB	Adobe Acrobat Document	02/11/2015 16:24:18	STANDARD

Below the file list is a toolbar with icons for Upload, Download, Delete, New Folder, and Refresh. At the bottom, there is a 'Tasks' section with a table:

Task	Size	%	Progress	Status	Speed

The task table is currently empty. The interface also includes a menu bar with 'Accounts', 'Buckets', 'Files', 'Tools', 'Upgrade to Pro!', and 'Help'. A status bar at the bottom shows 'Running' and buttons for 'Start All', 'Pause All', and 'Cancel All'.

The 'Add New Account' dialog box is shown. It contains the following fields and options:

- Account Name:** A text input field with a placeholder and a note: "You can assign any name to your account."
- Storage Type:** A dropdown menu set to "Amazon S3 Storage" with a note: "Choose the storage you want to work with. Default value is Amazon S3 Storage."
- Access Key ID:** A text input field with a note: "Access Key ID can be found here: [https://console.aws.amazon.com/iam/home?#security\\_credential](https://console.aws.amazon.com/iam/home?#security_credential)"
- Secret Access Key:** A text input field with a note: "Secret Access Key can be found here: [https://console.aws.amazon.com/iam/home?#security\\_credential](https://console.aws.amazon.com/iam/home?#security_credential)"
- Encrypt Access Keys with a password:** A checkbox with a note: "Turn this option on if you want to protect your Access Keys with a master password."

At the bottom, there are buttons for "Add new account" and "Cancel", along with a link: "Click here to sign up for Amazon S3."



- ▶ The S3 service exposes a RESTful API
- ▶ Different URLs are used for 3 types of resources:
  - ▶ The list of your buckets (<https://s3.amazonaws.com/>)  
There's only one resource of this type
  - ▶ A particular bucket (<https://s3.amazonaws.com/{name-of-bucket}/>)  
There can be up to 100 resources of this type
  - ▶ A particular S3 object inside a bucket  
(<https://s3.amazonaws.com/{name-of-bucket}/{name-of-object}>)  
There can be infinitely many resources of this type.
- ▶ Fundamental operations on buckets corresponding to HTTP actions:
  - ▶ GET an existing object from a bucket
  - ▶ PUT a new object or update an existing object
  - ▶ DELETE an object from the bucket
  - ▶ HEAD to retrieve an object's metadata
- ▶ See Chapter 3 in [http://www.crummy.com/writing/RESTful-Web-Services/RESTful\\_Web\\_Services.pdf](http://www.crummy.com/writing/RESTful-Web-Services/RESTful_Web_Services.pdf)