
MarkLogic Server

MarkLogic Server on Amazon EC2 Guide

MarkLogic 5
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1.0 Getting Started with MarkLogic Server for EC2

This chapter provides an overview of MarkLogic Server on Amazon Elastic Compute Cloud (EC2) using a MarkLogic Amazon Machine Image (AMI), as well as how to create an Amazon EC2 account and order a MarkLogic Server for EC2 AMI. This chapter includes the following sections:

- [Understanding MarkLogic Server for EC2](#)
- [Summary of Set-up Procedures MarkLogic Server for EC2](#)
- [Creating an Amazon EC2 Account](#)
- [Ordering a MarkLogic Server for EC2 AMI](#)

For more detailed information on Amazon EC2, see the Amazon documentation located at the following URL:

<http://aws.amazon.com/documentation/>

1.1 Understanding MarkLogic Server for EC2

MarkLogic provides pre-packaged AMIs containing RightScale CentOS Linux and MarkLogic Server. MarkLogic has included scripts on these AMIs that simplify the steps necessary to get your MarkLogic Server instances up and running.

1.1.1 Amazon EC2 Terminology

The following are the definitions for the terms used in this guide:

Elastic Compute Cloud (EC2) is a web service that enables you to launch and manage server instances in Amazon's data centers using APIs or available tools and utilities.

CentOS is a community-supported, free and open source operating system based on Red Hat Enterprise Linux.

Amazon Machine Image (AMI) is an encrypted machine image that contains all information necessary to boot instances of software. Instances of MarkLogic Server are created from AMIs.

Elastic Block Store (EBS) is a type of storage designed specifically for Amazon EC2 instances. Amazon EBS allows you to create volumes that can be mounted as devices by Amazon EC2 instances. Amazon EBS volumes behave like raw unformatted external block devices. They have user-supplied device names and provide a block device interface. You can load a file system on top of Amazon EBS volumes, or use them just as you would use a block device. Amazon EBS volumes exist separately from the actual instances and persist until you delete them. This allows you to store your data without leaving an Amazon EC2 instance running. Each Amazon EBS volume can be up to one TiB in size.

An *Instance* is the running system after an AMI is launched. Instances remain running unless they fail or are terminated. When this happens, the data on the instance is no longer available. Once launched, an instance looks very much like a traditional host.

An *Instance Type* defines the size of an Amazon EC2 instance. The MarkLogic Server instance types are shown in the table below.

Instance Type	Description
Standard Instances	Large Instance 7.5 GB of memory, 4 EC2 Compute Units (2 virtual cores with 2 EC2 Compute Units each), 850 GB of local instance storage, 64-bit platform.
	Extra Large Instance 15 GB of memory, 8 EC2 Compute Units (4 virtual cores with 2 EC2 Compute Units each), 1690 GB of local instance storage, 64-bit platform.
High-Memory Instances	High-Memory Double Extra Large Instance 34.2 GB of memory, 13 EC2 Compute Units (4 virtual cores with 3.25 EC2 Compute Units each), 850 GB of local instance storage, 64-bit platform.
	High-Memory Quadruple Extra Large Instance 68.4 GB of memory, 26 EC2 Compute Units (8 virtual cores with 3.25 EC2 Compute Units each), 1690 GB of local instance storage, 64-bit platform.
High-CPU Instances	High-CPU Extra Large Instance 7 GB of memory, 20 EC2 Compute Units (8 virtual cores with 2.5 EC2 Compute Units each), 1690 GB of local instance storage, 64-bit platform.

An *Instance Store* is a fixed amount of storage space for an instance. An instance store is not designed to be a permanent storage solution. If an instance reboots, either intentionally or unintentionally, the data on the instance store will survive. If the underlying drive fails or the instance is terminated, the data will be lost.

An *EC2 Compute Unit (ECU)* provides the equivalent CPU capacity of a 1.0-1.2 GHz 2007 Opteron or 2007 Xeon processor.

1.1.2 MarkLogic Server in an EC2 Environment

Using MarkLogic Server as an EC2 service provides you with all of the MarkLogic Server functionality without having to maintain the hardware. In addition your instances of MarkLogic Server can be accessed from anywhere on the internet and you can grow the size of your instances as you roll out new MarkLogic Server applications and expand your user base.

1.2 Summary of Set-up Procedures MarkLogic Server for EC2

The following is a summary of the procedures described in this guide.

Procedure	For Details See
If you don't already have an Amazon EC2 account, create one.	"Creating an Amazon EC2 Account" on page 4
Order MarkLogic Server for EC2.	"Ordering a MarkLogic Server for EC2 AMI" on page 5
Open the Amazon AWS Management Console.	"Accessing the AWS Management Console" on page 6
Create a security group to enable HTTP traffic.	"Creating a Security Group" on page 8
If you don't already have a key pair, create one.	"Creating a Key Pair" on page 11
Create an instance of MarkLogic Server from an AMI.	"Creating an Instance of MarkLogic Server from an AMI" on page 12
Create an EBS volume and attach it to your MarkLogic Server instance.	"Creating an EBS Volume and Attaching it to an Instance" on page 17
Open the MarkLogic Server Admin interface.	"Accessing the MarkLogic Server Admin Interface" on page 19

1.3 Creating an Amazon EC2 Account

Before you can order a MarkLogic Server for EC2 AMI, you must set up an Amazon EC2 account. To set up an Amazon EC2 account, go to <http://aws.amazon.com/ec2> and click Sign Up for Amazon EC2:



Then follow the directions to create a new account. You will need to provide email and mail addresses, create a password, and provide credit card information.

1.4 Ordering a MarkLogic Server for EC2 AMI

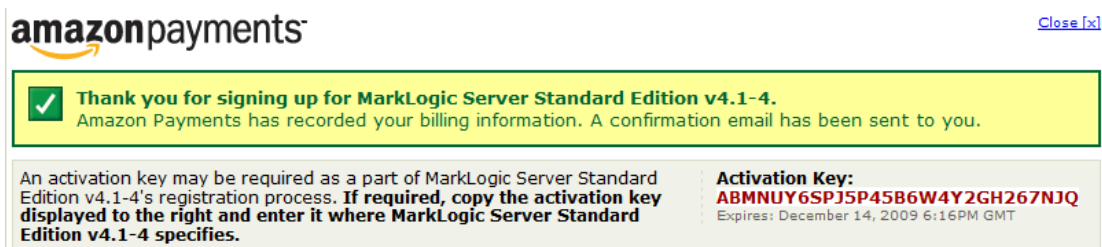
MarkLogic provides public AMIs that make it easy to create a new MarkLogic Server instance running on EC2. You can place an order for a MarkLogic Server for EC2 AMIs from the cloud computing page on the MarkLogic developer site:

<http://developer.marklogic.com/cloudcomputing/>

Follow the link on the MarkLogic Cloud Computing page to access the Amazon Payments page. An Amazon EC2 account is required to access this page. Here you will find detailed information on pricing and you will have the option to place an order to subscribe to a MarkLogic AMI service. Placing an order allows you to access the AMI from within Amazon's EC2 administration tools. You are not charged any up-front fees. You are only charged for hourly usage of the instances of MarkLogic Server you create. Once you have decided on your order, click Place Your Order:



Next you will see a page containing your Activation Key. You will not need the Activation Key, so there is no need to save a copy of the key.

A screenshot of an Amazon Payments confirmation page. At the top left is the "amazonpayments" logo. At the top right is a "Close [x]" link. Below the logo is a green banner with a white checkmark icon and the text: "Thank you for signing up for MarkLogic Server Standard Edition v4.1-4. Amazon Payments has recorded your billing information. A confirmation email has been sent to you." Below the banner is a grey box containing two columns of text. The left column reads: "An activation key may be required as a part of MarkLogic Server Standard Edition v4.1-4's registration process. If required, copy the activation key displayed to the right and enter it where MarkLogic Server Standard Edition v4.1-4 specifies." The right column reads: "Activation Key: ABMNUY6SPJ5P45B6W4Y2GH267NJQ Expires: December 14, 2009 6:16PM GMT".

2.0 Installing a MarkLogic Server AMI

This chapter describes how to launch a MarkLogic Server AMI and access the MarkLogic Server Admin interface. This chapter includes the following sections:

- [Initial Setup Procedures](#)
- [Creating an Instance of MarkLogic Server from an AMI](#)
- [Creating an EBS Volume and Attaching it to an Instance](#)
- [Accessing the MarkLogic Server Admin Interface](#)
- [Moving an EBS Volume Between Instances](#)

Examples in this chapter reference the browser-based AWS Management Console. Amazon also provides a Firefox plugin (ElasticFox), as well as a set of command-line tools and query APIs that provide equivalent mechanisms for performing the procedures outlined in this guide.

2.1 Initial Setup Procedures

This section describes how to access the AWS management console and create a security group and key pair. Typically, you will create your security groups and key pairs once and reuse them for each instance you create. The topics in this section are:

- [Accessing the AWS Management Console](#)
- [Creating a Security Group](#)
- [Creating a Key Pair](#)

2.1.1 Accessing the AWS Management Console

This section describes how to access the Amazon AWS Management Console.

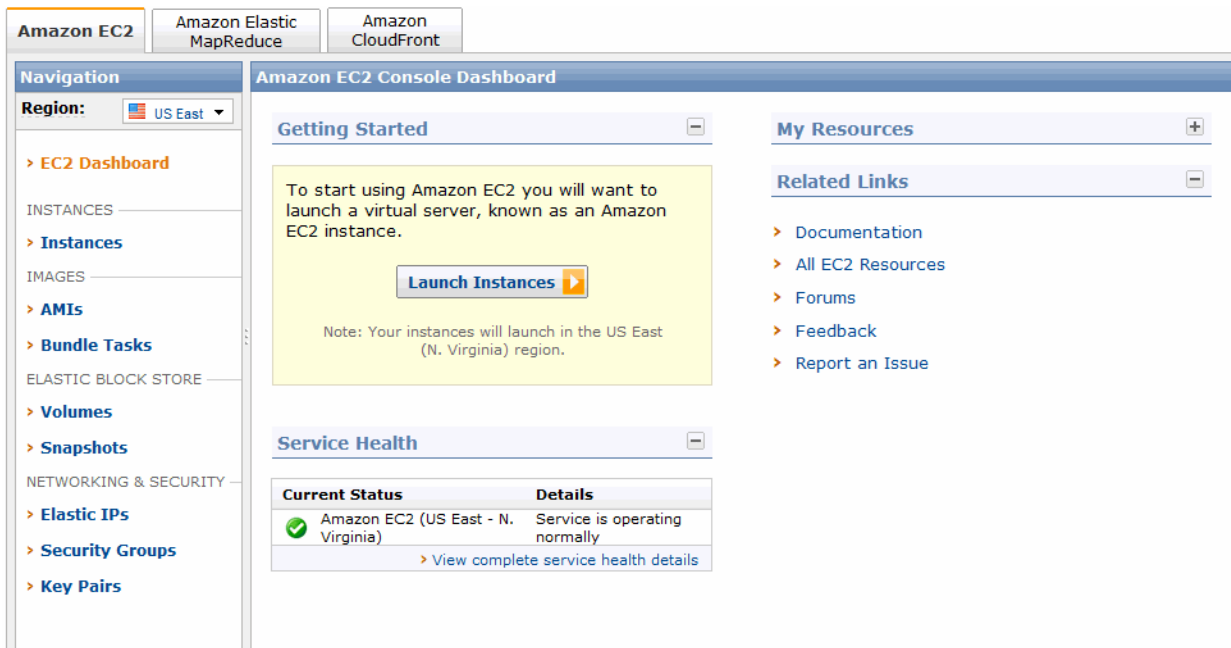
1. Log into your Amazon EC2 account and from the Your Account menu, select AWS Management Console:



2. Click Sign into the AWS Management Console and enter your email address and password for your EC2 account:



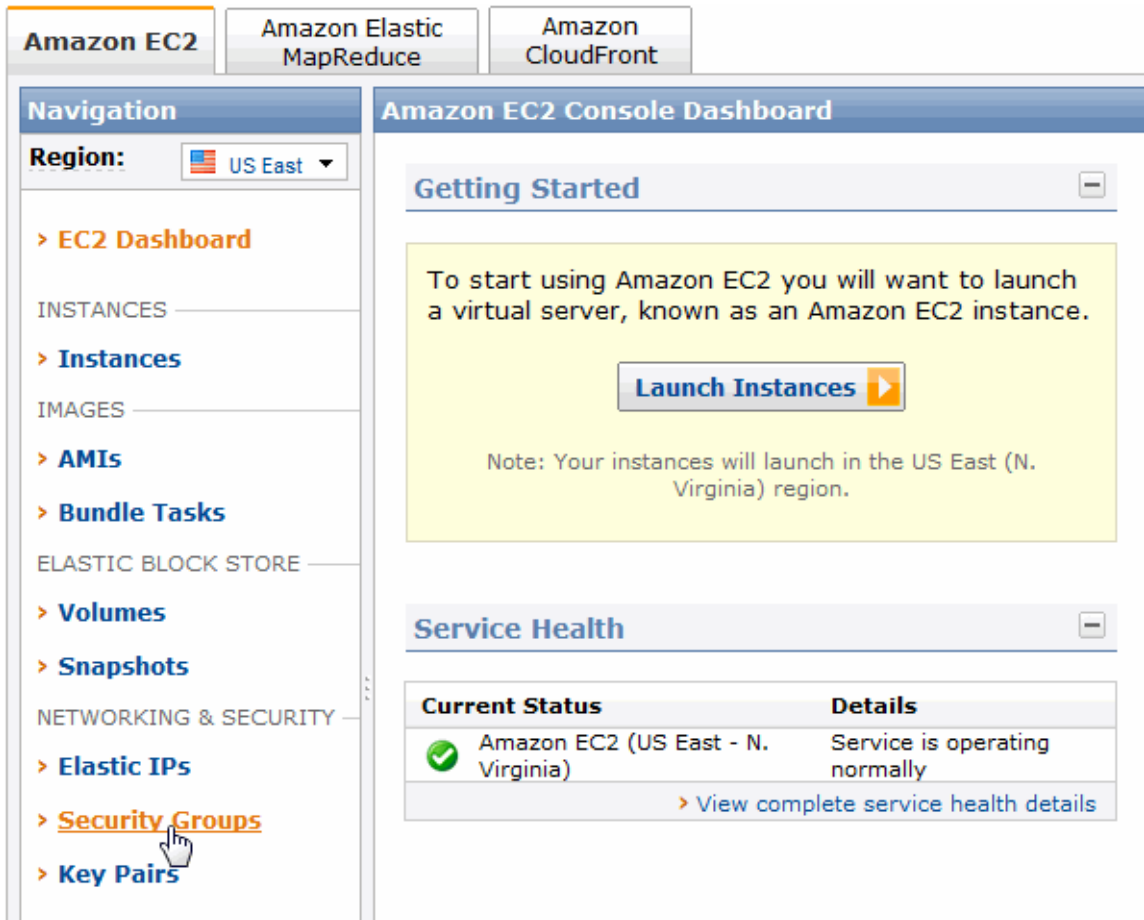
3. The AWS Management Console appears:



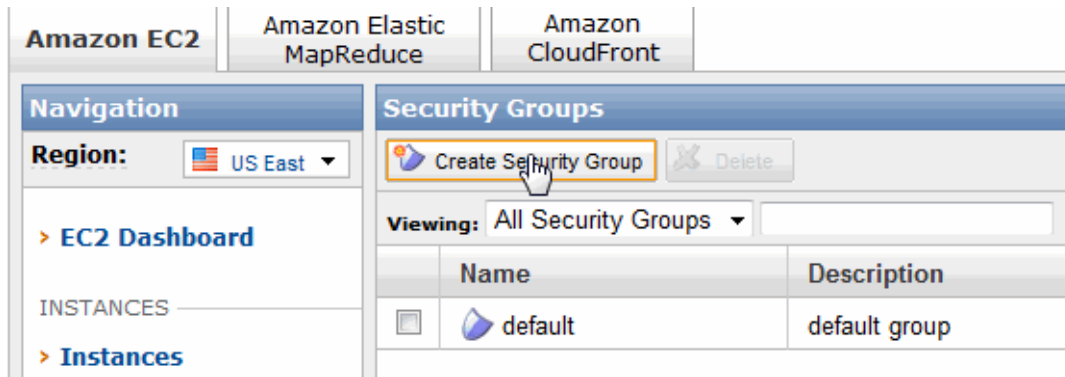
2.1.2 Creating a Security Group

A Security group is a named collection of firewall access rules for your EC2 instance. These access rules control the incoming network traffic delivered to your instance. Any incoming network traffic that does not pass the rules established in your security group is discarded. This section describes how to create a security group.

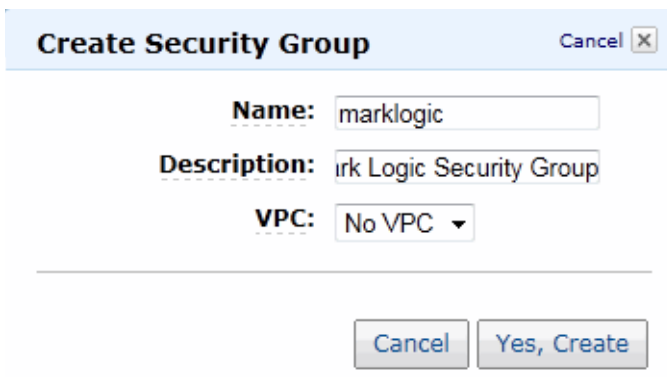
1. From the AWS Management Console, select Security Groups from the left-hand navigation section:



- In the Security Groups page, click Create Security Group:

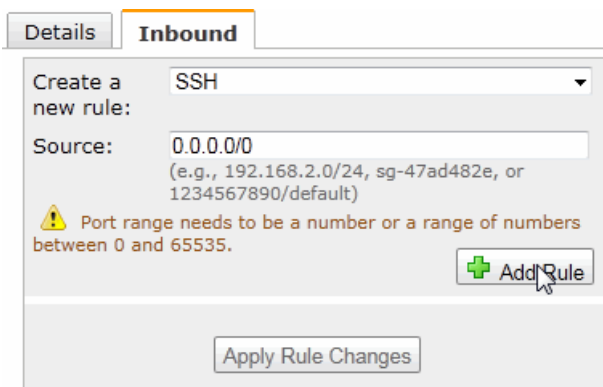


- You will be prompted for a name and description for this new security group. Enter the name and description and click Yes, Create:



- Select the newly created security group in the Security Groups page. In the Security Group section below, click on the Inbound tab and specify the connection methods for the security group.

For example, to specify SSH access, select SSH from the Create a new rule menu. Click Add Rule for each connection method you specify for this security group.



In order to secure your internal ports from attack, you can create a Custom TCP rule and specify a port range that includes 8001 for the MarkLogic Server Admin interface, as well as any other ports required for your MarkLogic Server applications. Click Add Rule to add the new rule.

Details **Inbound***

Create a new rule: Custom TCP rule

Port range: 8000-8002
(e.g., 80 or 49152-65535)

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

[+ Add Rule](#)

Your changes have not been applied yet.

[Apply Rule Changes](#)

TCP Port (Service)	Source	Action
22 (SSH)	0.0.0.0/0	Delete

- When you have finished adding all of your connection rules for the security group, click **Apply Rule Changes**.

Details **Inbound***

Create a new rule: Custom TCP rule

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

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

[+ Add Rule](#)

Your changes have not been applied yet.

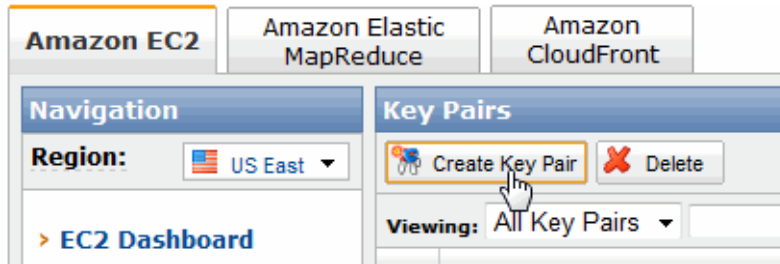
[Apply Rule Changes](#)

TCP Port (Service)	Source	Action
22 (SSH)	0.0.0.0/0	Delete
8000 - 8002	0.0.0.0/0	Delete

2.1.3 Creating a Key Pair

A key pair ensures that only you have access to your instances. You can create one or more Amazon EC2 key pairs. You can use a key pair to SSH to your instance.

1. From the AWS Management Console, select Key Pairs from the left-hand navigation section and click Create Key Pair in the Key Pairs page:



2. Enter a name for your key pair and click Create:

A screenshot of the 'Create Key Pair' dialog box. The title bar says 'Create Key Pair' and has a 'Cancel' button with an X icon. The main area contains a text input field labeled 'Key Pair Name:'. Below the input field is a horizontal line, and at the bottom center is a 'Create' button.

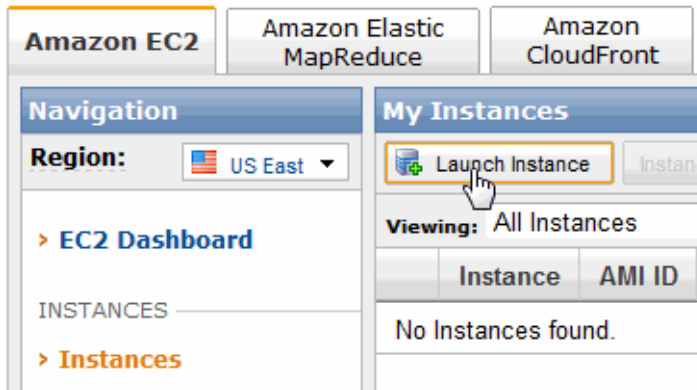
3. Your key pair will be downloaded to your local system. When the download of the key pair completes, click Save File.

Note: You will need to remember the location of the downloaded key pair on your local system should you need to create an SSH connection to your MarkLogic Server instance, as described in “Moving an EBS Volume Between Instances” on page 22.

2.2 Creating an Instance of MarkLogic Server from an AMI

This section describes how to create an instance of MarkLogic Server from a MarkLogic Server AMI.

1. From the AWS Management Console, select Instances from the left-hand navigation section and click Launch Instance in the My Instances page:



2. Select the Community AMIs tab and enter `marklogic` in the search box.
3. From the list of MarkLogic Server AMIs, locate the AMI from which you want to create your instance and click Select:



4. In the Launch Instance Wizard page, enter the number of instances, the availability zone, and the instance type (the memory and CPU resources to be used to host the instance). Select Launch Instances to pay for the Amazon resources used by your instance by the hour. Click Continue.

Request Instances Wizard Cancel

CHOOSE AN AMI **INSTANCE DETAILS** CREATE KEY PAIR CONFIGURE FIREWALL REVIEW

Provide the details for your instance(s). You may also decide whether you want to launch your instances as "on-demand" or "spot" instances.


Number of Instances: **Availability Zone:**

Instance Type:

Launch Instances

EC2 Instances let you pay for compute capacity by the hour with no long term commitments. This transforms what are commonly large fixed costs into much smaller variable costs.

Request Spot Instances

5. Click the defaults on this page. Click Continue.

Request Instances Wizard Cancel

CHOOSE AN AMI
INSTANCE DETAILS
CREATE KEY PAIR
CONFIGURE FIREWALL
REVIEW

Number of Instances: 1

Availability Zone: us-east-1a

Advanced Instance Options

Here you can choose a specific **kernel** or **RAM disk** to use with your instances. You can also choose to enable CloudWatch Monitoring or enter data that will be available from your instances once they launch.

Kernel ID:

RAM Disk ID:

Monitoring: Enable CloudWatch Monitoring for this instance
(additional charges will apply)

User Data:

base64 encoded

[< Back](#) **Continue**

6. Select the key pair you created, as described in “Creating a Key Pair” on page 11, or create a new key pair. Click Continue.

Request Instances Wizard Cancel

CHOOSE AN AMI
INSTANCE DETAILS
CREATE KEY PAIR
CONFIGURE FIREWALL
REVIEW

Public/private key pairs allow you to securely connect to your instance after it launches. To create a key pair, enter a name and click **Create & Download your Key Pair**. You will then be prompted to save the private key to your computer. Note, you only need to generate a key pair once - not each time you want to deploy an Amazon EC2 instance.

Choose from your existing Key Pairs

Your existing Key Pairs*:

Create a new Key Pair

Proceed without a Key Pair

[< Back](#) **Continue**

- Select the security group you created, as described in “Creating a Security Group” on page 8, or create a new security group. Click Continue.

Request Instances Wizard Cancel

CHOOSE AN AMI INSTANCE DETAILS CREATE KEY PAIR **CONFIGURE FIREWALL** REVIEW

Choose one or more of your existing Security Groups

Security Groups:

 (Selected groups: marklogic)

Create a new Security Group

[< Back](#) [Continue](#)

- Click Launch to create the instance.

Request Instances Wizard Cancel

CHOOSE AN AMI INSTANCE DETAILS CREATE KEY PAIR CONFIGURE FIREWALL **REVIEW**

Please review the information below, then click **Launch**.

AMI: Other Linux AMI ID ami-dbc021b2 (x86_64) [Edit AMI](#)

Number of Instances: 1
Availability Zone: us-east-1a
Monitoring: Disabled
Instance Type: Large (m1.large)
Instance Class: On Demand [Edit Instance Details](#)

Kernel ID: Use Default
Ramdisk ID: Use Default
User Data: [Edit Advanced Details](#)

Key Pair Name: marklogic [Edit Key Pair](#)

Security Group(s): marklogic [Edit Firewall](#)

[< Back](#) [Launch](#)

Note: It may take up to several minutes before your MarkLogic Server instance changes from pending to running status. Click [Refresh](#) to view the current status of your instance.

9. Select your EC2 instance and, in the Description section of the screen, note the Zone in which the instance was created. This will be needed when attaching your EBS volume to this instance.

My Instances

Launch Instance Instance Actions Reserved Instances Show/Hide Refresh Help

Viewing: All Instances All Instance Types 1 to 1 of 1 Instances

Instance	AMI ID	Root Device Type	Type	Status	Lifecycle	Public IP	Security Groups	Key Pair Name	Monitor
<input checked="" type="checkbox"/> i-abd993c3	ami-dbc021b2	instance-store	m1.large	running	normal	ec2-75-101-210-0.compute-1.amazonaws.com	marklogic	marklogic	disabled

1 EC2 Instance selected

EC2 Instance: i-abd993c3

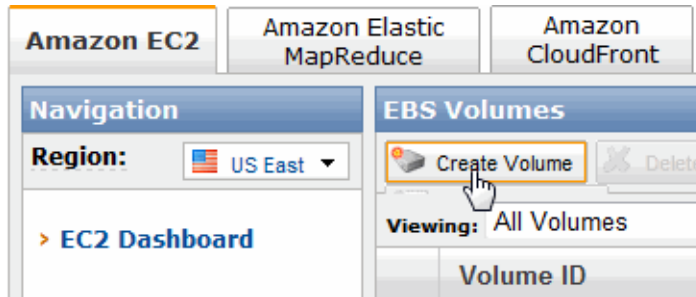
Description Monitoring

AMI ID:	ami-dbc021b2	Zone:	us-east-1a
Security Groups:	marklogic	Type:	m1.large
Status:	running	Owner:	407341317953
Reservation:	r-f533879d	Ramdisk ID:	ari-b31cf9da
Platform:	-	Key Pair Name:	marklogic
Kernel ID:	aki-b51cf9dc	Monitoring:	disabled
AMI Launch Index:	0	Elastic IP:	-
Root Device:	-	Root Device Type:	instance-store
Block Devices:	N/A - Instance Store		
Lifecycle:	normal		
Public DNS:	ec2-75-101-210-0.compute-1.amazonaws.com		
Private DNS:	domU-12-31-38-01-88-51.compute-1.internal		
Launch Time:	2009-12-15 12:39 PST		
State Transition Reason:			

2.3 Creating an EBS Volume and Attaching it to an Instance

This section describes how to create an EBS volume and attach it to your MarkLogic Server instance.

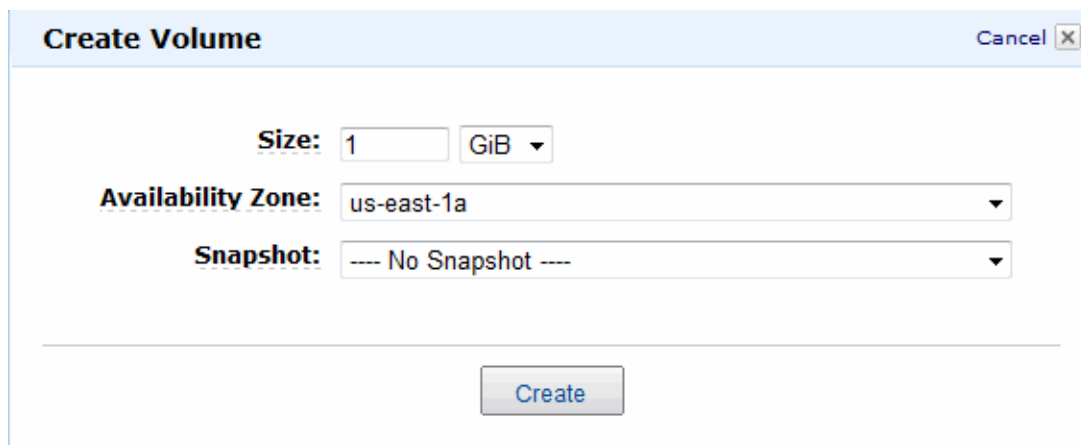
1. From the AWS Management Console, select Volumes from the left-hand navigation section. In the EBS Volumes page, select Create Volume:



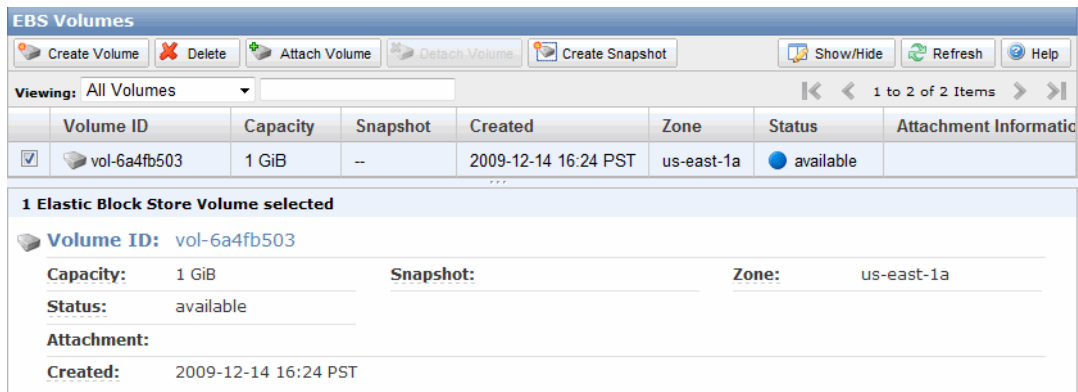
2. In the Create Volume window, specify a volume size large enough for your needs and the same availability zone associated with your instance. Specify the same zone as the instance to which you intend to attach the volume. You can also optionally specify an EBS snapshot. See Help on the EBS snapshot page for details on how to create a snapshot.

Warning The zones for your instance and EBS volume may not be the same by default.

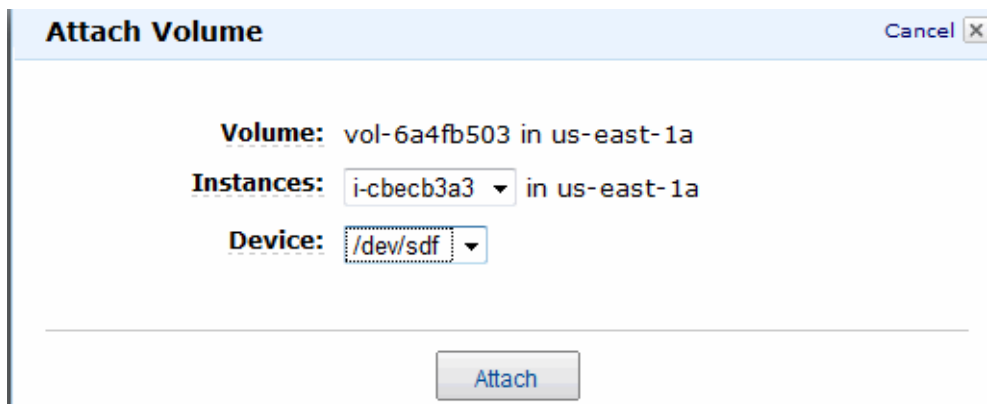
When finished, click Create. Locate the reference to this new volume in the right-hand section of the management console and verify that the status is available.

The image shows a 'Create Volume' dialog box with a 'Cancel' button in the top right corner. It contains three input fields: 'Size' with a value of '1' and a unit dropdown set to 'GiB'; 'Availability Zone' with a dropdown menu showing 'us-east-1a'; and 'Snapshot' with a dropdown menu showing '--- No Snapshot ---'. A 'Create' button is located at the bottom center of the dialog.

- From the AWS Management Console, Amazon EC2 tab, select Volumes from the left-hand navigation section and then click Attach Volume.



- In the Attach Volume window, specify the instance you launched from the MarkLogic Server AMI. For the Device selection, use `/dev/sdf`. Click Attach when you are finished. Locate the reference to this volume in the right-hand section of the management console and verify that the status is "in-use". If the status is not "in-use," continue to click Refresh until the status changes to "in-use."



When MarkLogic Server starts up, it will attempt to mount an EBS volume named `MARKLOGIC_EBS` at location `/dev/sdf`. You can mount your EBS volume in a different location by using SSH to access the instance and then changing the device path specified in `/etc/sysconfig/MarkLogic` and rebooting. MarkLogic Server will not start until it detects an attached volume.

Note: MarkLogic Server expects use of an EBS volume to be the appropriate storage choice for the majority of use cases. If, however, you prefer to use local storage, you can SSH to the instance and comment out the `MARKLOGIC_EBS` variable in `/etc/sysconfig/MarkLogic`, in which case the server will store its data locally. Repackaging the AMI will also have the effect of MarkLogic Server defaulting to local storage. Please be aware that using the local storage will not persist the stored data when the instance is terminated or if it fails. For example, if `/var/opt/MarkLogic` is local, it will disappear when the instance is terminated or fails.

2.4 Accessing the MarkLogic Server Admin Interface

This section describes how to access the Admin interface for your instance of MarkLogic Server.

1. From the AWS Management Console, select Instances from the left-hand navigation section. Locate your MarkLogic Server instance and copy the Public DNS value:

The screenshot shows the AWS Management Console interface for 'My Instances'. A table lists one instance: 'i-abd993c3' with AMI ID 'ami-dbc021b2', Root Device Type 'instance-store', Type 'm1.large', Status 'running', Lifecycle 'normal', Pu 'ec2', Security Groups 'marklogic', and Key Pair Name 'marklogic'. Below the table, the details for the selected EC2 instance 'i-abd993c3' are shown in a two-column layout.

1 EC2 Instance selected	
EC2 Instance: i-abd993c3	
Description	Monitoring
AMI ID:	ami-dbc021b2
Security Groups:	marklogic
Status:	running
Reservation:	r-f533879d
Platform:	-
Kernel ID:	aki-b51cf9dc
AMI Launch Index:	0
Root Device:	-
Block Devices:	N/A - Instance Store
Lifecycle:	normal
Public DNS:	ec2-75-101-210-0.compute-1.amazonaws.com
Private DNS:	domU-12-31-38-01-88-51.compute-1.internal
Launch Time:	2009-12-15 12:39 PST
State Transition Reason:	
Zone:	us-east-1a
Type:	m1.large
Owner:	407341317953
Ramdisk ID:	ari-b31cf9da
Key Pair Name:	marklogic
Monitoring:	disabled
Elastic IP:	-
Root Device Type:	instance-store

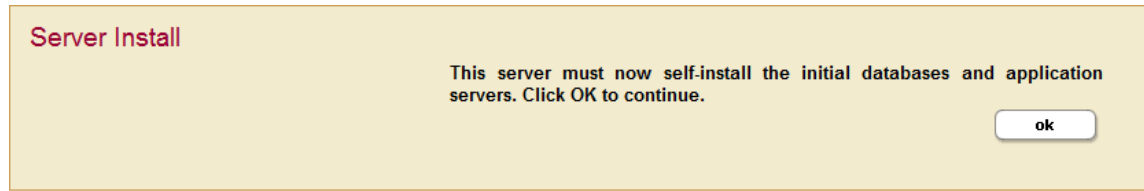
You use the Public DNS to formulate part of the URL to access the MarkLogic Server administration console. For example, if the Public DNS is `ec2-75-101-210-0.compute-1.amazonaws.com`, then the URL you enter into the browser would be:

```
http://ec2-75-101-210-0.compute-1.amazonaws.com:8001
```

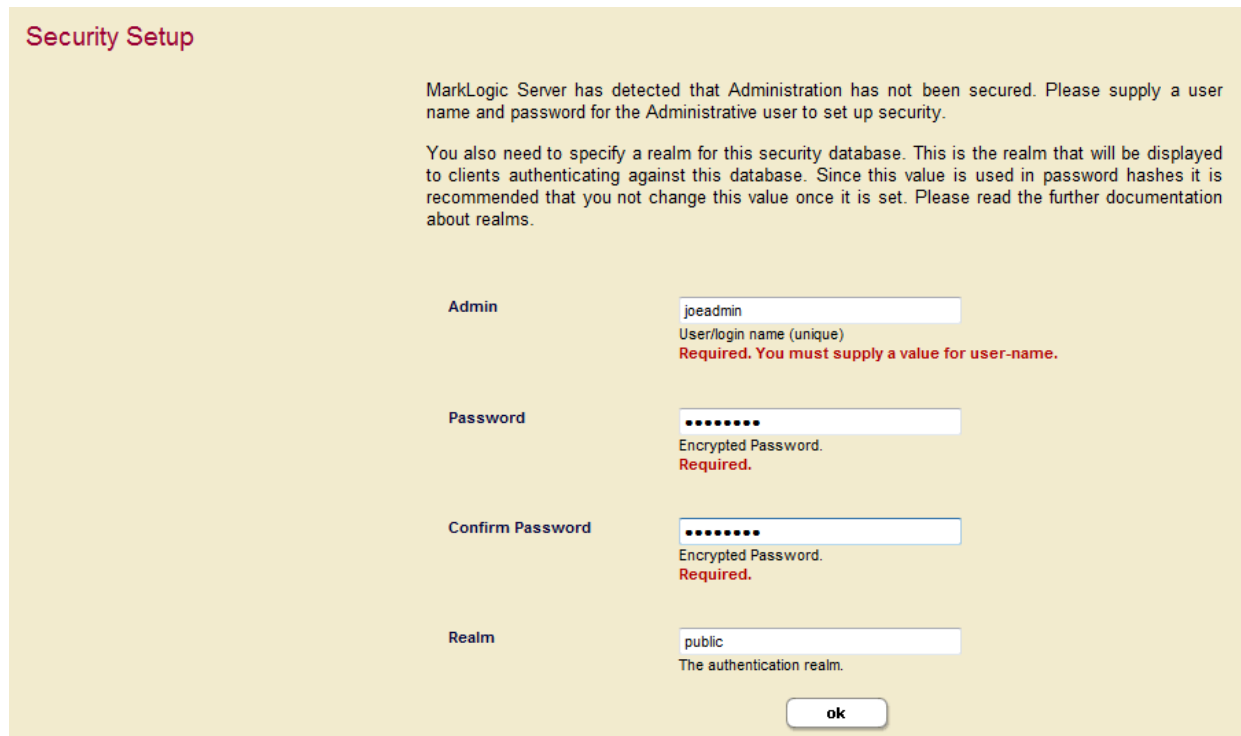
2. After entering the URL in your browser, you will be presented with a welcome screen. After clicking OK, you will be presented with the Amazon Machine Image End User License Agreement. Once you accept the terms of the agreement, click Accept.



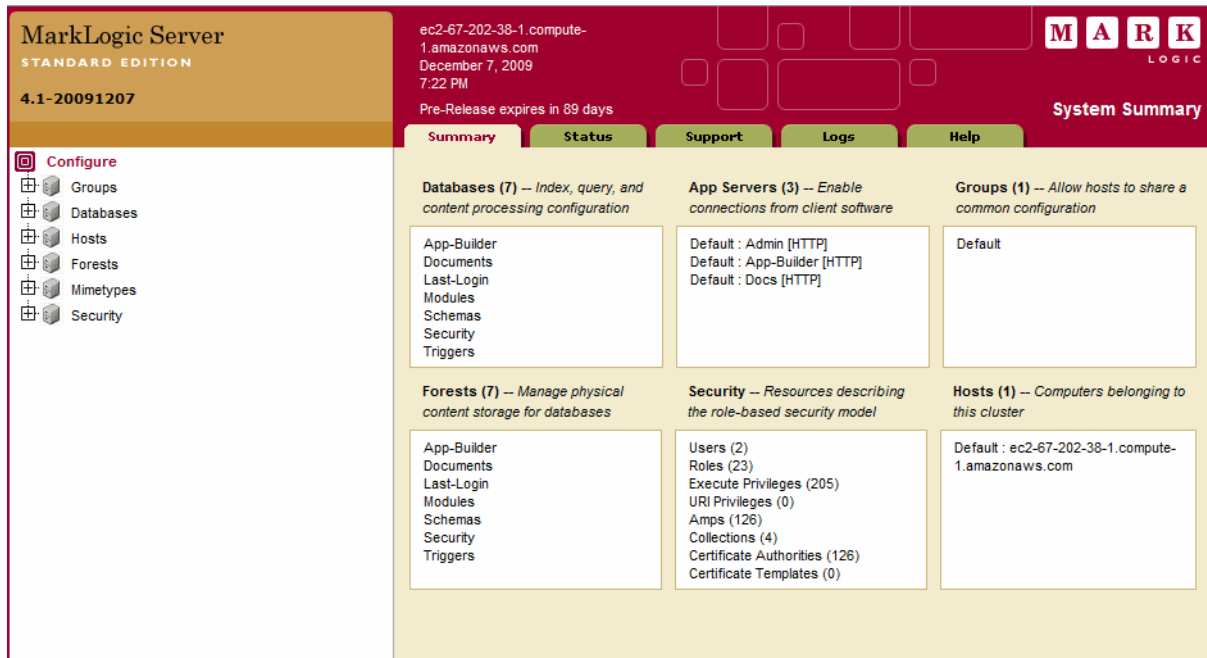
3. In the Server Install page, click OK:



4. In the Security Setup page, enter the name and password for the administrator:



5. You now have access to the MarkLogic Server Admin interface:



6. For information on getting started with MarkLogic Server and administrative tasks, go to the following URL and review the *Getting Started with MarkLogic Server* Guide and the *Administrator's Guide*:

<http://developer.marklogic.com/pubs>

2.5 Moving an EBS Volume Between Instances

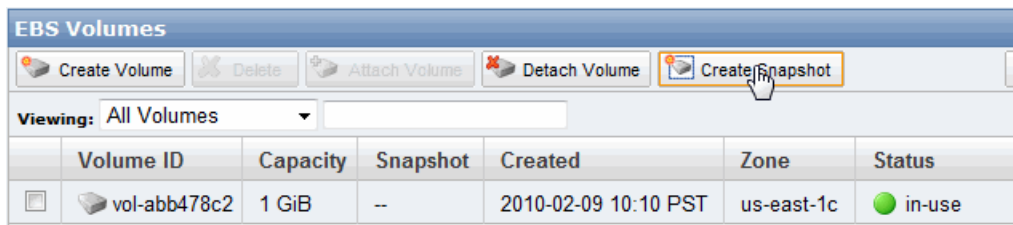
This section describes how to move an EBS volume from one MarkLogic Server instance to another. For example, you may want to populate an EBS volume using one MarkLogic Server instance for development and testing your applications and then later move it to a new instance for deployment. The topics in this section are:

- [Terminating a MarkLogic Server Instance](#)
- [Attaching an Existing EBS Volume to a New Instance](#)

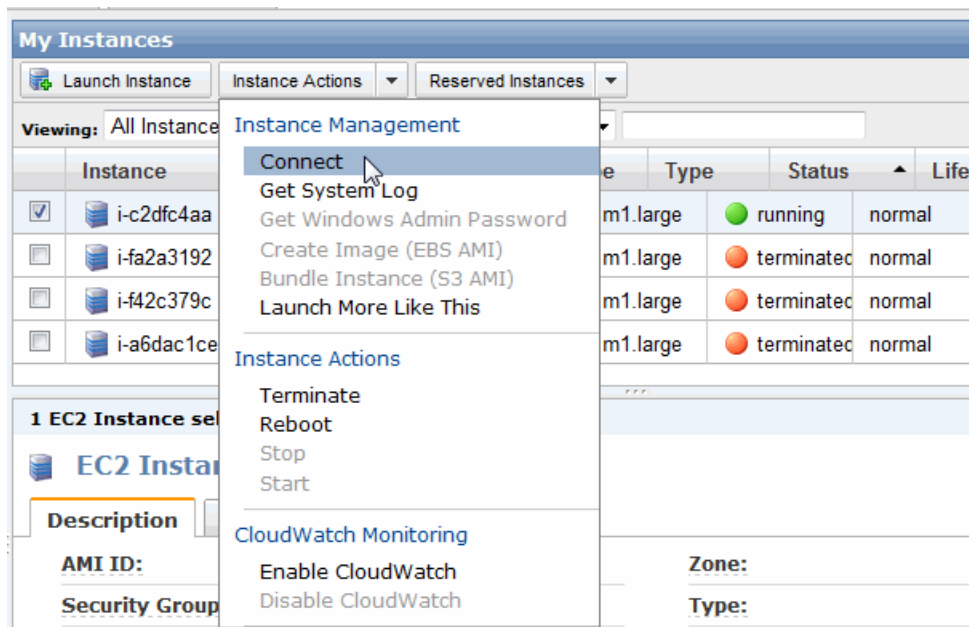
2.5.1 Terminating a MarkLogic Server Instance

To terminate an existing instance of MarkLogic Server, do the following:

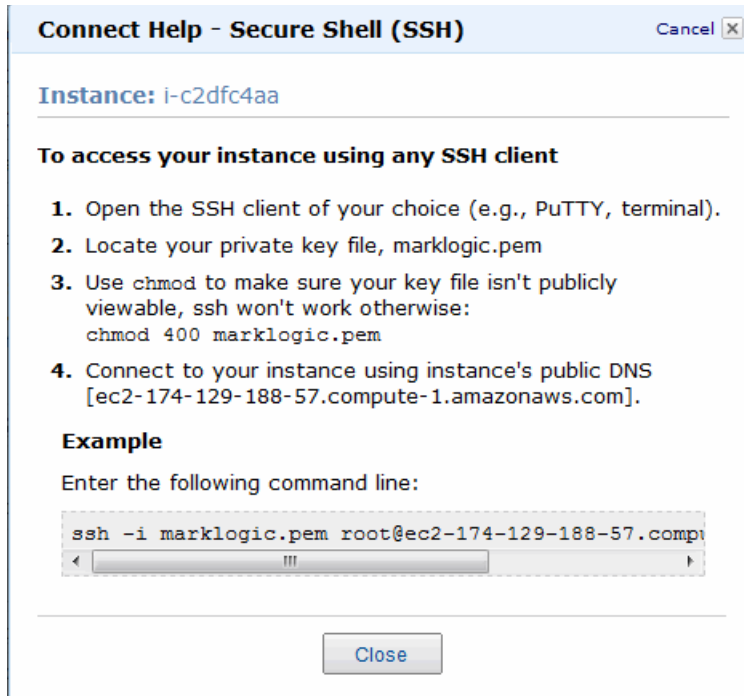
1. Select Volumes from the left-hand navigation section and create a snapshot of the volume attached to your MarkLogic Server instance.



2. Select Instances from the left-hand navigation section and select Connect from the Instance Actions pull-down menu.



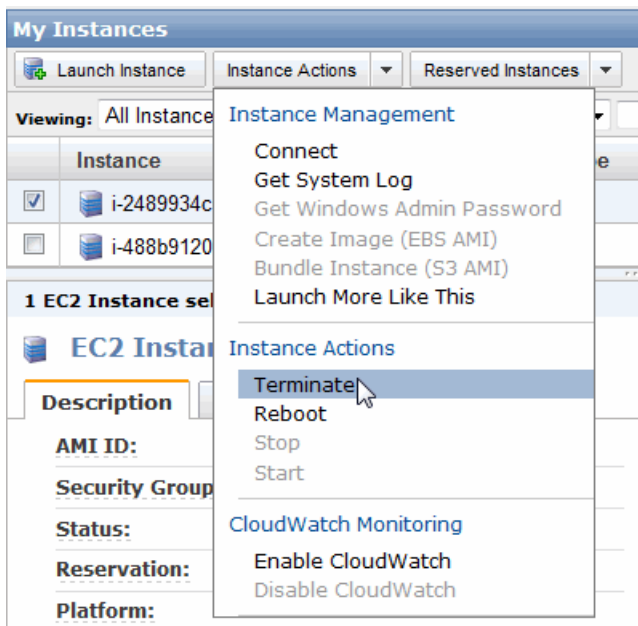
3. Open up a command line window, such as a Cygwin Bash Shell or a Putty terminal window. Navigate to the directory in which you stored the key pair you downloaded in “Creating a Key Pair” on page 11 and change the permission on the key pair file, as directed in the Connect Help window. Next, enter the command line at the bottom of the Connect Help window to create an SSH connection to your MarkLogic Server instance.



4. Once you have established an SSH connection to your MarkLogic Server instance, enter the following command in your command line window to stop MarkLogic Server:

```
/etc/init.d/MarkLogic stop
```

- Return to the AWS Management Console and select Instances from the left-hand navigation section. Select the instance to be terminated and, from the Instance Actions pull-down menu, select Terminate.



2.5.2 Attaching an Existing EBS Volume to a New Instance

To create a new instance of MarkLogic Server to use the data in an existing EBS volume, do the following:

1. Create your new instance of MarkLogic Server, as described in “Creating an Instance of MarkLogic Server from an AMI” on page 12.

Note: When creating the new instance, be sure to assign it the same zone as the old instance.

2. Select Volumes from the left-hand navigation section and click Refresh.
3. Click Attach Volume to attach the volume to your new MarkLogic Server instance.
4. In your browser, use the Public DNS from your new instance to access the Admin Interface. For example, if the Public DNS of the new instance is:

```
ec2-204-236-223-250.compute-1.amazonaws.com
```

then you use the following URL to access the Admin Interface:

```
http://ec2-204-236-223-250.compute-1.amazonaws.com:8001
```

5. In the Admin Interface, select Hosts from the left-hand navigation section. Click the hostname to open the Host Configuration window. Note that the Host Name in the Host Configuration window is the Public DNS of the terminated instance. Replace the Host Name with the Public DNS of the new instance and click OK.

3.0 Technical Support

For complete product documentation, the latest product release updates, and other useful information for developers, visit our developer site at <http://developer.marklogic.com/cloudcomputing>.

Support services are not included with MarkLogic Server for EC2 products. You can take advantage of community support by using the developer mailing list available on the developer site. Should you require formal support services, please inquire about the available options by emailing support-cloud@marklogic.com.

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