

Cloud Computing

Lab 3

Phoebe Wu

Part I

Set up AWS Instance

The image displays two side-by-side screenshots of the AWS EC2 Management Console, illustrating the steps to set up a new instance.

Left Screenshot: Step 1: Choose an Amazon Machine Image (AMI)

This step shows a list of available Amazon Machine Images (AMIs). The first item is selected:

- Red Hat Enterprise Linux version 7.6 (HVM), EBS General Purpose (SSD) Volume Type**
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
- Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0ac019f4fcbb7cb7e6 (6)**
Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available for
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
- Amazon RDS**
Are you launching a database instance? Try Amazon RDS.
Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale database management tasks. With RDS, you can easily deploy Amazon Aurora, MariaDB, MySQL, PostgreSQL, Oracle, and Microsoft SQL Server databases at 1/10th the cost of running your own servers.
[Launch a database using RDS](#)
- Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0f9cf087c1f27d9b1 (6)**
Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available for
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
- Microsoft Windows Server 2016 Base - ami-0da19d4527d55af09**
Microsoft Windows 2016 Datacenter edition. [English]
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
- Deep Learning AMI (Ubuntu) Version 19.0 - ami-00fc7481b84be120b**
With latest deep learning frameworks pre-installed: MXNet, TensorFlow, PyTorch, Keras, Chainer

Right Screenshot: Step 2: Choose an Instance Type

This step shows a table of available instance types:

Instance Type	Cores	Memory (GiB)	Storage	Network	ENAs	Up to 10 Gigabit	Up to 100 Gigabit
General purpose	m5.4xlarge	16	64	EBS only	Yes	Up to 10 Gigabit	Yes
General purpose	m5.12xlarge	48	192	EBS only	Yes	10 Gigabit	Yes
General purpose	m5.24xlarge	96	384	EBS only	Yes	25 Gigabit	Yes
General purpose	m4.large	2	8	EBS only	Yes	Moderate	-
General purpose	m4.xlarge	4	16	EBS only	Yes	High	-
General purpose	m4.2xlarge	8	32	EBS only	Yes	High	-
General purpose	m4.4xlarge	16	64	EBS only	Yes	High	-
General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit	-
General purpose	m4.16xlarge	64	256	EBS only	Yes	25 Gigabit	-
General purpose	a1.medium	1	2	EBS only	Yes	Up to 10 Gigabit	Yes
General purpose	a1.large	2	4	EBS only	Yes	Up to 10 Gigabit	Yes
General purpose	a1.xlarge	4	8	EBS only	Yes	Up to 10 Gigabit	Yes
General purpose	a1.2xlarge	8	16	EBS only	Yes	Up to 10 Gigabit	Yes

Buttons at the bottom of both screenshots include: Feedback, English (US), Cancel, Previous, Review and Launch, and Next: Configure Instance Details.

Step 7: Review Instance Launch

AMI Details

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0f9cf087c1f27d9b1

Instance Type

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized
m4.large	6.5	2	8	EBS only	Yes

Security Groups

Security group name	Description
launch-wizard-2	launch-wizard-2 created 2018-12-12T14:51:09.011-05:00

Instance Details

Storage

Feedback English (US)

EC2 Management Console

Instances

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
Webserver	i-05c0dbb271ce5ec27	m4.large	us-east-1c	running	Initializing	None	ec2-34-229-122-99.compute-1.amazonaws.com	34.229.122.99

Description **Status Checks** **Monitoring** **Tags**

Instance ID	i-05c0dbb271ce5ec27	Public DNS (IPv4)	ec2-34-229-122-99.compute-1.amazonaws.com
Instance state	running	IPv4 Public IP	34.229.122.99
Instance type	m4.large	IPv6 IPs	-
Elastic IPs	-	Private DNS	ip-172-31-31-205.ec2.internal
Availability zone	us-east-1c	Private IPs	172.31.31.205
Security groups	launch-wizard-1. view inbound rules. view outbound rules	Secondary private IPs	-
Scheduled events	No scheduled events	VPC ID	vpc-883deff2
AMI ID	ubuntu/images/hvm-ssd/ubuntu-xenial-16.04-amd64-server-20181114 (ami-0f9cf087c1f27d9b1)	Subnet ID	subnet-33154479
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	MyKeypair	T2/T3 Unlimited	-
Owner	146747544651	EBS-optimized	True
Launch time	December 12, 2018 at 2:49:50 PM UTC-5 (less than one hour)	Root device type	ebs
Termination protection	False	Root device	/dev/sda1

Feedback English (US)

© 2008 - 2018, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use

Login

```
wansMacBookPro:Downloads phoebewu$ ssh -i MyKeypair.pem ubuntu@ec2-34-229-122-99.compute-1.amazonaws.com
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-1072-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

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

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-172-31-31-205:~$
```

Package Installations & Install Java

```
[ubuntu@ip-172-31-31-205:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:4 http://us-ea[ubuntu@ip-172-31-31-205:~$ sudo apt-get upgrade
Get:5 http://us-ea Reading package lists... Done
Get:6 http://us-ea Building dependency tree
Get:7 http://secur Reading state information... Done
Get:8 http://us-ea Calculating upgrade... Done
Get:9 http://us-ea The following package
  linux-aws linux-hea
Get:10 http://us-e The following package
  git git-man grub-co
Get:11 http://us-e libufsas12-modules-db
Get:12 http://us-e ubuntu-release-upgr
26 upgraded, 0 newly
Get:13 http://us-e Need to get 22.6 MB o
Get:14 http://us-e After this operation,
26 upgraded, 0 newly
Get:15 http://us-e Do you want to contin
Get:16 http://us-e Get:1 http://us-east-
Get:17 http://us-e Do you want to contin
Get:18 http://us-e Get:2 http://us-east-
Get:19 http://us-e Get:3 http://us-east-
Get:20 http://us-e Get:4 http://us-east-
Get:21 http://us-e Get:5 http://us-east-
Get:22 http://us-e Get:6 http://us-east-
Get:23 http://us-e Get:7 http://us-east-
Get:24 http://us-e Get:8 http://us-east-
Get:25 http://us-e Get:9 http://us-east-
Get:26 http://us-e Get:10 http://us-east-
Get:27 http://us-e Get:11 http://us-east-
Get:28 http://us-e Get:12 http://us-east-
Get:29 http://secu Get:13 http://us-east-
Get:30 http://secu Get:14 http://us-east-
Get:31 http://secu Get:15 http://us-east-
Get:32 http://secu Get:16 http://us-east-
Get:33 http://secu Get:17 http://us-east-
Get:18 http://us-east-
Get:19 http://us-east-
Get:20 http://us-east-
Get:21 http://us-east-
Get:22 http://us-east-
Get:23 http://us-east-
Get:24 http://us-east-
Get:25 http://us-east-
Get:26 http://us-east-
Get:27 http://us-east-
Get:28 http://us-east-
Get:29 http://us-east-
Get:30 http://us-east-
Get:31 http://us-east-
Get:32 http://us-east-
Get:33 http://us-east-
Get:34 http://us-east-
[ubuntu@ip-172-31-31-205:~$ sudo apt-get install default-jre
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ca-certificates-java default-jre-headless fontconfig fontconfig-config fonts-dejavu-core fonts-dejavu-extra hicolor-icon-theme java-common
  libasound2 libasound2-data libasynncns0 libatk1.0-0 libatk1.0-data libavahi-client3 libavahi-common-data libcairo2 libcurl2
  libdatrie1 libdrm-amdgpu1 libdrm-intel1 libdrm-nouveau2 libdrm-radeon1 libflac8 libfontconfig1 libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-common libgif7
  libgl1-mesa-dri libgl1-mesa-glx libglapi-mesa libgraphite2-3 libgtk2.0-0 libgtk2.0-bin libgtk2.0-common libharfbuzz0b libjbig0 libjpeg-turbo8
  libjpeg8 liblcms2-2 libllvm6.0 libnsspr4 libnss3 libnss3-nssdb libogg0 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0
  libpcslite1 libpixman-1-0 libpulse0 libsensors4 libsndfile1 libthai-data libthai0 libtiff5 libtxc-dxtn-s2tc0 libvorbis0a libvorbisenc2
  libx11-xcb1 libxcb-dri2-0 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-render0 libxcb-shm0 libxcb-sync1 libcomposite1 libxcursor1
  libxdamage1 libxf86fixes3 libxi6 libxinerama1 libxrandr2 libxrender1 libxshmfence1 libxtst6 libxf86vm1 openjdk-8-jre openjdk-8-jre-headless
  x11-common
Suggested packages:
  default-java-plugin lib
  libnss-mdns fonts-ipafonts ipafonts
The following NEW package
  ca-certificates-java de
  java-common libasound2
  libcurl2 libdatrie1 lib
  libgdk-pixbuf2.0-common libgif7 libgl1-mesa-dri libgl1-mesa-glx libglapi-mesa libgraphite2-3 libgtk2.0-0 libgtk2.0-bin libgtk2.0-common
  libharfbuzz0b libjbig0 libjpeg-turbo8 liblcms2-2 libllvm6.0 libnsspr4 libnss3 libnss3-nssdb libogg0 libpango-1.0-0 libpangocairo-1.0-0
  libpangoft2-1.0-0 libpciaccess0 libpcslite1 libpixman-1-0 libpulse0 libsensors4 libsndfile1 libthai-data libthai0 libtiff5 libtxc-dxtn-s2tc0
  libvorbis0a libvorbisenc2 libx11-xcb1 libxcb-dri2-0 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-render0 libxcb-shm0 libxcb-sync1
  libcomposite1 libxcursor1 libxdamage1 libxf86fixes3 libxi6 libxinerama1 libxrandr2 libxrender1 libxshmfence1 libxtst6 libxf86vm1 openjdk-8-jre
  openjdk-8-jre-headless x11-common
0 upgraded, 83 newly installed, 0 to remove and 3 not upgraded.
Need to get 58.0 MB of archives.
After this operation, 341 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 fonts-dejavu-core all 2.35-1 [1,039 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 fontconfig-confia all 2.11.94-0ubuntu1.1 [49.9 kB]
```

Elasticsearch Installation

```
[ubuntu@ip-172-31-31-205:~$ wget -qO - https://artifacts.elastic.co/GPG-KEY-elasticsearch | sudo apt-key add -
OK
ubuntu@ip-172-31-31-205:~$ echo "deb https://artifacts.elastic.co/packages/6.x/apt stable main" | sudo tee -a /etc/apt/sources.list.d/elastic-6.x.list
deb https://artifacts.elastic.co/packages/6.x/apt stable main
ubuntu@ip-172-31-31-205:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-backports InRelease
Ign:4 https://artifacts.elastic.co/packages/6.x/apt stable InRelease
Get:5 https://artifacts.elastic.co/packages/6.x/apt stable Release [5,116 B]
Hit:6 http://security.ubuntu.com/ubuntu xenial-security InRelease
Get:7 https://artifacts.elastic.co/packages/6.x/apt stable Release.gpg [473 B]
Get:8 https://artifacts.elastic.co/packages/6.x/apt stable/main amd64 Packages [36.3 kB]
Fetched 41.9 kB in 0s (116 kB/s)
Reading package lists... Done
[ubuntu@ip-172-31-31-205:~$ sudo apt-get install elasticsearch
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  elasticsearch
0 upgraded, 1 newly installed, 0 to remove and 3 not upgraded.
Need to get 113 MB of archives.
After this operation, 168 MB of additional disk space will be used.
Get:1 https://artifacts.elastic.co/packages/6.x/apt stable/main amd64 elasticsearch all 6.5.3 [113 MB]
Fetched 113 MB in 3s (35.2 MB/s)
Selecting previously unselected package elasticsearch.
(Reading database ... 52849 files and directories currently installed.)
Preparing to unpack .../elasticsearch_6.5.3_all.deb ...
/usr/bin/java
Creating elasticsearch group... OK
Creating elasticsearch user... OK
Unpacking elasticsearch (6.5.3) ...
Processing triggers for systemd (229-4ubuntu21.10) ...
Processing triggers for ureadahead (0.100.0-19) ...
Setting up elasticsearch (6.5.3) ...
Created elasticsearch keystore in /etc/elasticsearch
Processing triggers for systemd (229-4ubuntu21.10) ...
Processing triggers for ureadahead (0.100.0-19) ...
```

Elasticsearch configuration file

```
ubuntu@ip-172-31-31-205: ~ ssh -i MyKeypair.pem ubuntu@ec2-34-229-122-99.compute-1.amazonaws.com 149x57
GNU nano 2.5.3          File: /etc/elasticsearch/elasticsearch.yml

# ===== Elasticsearch Configuration =====
#
# NOTE: Elasticsearch comes with reasonable defaults for most settings.
#       Before you set out to tweak and tune the configuration, make sure you
#       understand what are you trying to accomplish and the consequences.
#
# The primary way of configuring a node is via this file. This template lists
# the most important settings you may want to configure for a production cluster.
#
# Please consult the documentation for further information on configuration options:
# https://www.elastic.co/guide/en/elasticsearch/reference/index.html
#
# ----- Cluster -----
#
# Use a descriptive name for your cluster:
#
#cluster.name: my-application
#
# ----- Node -----
#
# Use a descriptive name for the node:
#
#node.name: node-1
#
# Add custom attributes to the node:
#
#node.attr.rack: r1
#
# ----- Paths -----
#
# Path to directory where to store the data (separate multiple locations by comma):
#
path.data: /var/lib/elasticsearch
#
# Path to log files:
#
path.logs: /var/log/elasticsearch
#
# ----- Memory -----
#
# Lock the memory on startup:
#
#bootstrap.memory_lock: true
#
# Make sure that the heap size is set to about half the memory available
# on the system and that the owner of the process is allowed to use this
# limit.
#
# Elasticsearch performs poorly when the system is swapping the memory.
#
# ----- Network -----
#
#
^G Get Help      ^O Write Out    ^W Where Is     ^K Cut Text      ^J Justify      ^C Cur Pos      ^Y Prev Page    M-\ First Line   M-W Whereis Next
^X Exit         ^R Read File    ^\ Replace      ^U Uncut Text    ^T To Spell     ^_ Go To Line   ^V Next Page    M-/ Last Line    M-J To Bracket
```

Elasticsearch Test:

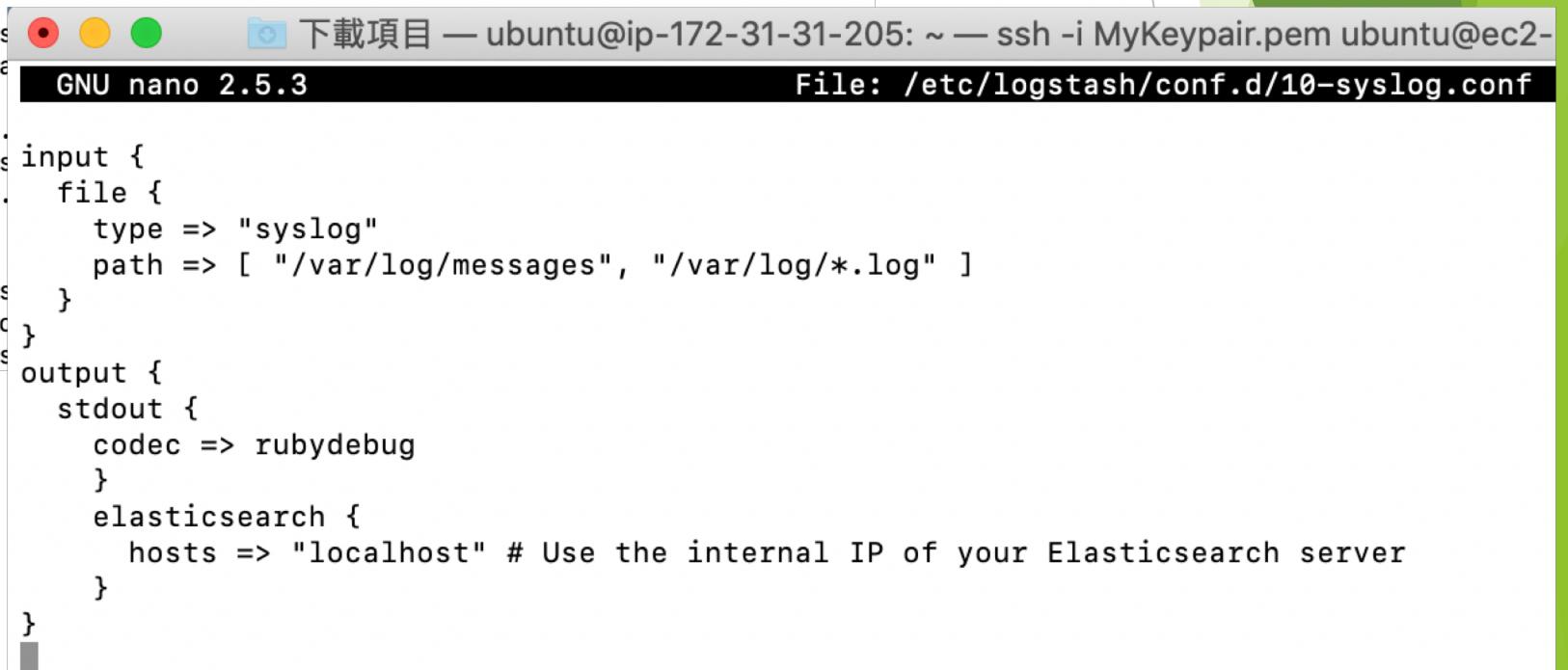
```
ubuntu@ip-172-31-31-205:~$ sudo curl http://localhost:9200
{
  "name" : "Jd9ICGV",
  "cluster_name" : "elasticsearch",
  "cluster_uuid" : "DESRrazEQQeCbPYsE18fWw",
  "version" : {
    "number" : "6.5.3",
    "build_flavor" : "default",
    "build_type" : "deb",
    "build_hash" : "159a78a",
    "build_date" : "2018-12-06T20:11:28.826501Z",
    "build_snapshot" : false,
    "lucene_version" : "7.5.0",
    "minimum_wire_compatibility_version" : "5.6.0",
    "minimum_index_compatibility_version" : "5.0.0"
  },
  "tagline" : "You Know, for Search"
}

ubuntu@ip-172-31-31-205:~$
```

Logstash Installation

```
[ubuntu@ip-172-31-31-205:~$ sudo apt-get install logstash
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  logstash
0 upgraded, 1 newly installed, 0 to remove and 3 not upgraded.
Need to get 162 MB of archives.
After this operation, 289 MB of additional disk space will be used.
Get:1 https://artifacts.elastic.co/packages/6.x/debian/binary/ logstash_1%3a6.5.3-1_all.deb [162.0MB]
Fetched 162 MB in 5s (31.4 MB/s)
Selecting previously unselected package logstash.
(Reading database ... 53255 files and directories currently installed.)
Preparing to unpack .../logstash_1%3a6.5.3-1_all.deb ...
Unpacking logstash (1:6.5.3-1) ...
Setting up logstash (1:6.5.3-1) ...
Using provided startup.options file: /etc/logstash/startup.options
Successfully created system startup script for Logstash.
[ubuntu@ip-172-31-31-205:~$ sudo nano /etc/logstash/conf.d/10-syslog.conf
```

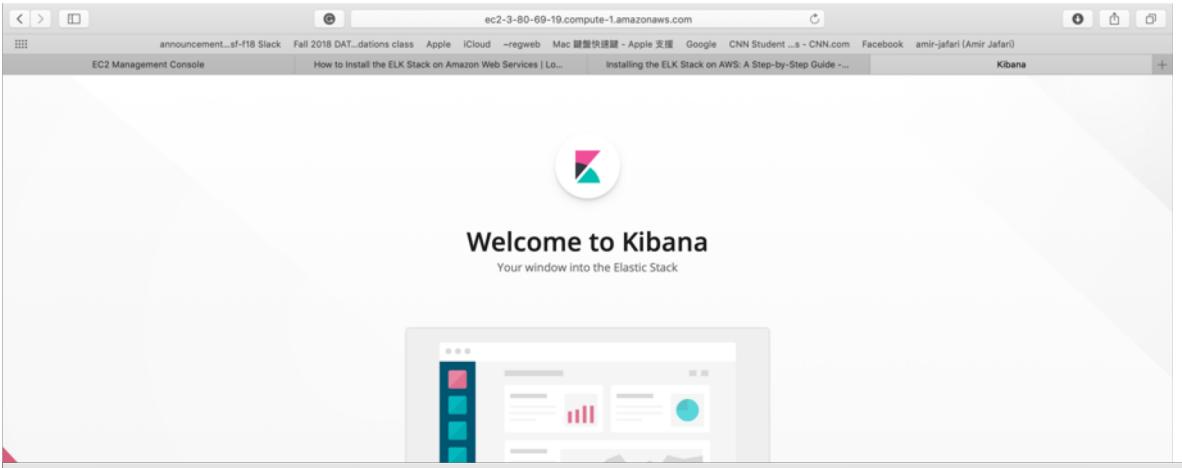
Create a Logstash configuration file



The screenshot shows a terminal window titled "下載項目 — ubuntu@ip-172-31-31-205: ~ — ssh -i MyKeypair.pem ubuntu@ec2-". The window displays the contents of the file "/etc/logstash/conf.d/10-syslog.conf" using the GNU nano 2.5.3 editor. The configuration file contains the following code:

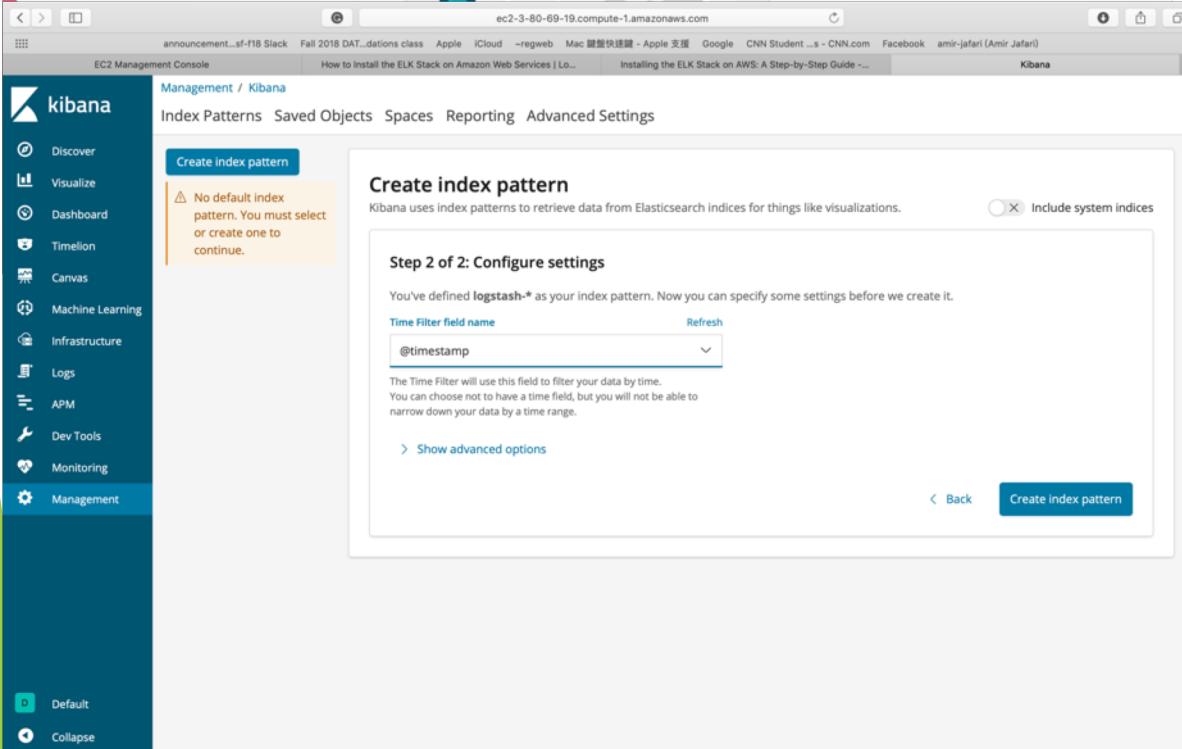
```
input {
  file {
    type => "syslog"
    path => [ "/var/log/messages", "/var/log/*.log" ]
  }
}
output {
  stdout {
    codec => rubydebug
  }
  elasticsearch {
    hosts => "localhost" # Use the internal IP of your Elasticsearch server
  }
}
```

Login Kibana



Welcome to Kibana
Your window into the Elastic Stack

The Kibana interface shows a dashboard with various visualizations like charts and maps. A sidebar on the left lists navigation options: Discover, Visualize, Dashboard, Timelion, Canvas, Machine Learning, Infrastructure, Logs, APM, Dev Tools, and Management.



Create index pattern

No default index pattern. You must select or create one to continue.

Step 2 of 2: Configure settings

You've defined logstash-* as your index pattern. Now you can specify some settings before we create it.

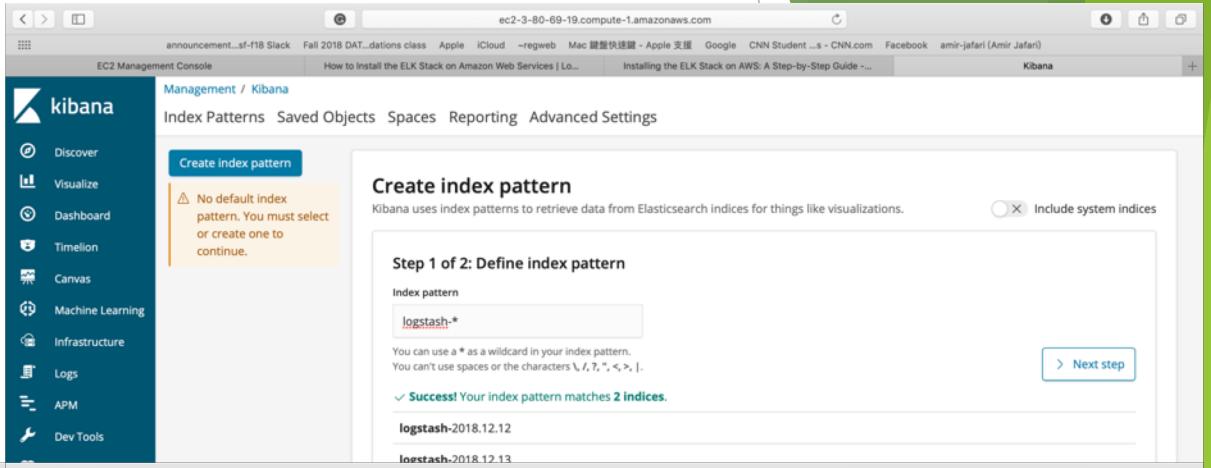
Time Filter field name: @timestamp

The Time Filter will use this field to filter your data by time. You can choose not to have a time field, but you will not be able to narrow down your data by a time range.

Show advanced options

Back Create index pattern

The sidebar includes: Default, Collapse, Management, Monitoring, Dev Tools, APM, Logs, Infrastructure, Machine Learning, Canvas, Timelion, Dashboard, Visualize, Discover, and Create index pattern.



Create index pattern

No default index pattern. You must select or create one to continue.

Step 1 of 2: Define index pattern

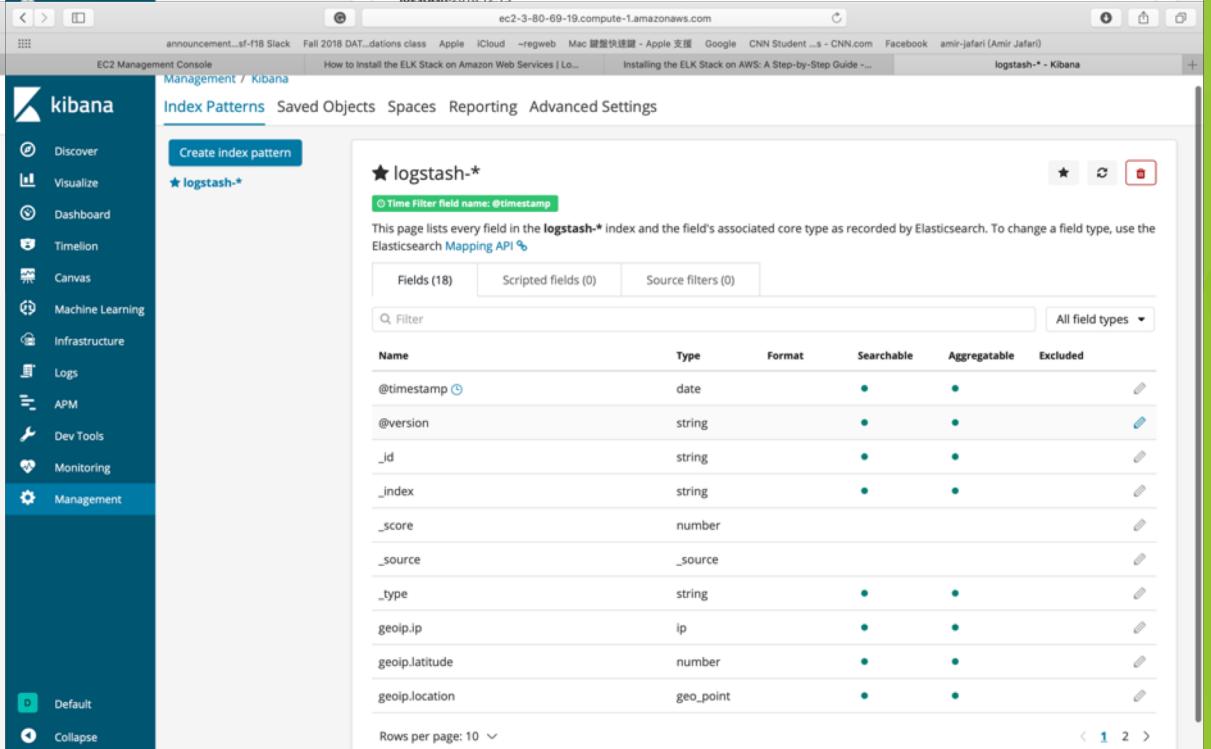
Index pattern: logstash-*

You can use a * as a wildcard in your index pattern. You can't use spaces or the characters \, /, ?, ., <, >, |.

Success! Your index pattern matches 2 indices.

logstash-2018.12.12
logstash-2018.12.13

Next step



Index Patterns Saved Objects Spaces Reporting Advanced Settings

logstash-*

Time Filter field name: @timestamp

This page lists every field in the logstash-* index and the field's associated core type as recorded by Elasticsearch. To change a field type, use the Elasticsearch Mapping API.

Name	Type	Format	Searchable	Aggregatable	Excluded
@timestamp	date				
@version	string				
_id	string				
_index	string				
_score	number				
_source	_source				
_type	string				
geoip.ip	ip				
geoip.latitude	number				
geoip.location	geo_point				

Fields (18) Scripted fields (0) Source filters (0)

Filter All field types

Rows per page: 10 1 2

Kibana Graphics View

