

Cloud Computing

Lab 1

Phoebe Wu

Part-I:

Compute Instances

Launch EC2 instance

The screenshot shows the AWS EC2 Management Console interface. The left sidebar navigation includes: EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES (with Instances selected), Launch Templates, Spot Requests, Reserved Instances, Dedicated Hosts, Scheduled Instances, IMAGES (with AMIs selected), Bundle Tasks, ELASTIC BLOCK STORE (with Volumes selected), Snapshots, Lifecycle Manager, NETWORK & SECURITY (with Security Groups selected), Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, and LOAD BALANCING.

The main content area displays the "Launch Instance" wizard. At the top, there are tabs for "Launch Instance" (selected), "Connect", and "Actions". Below this is a search bar with the placeholder "Filter by tags and attributes or search by keyword". A table lists five terminated instances: Web Server, Webserver, Auto Scaling, Web Server4, and Web Server3. The last instance, Web Server3, is highlighted with a blue selection bar.

Below the table, the instance details for "Web Server3" are shown:

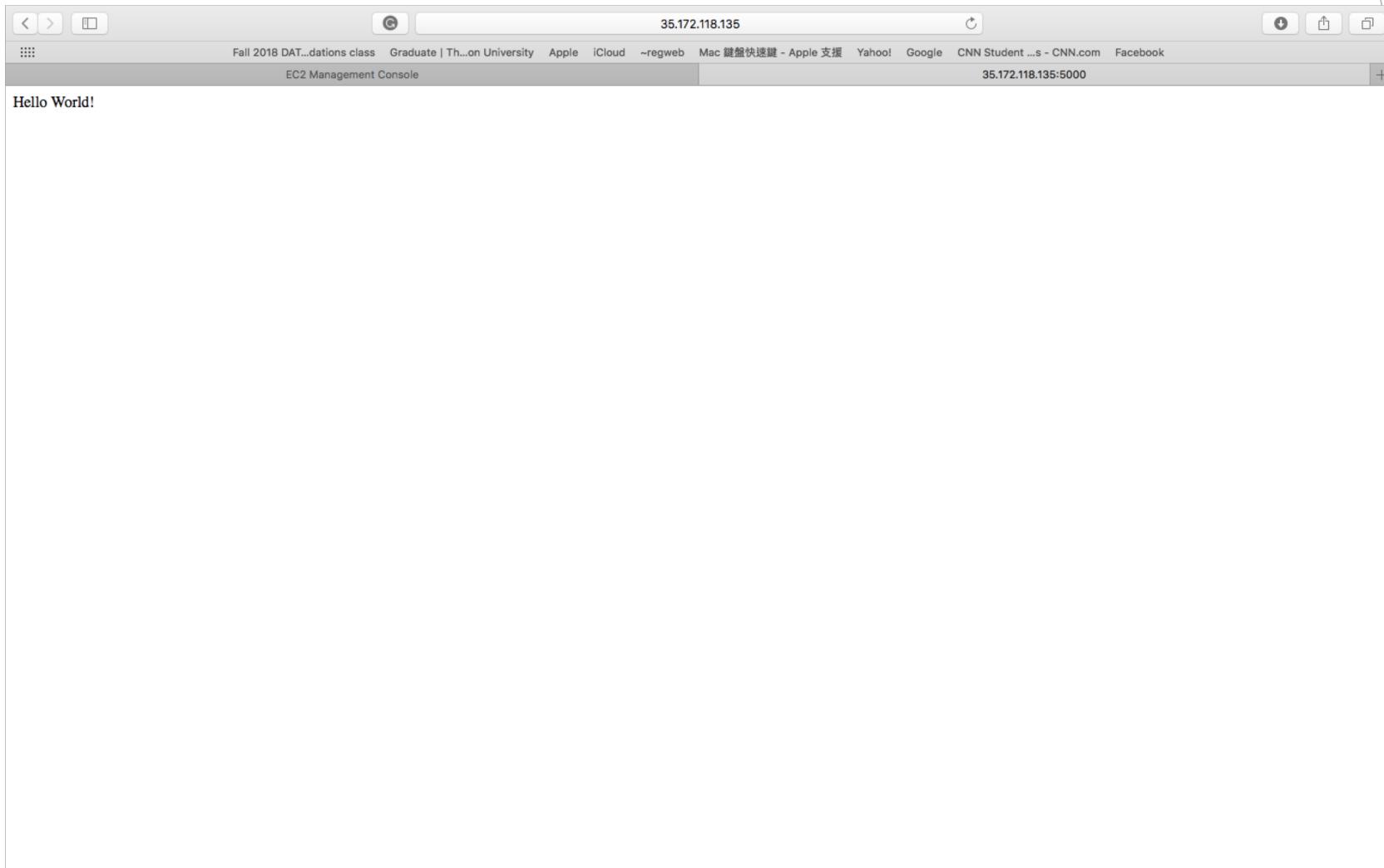
Description	Status Checks	Monitoring	Tags
Instance ID: i-0c8228a2bc200f34d			
Instance state: running			
Instance type: t2.micro			
Elastic IPs: -			
Availability zone: us-east-1b			
Security groups: launch-wizard-3, view inbound rules, view outbound rules			
Scheduled events: No scheduled events			
AMI ID: amzn-ami-hvm-2018.03.0.20180811-x86_64-gp2 (ami-0ff8a91507f77f867)			
Platform: -			
IAM role: -			
Key pair name: MyKeypair			
Owner: 146747544651			
Launch time: September 28, 2018 at 3:20:30 PM UTC-4 (1 hour)			
Public DNS (IPv4): ec2-54-175-107-190.compute-1.amazonaws.com			
IPv4 Public IP: 54.175.107.190			
IPv6 IPs: -			
Private DNS: ip-172-31-95-45.ec2.internal			
Private IPs: 172.31.95.45			
Secondary private IPs: -			
VPC ID: vpc-883deff2			
Subnet ID: subnet-c839b4e6			
Network interfaces: eth0			
Source/dest. check: True			
T2/T3 Unlimited: Disabled			
EBS-optimized: False			
Root device type: ebs			

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Virtualization Type of EC2

- ▶ I think Amazon EC2 is a kind of Hardware virtualization.

Exercise-2(Setup Flask and run hello.py):



Exercise-3(Meta-data flask application):

First, run the commands:

```
curl http://169.254.169.254/latest/meta-data/instance-id > a.txt  
curl http://169.254.169.254/latest/meta-data/instance-id > b.txt  
curl http://169.254.169.254/latest/meta-data/public-hostname > c.txt  
curl http://169.254.169.254/latest/meta-data/public-ipv4 > d.txt  
curl http://169.254.169.254/latest/meta-data/local-hostname > e.txt  
curl http://169.254.169.254/latest/meta-data/local-ipv4 > f.txt
```

The output:

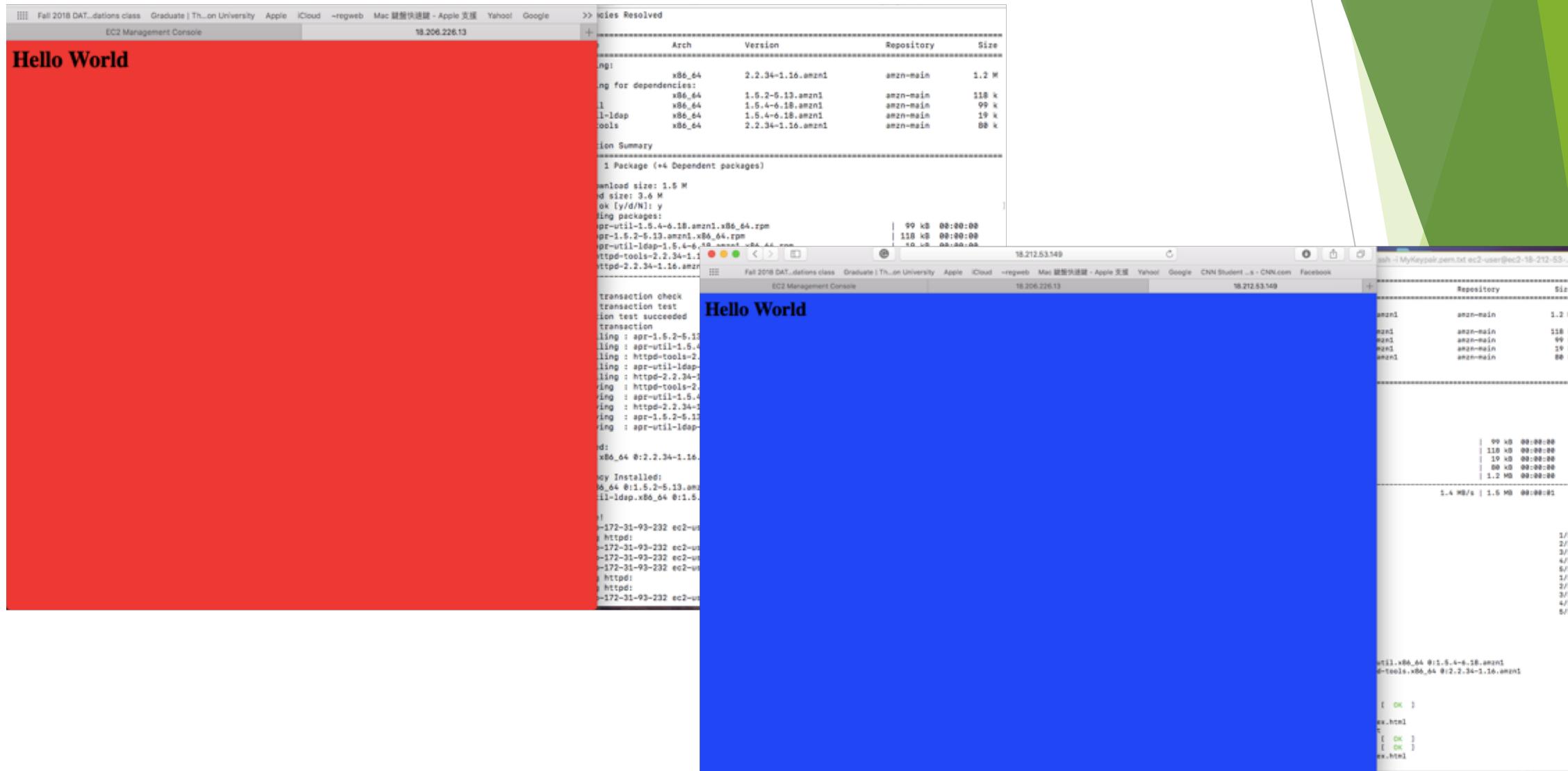
```
instantid:i-0d5e8e1c31c011839  
ami-launch-index:i-0d5e8e1c31c011839  
public-hostname:ec2-18-234-142-15.compute-1.amazonaws.com  
public-ipv4:18.234.142.15  
local-hostname:ip-172-31-81-0.ec2.internal  
local-ipv4:172.31.81.0
```

```
from flask import Flask  
application = Flask(__name__)  
@application.route("/")  
def hello():  
    content=""  
    with open("a.txt",'r') as rd1:  
        instantid = rd1.read()  
    with open("b.txt",'r') as rd2:  
        index = rd2.read()  
    with open("c.txt",'r') as rd3:  
        hostname = rd3.read()  
    with open("d.txt",'r') as rd4:  
        pip = rd4.read()  
    with open("e.txt",'r') as rd5:  
        lhostname = rd5.read()  
    with open("f.txt",'r') as rd6:  
        lip = rd6.read()  
    content += "<h4>instantid:" + instantid + "</h4>"  
    content += "<h4>ami-launch-index:" + index + "</h4>"  
    content += "<h4>public-hostname:" + hostname + "</h4>"  
    content += "<h4>public-ipv4:" + pip + "</h4>"  
    content += "<h4>local-hostname:" + lhostname + "</h4>"  
    content += "<h4>local-ipv4:" + lip + "</h4>"  
    return content  
if __name__ == "__main__":  
    application.run(host='0.0.0.0')
```

Part-II:

Load Balancing

Create two instances and run the hello.py



ELB details and web application

The screenshot shows the AWS EC2 Management Console interface. The left sidebar navigation includes 'Instances', 'AMIs', 'Elastic Block Store', 'Network & Security', 'Load Balancing' (with 'Load Balancers' selected), and 'Auto Scaling'. The main content area displays a table of load balancers with one entry: myLB2. Below the table, the 'Basic Configuration' section provides detailed information about the load balancer.

Name	DNS name	State	VPC ID	Availability Zones	Type
myLB2	myLB2-716519872.us-east-1.elb.amazonaws.com	active	vpc-883deff2	us-east-1c, us-east-1f, ...	application

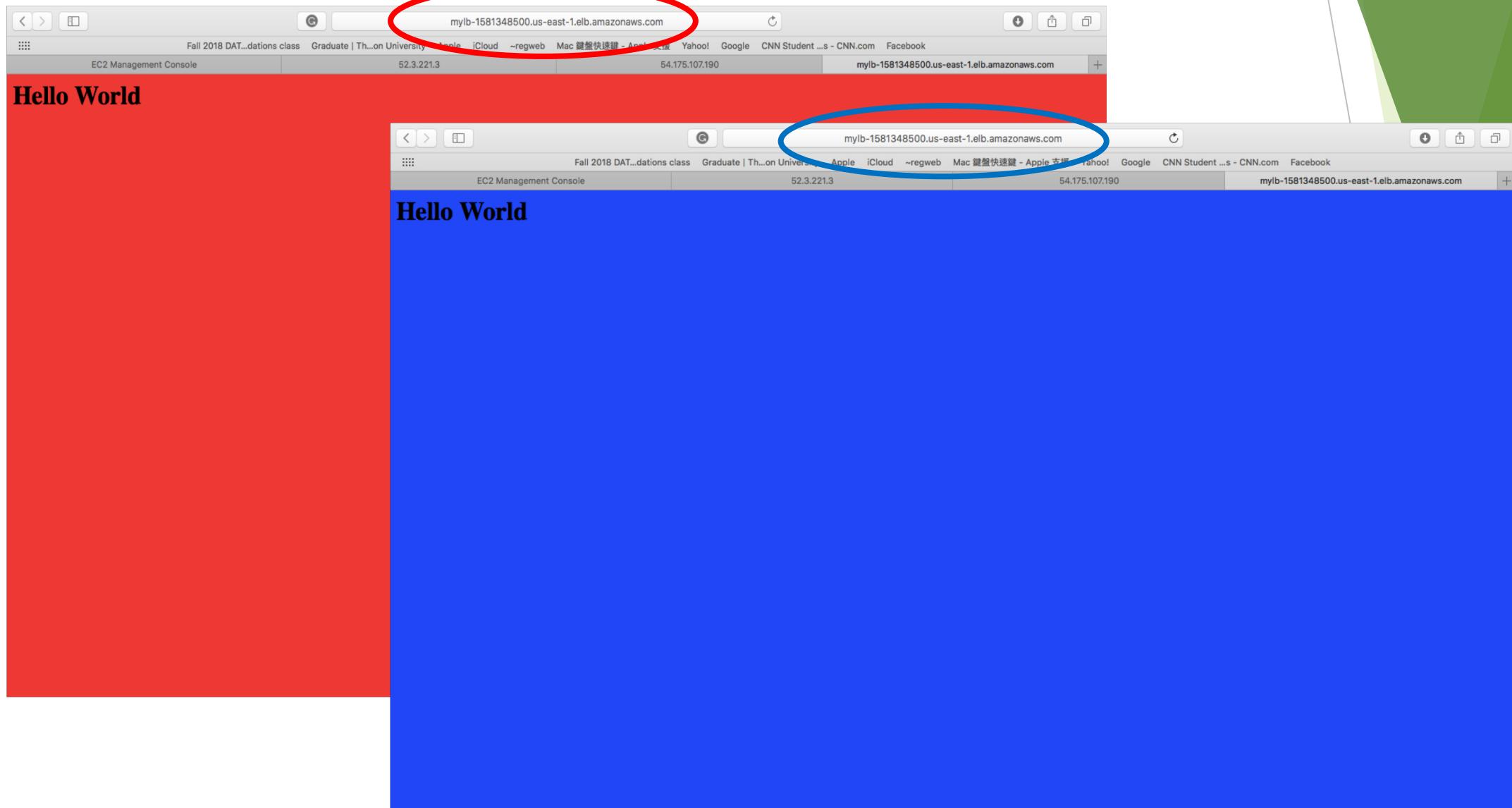
Basic Configuration

Name:	myLB2	Creation time:	September 28, 2018 at 3:45:33 PM UTC-4
ARN:	arn:aws:elasticloadbalancing:us-east-1:146747544651:loadbalancer/app/myLB2/5e8be919db8b429d	Hosted zone:	Z35SXDOTRQ7X7K
DNS name:	myLB2-716519872.us-east-1.elb.amazonaws.com	State:	active
Scheme:	internet-facing	VPC:	vpc-883deff2
Type:	application	IP address type:	ipv4
Availability Zones:	subnet-33154479 - us-east-1c, subnet-3fd4ac30 - us-east-1f, subnet-8437b4d8 - us-east-1d, subnet-c68b5ef8 - us-east-1e, subnet-c839b4e6 - us-east-1b, subnet-d51f99b2 - us-east-1a	AWS WAF Web ACL:	

[Edit availability zones](#)

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Exercise-1 (My load balancer link):



Create custom AMI

EC2 Management Console

Services Resource Groups

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

Cancel and Exit

Step 1: Choose an Amazon Machine Image (AMI)

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.

Search for an AMI by entering a search term e.g. "Windows"

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Ownership

Owned by me

Shared with me

Architecture

32-bit

64-bit

Root device type

EBS

Instance store

instanceone - ami-062905831bf48aec9

Root device type: ebs Virtualization type: hvm Owner: 146747544651 ENA Enabled: Yes

Select

64-bit

console.aws.amazon.com

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EC2 Management Console

Instances

Register and deregister targets

Registered targets

To deregister instances, select one or more registered instances and then click Remove.

Remove

Instance	Name	Port	State	Security groups	Zone
i-073fb4ec3badebb8c	Webserver	80	running	launch-wizard-3, load-balancer-wizard-1, launch-wiz...	us-east-1a
i-073fb4ec3badebb8c	Webserver	5000	running	launch-wizard-3, load-balancer-wizard-1, launch-wiz...	us-east-1a
i-0c8228a2bc200f34d	phoebe4	80	running	launch-wizard-3	us-east-1b
i-0c8228a2bc200f34d	phoebe4	5000	running	launch-wizard-3	us-east-1b

Instances

To register additional instances, select one or more running instances, specify a port, and then click Add. The default port is the port specified for the target group. If the instance is already registered on the specified port, you must specify a different port.

Add to registered on port 80

Search Instances

Instance	Name	State	Security groups	Zone	Subnet ID	Subnet CIDR
i-073fb4ec3badebb8c	Webserver	running	launch-wizard-3, lo...	us-east-1a	subnet-d5199b2	172.31.0.0/20
i-0c8228a2bc200f34d	phoebe4	running	launch-wizard-3	us-east-1b	subnet-c839b4e6	172.31.80.0/20

Feedback English (US)

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My AMI

The screenshot shows the AWS EC2 Management Console interface. The left sidebar navigation includes links for EC2 Dashboard, Events, Tags, Reports, Limits, Instances, Launch Templates, Spot Requests, Reserved Instances, Dedicated Hosts, Scheduled Instances, Images, AMIs (selected), and Elastic Block Store. The main content area displays a table of owned AMIs, with one entry selected: "Webserver" named "instanceone". The detailed view for "instanceone" shows the following information:

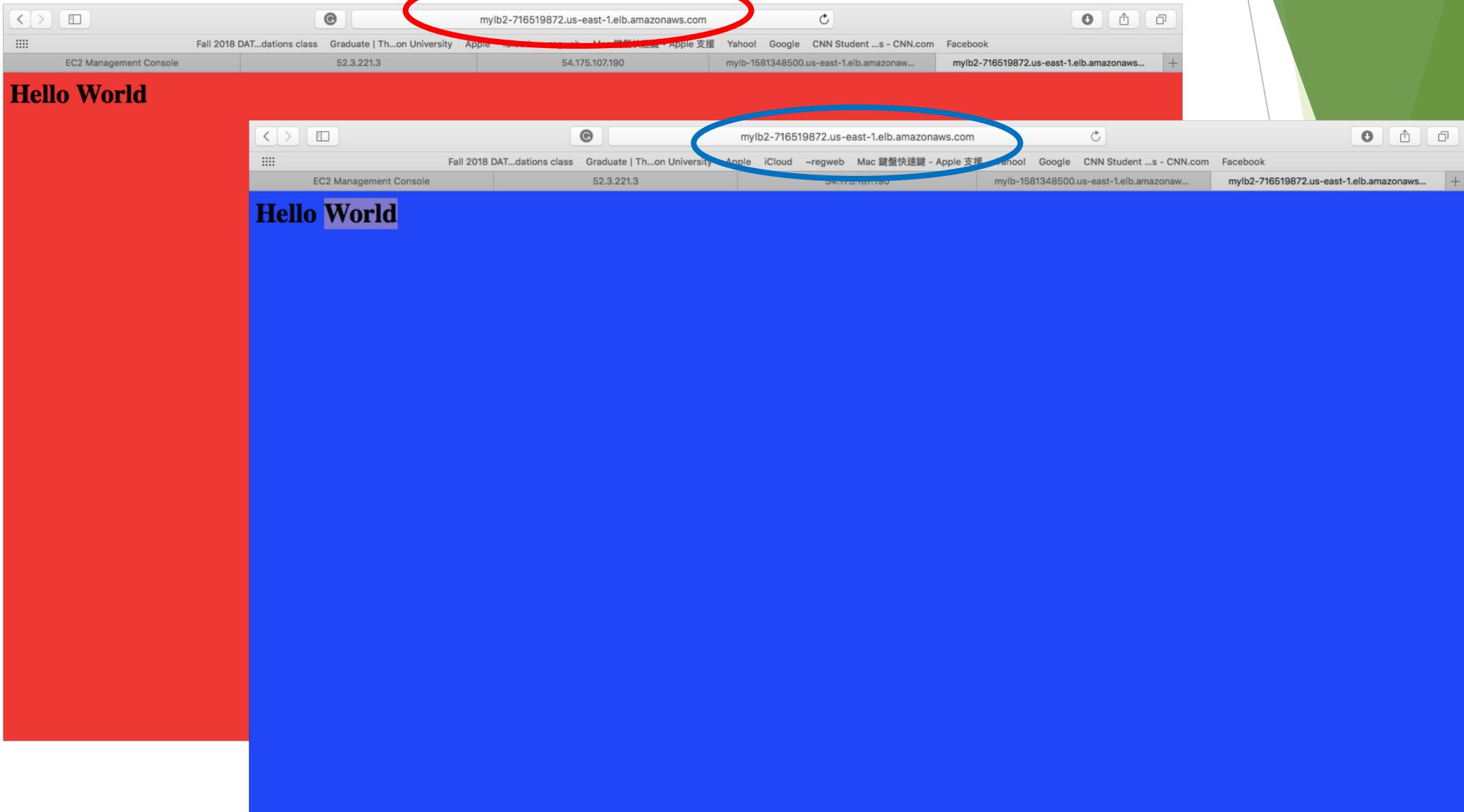
AMI ID	AMI Name	Source	Owner	Visibility	Status	Creation Date	Platform
ami-062905831bf48aec9	instanceone	146747544651/inst...	146747544651	Private	available	September 27, 2018 at 4:30:56 PM UTC-4	Other Linux

Below the table, the "Image: ami-062905831bf48aec9" section provides detailed settings for the AMI:

AMI ID	AMI Name	Source
ami-062905831bf48aec9	instanceone	146747544651/instanceone
Owner	State Reason	Platform
146747544651	-	Other Linux
Status	Image Type	Description
available	machine	-
Creation date	Root Device Type	Kernel ID
September 27, 2018 at 4:30:56 PM UTC-4	ebs	-
Architecture	Block Devices	
x86_64	/dev/xvda=snap-05bf280980b5fcae6:8:true:gp2	
Virtualization type		
hvm		
Root Device Name		
/dev/xvda		
RAM disk ID		
-		
Product Codes		
-		

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New Load Balance after creating AMI



Part-III:

Auto Scaling

Python boto setup

```
[Phoebebede-MACBOOK-AIR:Downloads phoebewus ssh -i "MyKeypair.pem.txt" ec2-user@ec2-18-212-53-14
aws.com
Last login: Thu Sep 27 19:57:33 2018 from 128.164.197.41

--|_ _--|_
_| (   /   Amazon Linux AMI
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https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
[ec2-user@ip-172-31-95-45 ~]$ sudo yum update
Loaded plugins: priorities, update-motd, upgrade-helper
amzn-main
amzn-updates
No packages marked for update
[ec2-user@ip-172-31-95-45 ~]$ sudo su
[root@ip-172-31-95-45 ec2-user]# sudo yum install httpd
Loaded plugins: priorities, update-motd, upgrade-helper
Package httpd-2.2.34-1.16.amzn1.x86_64 already installed and latest version
Nothing to do
[root@ip-172-31-95-45 ec2-user]# sudo service httpd start
Starting httpd:
[root@ip-172-31-95-45 ec2-user]# sudo chkconfig httpd on
[root@ip-172-31-95-45 ec2-user]# sudo vi /var/www/html/index.html
[root@ip-172-31-95-45 ec2-user]# packet_write_wait: Connection to 18.212.53.149 port 22: Bro
Phoebebede-MacBook-Air:Downloads phoebewu$ chmod 400 MyKeypair.pem.txt
Phoebebede-MacBook-Air:Downloads phoebewu$ ssh -i "MyKeypair.pem.txt" ec2-user@ec2-18-212-53-14
aws.com
^C
Phoebebede-MacBook-Air:Downloads phoebewu$ ssh -i "MyKeypair.pem" ec2-user@ec2-52-3-221-3.compute-1.amazonaws.com
Warning: Identity file MyKeypair.pem not accessible: No such file or directory.
The authenticity of host 'ec2-52-3-221-3.compute-1.amazonaws.com (52.3.221.3)' can't be established.
ECDSA key fingerprint is SHA256:MNmAVqrSN0UDB/INB5qm/jBcyd2kjS48YalX8IVsRps.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-52-3-221-3.compute-1.amazonaws.com,52.3.221.3' (ECDSA) to the list of known hosts.
ec2-user@ec2-52-3-221-3.compute-1.amazonaws.com: Permission denied (publickey).
Phoebebede-MacBook-Air:Downloads phoebewu$ chmod 400 MyKeypair.pem.txt
Phoebebede-MacBook-Air:Downloads phoebewu$ ssh -i "MyKeypair.pem.txt" ec2-user@ec2-52-3-221-3.compute-1.amazonaws.com
Last login: Thu Sep 27 20:43:28 2018 from 128.164.197.41

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_| (   /   Amazon Linux AMI
---\_\_|\__|_

https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
[ec2-user@ip-172-31-10-89 ~]$ sudo vi /var/www/html/index.html
[ec2-user@ip-172-31-10-89 ~]$ pip install boto
Requirement already satisfied: boto in /usr/lib/python2.7/dist-packages
You are using pip version 9.0.3, however version 18.0 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
[ec2-user@ip-172-31-10-89 ~]$ sudo vi /var/www/html/index.html
[ec2-user@ip-172-31-10-89 ~]$



-----[redacted]-----
```

```
Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : apr-1.5.2-5.13.amzn1.x86_64
  Installing : apr-util-1.5.4-6.18.amzn1.x86_64
  Installing : httpd-tools-2.2.34-1.16.amzn1.x86_64
  Installing : apr-util-ldap-1.5.4-6.18.amzn1.x86_64
  Installing : httpd-2.2.34-1.16.amzn1.x86_64
  Verifying  : httpd-tools-2.2.34-1.16.amzn1.x86_64
  Verifying  : apr-util-1.5.4-6.18.amzn1.x86_64
  Verifying  : httpd-2.2.34-1.16.amzn1.x86_64
  Verifying  : apr-1.5.2-5.13.amzn1.x86_64
  Verifying  : apr-util-ldap-1.5.4-6.18.amzn1.x86_64
                                         1/5
                                         2/5
                                         3/5
                                         4/5
                                         5/5
                                         1/5
                                         2/5
                                         3/5
                                         4/5
                                         5/5

Installed:
  httpd.x86_64 0:2.2.34-1.16.amzn1

Dependency Installed:
  apr.x86_64 0:1.5.2-5.13.amzn1
  apr-util.x86_64 0:1.5.4-6.18.amzn1
  httpd-tools.x86_64 0:2.2.34-1.16.amzn1

Complete!
[root@ip-172-31-10-89 ec2-user]# sudo service httpd start
Starting httpd: [ OK ]
[root@ip-172-31-10-89 ec2-user]# sudo chkconfig httpd on
[root@ip-172-31-10-89 ec2-user]# sudo vi /var/www/html/index.html
[root@ip-172-31-10-89 ec2-user]# packet_write_wait: Connection to 52.73.185.118 port 22: Broken pipe
Phoebebede-MacBook-Air:Downloads phoebewu$ chmod 400 MyKeypair.pem.txt
Phoebebede-MacBook-Air:Downloads phoebewu$ ssh -i "MyKeypair.pem.txt" ec2-user@ec2-54-175-107-190.compute-1.amazonaws.com
The authenticity of host 'ec2-54-175-107-190.compute-1.amazonaws.com (54.175.107.190)' can't be established.
ECDSA key fingerprint is SHA256:EWgFMfsiEj08d223hDdg7Wpuj/XOMV6AZMsWatFbiWo.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-54-175-107-190.compute-1.amazonaws.com,54.175.107.190' (ECDSA) to the list of known hosts.
Last login: Thu Sep 27 20:47:21 2018 from 128.164.197.41

--|_ _--|_
_| (   /   Amazon Linux AMI
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https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
[ec2-user@ip-172-31-95-45 ~]$ sudo vi /var/www/html/index.html
[ec2-user@ip-172-31-95-45 ~]$ pip install boto
Requirement already satisfied: boto in /usr/lib/python2.7/dist-packages
You are using pip version 9.0.3, however version 18.0 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
[ec2-user@ip-172-31-95-45 ~]$
```

Create Launch Configuration

The screenshot shows the AWS EC2 Management Console interface. On the left, there's a navigation sidebar with links like EC2 Dashboard, Instances, AMIs, and Network & Security. The main content area has a header with tabs: 'Create launch configuration' (which is active), 'Create Auto Scaling group', 'Copy to launch template', and 'Actions'. A blue info box at the top says 'Launch Templates have arrived!' with a message about full support for launch templates. Below this, a table lists one launch configuration: 'LaunchCon' with AMI ID 'ami-0ff8a91507f77f867', Instance Type 't2.micro', and Creation Time 'September 28, 2018 at 4:10:03 ...'. The 'Details' tab is selected in the bottom-left, showing detailed settings: IAM Instance Profile 'MyKeypair', EBS Optimized 'false', Spot Price, RAM Disk ID, User data, Instance Type 't2.micro', Kernel ID, Monitoring 'false', Security Groups 'sg-05b5933c2488cbf89,sg-08a7e95a83d3bd0b1,sg-0a5b88e980636fc2d,sg-61e1072e', Creation Time 'Fri Sep 28 16:10:03 GMT-400 2018', Block Devices '/dev/xvda', and IP Address Type 'Only assign a public IP address to instances launched in the default VPC and subnet. (default)'. There's also a 'Copy launch configuration' button.

Create Auto Scaling group

The screenshot shows two views of the AWS EC2 Management Console. On the left, the 'Create Auto Scaling Group' wizard is displayed, step 1: Configure Auto Scaling group details. It shows a 'Launch Configuration' named 'LaunchCon', a 'Group name' of 'Group1', a 'Group size' of 'Start with 1 instances', and a 'Network' of 'vpc-883def12 (172.31.0.0/16) (default)'. A dropdown menu for 'Subnet' lists 'subnet-c839b4e6(172.31.80.0/20)' and 'subnet-d51f99b2(172.31.0.0/20)'. Below the form, a note says 'Each instance in this Auto Scaling group will be assigned a public IP address.' On the right, the 'Auto Scaling Groups' page shows a single group named 'Group1' with the same configuration. The 'Details' tab is selected, displaying launch template 'LaunchCon', service-linked role 'arn:aws:iam::146747544651:role/aws-service-role/autoscaling.amazonaws.com/AWSS...', and classic load balancer settings.

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AWS Services Resource Groups

1. Configure Auto Scaling group details 2. Configure scaling policies 3. Configure Notifications 4. Configure Tags 5. Review

Create Auto Scaling Group

Launch Configuration LaunchCon

Group name Group1

Group size Start with 1 instances

Network vpc-883def12 (172.31.0.0/16) (default) Create new VPC

Subnet subnet-c839b4e6(172.31.80.0/20) | Default in us-east-1b
subnet-d51f99b2(172.31.0.0/20) | Default in us-east-1a

Create new subnet

Each instance in this Auto Scaling group will be assigned a public IP address.

Advanced Details

Feedback English (US)

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console.aws.amazon.com

AWS Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts Scheduled Instances

IMAGES AMIs Bundle Tasks

ELASTIC BLOCK STORE Volumes Snapshots Lifecycle Manager

NETWORK & SECURITY Security Groups Elastic IPs Placement Groups Key Pairs Network Interfaces

LOAD BALANCING Load Balancers

Create Auto Scaling group Actions

Filter: Filter Auto Scaling groups...

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace Period
Group1	LaunchCon	1	1	1	1	us-east-1a, us-east-1b	300	300

Auto Scaling Group: Group1

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Launch Template LaunchCon

Launch Template Version -

Launch Configuration LaunchCon

Service-Linked Role arn:aws:iam::146747544651:role/aws-service-role/autoscaling.amazonaws.com/AWSS...

Classic Load Balancers

Target Groups

Desired Capacity 1

Min 1

Max 1

Health Check Type EC2

Health Check Grace Period 300

Termination Policies Default

Creation Time Fri Sep 28 16:15:25 GMT-400 2018

Availability Zone(s) us-east-1a, us-east-1b

Subnet(s) subnet-c839b4e6,subnet-d51f99b2

Default Cooldown 300

Placement Groups

Suspended Processes

Enabled Metrics

Instance Protection

Feedback English (US)

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My Autoscaling Instance

The screenshot shows the AWS EC2 Management Console interface. The left sidebar navigation bar includes links for EC2 Dashboard, Events, Tags, Reports, Limits, Instances (selected), Launch Templates, Spot Requests, Reserved Instances, Dedicated Hosts, Scheduled Instances, Images (AMIs), and Elastic Block Store (Volumes, Snapshots, Lifecycle Manager). The main content area displays a table of instances with columns for Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, Alarm Status, Public DNS (IPv4), and IPv4 Public IP. One instance, "Auto Scaling" (i-0523ef45367ffd7bf), is highlighted in blue and selected. Below the table, detailed information for this instance is shown in tabs: Description, Status Checks, Monitoring, and Tags. The "Description" tab provides specific details like Instance ID, Instance state, Instance type, Availability zone, Security groups, Scheduled events, AMI ID, Platform, IAM role, and Key pair name. The "Status Checks" tab shows 2/2 checks passing. The "Monitoring" and "Tags" tabs are currently inactive.

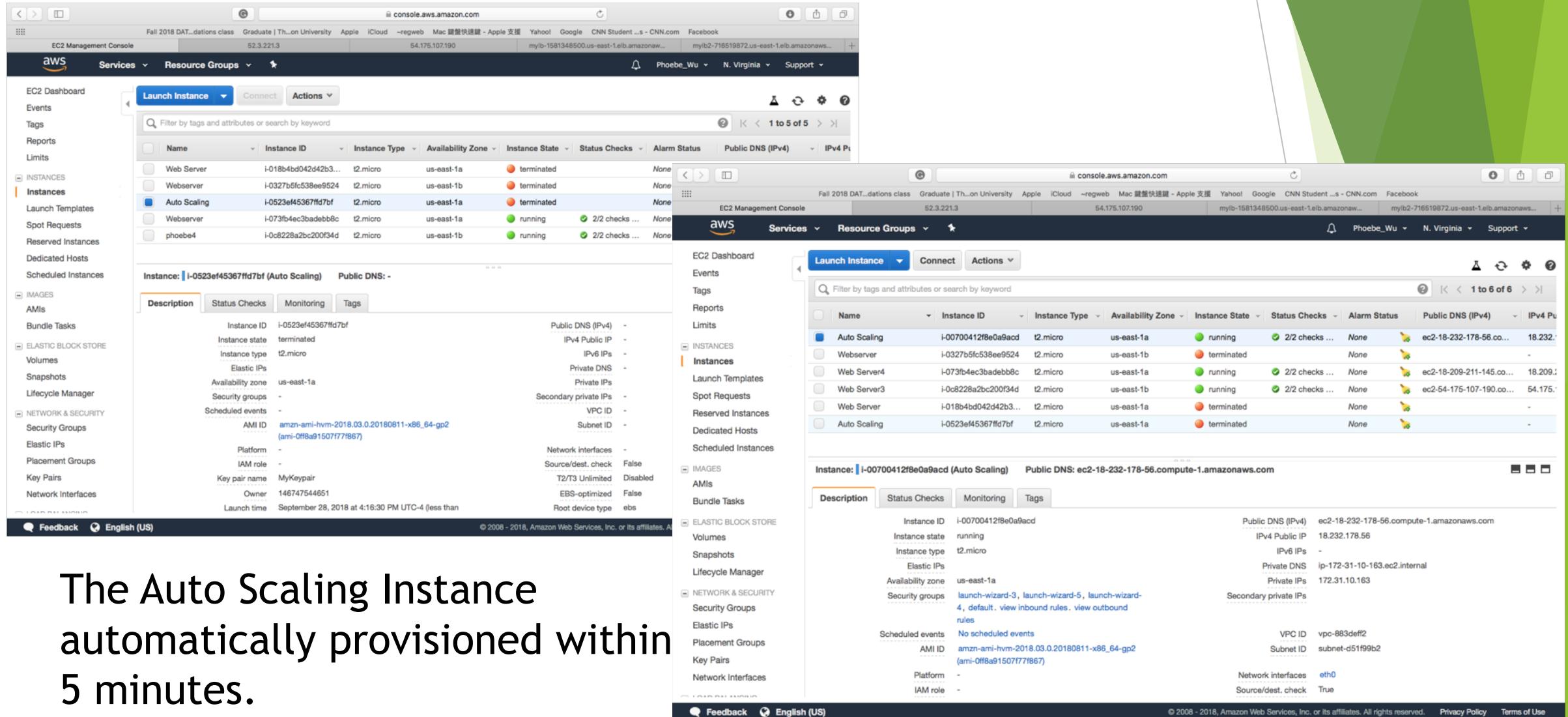
Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
Web Server	i-018b4bd042d42b3...	t2.micro	us-east-1a	terminated	None	-	-	-
Webserver	i-0327b5fc538ee9524	t2.micro	us-east-1b	terminated	None	-	-	-
Auto Scaling	i-0523ef45367ffd7bf	t2.micro	us-east-1a	running	2/2 checks ...	None	ec2-52-54-70-127.compute-1.amazonaws.com	52.54.7
Webserver	i-073fb4ec3baedb8c	t2.micro	us-east-1a	running	2/2 checks ...	None	ec2-18-209-211-145.co...	18.209.
phoebe4	i-0c8228a2bc200f34d	t2.micro	us-east-1b	running	2/2 checks ...	None	ec2-54-175-107-190.co...	54.175.

Instance: i-0523ef45367ffd7bf (Auto Scaling) Public DNS: ec2-52-54-70-127.compute-1.amazonaws.com

Description	Value	Description	Value
Instance ID	i-0523ef45367ffd7bf	Public DNS (IPv4)	ec2-52-54-70-127.compute-1.amazonaws.com
Instance state	running	IPv4 Public IP	52.54.70.127
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs	-	Private DNS	ip-172-31-2-217.ec2.internal
Availability zone	us-east-1a	Private IPs	172.31.2.217
Security groups	launch-wizard-3, launch-wizard-5, launch-wizard-4, default. view inbound rules. view outbound rules	Secondary private IPs	-
Scheduled events	No scheduled events	VPC ID	vpc-883deff2
AMI ID	amzn-ami-hvm-2018.03.0.20180811-x86_64-gp2 (ami-0ff8a91507f77f867)	Subnet ID	subnet-d51f99b2
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	MyKeypair	T2/T3 Unlimited	Disabled

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Test Auto Scaling by Terminate the Auto Scaling Instance



The screenshot shows the AWS EC2 Management Console interface. On the left, a sidebar navigation includes EC2 Dashboard, Events, Tags, Reports, Limits, Instances (selected), Launch Templates, Spot Requests, Reserved Instances, Dedicated Hosts, Scheduled Instances, Images, AMIs, and Elastic Block Store. The main content area displays a table of instances. The first instance listed is an Auto Scaling instance with the ID i-0523ef45367ffd7bf, which is currently terminated. Below this table is a detailed view for the terminated instance, showing its configuration: Instance ID i-0523ef45367ffd7bf, Instance state terminated, Instance type t2.micro, Availability zone us-east-1a, Security groups -, Scheduled events -, AMI ID amzn-ami-hvm-2018.03.0.20180811-x86_64-gp2 (ami-off8a91507f77f867), Platform -, IAM role -, Key pair name MyKeypair, Owner 146747544651, and Launch time September 28, 2018 at 4:16:30 PM UTC-4 (less than 5 minutes ago). The second instance listed is a Web Server with the ID i-0327b5fc538ee9524, which is also terminated. To the right, another screenshot shows the same list of instances, but the terminated instance has been replaced by a new running instance with the ID i-00700412f8e0a9acd, which has been running for 18 minutes. This demonstrates that the Auto Scaling group automatically provisions a new instance to replace the terminated one.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
Web Server	i-018b4bd042d42b3...	t2.micro	us-east-1a	terminated	None	-	-	-
Webserver	i-0327b5fc538ee9524	t2.micro	us-east-1b	terminated	None	-	-	-
Auto Scaling	i-0523ef45367ffd7bf	t2.micro	us-east-1a	terminated	None	-	-	-
Webserver	i-073fb4ec3badeb8c	t2.micro	us-east-1a	running	2/2 checks ...	None	-	-
phoebe4	i-0c8228a2bc200f34d	t2.micro	us-east-1b	running	2/2 checks ...	None	-	-

Description	Status Checks	Monitoring	Tags
Instance ID: i-0523ef45367ffd7bf (Auto Scaling)	Public DNS: -		
Instance ID: i-0523ef45367ffd7bf	Public DNS (IPv4) -		
Instance state: terminated	IPv4 Public IP -		
Instance type: t2.micro	IPv6 IPs -		
Elastic IPs	Private DNS -		
Availability zone: us-east-1a	Private IPs -		
Security groups: -	Secondary private IPs -		
Scheduled events: -	VPC ID -		
AMI ID: amzn-ami-hvm-2018.03.0.20180811-x86_64-gp2 (ami-off8a91507f77f867)	Subnet ID -		
Platform: -	Network interfaces: -		
IAM role: -	Source/dest. check: False		
Key pair name: MyKeypair	T2/T3 Unlimited: Disabled		
Owner: 146747544651	EBS-optimized: False		
Launch time: September 28, 2018 at 4:16:30 PM UTC-4 (less than 5 minutes ago)	Root device type: ebs		

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
Auto Scaling	i-00700412f8e0a9acd	t2.micro	us-east-1a	running	2/2 checks ...	None	ec2-18-232-178-56.co...	18.232.178.56
Webserver	i-0327b5fc538ee9524	t2.micro	us-east-1b	terminated	None	-	-	-
Web Server4	i-073fb4ec3badeb8c	t2.micro	us-east-1a	running	2/2 checks ...	None	ec2-18-209-211-145.co...	18.209.211.145
Web Server3	i-0c8228a2bc200f34d	t2.micro	us-east-1b	running	2/2 checks ...	None	ec2-54-175-107-190.co...	54.175.107.190
Web Server	i-018b4bd042d42b3...	t2.micro	us-east-1a	terminated	None	-	-	-
Auto Scaling	i-0523ef45367ffd7bf	t2.micro	us-east-1a	terminated	None	-	-	-

Description	Status Checks	Monitoring	Tags
Instance ID: i-00700412f8e0a9acd (Auto Scaling)	Public DNS: ec2-18-232-178-56.compute-1.amazonaws.com		
Instance ID: i-00700412f8e0a9acd	Public DNS (IPv4): ec2-18-232-178-56.compute-1.amazonaws.com		
Instance state: running	IPv4 Public IP: 18.232.178.56		
Instance type: t2.micro	IPv6 IPs: -		
Elastic IPs	Private DNS: ip-172-31-10-13.ec2.internal		
Availability zone: us-east-1a	Private IPs: 172.31.10.163		
Security groups: launch-wizard-3, launch-wizard-5, launch-wizard-4, default, view inbound rules, view outbound rules	Secondary private IPs: -		
Scheduled events: No scheduled events	VPC ID: vpc-883deff2		
AMI ID: amzn-ami-hvm-2018.03.0.20180811-x86_64-gp2 (ami-off8a91507f77f867)	Subnet ID: subnet-d51f99b2		
Platform: -	Network interfaces: eth0		
IAM role: -	Sourced/dest. check: True		

The Auto Scaling Instance automatically provisioned within 5 minutes.

Auto Scaling Group History

The screenshot shows the AWS EC2 Management Console interface. The left sidebar contains navigation links for EC2 Dashboard, Events, Tags, Reports, Limits, Instances, AMIs, Elastic Block Store, Network & Security, and Load Balancing. The main content area displays the 'Resource Groups' section, specifically the 'Auto Scaling group' configuration for 'Group1'. The 'Activity History' tab is selected, showing a table of scaling events:

Status	Description	Start Time	End Time
Successful	Launching a new EC2 instance: i-00700412f8e0a9acd	2018 September 28 16:24:30 UTC-4	2018 September 28 16:25:06 UTC-4
Successful	Terminating EC2 instance: i-0523ef45367ffd7bf	2018 September 28 16:23:57 UTC-4	2018 September 28 16:24:00 UTC-4
Successful	Launching a new EC2 instance: i-0523ef45367ffd7bf	2018 September 28 16:16:30 UTC-4	2018 September 28 16:17:04 UTC-4
Failed	Launching a new EC2 instance	2018 September 28 16:15:29 UTC-4	2018 September 28 16:15:29 UTC-4

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