

# Amazon-Auto scaling

1

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# Learning object

1. Creating an Elastic Load Balancer (P7-P9)
2. Creating a Launch Configuration (P10-P12)
3. Creating an Auto Scaling Group (P13-P16)
4. Activating Auto Scaling Notifications (P21-P23)
5. Creating Scaling Policies (P24-P27)
6. Testing Auto Scaling by triggering Scaling Policies (P28-P30)

# What service to use ?

- Amazon Elastic Compute Cloud (Amazon EC2)
- Amazon Machine Image (AMI)
- Elastic Load Balancing (ELB)
- Security Group
- Auto Scaling-

is particularly well suited for applications that experience hourly, daily, or weekly variability in usage.

## What service to use ? (continued...)

- Cloud Watch-

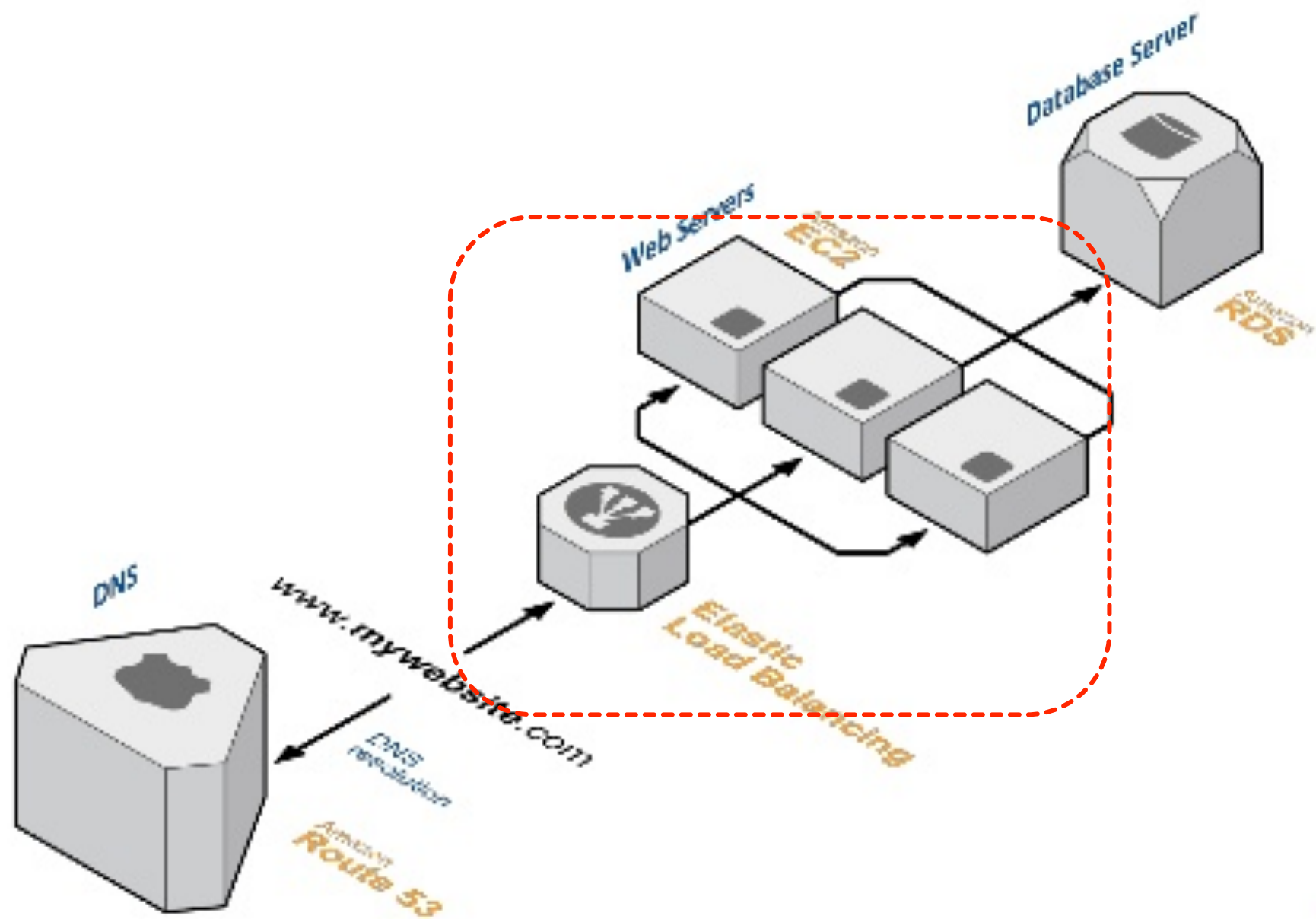
is a monitoring service for AWS cloud resources and the applications you run on AWS.

- Amazon Simple Notification Service (Amazon SNS)-

is a fast, flexible, fully managed push messaging service.

# Amazon EC2 Key Pairs

- Use your .pem file



# Creating an Elastic Load Balancer

- When you are logged into the console, click **EC2**.
- Click **Load Balancers** in the left panel.
- Click **Create Load Balancer**.
- In the **Define Load Balancer** panel:
  - a. **Load Balancer name**: auto-scaling-elb
  - b. Click **Continue**

## Creating an Elastic Load Balancer (continued...)

- In the **Configure Health Check** panel, set the following Health Check parameters (leave all others as the default):
  - a. **Ping Protocol**: TCP
  - b. **Ping Port**: 80
  - c. **Health Check Interval**: 10
  - d. **Healthy Threshold**: 2
  - e. Click **Continue**



## Creating an Elastic Load Balancer (continued...)

- In the **Assign Security Groups** panel, allow incoming web traffic:
  - a. Click **Create a new security group** (at the top)
  - b. **Security group name**: Web
  - c. **Description**: Web traffic
  - d. Traffic on port 80 is already permitted, so click **Continue**
- In the **Add Instances to Load Balancer** panel, click **Continue**.
- In the **Add Tags** panel, click **Continue**.
- Click **Create**, and wait while the load balancer is created
- Click **Close** to return to the EC2 dashboard

# Creating a Launch Configuration

- Click **Launch Configurations** in the left panel (you may need to scroll down to see it). Since you have not yet created an Auto Scaling group, the console assumes you ultimately want to create an Auto Scaling group.
- Click **Create Auto Scaling group**.
- Click **Create launch configuration**.
- On the **Choose AMI** panel, select the **Amazon Linux AMI**.
- On the **Choose Instance Type** panel, click **Next: Configure details**.
- On the **Configure details** panel:
  - a. **Name**: **Web launch configuration**
  - b. **Monitoring**: Check the **Enable CloudWatch detailed monitoring** check box
  - c. Expand the **Advanced Details** section.

# Creating a Launch Configuration (continued...)

d. Enter the following text in the **User Data** field.

```
#!/bin/sh
```

```
yum -y install httpd php mysql php-mysql
```

```
chkconfig httpd on
```

```
/etc/init.d/httpd start
```

```
cd /tmp
```

```
wget https://us-west-2-aws-training.s3.amazonaws.com/awsu-ilt/  
architecting/lab-2-autoscaling-3.2/static/examplefiles-as.zip
```

```
unzip examplefiles-as.zip
```

```
mv examplefiles-as/* /var/www/html
```

e. Click Next: **Add Storage**.

## Creating a Launch Configuration (continued...)

- There are no modifications needed in the Add Storage panel. Click Next: Configure Security Group.
- At the Configure Security Group panel, permit inbound Web and SSH traffic:
  - a. **Security group name:** Web-SSH
  - b. **Description:** Web and SSH
  - c. Click **Add Rule** to add another rule (there is already a rule for SSH)
  - d. Set the **Protocol** drop-down to HTTP
  - e. Click **Review**
- Click **Create launch configuration** . **Select an existing key pair** and choose your .pem file.
- click **Create launch configuration**

# Creating an Auto Scaling Group

- From the AWS Management Console, select **EC2** from the Services menu and then click **Auto Scaling Groups**.
- Click **Create auto scaling group**.
- Select the **Launch Configuration** you created in the last section and click **Next Step**.

## Creating an Auto Scaling Group (continued...)

- In the **Configure Auto Scaling group details** panel:
  - a. **Group Name:** web-group
  - b. **Subnet:** Select at least one subnet by clicking in the Subnet box
  - c. Expand the Advanced Details section.
  - d. In the **Load Balancing** section, check the **Receive traffic from Elastic Load Balancer(s)** option.
  - e. Click inside the box that appears and select the **auto-scaling-elb** load balancer that you created earlier.
  - f. Click **Next: Configure scaling policies**



## Create Auto Scaling Group

[Cancel and Exit](#)**Launch Configuration** ⓘ Web launch configuration -testaaa**Group name** ⓘ **Group size** ⓘ Start with  instances**Network** ⓘ   [Create new VPC](#)**Subnet** ⓘ  [Create new subnet](#)

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

### ▼ Advanced Details

**Load Balancing** ⓘ ☒ Receive traffic from Elastic Load Balancer(s) ⓘ**Health Check Type** ⓘ ☐ ELB ☒ EC2**Health Check Grace Period** ⓘ  seconds**Monitoring** ⓘ ☐ Enable CloudWatch detailed monitoring  
[Learn more](#)[Cancel](#)[Next: Configure scaling policies](#)

## Creating an Auto Scaling Group (continued...)

- Verify that **Keep this group at its initial size** option is selected and click **Next: Configure Notifications**.
- Click **Review**.
- Click **Create Auto Scaling group**.
- Click **Close**.



# Find your instance

- From the AWS Management Console, select **EC2** from the Services menu and then click **Auto Scaling Groups**.
- Choose your group by name
- In the **Instance** panel , you will see the **InstanceID**
- Copy the **InstanceID** , Click **Instances** in the left panel. And your can find your instance by InstanceID.



EC2 Dashboard  
Events  
Tags  
Reports  
Limits

INSTANCES  
Instances  
Spot Requests  
Reserved Instances

IMAGES  
AMIs  
Bundle Tasks

ELASTIC BLOCK STORE  
Volumes  
Snapshots

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

AUTO SCALING  
Launch Configurations  
Auto Scaling Groups

Create Auto Scaling group

Actions

Filter: Filter Auto Scaling groups...

1 to 3 of 3 Auto Scaling Groups

<input type="checkbox"/>	Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grac
<input checked="" type="checkbox"/>	web-group-testaaa	Web launch configurati...	1	1	1	1	us-east-1a	300	300
<input type="checkbox"/>	web yutseun	web-group yutsuen	0	0	0	1	us-east-1a	300	300
<input type="checkbox"/>	worker-group yutsuen	worker-yutsuenCopy	0	0	0	2	us-east-1d	300	300

## Auto Scaling Group: web-group-testaaa

Details

Scaling History

Scaling Policies

Instances

Notifications

Tags

Actions

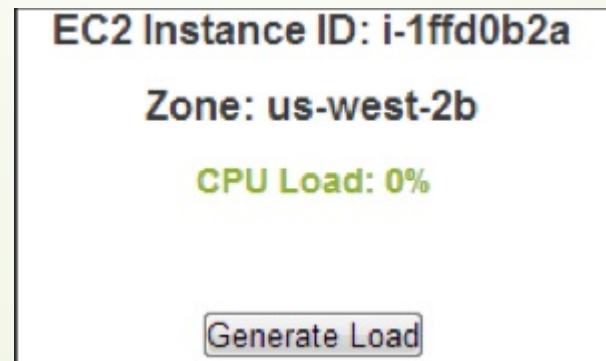
Filter: Any Health Status Any Lifecycle State Filter instances...

1 to 1 of 1 Instances

<input type="checkbox"/>	Instance ID	Lifecycle	Launch Configuration Name	Availability Zone	Health Status
<input type="checkbox"/>	i-d1cf572b	InService	Web launch configuration -testaaa	us-east-1a	Healthy

# Verifying that the Servers Launched


- Click **Instances** in the left panel. You should see your instance running.
- If the **Status Checks** for this instance still says **Initializing**, wait a few minutes. (You can periodically click the refresh button ↻ in the AWS Management Console to update the dashboard. You can continue once the status changes to **running**.)
- On the **Details** tab below, copy the **Public DNS** name of the instance into your clipboard.
- **Open a new tab** in your web browser, **paste the DNS address** and hit Enter. You should see something similar to the following:



# Verifying That Auto Scaling Works

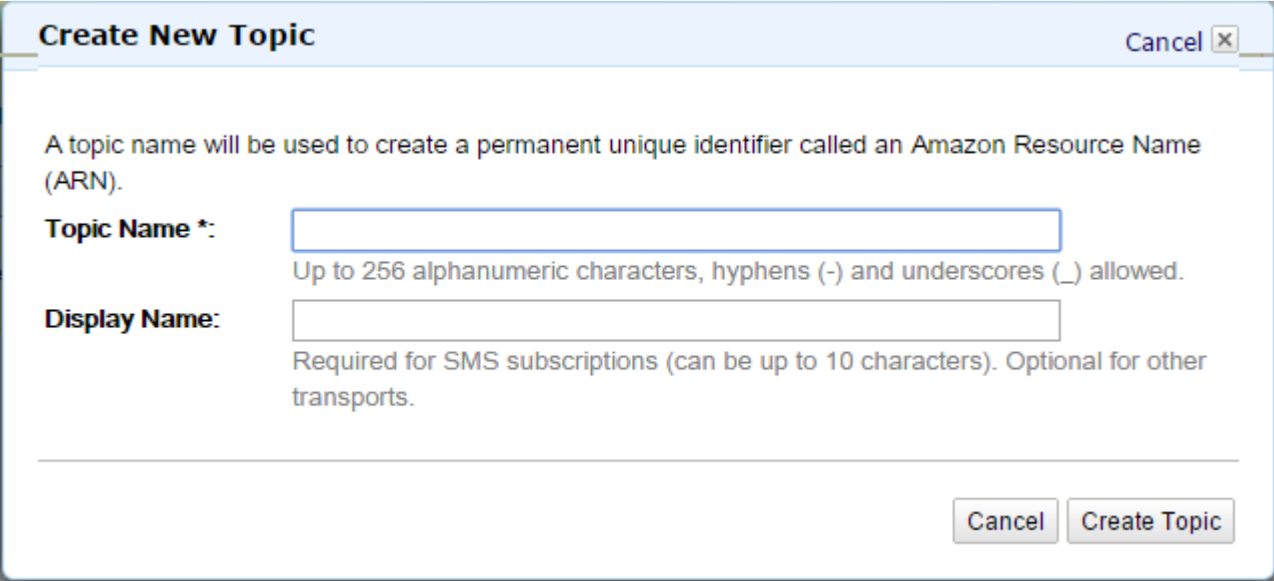
- In the AWS Management Console, **stop** the instance by selecting Stop from the **Actions** menu.
- When the confirmation box appears, click **Yes, Stop**.

## Tagging Auto Scaling Resources

- Click the **Show/Hide** button  in the top-right, then check **aws:autoscaling:groupName** on the left under **Your Tag Keys**.
- Click **Close**. Auto scaling automatically displays a column with the name of the Auto Scaling group that launched the instance.

# Creating an SNS Topic

- From the AWS Management Console, select **SNS** from the **Services** menu.
- Click **Create New Topic**, then:
  - a. **Topic Name**: auto-scaling-topic
  - b. **Display Name**: groupname
  - c. Click **Create New Topic**



The screenshot shows the 'Create New Topic' dialog box. At the top, there's a title bar with 'Create New Topic' and a 'Cancel' button with a close icon. Below the title bar, a note states: 'A topic name will be used to create a permanent unique identifier called an Amazon Resource Name (ARN)'. There are two input fields: 'Topic Name \*:' and 'Display Name:'. The 'Topic Name' field has a hint: 'Up to 256 alphanumeric characters, hyphens (-) and underscores (\_) allowed.' The 'Display Name' field has a hint: 'Required for SMS subscriptions (can be up to 10 characters). Optional for other transports.' At the bottom right, there are two buttons: 'Cancel' and 'Create Topic'.

**Create New Topic** Cancel

A topic name will be used to create a permanent unique identifier called an Amazon Resource Name (ARN).

**Topic Name \*:**   
Up to 256 alphanumeric characters, hyphens (-) and underscores (\_) allowed.

**Display Name:**   
Required for SMS subscriptions (can be up to 10 characters). Optional for other transports.

Cancel Create Topic

## Creating an SNS Topic (continued...)

- Click the **Create Subscription** button, then:
  - a. **Protocol**: **Email**
  - b. **Endpoint**: Type an email address that you can access from the classroom, so you can view email notifications.
  - c. Click **Subscribe**.
  - d. Click **Close**.
- Check your email and click the link in the message to confirm your subscription to the topic.

# Creating an Auto Scaling Notification

- From the AWS Management Console, select **EC2** from the **Services** menu.
- Click **Auto Scaling Groups** in the left panel.
- Select your Auto Scaling group.
- Click the **Notifications** tab in the lower half of the window.
- Click **Create Notification**, then:
  - a. Verify that your **auto-scaling-topic** is selected from the **Send a notification** to list. Notice that you can select to receive notifications whenever instances launch, fail to launch, terminate, or fail to terminate. Leave all the options enabled.
  - b. Click **Save**.
- Check your email. You should receive a test notification email confirming the configuration.



# Creating a scale-out policy

- Select your Auto Scaling group.
- Click the **Scaling Policies** tab (in the lower half of the window).
- Click **Add Policy**, then:
  - a. **Name:** web-scale-out
  - b. Click **Create new alarm**.
  - c. Enter these details: (Figure 1)
  - d. Click Create Alarm.
  - e. Click Close.
  - f. Take the Action: Add 1 instances (Figure 2)
  - g. Click Create.



### Create Alarm

You can use CloudWatch alarms to be notified automatically whenever metric data reaches a level you define.  
To edit an alarm, first choose whom to notify and then define when the notification should be sent.

☒ **Send a notification to:** auto-scaling-topic-testaaa (zgbsfs@hotr ▼ [create topic](#))

**Whenever:** Average ▼ of CPU Utilization ▼

**Is:** >= ▼ 50 Percent

**For at least:** 1 consecutive period(s) of 1 Minute ▼

**Name of alarm:** High-CPU-Utilization-testaaa

**CPU Utilization Percent**

web-group-testaaa

[Cancel](#) [Create Alarm](#)

Figure 1

### Create Scaling policy

[Cancel](#) [Create](#)

**Name:** web-scale-out-testaaa

**Execute policy when:** High-CPU-Utilization-testaaa ▼ [Create new alarm](#)

breaches the alarm threshold: CPUUtilization >= 50 for 60 seconds  
for the metric dimensions AutoScalingGroupName = web-group-testaaa

**Take the action:** Add ▼ 1 instances ▼

**And then wait:** 300 seconds before allowing another scaling activity

Figure 2

# Creating a scale-in policy

- Click Add Policy, then:
  - a. Name: **web-scale-in**
  - b. Click Create new alarm.
  - c. Enter these details: (Figure 3)
  - d. Click Create Alarm.
  - e. Click Close.
  - f. Take the Action: Remove 1 instances (Figure 4)
  - g. Click Create.

### Create Alarm

You can use CloudWatch alarms to be notified automatically whenever metric data reaches a level you define.  
To edit an alarm, first choose whom to notify and then define when the notification should be sent.

☒ **Send a notification to:**  [create topic](#)

**Whenever:**  of

**Is:**   Percent

**For at least:**  consecutive period(s) of

**Name of alarm:**

[Cancel](#) [Create Alarm](#)

**CPU Utilization Percent**

web-group-testaaa

Figure 3

### Create Scaling policy

[Cancel](#)[Create](#)

**Name:**

**Execute policy when:**

[Create new alarm](#)

breaches the alarm threshold: CPUUtilization  $\geq$  50 for 60 seconds  
for the metric dimensions AutoScalingGroupName = web-group-testaaa

**Take the action:**

**And then wait:**  seconds before allowing another scaling activity

Figure 4

# Adjusting the maximum size of the Auto Scaling group

- Click the **Details** tab. You will see that **Min** and **Max** are both set to 1
- Click **Edit** (on the right side of the Details tab), then:
  - a. Set Max to: 3
  - b. Click Save (on the right).

# Testing Auto Scaling

- Click **Load Balancers** in the left panel.
- Select the load balancer you created earlier.
- In the **Description** tab, copy the **DNS Name (A Record)** to your clipboard.  
Do not copy the “(A Record)” text at the end.
- Open a new tab in your web browser, **paste the DNS Name** and hit **Enter**.
- Click the **Generate Load** button and you will see the CPU Load jump up to 100% (you may have to refresh your browser to see the CPU Load increase). This button triggers a simple background process to copy, zip, and unzip ~1GB of nothing (/dev/zero) for 10-20 minutes.

## Testing Auto Scaling (continued...)

- Return to the AWS Management Console and select **CloudWatch** from the **Services** menu.
- Check your email. You should receive an email notification from auto scaling informing you that a scale-up action was triggered.
- Click **Instances** in the left panel. You will see a new instance has been added to your group.
- Click **Auto Scaling Groups** in the left panel (at the bottom). You will notice that the **Desired** number of instances has now increased.

# Viewing Auto Scaling Activities

- Select your Auto Scaling group.
- Click the **Scaling History** tab.

You should see a list of events in which the Auto Scaling group added and removed EC2 instances.



## LAB(1%)

As auto scaling group running , you would receive some notification about your instance increasing or decreasing.

- ▶ Please show me your mails with scaling out and scaling in notification.
- ▶ You can reference the following image.



☐ 篩選依據: 資料夾 ▾ 類別 ▾ 附件 ▾ 日期 ▾

- |   |   |
|---|---|
| <input type="checkbox"/> Auto Scaling notifications   | ▶ <a href="#">Auto Scaling: termination for group "web-group-testaaa"</a>   |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ <a href="#">ALARM: "Low-CPU-Utilization-testaaa" in US - N. Virginia</a>  |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ <a href="#">ALARM: "High-CPU-Utilization-testaaa" in US - N. Virginia</a> |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ Auto Scaling: termination for group "web-group-testaaa"                   |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ ALARM: "Low-CPU-Utilization-testaaa" in US - N. Virginia                  |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ Auto Scaling: launch for group "web-group-testaaa"                        |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ ALARM: "High-CPU-Utilization-testaaa" in US - N. Virginia                 |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ ALARM: "Low-CPU-Utilization-testaaa" in US - N. Virginia                  |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ Auto Scaling: test notification for group "web-group-testaaa"             |
| <input type="checkbox"/> Auto Scaling notifications   | ▶ AWS Notification - Subscription Confirmation                              |