

The screenshot shows the AWS EC2 Management console for creating an Auto Scaling group. The user is on Step 2: Configure scaling policies. There are two policy configurations:

- Increase Group Size:** Name: increase Group Size. Execute policy when: No alarm selected. Take the action: Add 0 instances. Instances need: 300 seconds to warm up after each step.
- Decrease Group Size:** Name: Decrease Group Size. Execute policy when: No alarm selected. Take the action: Remove 0 instances. Instances need: 300 seconds to warm up after each step.

At the bottom, there are buttons for Cancel, Previous, Review, and Next: Configure Notifications.

There are two policies used by an Auto Scaling Group: one to increase the instance count based on certain alarms and the other to decrease the instance count.

Increase Group Size policy, as shown in the following screenshot:

Name: Provide a suitable name for your scale-out policy.

Execute policy when: Here you have to select a pre-configured alarm using which the policy will get triggered. As we are configuring this for the first time, select the Add new alarm option. This will pop up the Create Alarm dialog, as shown in the following screenshot:

Scaling as per CPU utilization: We want our Auto Scaling Group to be monitored based on the CPU Utilization metric for an interval of 5 minutes. If the average CPU Utilization is greater than or equal to 50 percent for at least one consecutive period, then send a notification mail.

The screenshot shows the 'Create Alarm' dialog box overlaid on the main configuration screen. The dialog box contains the following settings:

- Send a notification to: No SNS topics found
- Whenever: Average of CPU Utilization is ≥ 70 Percent
- For at least: 1 consecutive period(s) of 5 Minutes
- Name of alarm: High CPU usage

The main configuration screen shows the 'Increase Group Size' policy with the 'Send a notification to' field also set to 'No SNS topics found'.

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Set the action after trigger:

With the basic alarm now set, you can configure your policy what action it has to take if the particular threshold is breached. Select Add from the dropdown list and provide a suitable number of instances that you wish to add when a certain condition matches. Here I have created a four-step scaling policy that first adds one instance to the group when the average CPU utilization is within a particular threshold range, such as 70-80 percent. Next, another two instances are added when the CPU utilization increases to 80-90 percent.

You can add multiple such steps by selecting the Add step option, as shown in the following screenshot.

Create Auto Scaling Group

Keep this group at its initial size

Use scaling policies to adjust the capacity of this group

Scale between 2 and 4 instances. These will be the minimum and maximum size of your group.

Increase Group Size

Name: Increase Group Size

Execute policy when: High CPU usage

breaches the alarm threshold: CPUUtilization >= 70 for 300 seconds
for the metric dimensions AutoScalingGroupName = worthy-auto-scale-group

Take the action:

- Add 1 instances when 70 <= CPUUtilization < 80
- Add 2 instances when 80 <= CPUUtilization < 90
- Add 3 instances when 90 <= CPUUtilization < infinity

Add step

Instances need: 300 seconds to warm up after each step

Create a simple scaling policy

Decrease Group Size

Name: Decrease Group Size

Execute policy when: No alarm selected

Cancel Previous Review Next: Configure Notifications

Set scale in alarm trigger: Similarly set the threshold for decreasing group size and terminating the instances.

Create Auto Scaling Group

Scale between 2 and 4 instances. These will be the minimum and maximum size of your group.

Increase Group Size

Name: Increase Group Size

Execute policy when: High CPU usage

breaches the alarm threshold: CPUUtilization >= 70 for 300 seconds
for the metric dimensions AutoScalingGroupName = worthy-auto-scale-group

Take the action:

- Add 1 instances when 70 <= CPUUtilization < 80
- Add 2 instances when 80 <= CPUUtilization < 90
- Add 3 instances when 90 <= CPUUtilization < infinity

Add step

Instances need: 300 seconds to warm up after each step

Create a simple scaling policy

Decrease Group Size

Name: Decrease Group Size

Execute policy when: No alarm selected

Take the action:

- Remove 1 instances when 90 <= CPUUtilization < 80

Add step

Create a simple scaling policy

Create Alarm

You can use CloudWatch alarms to be notified automatically whenever metric data reaches a level you define.

Send a notification to: No SNS topics found...

Whenever: Average of CPU Utilization Percent

Is: <= 80

For at least: consecutive period(s) of 5 Minutes

Name of alarm: aws:AutoScalingGroup-High-CPU-Utilization

Create Alarm

Cancel Previous Review Next: Configure Notifications

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When the decreasing threshold is reached another instance is removed when the CPU utilization decreases to less than 60.

Below Screenshot gives the review of the increasing and decreasing group size of auto scaling group. Click on Next Configure Notifications

We can configure our Auto Scaling Group to send notifications to any particular endpoint such as an e-mail address whenever a specified event gets triggered, such as the successful launch of an

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instance, or a failure to launch an instance. Here I have not given any notification. Click on next configure tags

Create Auto Scaling Group

Configure your Auto Scaling group to send notifications to a specified endpoint, such as an email address, whenever a specified event takes place, including: successful launch of an instance, failed instance launch, instance termination, and failed instance termination.

If you created a new topic, check your email for a confirmation message and click the included link to confirm your subscription. Notifications can only be sent to confirmed addresses.

Add notification

Cancel Previous Review Next: Configure Tags

We can tag our instances for organizing, managing and identifying our instances more effectively and efficiently. Next click on review which gives all the details you have selected for auto scaling group and click on create auto scaling group.

Create Auto Scaling Group

Please review your Auto Scaling group details. You can go back to edit changes for each section. Click **Create Auto Scaling group** to complete the creation of an Auto Scaling group.

Auto Scaling Group Details

Group name: worthy-auto-scale-group
Group size: 2
Minimum Group Size: 2
Maximum Group Size: 4
Subnet(s): subnet-6e19a436, subnet-8c264ae8
Load Balancers: worthy-web-elb
Target Groups:
Health Check Type: ELB
Health Check Grace Period: 300
Detailed Monitoring: Yes
Instance Protection: None

Scaling Policies

Increase Group Size: With alarm = High CPU usage; Add 1,2,3 instances and 300 seconds for instances to warm up
Decrease Group Size: With alarm = Low CPU usage; Remove 1,2,3 instances

Notifications

Tags

Cancel Previous Create Auto Scaling group

Feedback English

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Then you can see a message as Successfully created auto scaling group.

The screenshot shows the AWS EC2 Management Console with the URL <https://us-west-1.console.aws.amazon.com/ec2 autoscaling/home?region=us-west-1#CreateAutoScalingGroupsource=lcLaunchConfigurationName=worthy-servers-config>. The page displays a success message: "Successfully created Auto Scaling group". Below this, there are links to "View your Auto Scaling groups" and "View your launch configurations". A sidebar on the left lists various services like EC2 Dashboard, Instances, AMIs, and Auto Scaling Groups. At the bottom, there are links for Feedback, English, Privacy Policy, and Terms of Use.

Verify all the details On the Auto Scaling Groups page, select the Auto Scaling group that you just created.

- The Details tab provides information about the Auto Scaling group.

The screenshot shows the AWS EC2 Management Console with the URL <https://us-west-1.console.aws.amazon.com/ec2 autoscaling/home?region=us-west-1#AutoScalingGroupsId=worthy-auto-scale-groupview=details>. The main area displays the "Create Auto Scaling group" section with a table showing one Auto Scaling Group named "worthy-auto-scaling-group" with a Launch Configuration "worthy-servers-config" and 2 instances. Below this, the "Auto Scaling Group: worthy-auto-scaling-group" details are shown in a tabular format. The "Details" tab is selected, showing the Launch Configuration "worthy-servers-config", Load Balancers "worthy-web-elb", Target Groups (Desired: 2, Min: 2, Max: 4), Health Check Type "ELB", and Health Check Grace Period "300". To the right, there are sections for Availability Zone(s) "us-west-1a, us-west-1b", Subnet(s) "subnet-6e19a436, subnet-8c264ae8", Default Cooldown "300", Placement Group, and Suspended Processes. A sidebar on the left shows the navigation menu with "Auto Scaling Groups" selected. At the bottom, there are links for Feedback, English, Privacy Policy, and Terms of Use.

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On the Instances tab, the Lifecycle column shows the state of your instance.

The screenshot shows the AWS Auto Scaling Groups page. On the left, there's a sidebar with various navigation options like EC2 Dashboard, Instances, AMIs, and Auto Scaling Groups. The main area shows an Auto Scaling Group named "worthy-auto-sca.". Under the "Instances" tab, there are two instances listed:

Instance ID	Lifecycle	Launch Configuration Name	Availability Zone	Health Status
i-0210f6fd751304a35	Pending	worthy-servers-config	us-west-1b	Healthy
i-02f2be990d518575	Pending	worthy-servers-config	us-west-1a	Healthy

On the EC2 Instances Dashboard you can see the scaled out instances as shown in the below screenshot:

The screenshot shows the AWS Instances Dashboard. On the left, there's a sidebar with various navigation options like EC2 Dashboard, Instances, AMIs, and Auto Scaling Groups. The main area shows a table of instances:

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
i-0210f6fd751304a35	i-0210f6fd751304a35	t2.micro	us-west-1b	running	Initializing	None	ec2-54-219-143-235.us...	54.219.143.235	-
i-02f2be990d518575	i-02f2be990d518575	t2.micro	us-west-1a	running	Initializing	None	ec2-54-183-33-152.us...	54.183.33.152	-
Nexus	i-03a21f53104ed8d84	t2.micro	us-west-1a	stopped	None	None	-	-	-
Jenkins	i-055aae4789ea431b1	t2.micro	us-west-1a	stopped	None	None	-	-	-
worthy-web01	i-07cabdf20b3b86a9a	t2.micro	us-west-1a	running	2/2 checks p...	None	ec2-54-193-0-30.us-wes...	54.193.0.30	-

Below the table, there's a detailed view for the instance "i-07cabdf20b3b86a9a" (named "worthy-web01"). It shows the following details:

- Description:** Instance ID: i-07cabdf20b3b86a9a, Public DNS: ec2-54-193-0-30.us-west-1.compute.amazonaws.com
- Status Checks:** Public DNS (IPv4): ec2-54-193-0-30.us-west-1.compute.amazonaws.com, IPv4 Public IP: 54.193.0.30, IPv6 IPs: -
- Monitoring:** Private DNS: ip-172-31-6-243.us-west-1.compute.internal, Private IPs: 172.31.6.243
- Tags:** Secondary private IPs: -
- Scheduled events:** No scheduled events
- AMI ID:** CentOS Linux x86_64 HVM EBS 1602-74e73035-3435-4886-88e0-89cc02ad83ee-ami-21e6d54b.3 (ami-ac9f2fc)
- Platform:** Network interfaces: eth0

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On the load balancer navigation page, select the load balancer you can see the instances attached to the load balancer which are created by auto scaling group.

The screenshot shows the AWS EC2 Management Console. The left sidebar is collapsed. The main area displays a table of load balancers. One row is selected, showing details for the load balancer 'worthy-web-elb'. The table includes columns for Name, DNS name, State, VPC ID, Availability Zones, Type, and Created At. The 'Instances' tab is selected in the sub-navigation bar below the table. A detailed view of the selected load balancer is shown in a modal window, listing three EC2 instances associated with it, each with its instance ID, name, availability zone, status (e.g., OutOfService or InService), and actions (Remove from Load Balancer).

In the below screenshot you can see that your Auto Scaling group has launched your EC2 instance, and that it is in the InService lifecycle state. The Health Status column shows the result of the EC2 instance health check on your instance.

The screenshot shows the AWS EC2 Management Console. The left sidebar is collapsed. The main area displays a table of Auto Scaling groups. One row is selected, showing details for the Auto Scaling group 'worthy-auto-sca-'. The table includes columns for Name, Launch Configuration, Instances, Desired, Min, Max, Availability Zones, Default Cooldown, and Health Check Grac. The 'Instances' tab is selected in the sub-navigation bar below the table. A detailed view of the selected Auto Scaling group is shown in a modal window, listing two EC2 instances. Both instances are in the 'InService' lifecycle state and have a 'Healthy' health status.

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Monitoring tab shows the cloud watch metrics for the selected auto scaling group

EC2 Manager: EC2

https://us-west-1.console.aws.amazon.com/ec2/autoscaling/home?region=us-west-1&AutoScalingGroupsId=worthy-auto-scale-group&view=monitoring

Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

INSTANCES Instances Spot Requests Reserved Instances Dedicated Hosts

IMAGES AMIs Bundle Tasks

ELASTIC BLOCK STORE Volumes Snapshots

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

LOAD BALANCING Load Balancers Target Groups

AUTO SCALING Launch Configurations Auto Scaling Groups

SYSTEMS MANAGER

Create Auto Scaling group Actions

Filter: Filter Auto Scaling groups.

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grac
worthy-auto-sca...	worthy-servers-config	2	2	2	4	us-west-1a, us-west-1b	300	300

Auto Scaling Group: worthy-auto-scale-group

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions

Auto Scaling Metrics: Disable Group Metrics Collection Showing data for: Last Hour

Display: Auto Scaling or EC2

Below are your CloudWatch metrics for the selected resources (a maximum of 10). Click on a graph to see an expanded view. All times shown are in UTC. View all CloudWatch metrics

worthy-auto-scale-group							
Minimum Group Size (Count)	Maximum Group Size (Count)	Desired Capacity (Count)	In Service Instances (Count)	Minimum Group Size (Count)	Maximum Group Size (Count)	Desired Capacity (Count)	In Service Instances (Count)
2.5	5	2.5	2.5	2.5	5	2.5	2.5
2	4	2	2	2	4	2	2
1.5	3	1.5	1.5	1.5	3	1.5	1.5
1	2	1	1	1	2	1	1
0.5	1	0.5	0.5	0.5	1	0.5	0.5
0	0	0	0	0	0	0	0
3/18	3/18	3/18	3/18	3/18	3/18	3/18	3/18
14:30	15:00	14:30	15:00	14:30	15:00	14:30	15:00

Pending Instances (Count)	Standby Instances (Count)	Terminating Instances (Count)	Total Instances (Count)
1	1	1	2.5
0.75	0.75	0.75	2
0.5	0.5	0.5	1.5

Feedback English

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EC2 Manager x

https://us-west-1.console.aws.amazon.com/ec2/autoscaling/home?region=us-west-1&AutoScalingGroupsId=worthy-auto-scale-group&view=policies

Services Resource Groups

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LOAD BALANCING Load Balancers Target Groups

AUTO SCALING Launch Configurations Auto Scaling Groups

SYSTEMS MANAGER

Create Auto Scaling group Actions

Filter: Filter Auto Scaling groups.

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grac
worthy-auto-sca-	worthy-servers-config	2	2	2	4	us-west-1a, us-west-1b	300	300

Auto Scaling Group: worthy-auto-scale-group

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions

Add policy

Decrease Group Size

Actions

Execute policy when: Low CPU usage
breaches the alarm threshold: CPUUtilization <= 60 for 300 seconds
for the metric dimensions: AutoScalingGroupName = worthy-auto-scale-group

Take the action: Remove 1 instances when 60 >= CPUUtilization > 50
Remove 2 instances when 50 >= CPUUtilization > 40
Remove 3 instances when 40 >= CPUUtilization > -infinity

Increase Group Size

Actions

Execute policy when: High CPU usage
breaches the alarm threshold: CPUUtilization >= 70 for 300 seconds
for the metric dimensions: AutoScalingGroupName = worthy-auto-scale-group

Take the action: Add 1 instances when 70 <= CPUUtilization < 80
Add 2 instances when 80 <= CPUUtilization < 90
Add 3 instances when 90 <= CPUUtilization < +infinity

Instances need: 300 seconds to warm up after each step

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The screenshot shows the AWS EC2 Management console under the Auto Scaling Groups section. A single Auto Scaling Group named "worthy-auto-scale-group" is listed, containing two instances. The group has a launch configuration named "worthy-servers-config" with a minimum of 2, maximum of 4, and availability zones us-west-1a and us-west-1b. The default cooldown is set to 300 seconds. The Activity History tab shows two successful launches of new EC2 instances on March 18, 2017.

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grac.
worthy-auto-sca...	worthy-servers-config	2	2	2	4	us-west-1a, us-west-1b	300	300

Status	Description	Start Time	End Time
Successful	Launching a new EC2 instance: i-0210f6fd751304a35	2017 March 18 20:54:53 UTC+5:30	2017 March 18 20:55:26 UTC+5:30
Successful	Launching a new EC2 instance: i-02f2be9900d518575	2017 March 18 20:54:53 UTC+5:30	2017 March 18 20:55:26 UTC+5:30

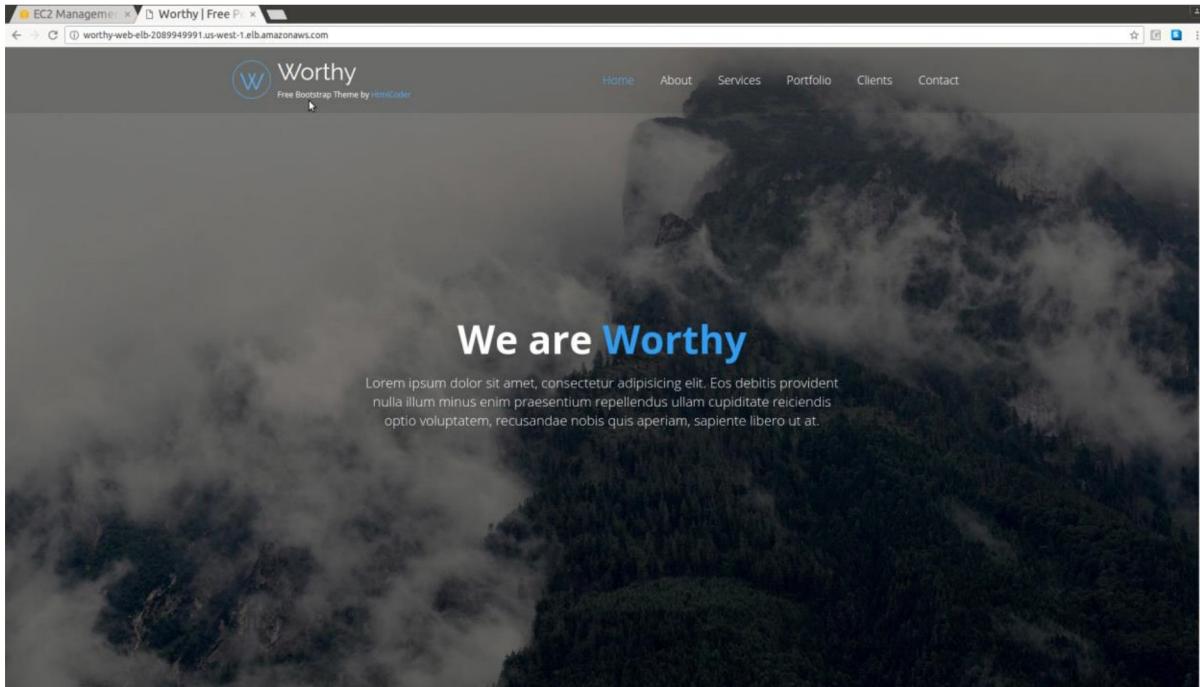
The screenshot shows the AWS EC2 Management console under the Load Balancers section. A single load balancer named "worthy-web-elb" is listed. It has a classic type, VPC ID vpc-9610c2f2, and availability zones us-west-1a and us-west-1b. The Instances tab shows three instances associated with the load balancer, all in the InService state.

Instance ID	Name	Availability Zone	Status	Actions
i-0210f6fd751304a35		us-west-1b	InService	Remove from Load Balancer
i-02f2be9900d518575		us-west-1a	InService	Remove from Load Balancer
i-07cabdf20b3b86a9a	worthy-web01	us-west-1a	InService	Remove from Load Balancer

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Use ELB DNS name to verify website.



14. AWS Cloud Watch

Amazon CloudWatch is a monitoring service for AWS cloud resources and the applications we run on AWS. It provides a reliable, scalable, and flexible monitoring solution that we can start using within minutes. We no longer need to set up, manage, and scale our own monitoring systems and infrastructure. We can use CloudWatch to collect and track metrics, which are variables we can measure for our resources and applications. CloudWatch alarms send notifications or automatically make changes to the resources we are monitoring based on rules that you define.

Features & Benefits:

- **Monitor Amazon EC2** - View metrics for CPU utilization, data transfer, and disk usage activity from Amazon EC2 instances for no additional charge. For an additional charge, CloudWatch provides Detailed Monitoring for EC2 instances with higher resolution and metric aggregation. No additional software needs to be installed.
- **Monitor Other AWS Resources** - Monitor metrics on Amazon DynamoDB tables, Amazon EBS volumes, Amazon RDS DB instances, Amazon Elastic MapReduce job flows, Elastic Load Balancers, Amazon SQS queues, Amazon SNS topics, and more for no additional charge. No additional software needs to be installed.
- **Monitor Custom Metrics** - Submit Custom Metrics generated by your own applications via a simple API request and have them monitored by Amazon CloudWatch.
- **Monitor and Store Logs** - You can use CloudWatch Logs to monitor and troubleshoot your systems and applications using your existing system, application, and custom log files. You can send your existing system, application, and custom log files to CloudWatch Logs and monitor these logs in near real-time. This can help you better understand and operate your systems and applications, and you can store your logs using highly durable, low-cost storage for later access.
- **Set Alarms** - Set alarms on any of your metrics to send you notifications or take other automated actions. For example, when a specific Amazon EC2 metric crosses your alarm