Immersion Day

Introduction to Monitoring on AWS

Rev 2017

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Overview

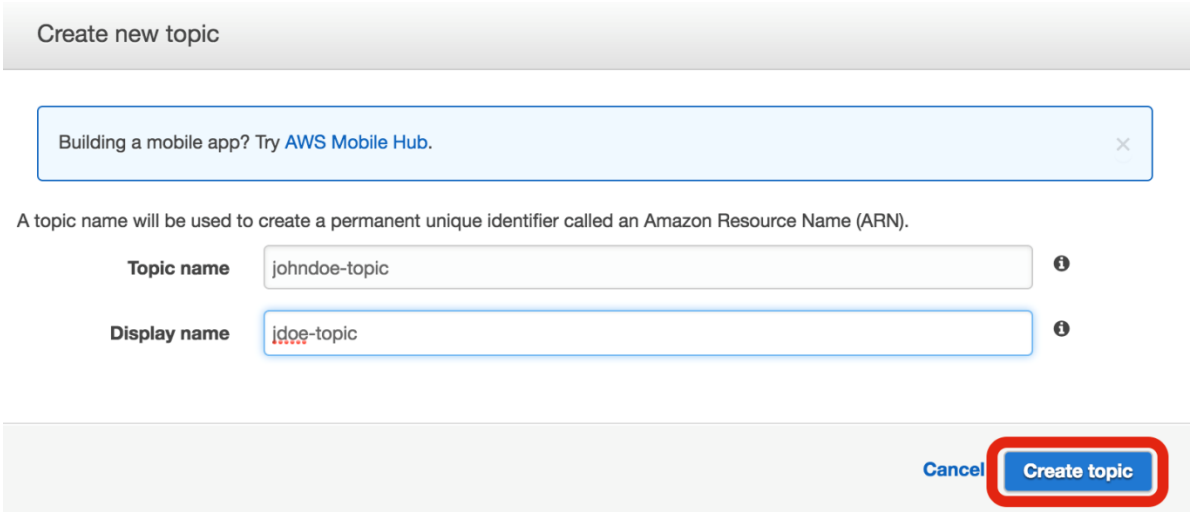
Amazon CloudWatch monitors your Amazon Web Services (AWS) resources and the applications you run on AWS in real-time. You can use CloudWatch to collect and track metrics, which are the variables you want to measure for your resources and applications. CloudWatch alarms send notifications or automatically make changes to the resources you are monitoring based on rules that you define. For example, you can monitor the CPU usage and disk reads and writes of your Amazon Elastic Compute Cloud (Amazon EC2) instances and then use this data to determine whether you should launch additional instances to handle increased load. You can also use this data to stop under-used instances to save money. In addition to monitoring the built-in metrics that come with AWS, you can monitor your own custom metrics. With CloudWatch, you gain system-wide visibility into resource utilization, application performance, and operational health.

In this lab, you will utilize CloudWatch to track EC2 CPU utilization and set up Alarm based on a configured threshold. The Alarm will trigger a Simple Notification Service (SNS) notification. As an optional exercise you will utilize CloudWatch to monitor Billing and send a notification if estimated charges are above a defined threshold.

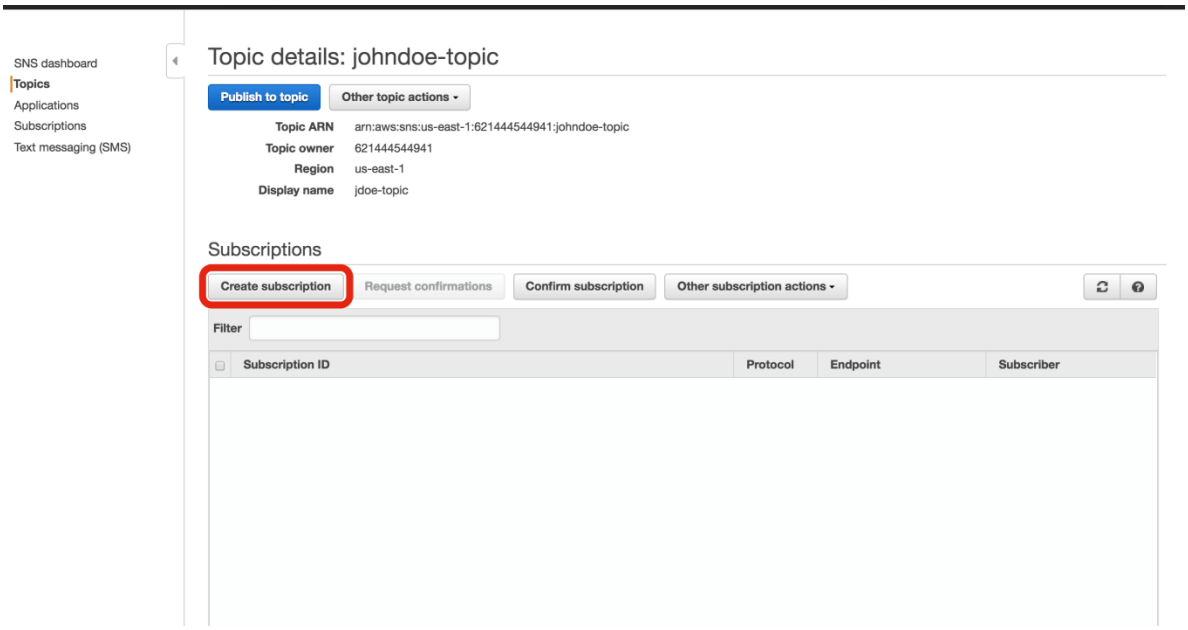
Create Simple Notification Service (SNS) Topic

In this example we will launch a default Amazon Linux Instance with a simple “stress” tool installed and executed on initialization. The stress tool will generate a simulated workload on the CPU. Before launching the EC2 instance, you will first configure an SNS topic to utilize for the alert.

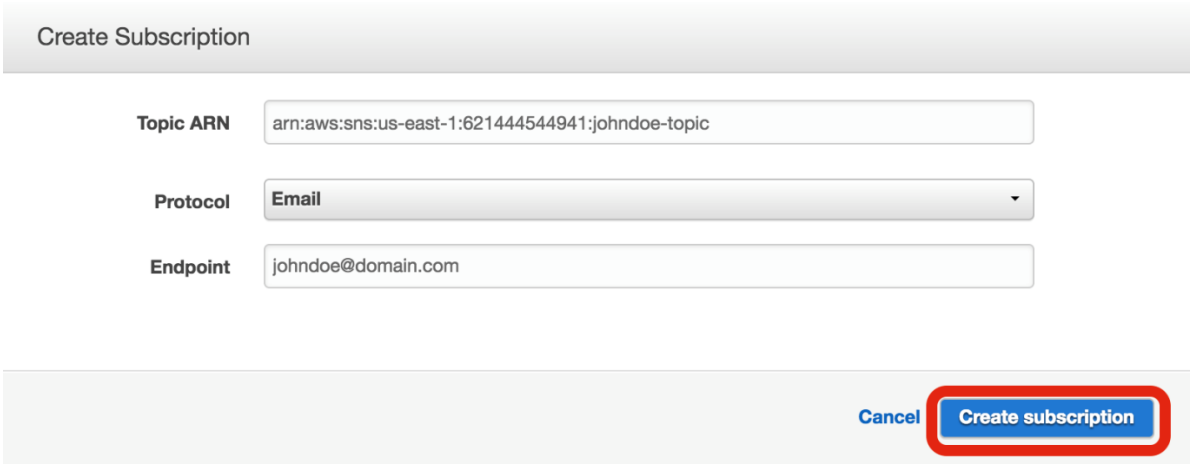
1. From the AWS console click **Services** > **SNS**.
2. Under **Common Actions** click **Create Topic.**
3. In the **Topic Name** field , type a name for your topic that includes your name and optionally a **Display Name** and click **Create Topic**.



4. In the Topic configuration, click **Create Subscription**.



5. In the **Protocol** drop down select **Email** and enter a working email address you are able to access. Utilize a non-business email if there may potentially be a spam filter that will block the SNS messages. Click **Create Subscription**.



6. A verification email will be sent to your address with the subject “AWS Notification – Subscription Confirmation”. Open the email and click the **Confirm Subscription** link.

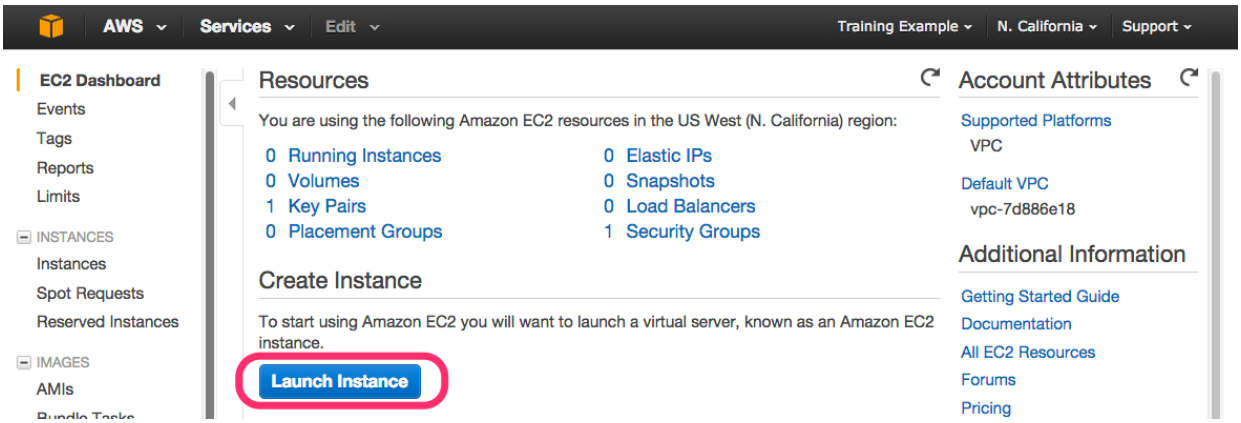
7. Your subscription should now be active and **not** “PendingConfirmation” under the **Subscriptions** section in the SNS console.

Launch an Elastic Compute Cloud (EC2) Instance

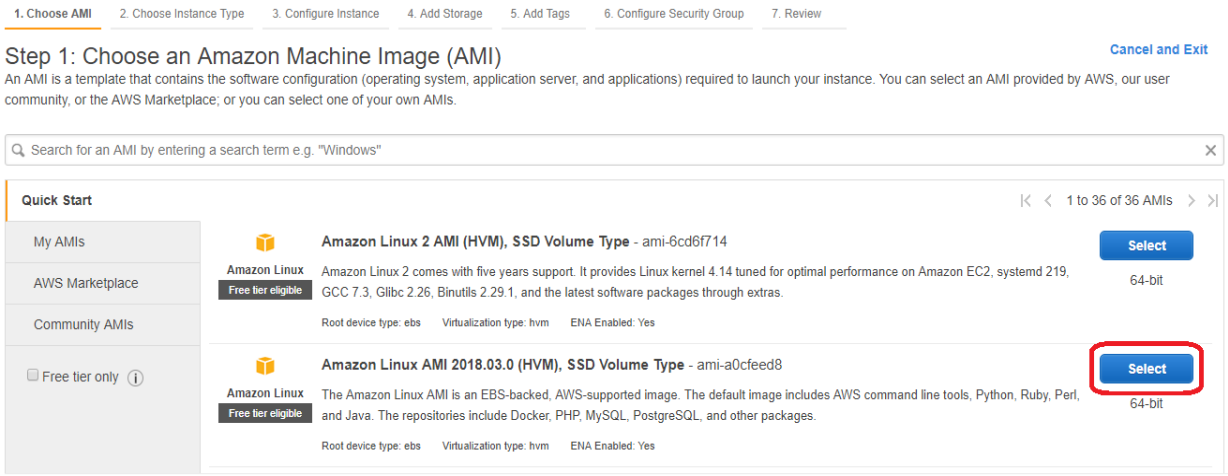
In this step you will launch an EC2 instance and configure the User Data to install and launch the stress tool. The stress tool will begin simulating CPU load 5 minutes after the instance launches to allow you time to configure the CloudWatch Alarm.

1. Click **EC2** Dashboard towards the top of the left menu.

2. Click on **Launch Instance**

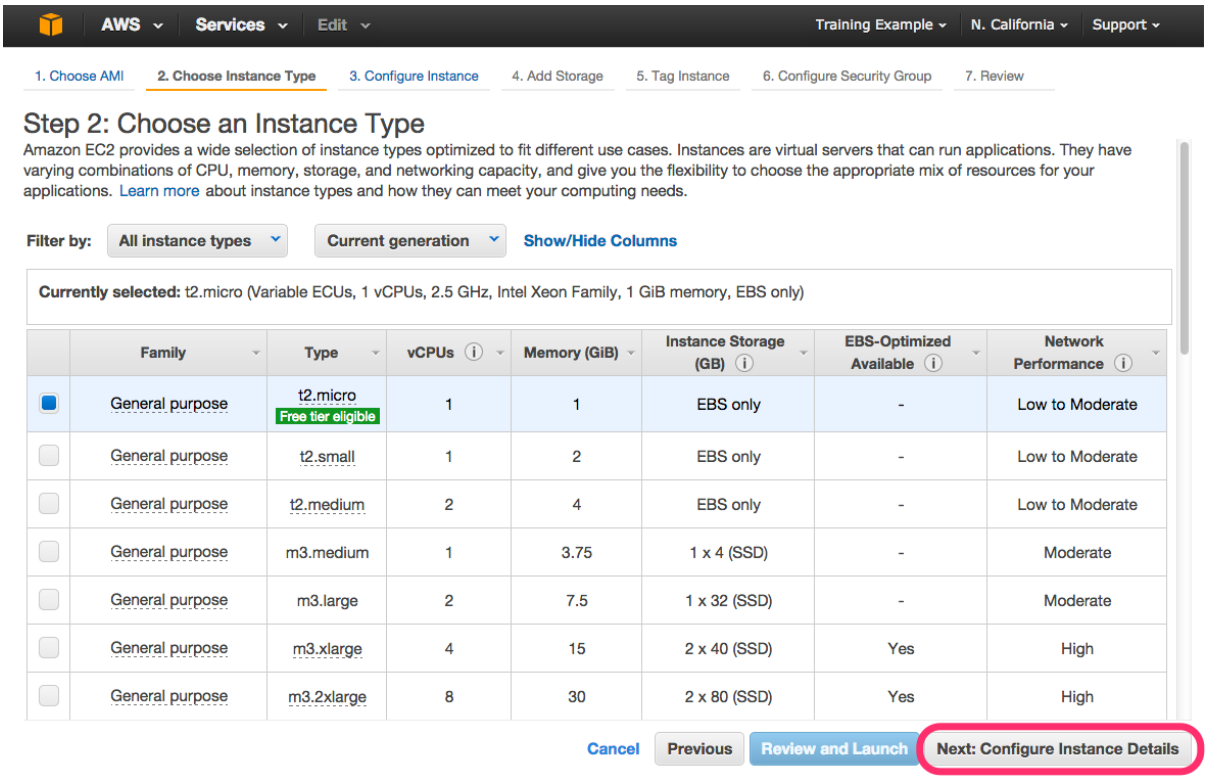


3. In the **Quick** Start section, select the “Amazon Linux AMI” and click **Select**



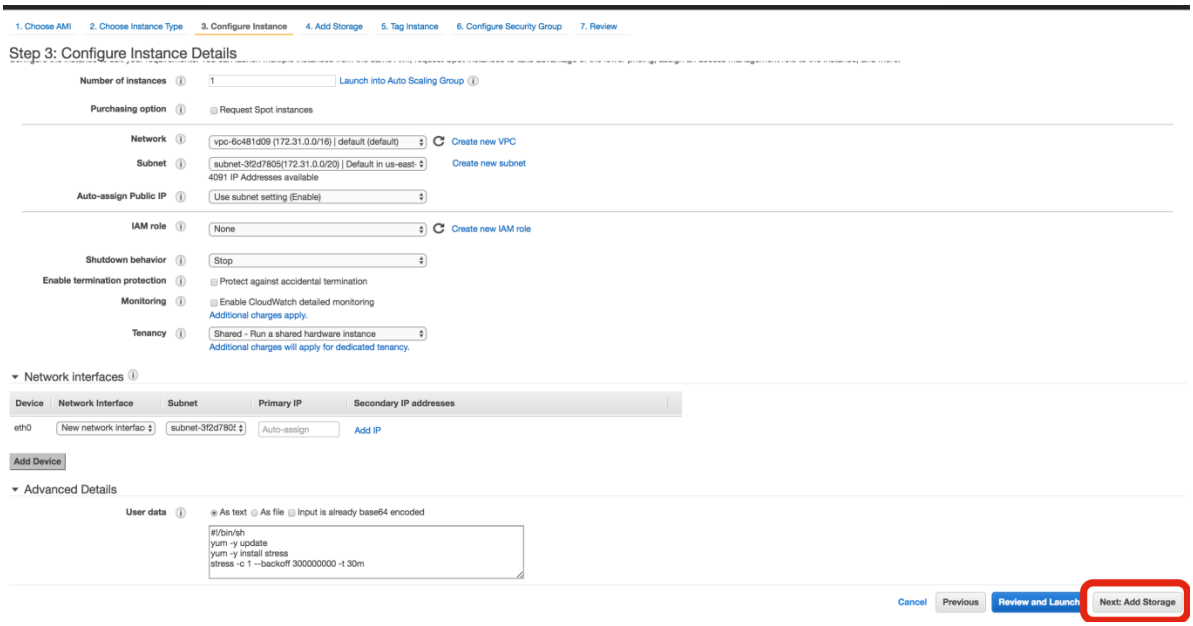
PLEASE NOTE: You must select “Amazon Linux AMI”, **NOT** “Amazon Linux 2 AMI”! This lab will not work properly if you select Amazon Linux 2.

4. Select the General purpose t2.micro instance type and click **Next: Configure Instance Details**

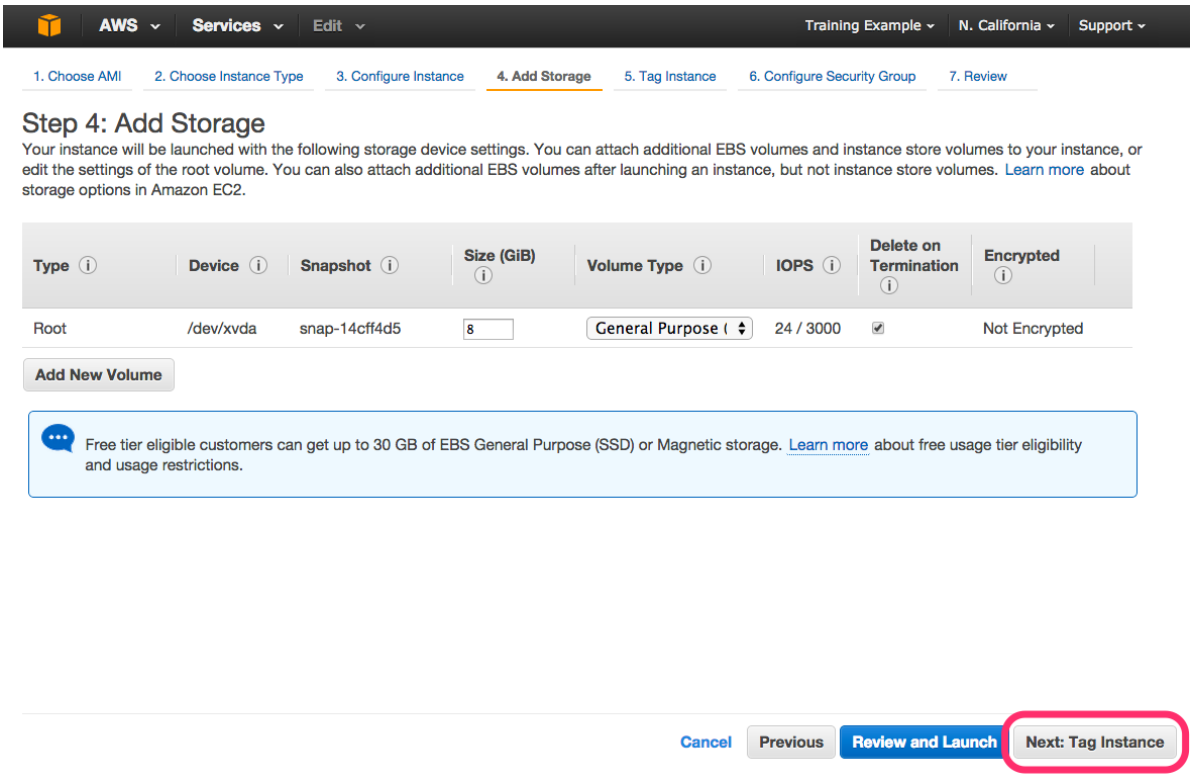


5. On the **Configure Instance Details** page, expand the **Advanced Details** section at the bottom of the page, and type the following initialization script information *(you can use Shift-Enter to create the necessary line break, or alternatively you could type this into Notepad and copy & paste the results)* into the User Data field (this will automatically install and start the stress tool), confirm "Auto-assign Public IP" is **Enabled** and click **Next: Add Storage**:

```
#!/bin/sh
yum -y update
yum -y install stress
stress -c 1 --backoff 300000000 -t 30m
```

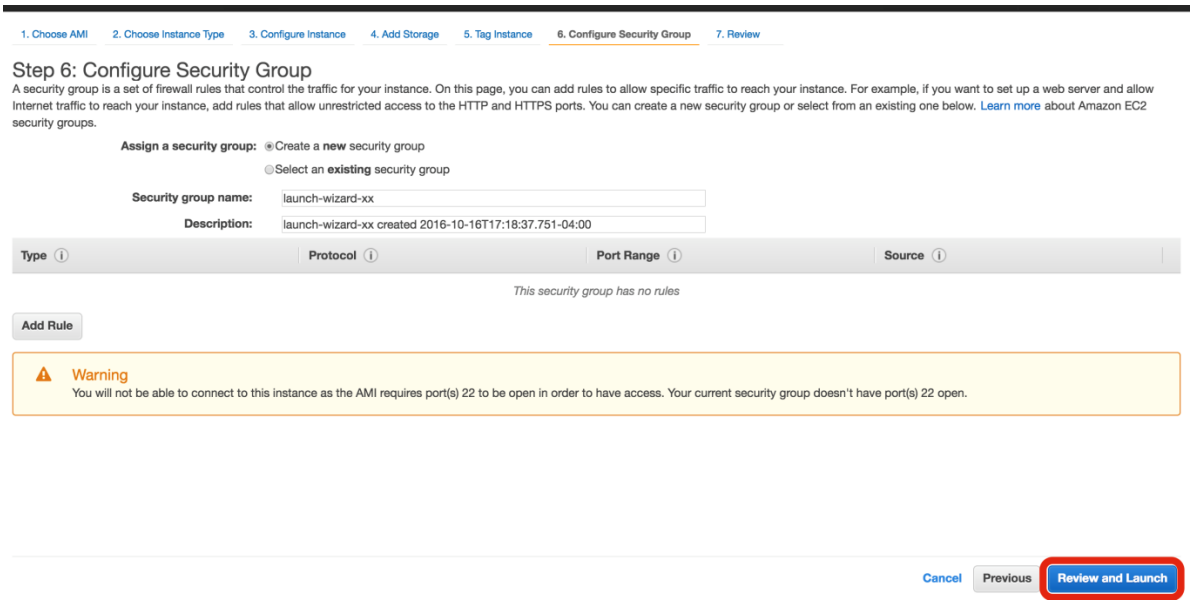


6. Click **Next: Tag Instance** to accept the default Storage Device Configuration.

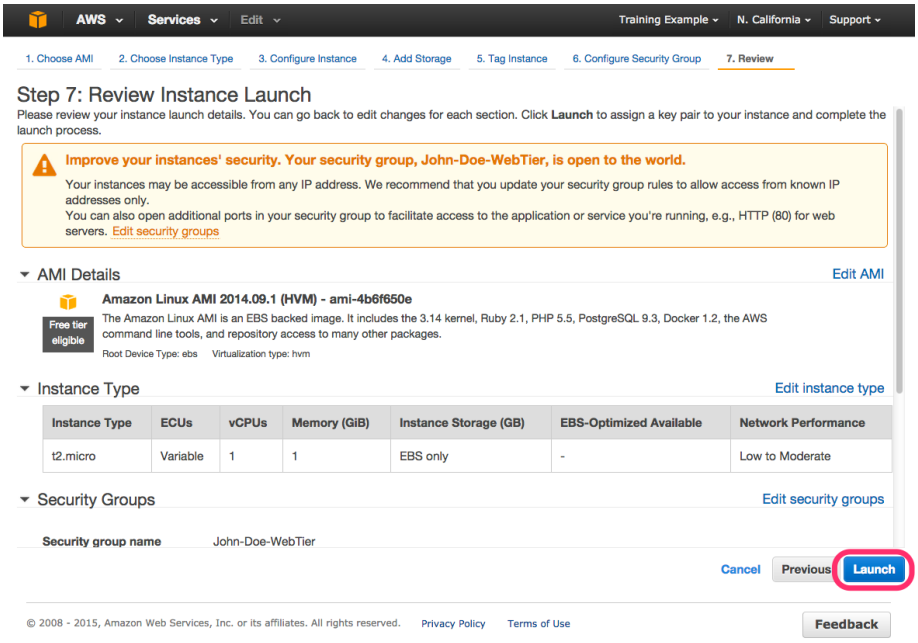


7. Next, choose a “friendly name” for your instance. This name, more correctly known as a tag, will appear in the console once the instance launches. It makes it easy to keep track of running machines in a complex environment. Named yours according to this format: “[Your Name] Server. Then click **Next: Configure Security Group**

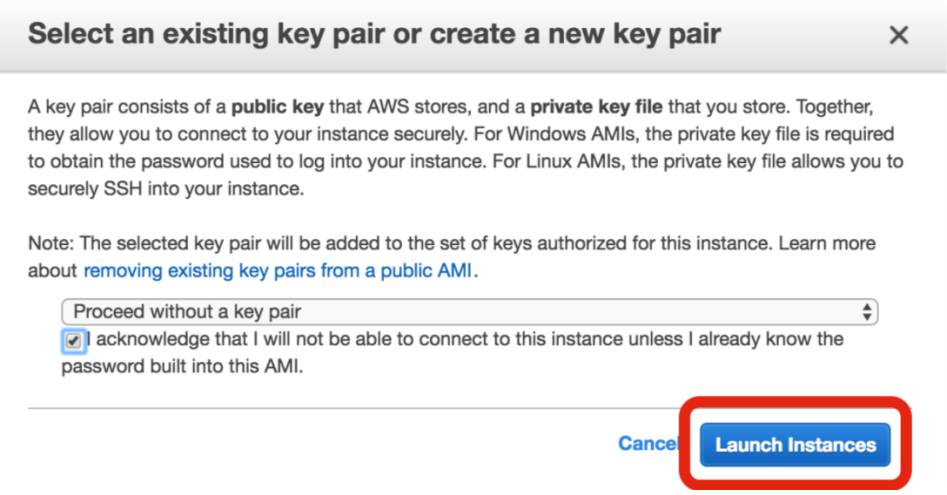
8. Remove the Security Group rule with by clicking the “x” on the right so there are no rules. (You will not need to connect with this instance). Then click **Review and Launch**



9. Review your Instance Launch Configuration, and then click **Launch**.



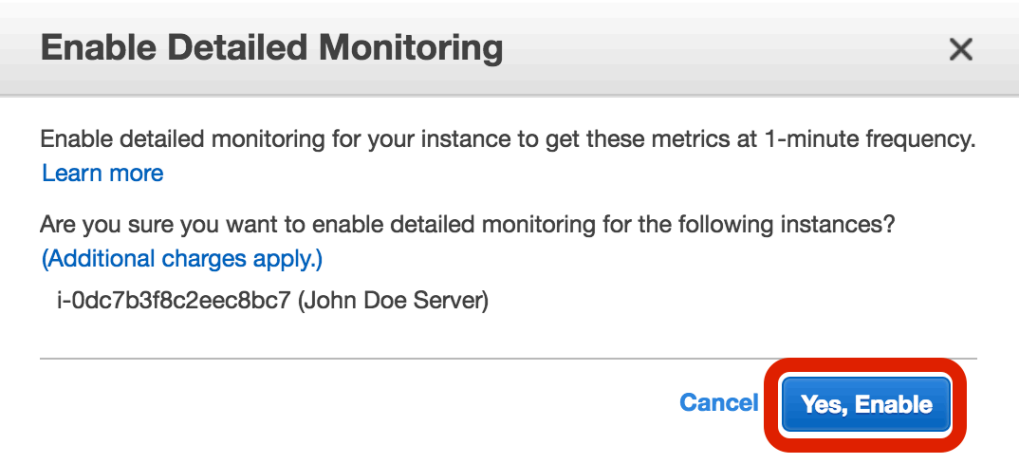
10. In the drop down choose “Proceed without a keypair” and click **Launch Instances**.



11. Click the **View Instances** button in the lower right-hand portion of the screen to view the list of EC2 instances. Once your instance has launched, you will see your Server as well as the Availability Zone the instance is in.

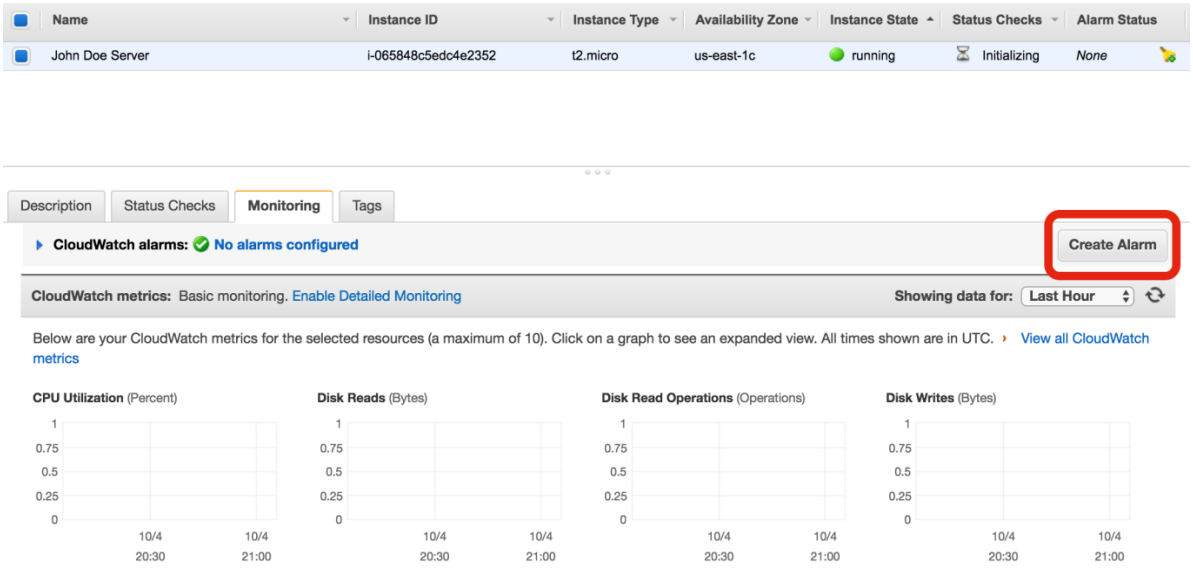
Configure a CloudWatch Alarm

1. In the EC2 Console, click the checkbox next to your server name to view details about this EC2 instance. Click the **Monitoring** tab and then click **Enable Detailed Monitoring** to provide monitoring data at a 1 minute interval vs. the default of 5 minutes.

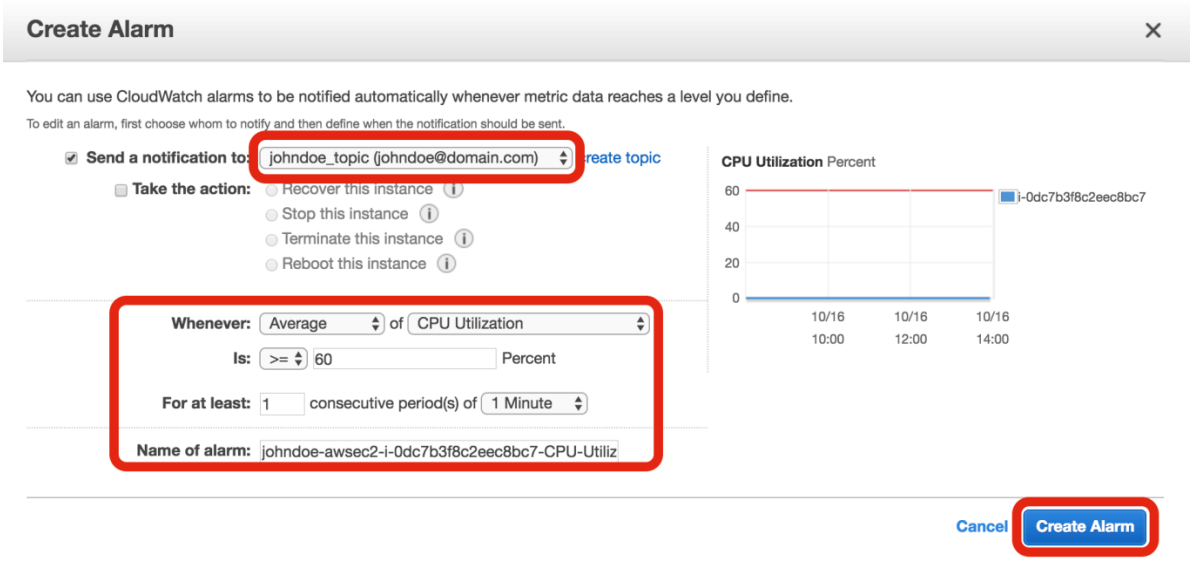


2. Click the **Description** tab and copy your “Instance ID” to the clipboard or other location such as notepad.

3. Click the **Monitoring** tab and click **Create Alarm**.



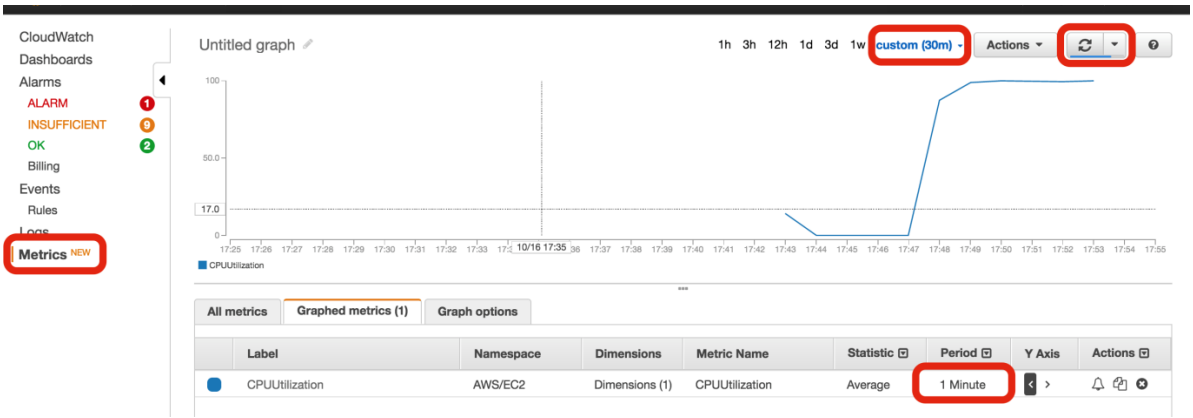
4. To the right of the “Send a notification to:” drop down, select the SNS Topic you created in the previous step. In the “Whenever:” field, set the **Average** of **CPU Utilization** to “>=” 60%. In the “For at least:” field, set the “Consecutive periods to **1 Minute**. Add your name to the “Name of alarm:” field and click **Create Alarm**. Note: If 1 minute period is not an option, click the **Description** tab and then click back to the **Monitoring** tab and proceed to set up the Alarm.



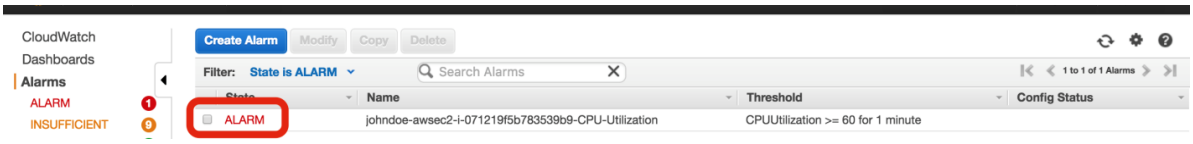
5. In the top left area of the AWS Console select **Services > CloudWatch**.

6. Click Alarms in the left pane of the Console and check the State of your Alarm.

7. In the CloudWatch Console select **Metrics** in the left pane. Select the **All Metrics** tab and paste your Instance ID into the filter. Add an additional filter “cpu”. Select **CPUUtilization** metric. Select the **Graphed metrics** tab and change the **Period** to 1 Minute. Change the graph interval to a custom value of 30m and select Auto refresh of 1min.



8. After 5 minutes, the stress tool will begin to simulate CPU workload and trigger the Alarm once the threshold is reached. You can view the Alarm state in the CloudWatch console under **Alarms**. If you setup an email notification you will receive an email alert when the Alarm is triggered.



Great Job! You have successfully configured a CloudWatch Alarm!!

Appendix A – Monitor Your Estimated Charges Using CloudWatch

In this scenario, you create an Amazon CloudWatch alarm that will monitor your estimated Amazon Web Services (AWS) charges. When you enable the monitoring of estimated charges for your AWS account, the estimated charges are calculated and sent several times daily to CloudWatch as metric data that is stored for 14 days. Billing metric data is stored in the US East (N. Virginia) Region and represents worldwide charges. This data includes the estimated charges for every service in AWS that you use, as well as the estimated overall total of your AWS charges. You can choose to receive alerts by email when charges have exceeded a certain threshold. These alerts are triggered by CloudWatch and messages are sent using Amazon Simple Notification Service (Amazon SNS).

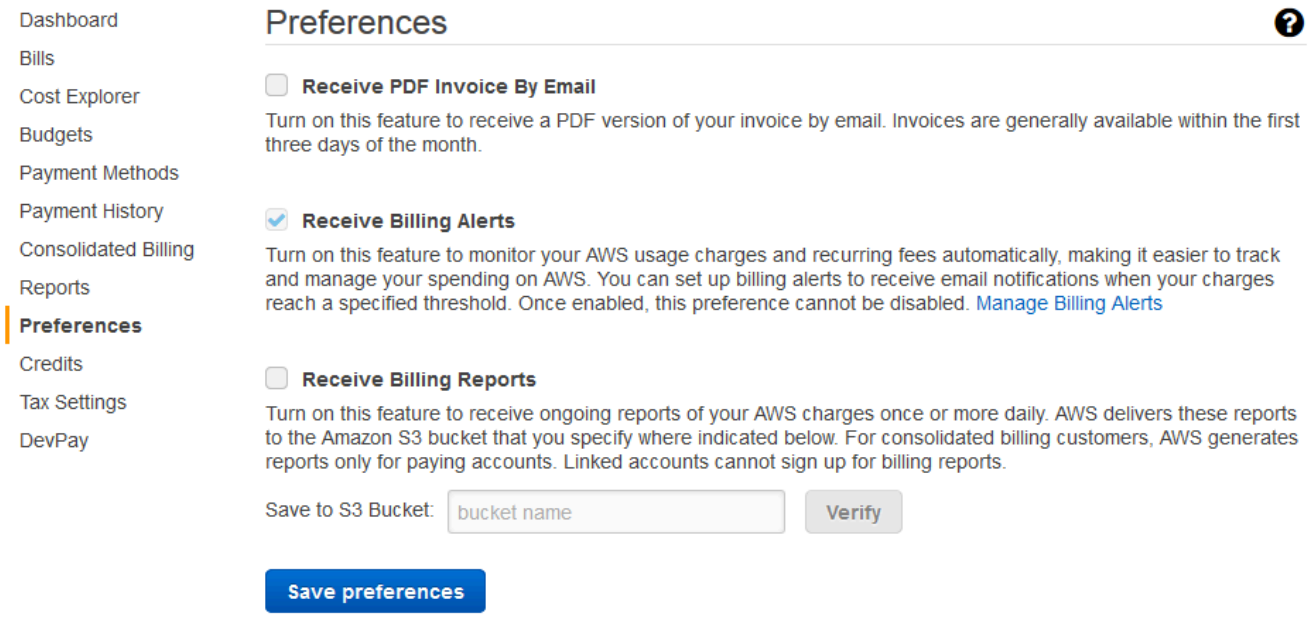
Step 1: Enable Monitoring of Your Estimated Charges

Before you can create an alarm on your estimated charges, you must enable monitoring of your estimated AWS charges, which creates metric data that you can use to create a billing alarm. It takes about 15 minutes before you can view billing data and create alarms. After you enable billing metrics you cannot disable the collection of data, but you can delete any alarms you have created. You must be signed in as the account owner (the "root user") to enable billing alerts for your AWS account.

To enable monitoring of your estimated charges

1. Open the Billing and Cost Management console at https://console.aws.amazon.com/billing/home?#.
2. In the spaces provided, enter your user name and password, and then click **Sign in using our secure server**.

3. In the navigation pane, click **Preferences**, and then select the **Receive Billing Alerts** check box.

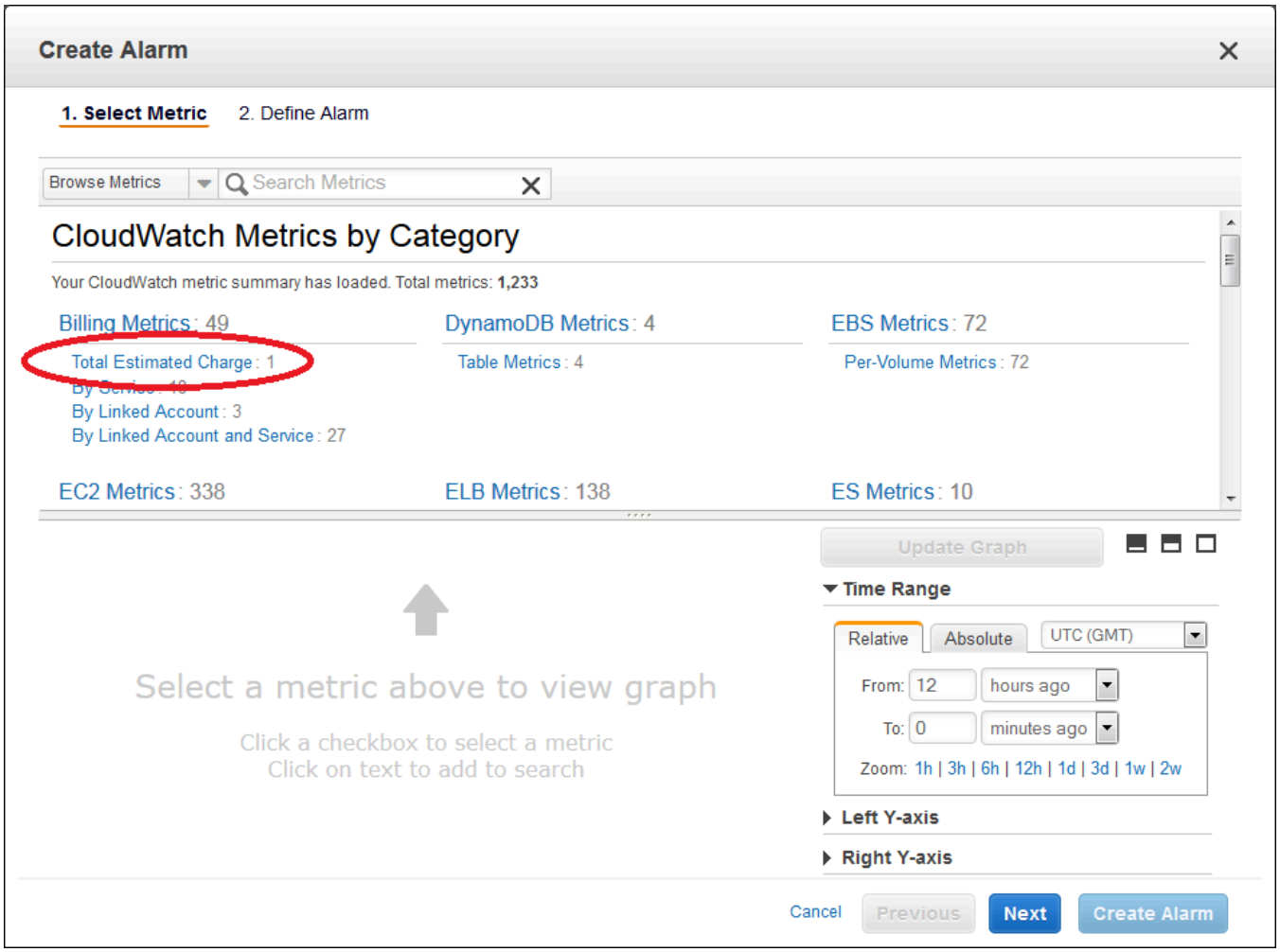


Step 2: Create a Billing Alarm

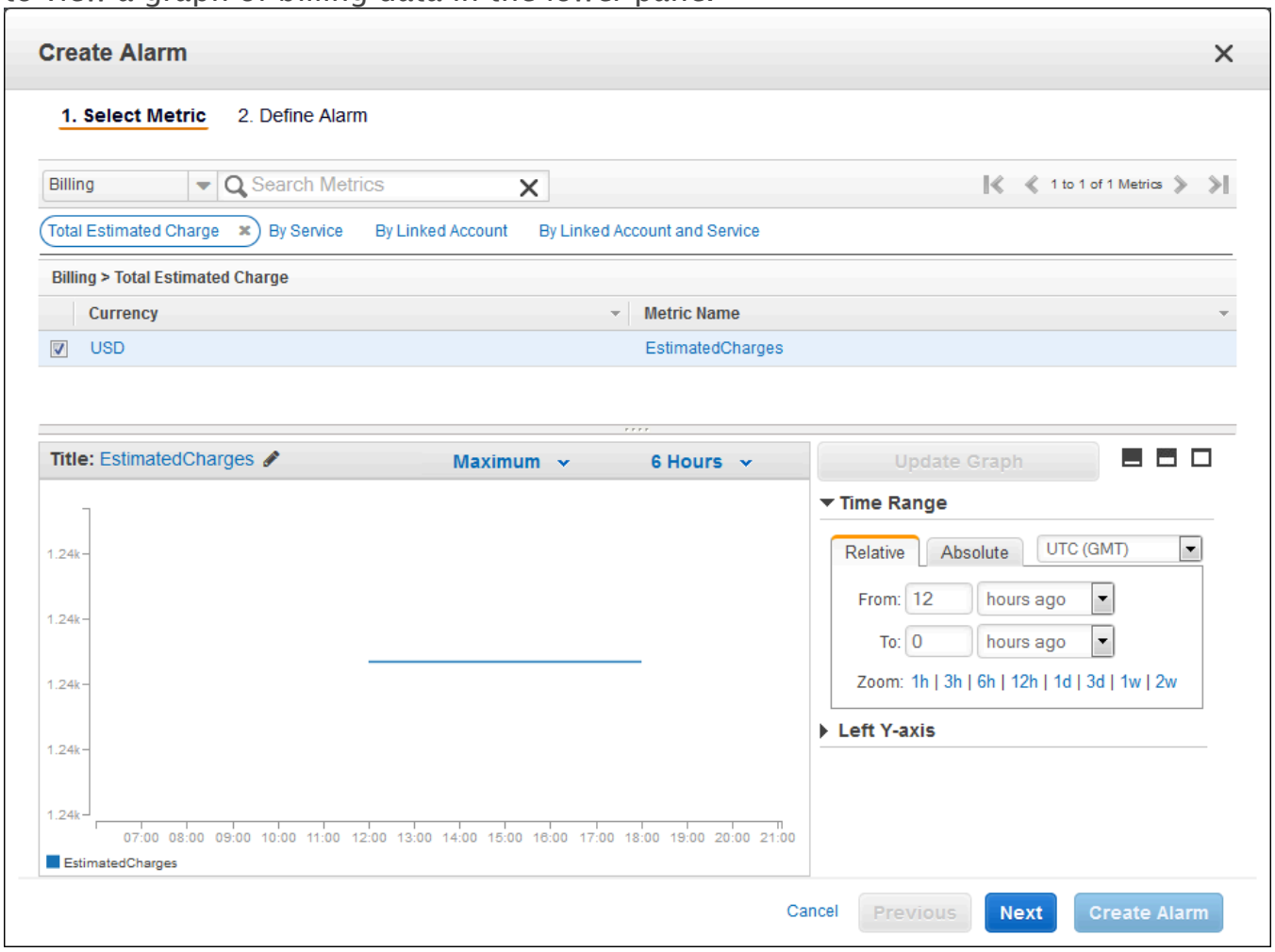
After you've enabled monitoring of your estimated AWS charges, you can create a billing alarm in the Amazon CloudWatch console. In this scenario, you'll create an alarm that will send an email message when your estimated charges for AWS exceed $200. When you enable the monitoring of your estimated charges for the first time, it takes about 15 minutes before you can view billing data and set billing alarms.

To create a billing alarm

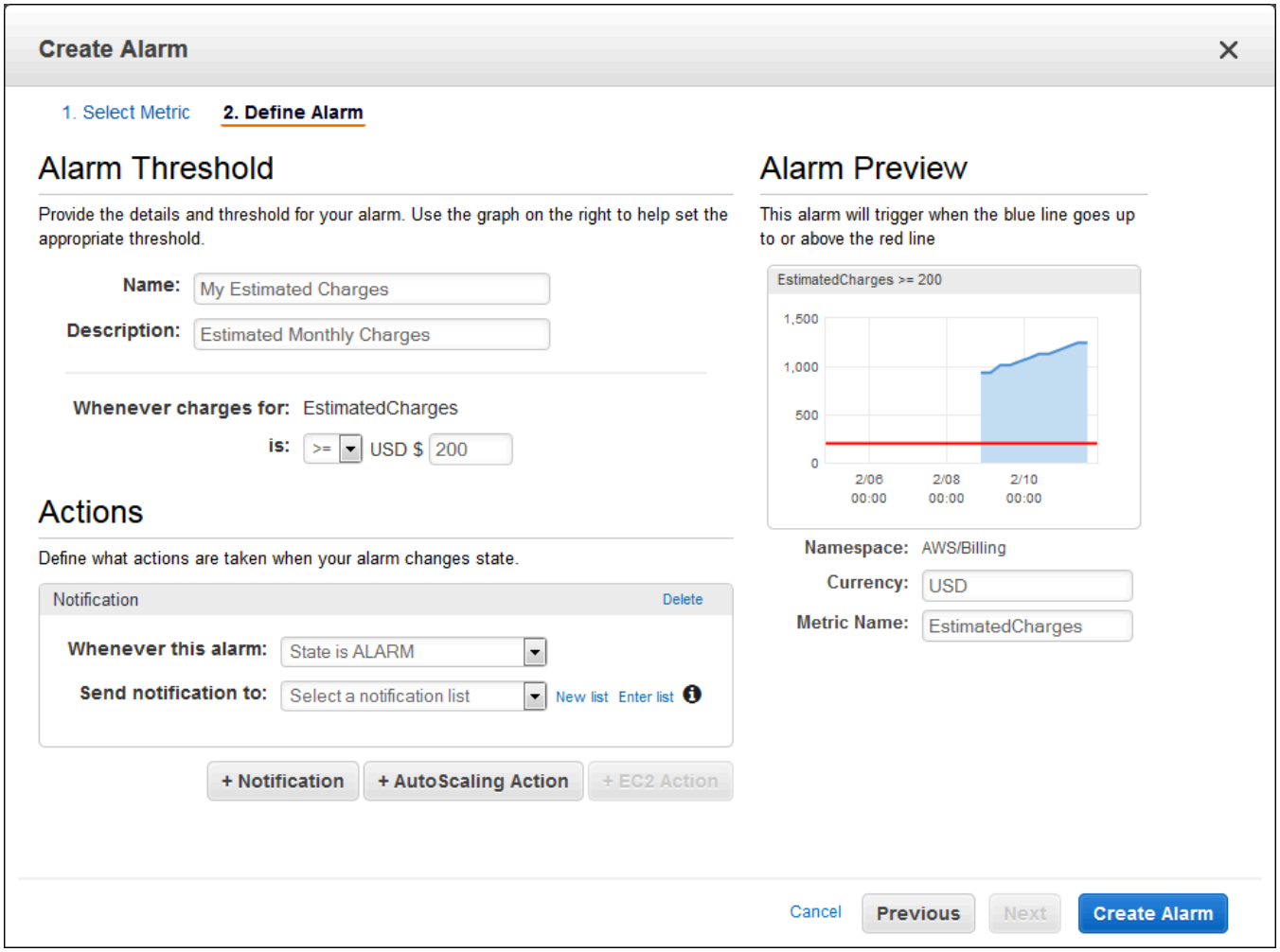
1. Open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/.
2. If necessary, change the region to US East (N. Virginia). Billing metric data is stored in the US East (N. Virginia) Region and represent worldwide charges. For more information, see Regions and Endpoints.
3. In the navigation pane, click **Alarms**, and then in the **Alarms** pane, click **Create Alarm**.
4. In the **CloudWatch Metrics by Category** pane, under **Billing Metrics**, click **Total Estimated Charge**.



5. Under **Billing** > **Total Estimated Charge**, select the **EstimatedCharges** metric to view a graph of billing data in the lower pane.



6. Click **Next**, and then in the **Alarm Threshold** pane, in the **Name** box, type a unique, friendly name for the alarm (for example, My Estimated Charges).

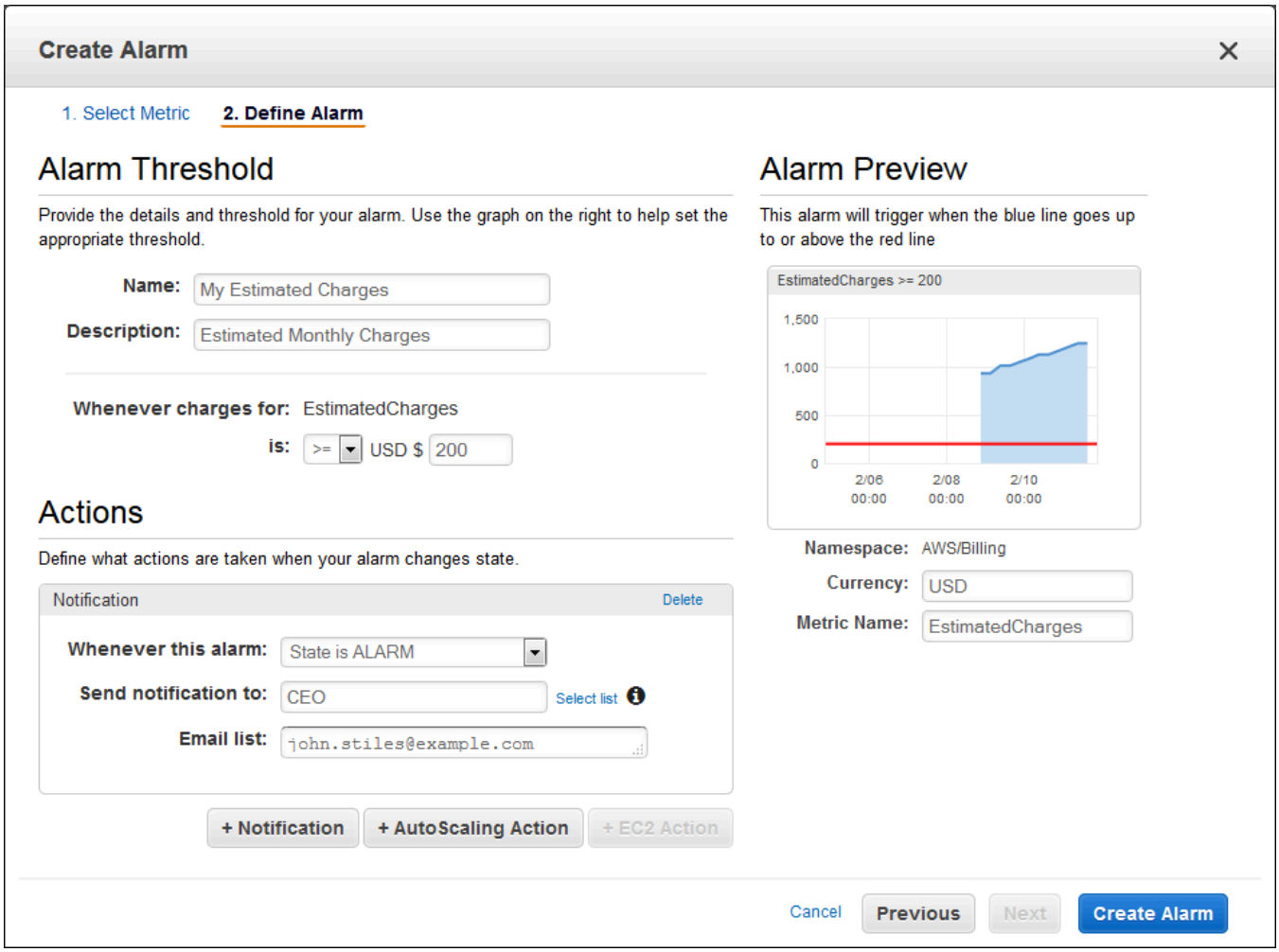


7. In the **Description** box, enter a description for the alarm (for example, Estimated Monthly Charges).
8. Under **Whenever charges for**, in the **is** drop-down list, select **>=** (greater than or equal to), and then in the **USD** box, set the monetary amount (for example, 200) that must be exceeded to trigger the alarm and send an email.
   Note: Under **Alarm Preview**, in the **Estimated Monthly Charges** thumbnail graph, you can see an estimate of your charges that you can use to set an appropriate threshold for the alarm.
9. Under **Actions**, click **Notification**, and then in the **Whenever this alarm** drop-down menu, click **State is ALARM**.
10. In the **Send notification to** box, select an existing Amazon SNS topic.

    To create a new Amazon SNS topic, click **Create topic**, and then in the **Send notification to** box, enter a name for the new Amazon SNS topic (for example., CFO),

and in the **Email list** box, enter the email address (for example, john.stiles@example.com) where email notifications should be sent.

Note: If you create a new Amazon SNS topic, the email account associated with the topic will receive a subscription confirmation email. You must confirm the subscription in order to receive future email notifications when the alarm is triggered.



11. Click **Create Alarm**.
    Important: If you added an email address to the list of recipients or created a new topic, Amazon SNS sends a subscription confirmation email to each new address shortly after you create an alarm. Remember to click the link contained in that message, which confirms your subscription. Alert notifications are only sent to confirmed addresses.

12. To view your billing alarm in the CloudWatch console, in the navigation pane, under **Alarms**, click **Billing**.

Step 3: Check Alarm Status

Now, check the status of the billing alarm that you just created.

To check alarm status using the CloudWatch console

1. Sign in to the AWS Management Console and open the CloudWatch console athttps://console.aws.amazon.com/cloudwatch/.
2. If necessary, change the region to US East (N. Virginia). Billing metric data is stored in the US East (N. Virginia) Region and represent worldwide charges. For more information, see Regions and Endpoints.
3. In the navigation pane, under **Alarms**, click **Billing**.

Step 4: Edit a Billing Alarm

Let's say that you want to increase the amount money you spend with AWS each month to $400. You can edit your existing billing alarm and increase the dollar amount that must be exceeded before the alarm is triggered.

To edit a billing alarm using the CloudWatch console

1. Sign in to the AWS Management Console and open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/.
2. If necessary, change the region to US East (N. Virginia). Billing metric data is stored in the US East (N. Virginia) Region and represent worldwide charges. For more information, see Regions and Endpoints.
3. In the navigation pane, under **Alarms**, click **Billing**.
4. In the list of alarms, select the check box next to the alarm you want to change, and then click **Modify**.
5. Under **Alarm Threshold**, in the **USD** box, set the monetary amount (for example, 400) that must be exceeded to trigger the alarm and send an email, and then click **Save Changes**.

Step 5: Delete a Billing Alarm

Now that you have enabled billing, and you have created and edited your first billing alarm, you can delete the billing alarm if you no longer need it.

To delete a billing alarm using the CloudWatch console

1. Sign in to the AWS Management Console and open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/.

2. If necessary, change the region to US East (N. Virginia). Billing metric data is stored in the US East (N. Virginia) Region and represent worldwide charges. For more information, see Regions and Endpoints.
3. In the navigation pane, under **Alarms**, click **Billing**.
4. In the list of alarms, select the check box next to the alarm you want to delete, and then click **Delete**.
5. In the **Delete Alarms** dialog box, click **Yes, Delete**.

