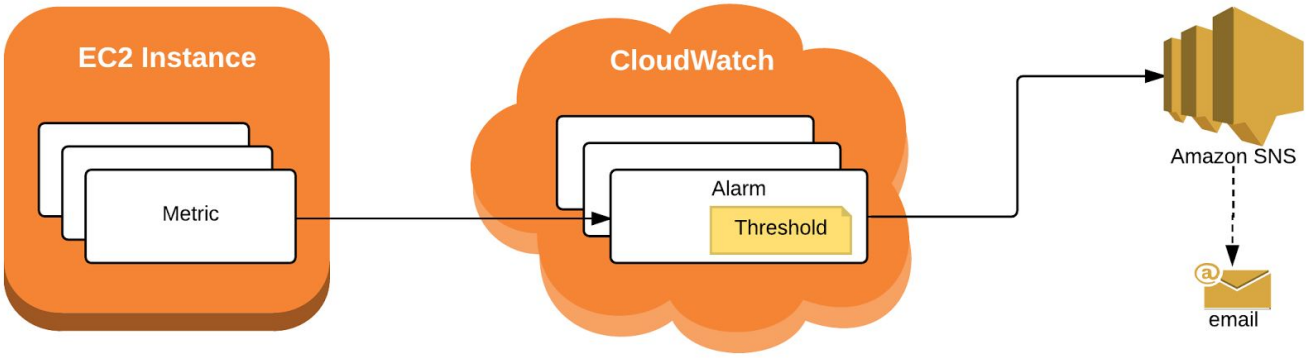
MODULE 6 – LAB EXERCISES

The lab exercises described below will help you to get practice in both Amazon CloudWatch and Amazon Simple Notification Service in performance monitoring and alarm alerting for your computing instances.

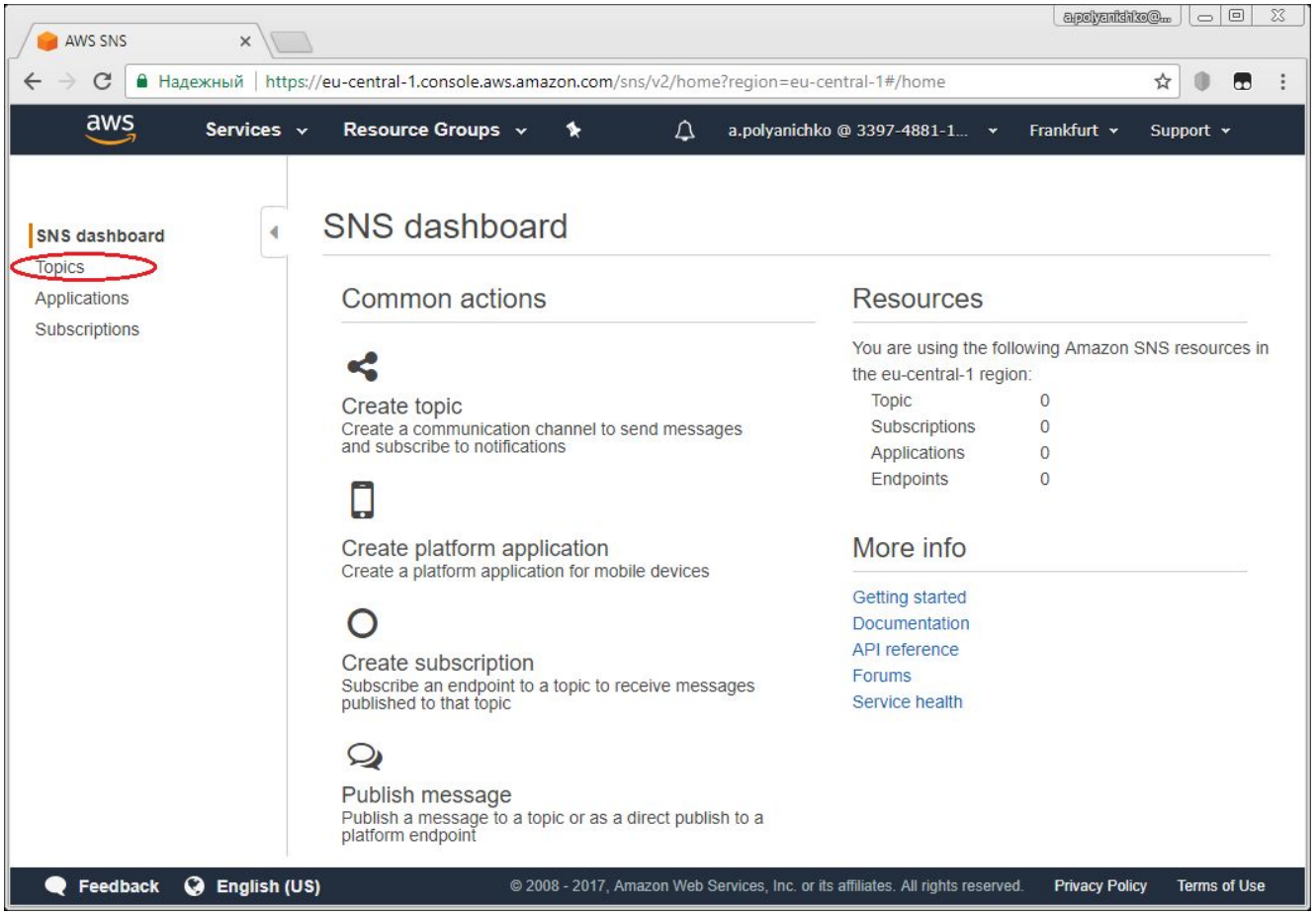
During the hands-on exercises we will use the scheme below as a reference model:



1. Create a new SNS Topic

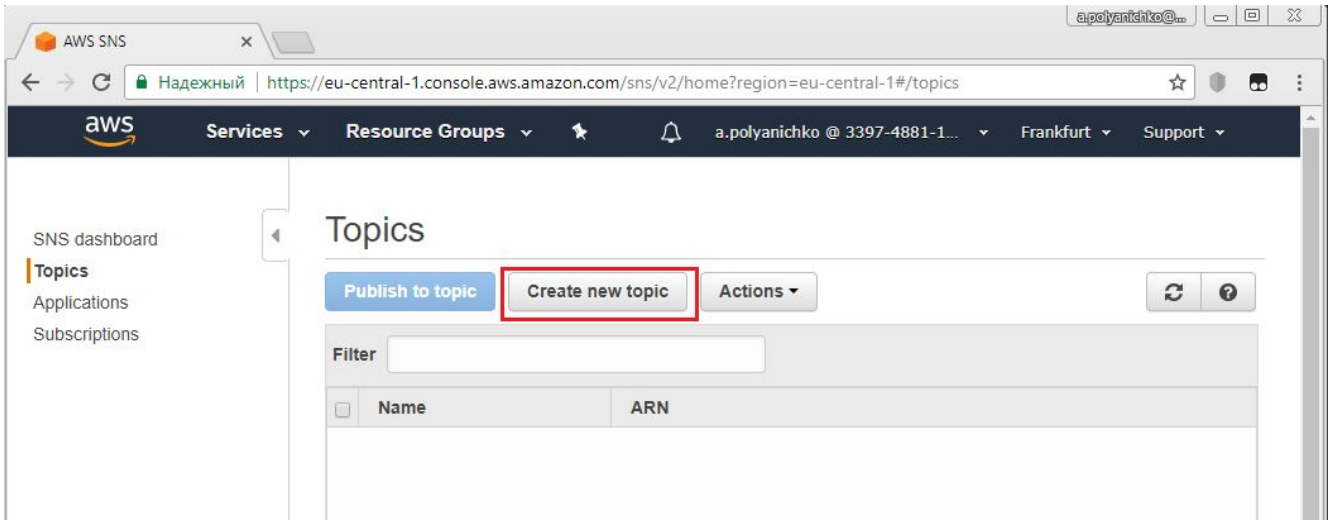
A quite comfortable way for our case is to start our configuration "from the tail" therefore let begin at e-mail notification part.

Please open AWS Management Console and then navigate to SNS main page:

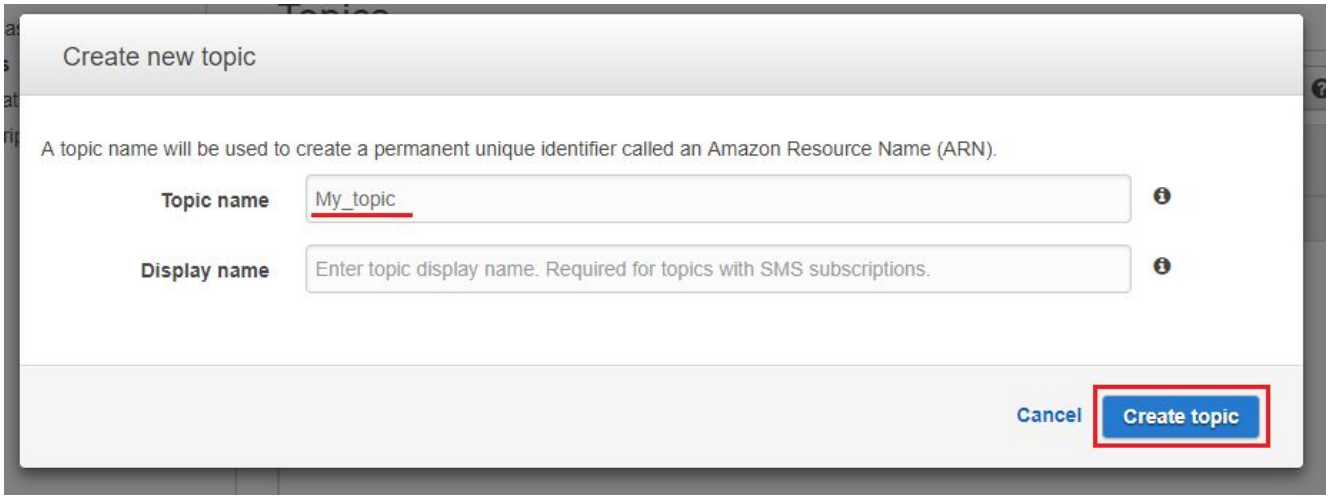


	If nothing was created before in Amazon SNS under your account, you will see a welcome page with some brief explanations, just click on “Get started” button.

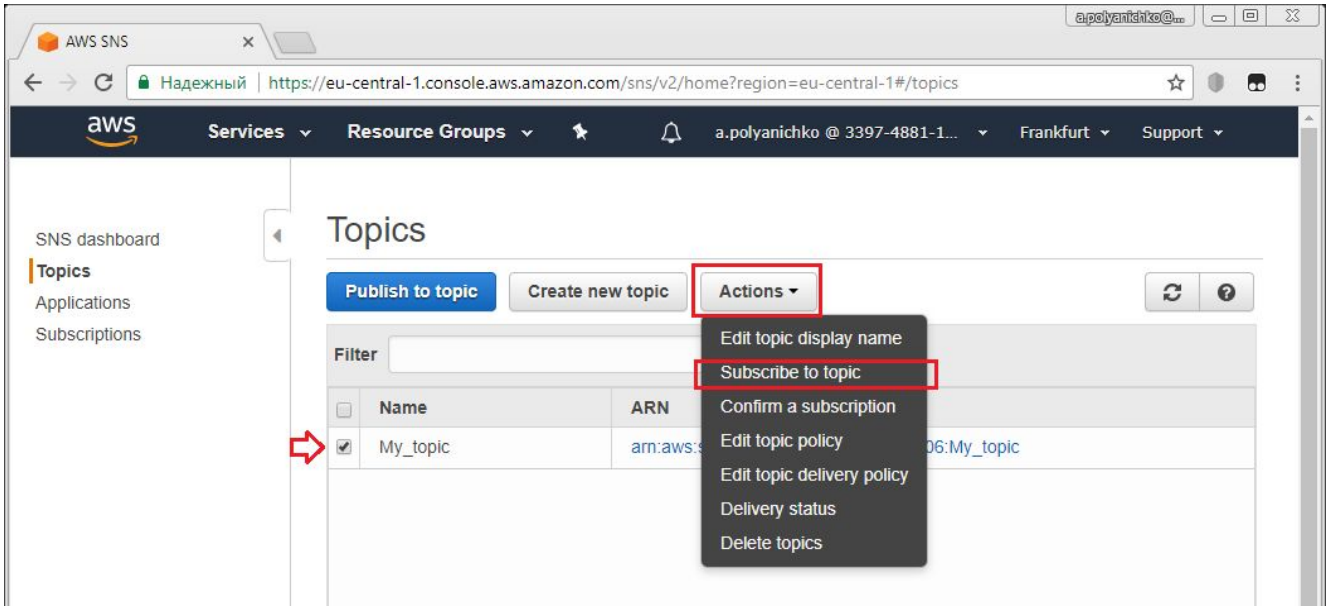
Click on “Topic” item on left-side menu (refer to previous screenshot) to open Topics page and then click on “Create new topic” button:



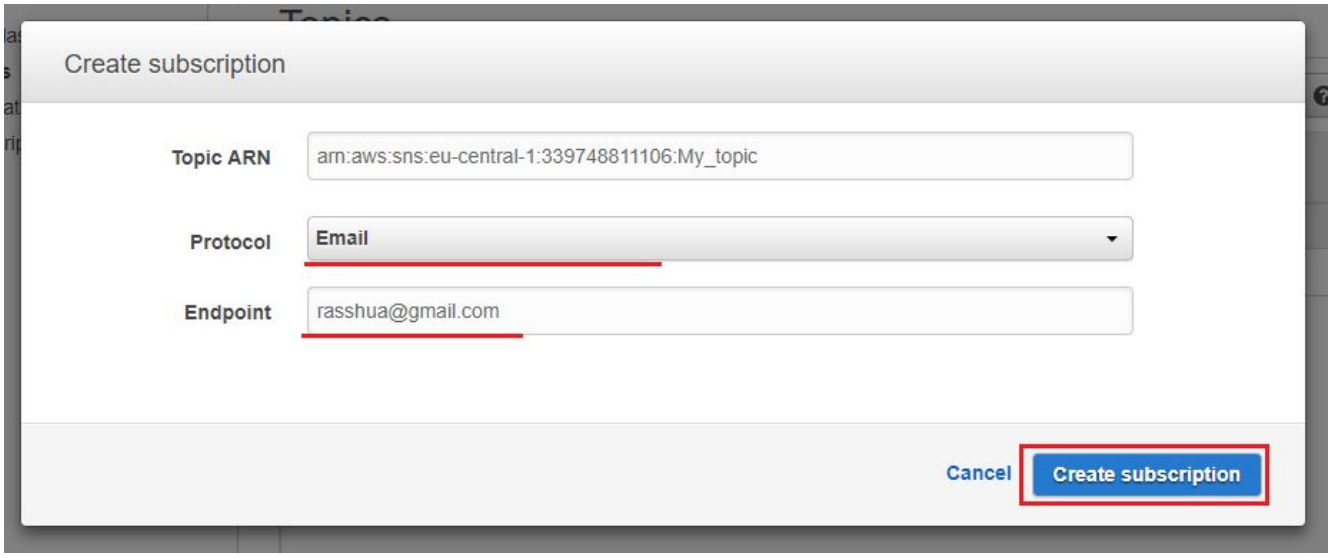
Specify the name and (optionally) displayed name for new topic, then click on “Create topic” button:



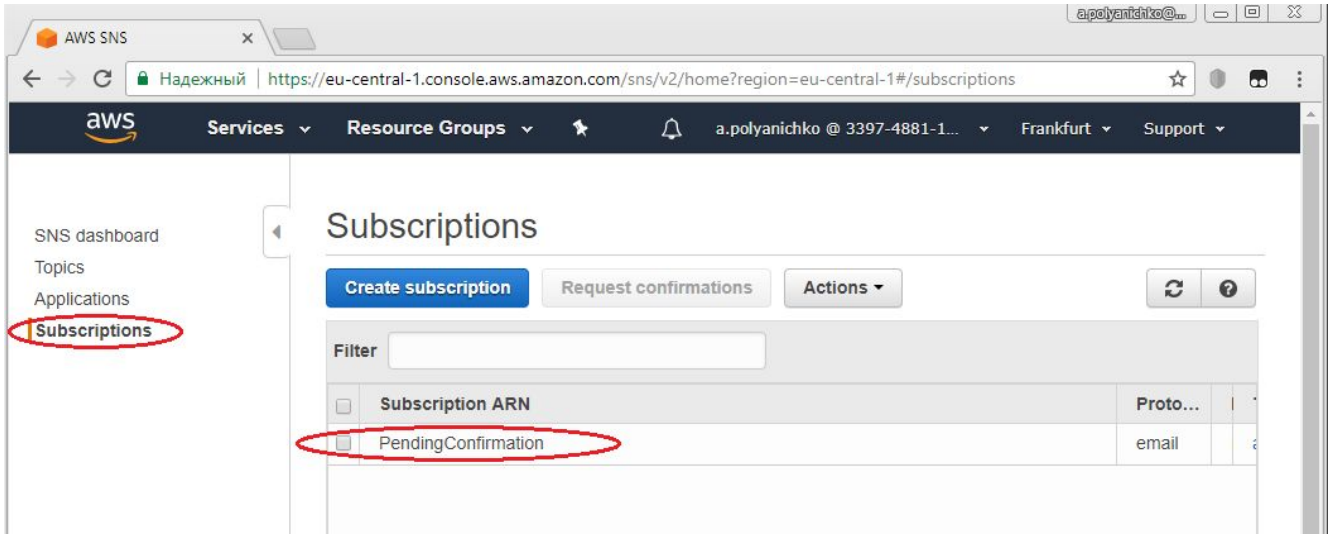
On the next page select your topic in the list then perform “Actions” → “Subscribe to topic” command from Topics top menu:



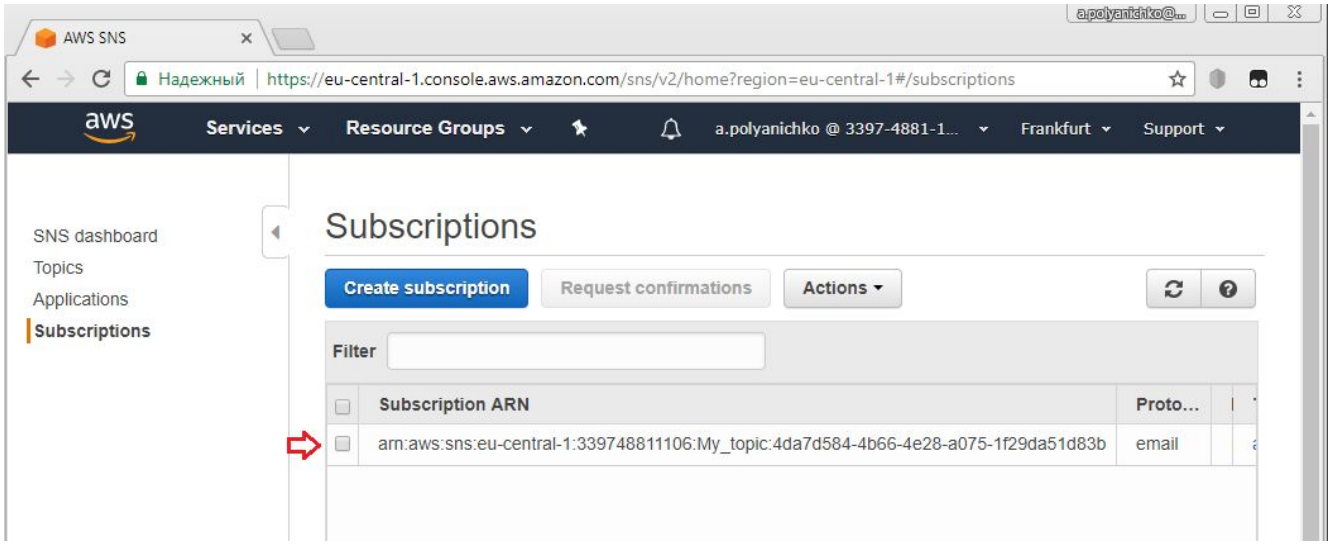
Please select Email protocol and then type the valid e-mail address as endpoint for the subscription:



Click on “Create subscription” button and find your subscription on Subscriptions page as shown below:

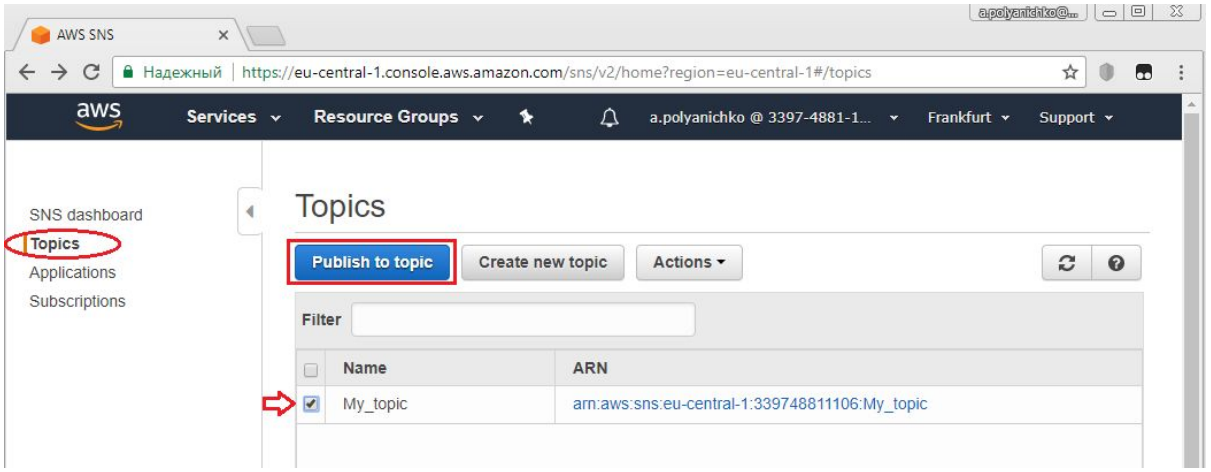


At this stage the subscription is waiting for confirmation by e-mail. Please check the mailbox that you have put as endpoint, find the message from AWS Notifications and confirm using of e-mail address. After that your subscription is being active:

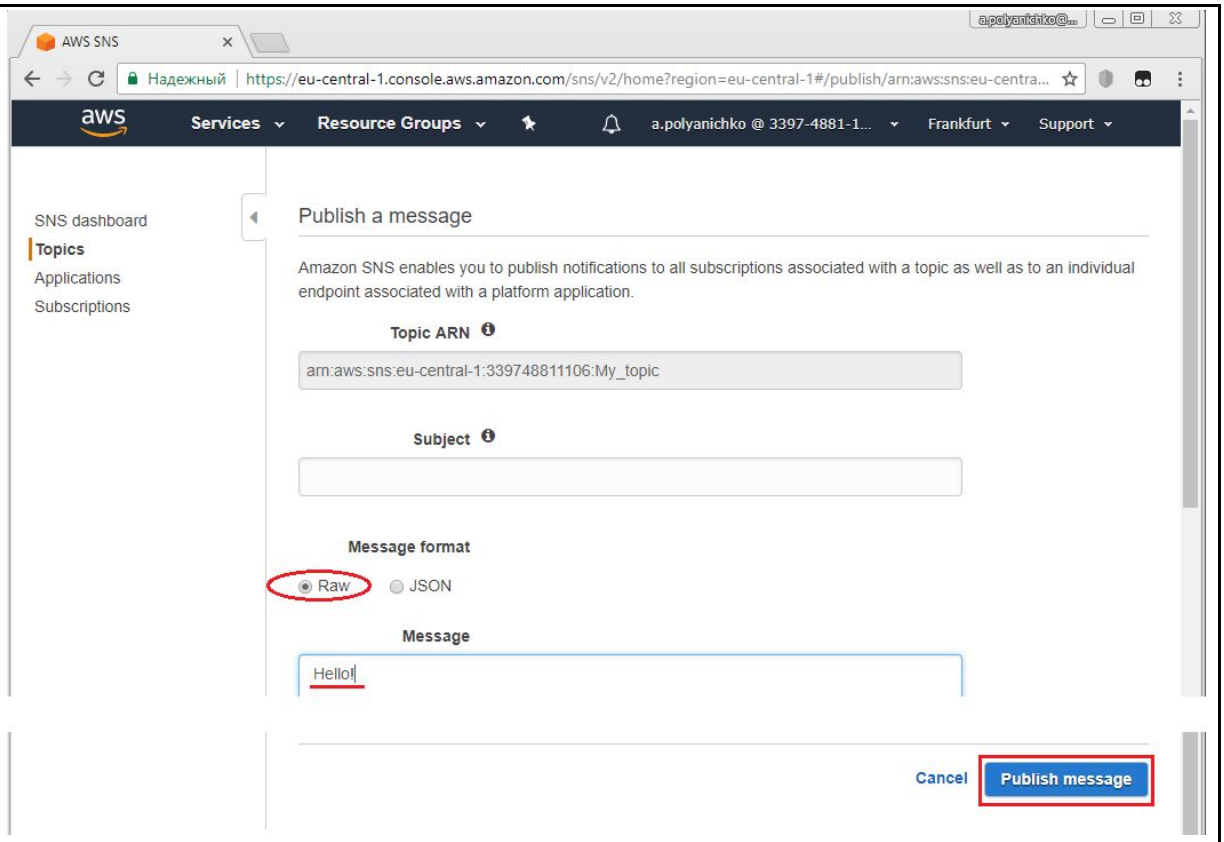


To check that everything is ok with your SNS you may test your topic manually.

Select desired topic in the list as shown below and click on “Publish to topic” button:



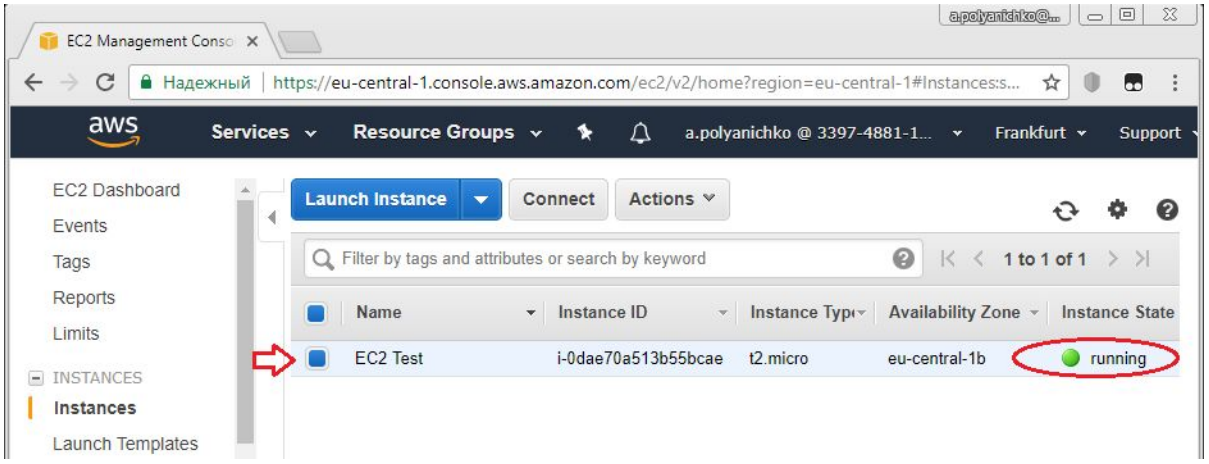
On the next page select “Raw” as message format, type a piece of text in Message textbox and finally click on “Publish message” button at the bottom:



You will receive the message on the address that you've specified in the subscription.

2. Starting CloudWatch monitoring on the existing EC2 Instance

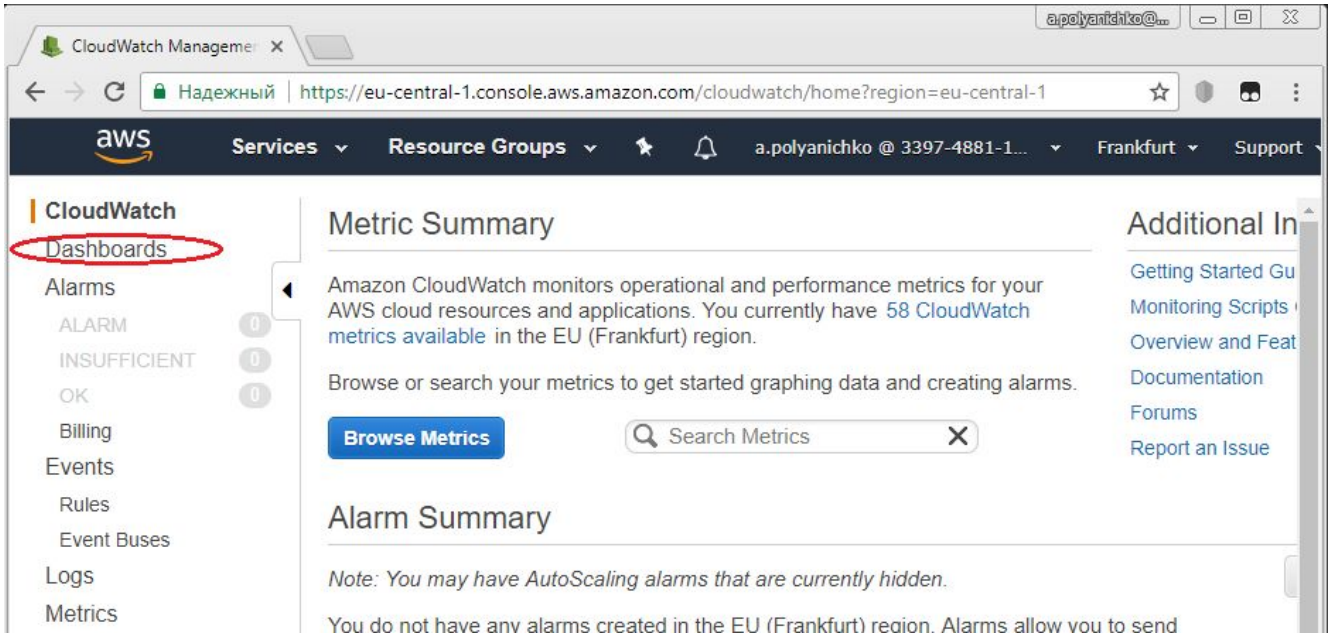
In the exercise we will use Amazon Linux AMI on EC2 instance which was created in our previous practice. We assume that your EC2 instance exists and is in running state:



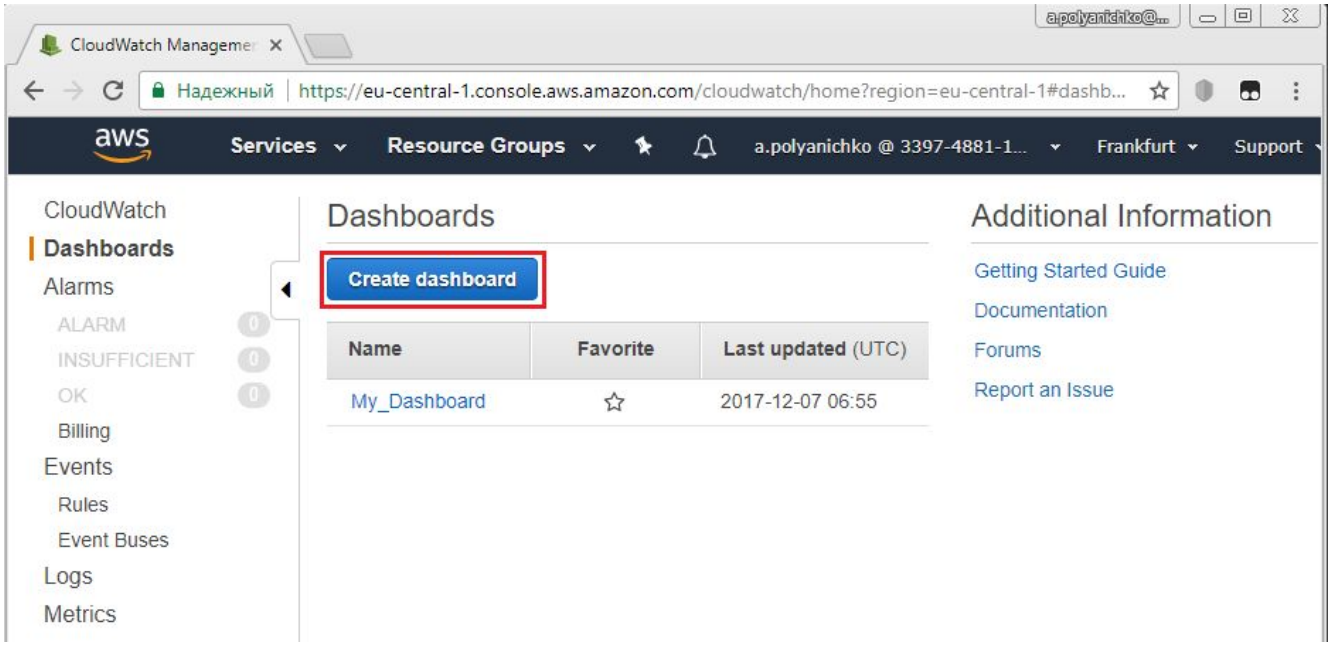
Otherwise please create EC2 instance from scratch as was described in MODULE 3 Lab classwork.

On AWS Management Console please find and click on CloudWatch link:

On CloudWatch main page let start from Dashboard menu item:

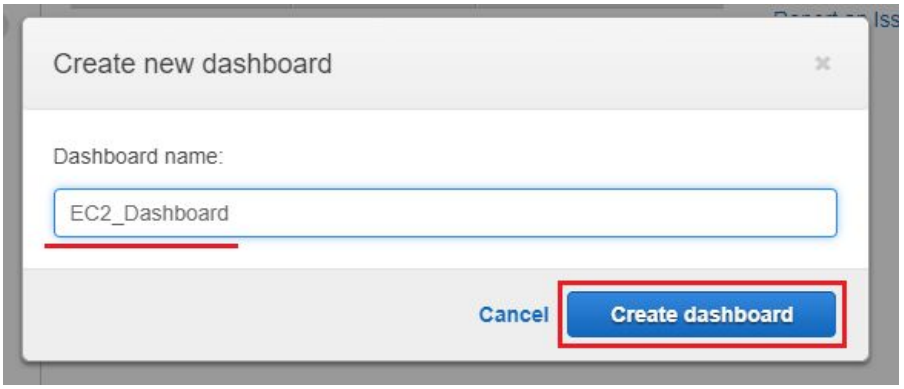


Please click on “Create dashboard” button on the next page:

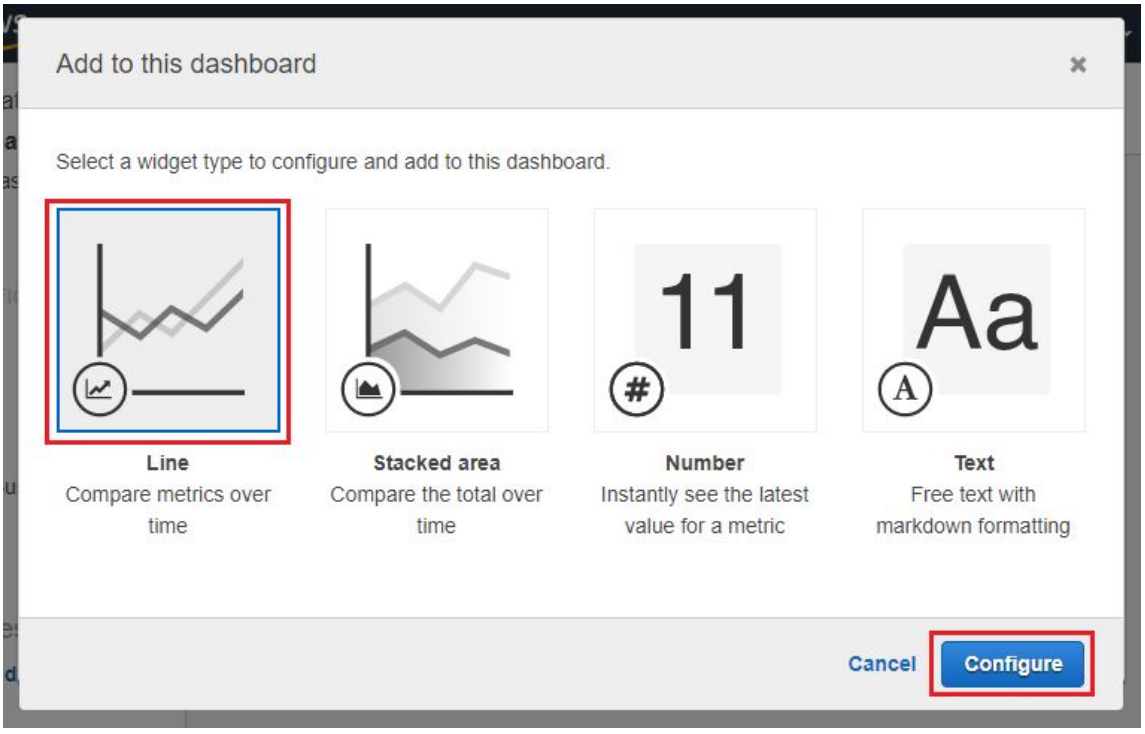


	Frankly speaking, the creation of a dashboard is not mandatory for objectives of this exercise. We will pass this step because the dashboard is comfortable tool for metric observation and alarm configuration.

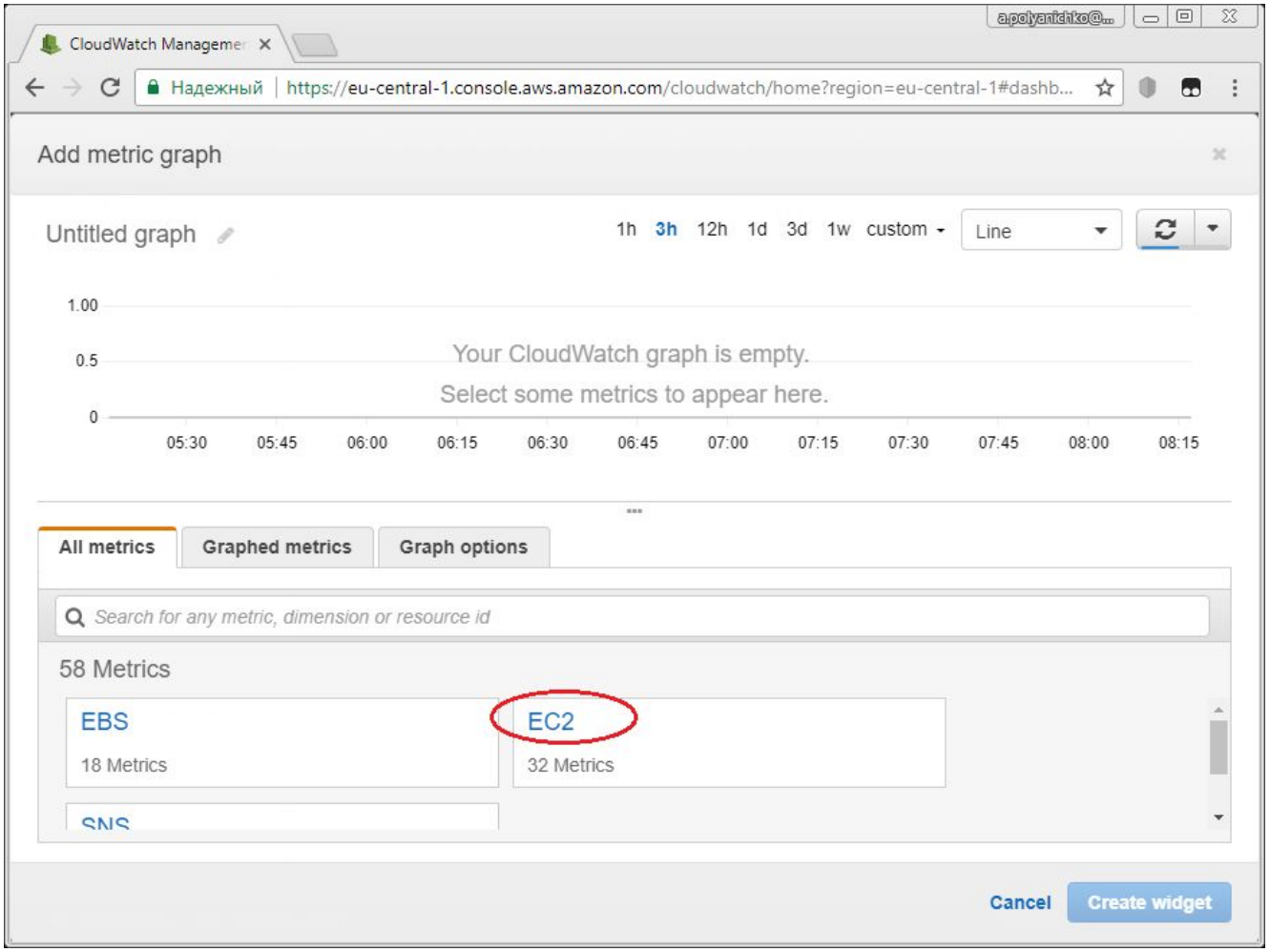
Specify the name for dashboard and then click on “Create dashboard” button below:



Select a type of widget which will be added on the dashboard and then click “Configure” button:



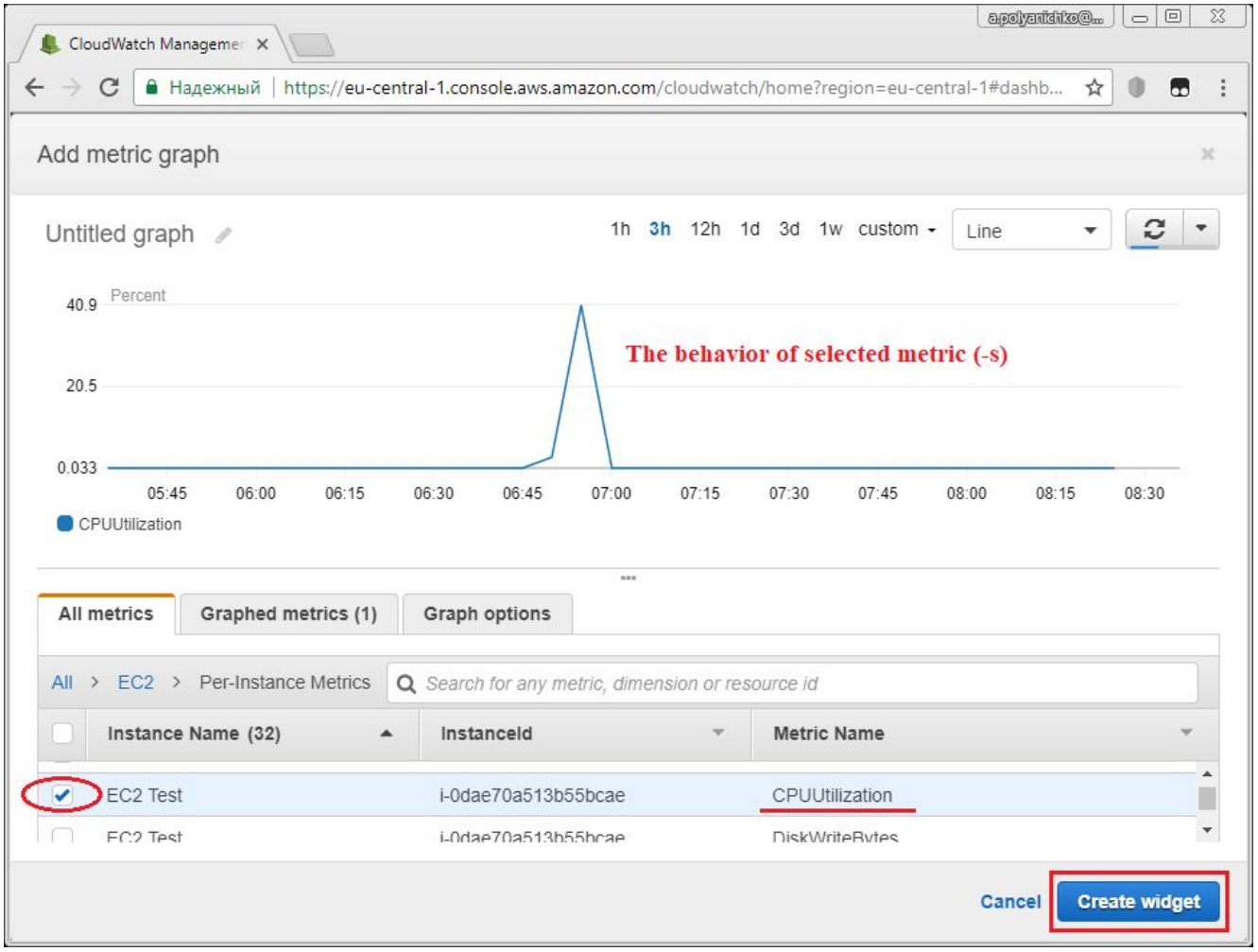
On the next page you must select the metric (-s) which will be displayed on the widget:



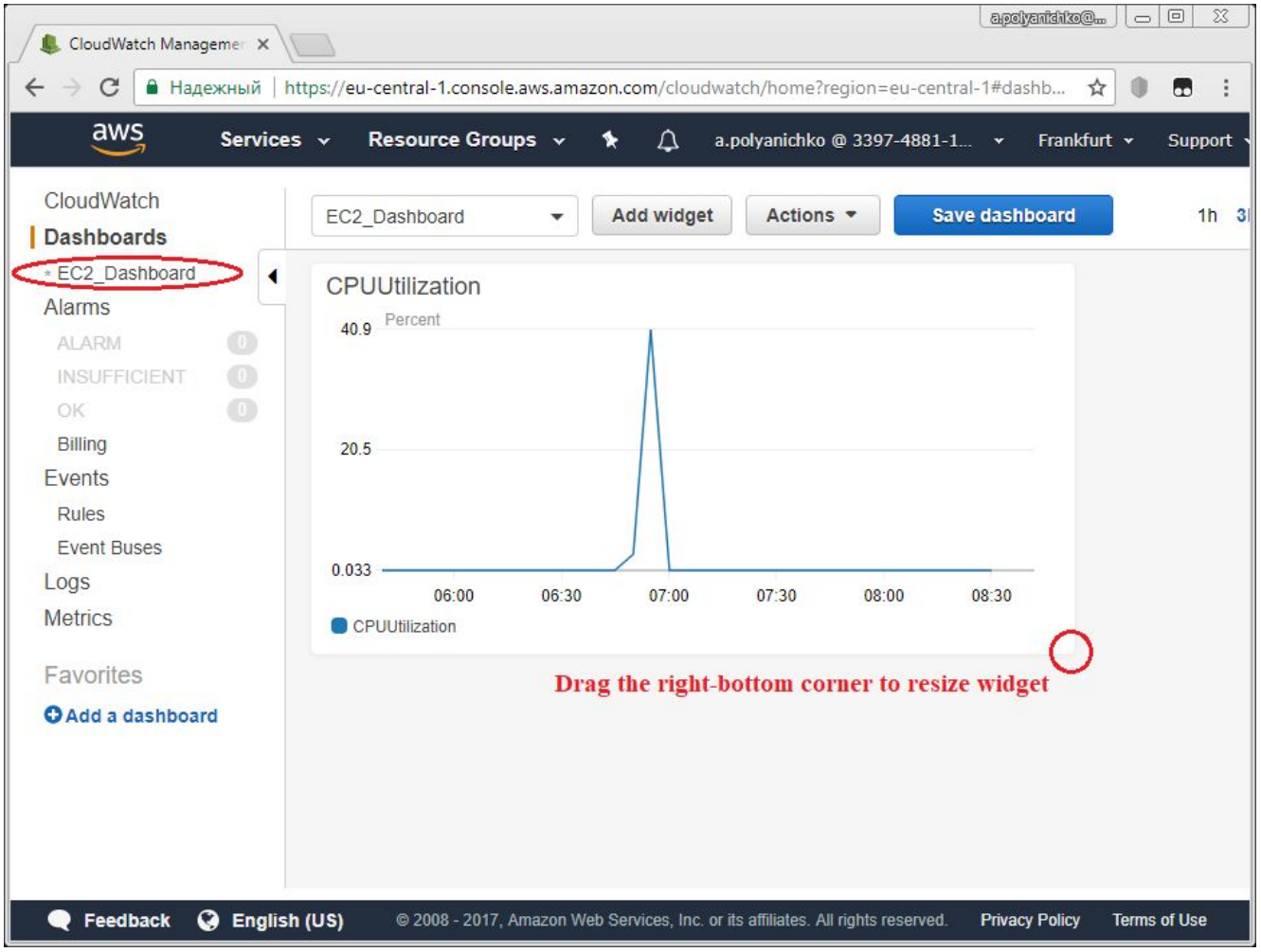
	We are using CPUUtilization metric from our active EC2 for training purpose.

Please clock on “EC2” link (shown above) than on “Per-Instance Metric” link:

and find and select CPUUtilization metric for your desired EC2:



Finally click on “Create widget” button as shown above and ensure that your dashboard displays desired metric:

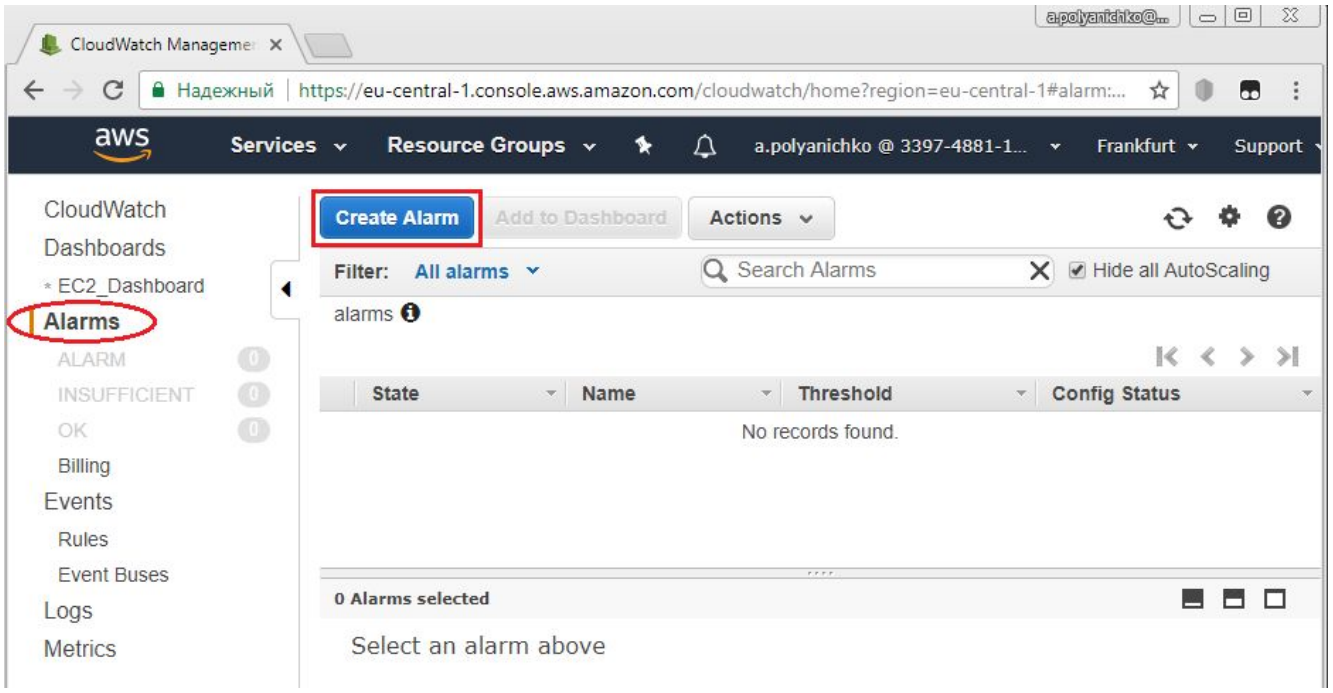


	Please take in account that the time on X-Axis is displayed in UTC format by default.

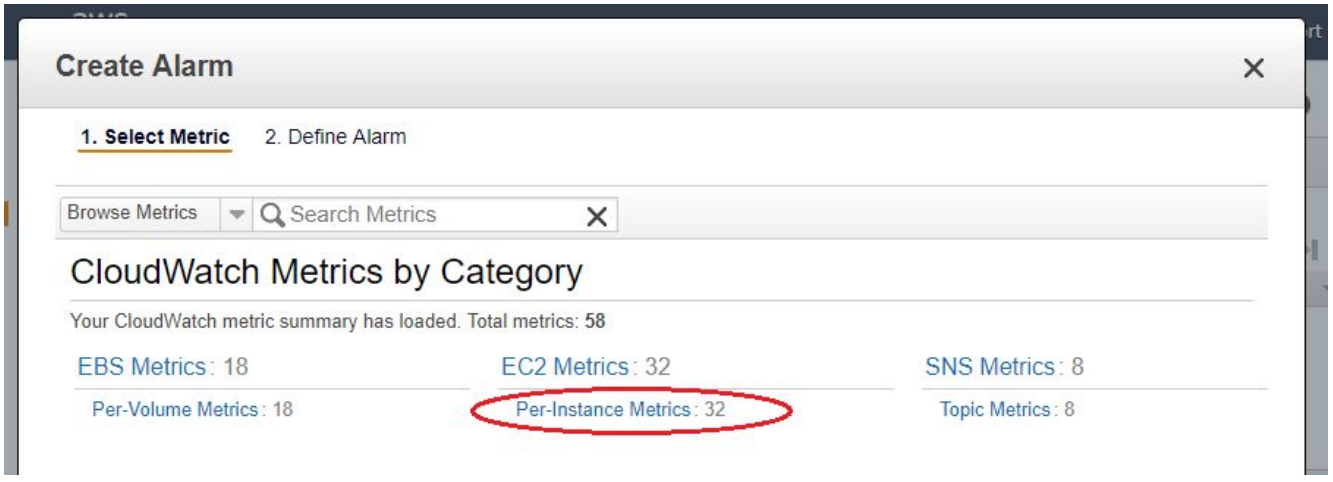
So your dashboard is ready for use and now you may start to create alarm in CloudWatch.

	At this point please note average maximal value for CPU utilization using your dashboard and widget. CPU utilization in “idle” mode will be necessary when you will configure alarm threshold. In our testing lazy CPU utilization values were less than 5%.

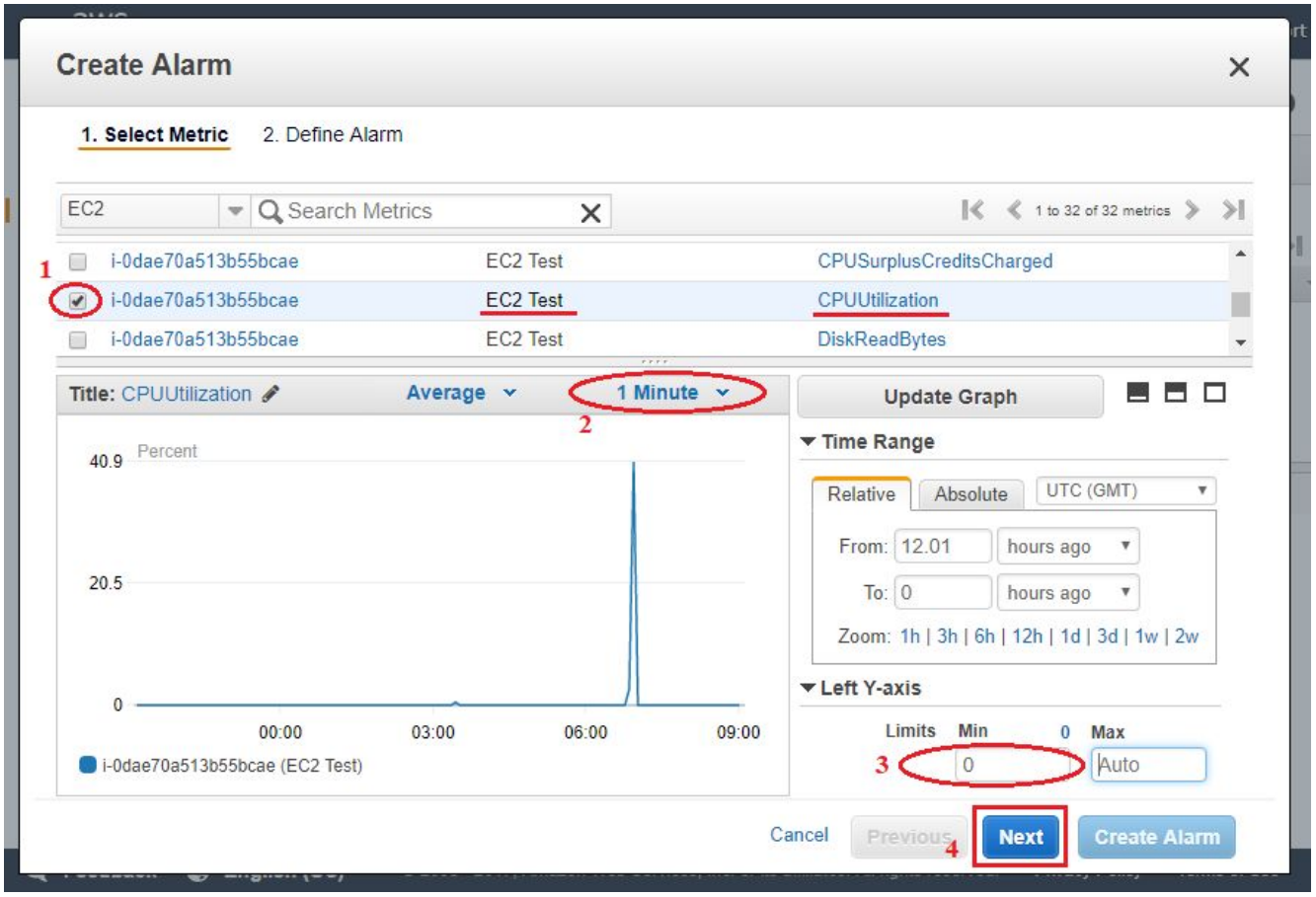
Switch to “Alarm” item on the left-side menu and click on “Create alarm” button:



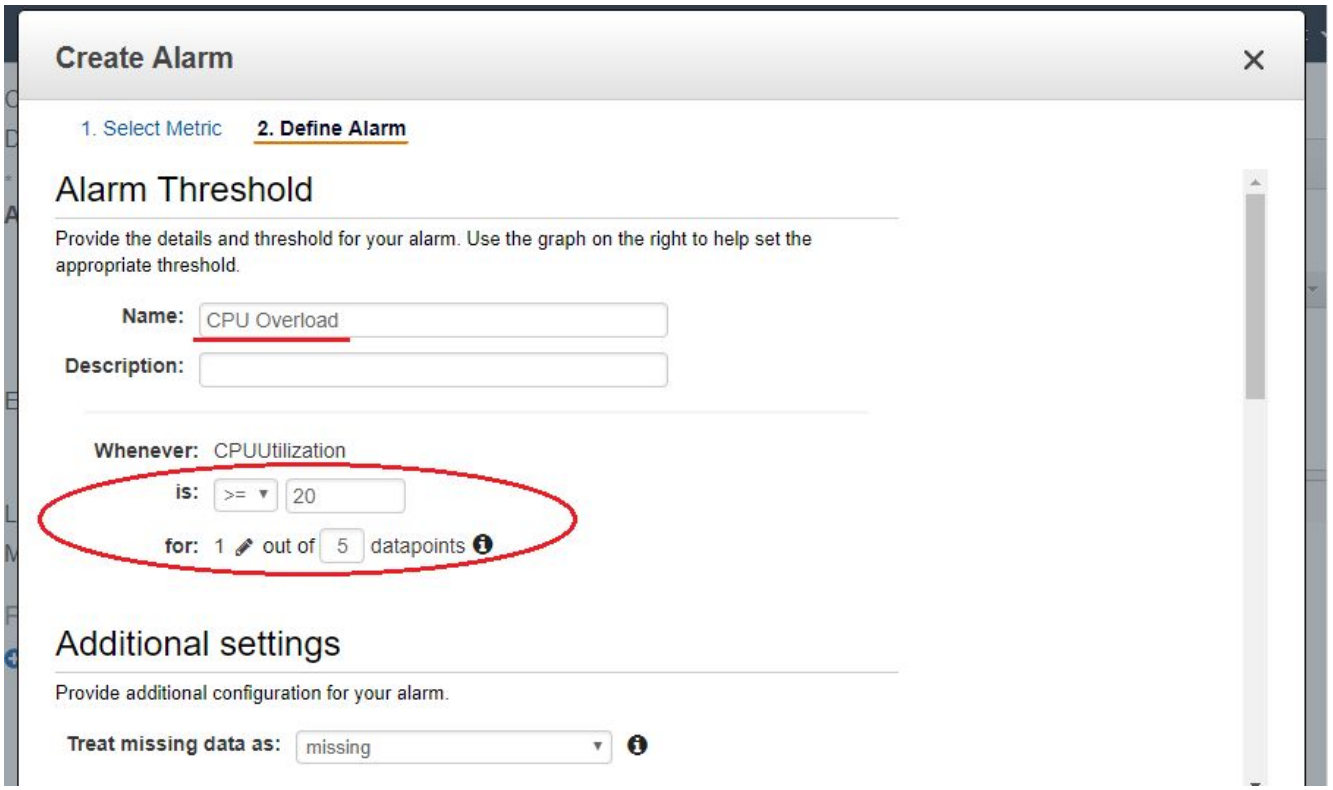
On the next page select desired metric group:



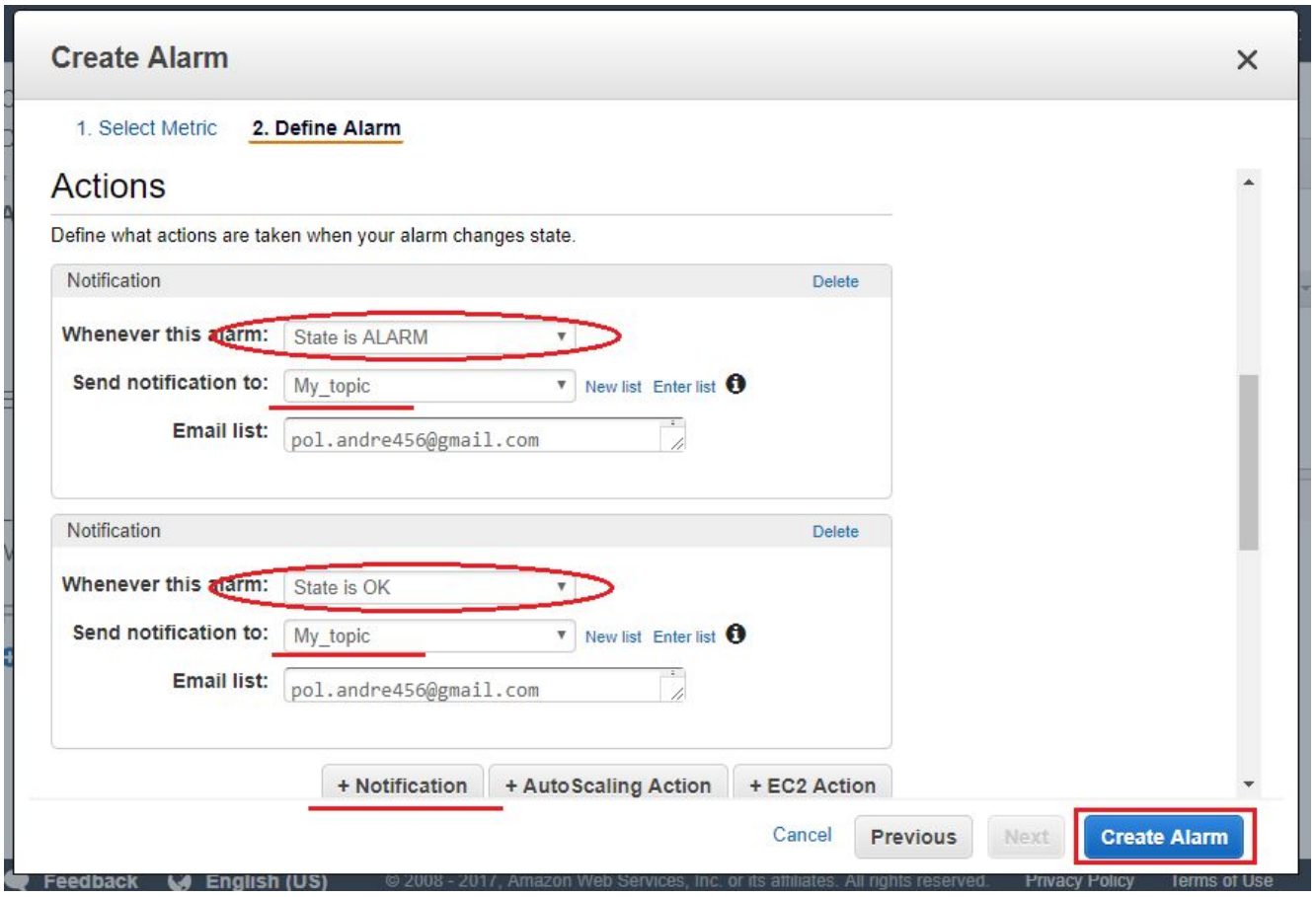
then select desired metric (1), define measurement interval (2) and optionally minimal limit for Y-axis (3), and finally click on “Next” button (4):



On the next step you must specify alarm threshold (name and value) as shown in example below:



And finally you specify consecutive actions for the alarm state as shown below:



	You must set the name of your SNS topic which was created before as the target to send notifications to.

	Use “+Notification” button to add one more notification to the list (by default there is only one string there).

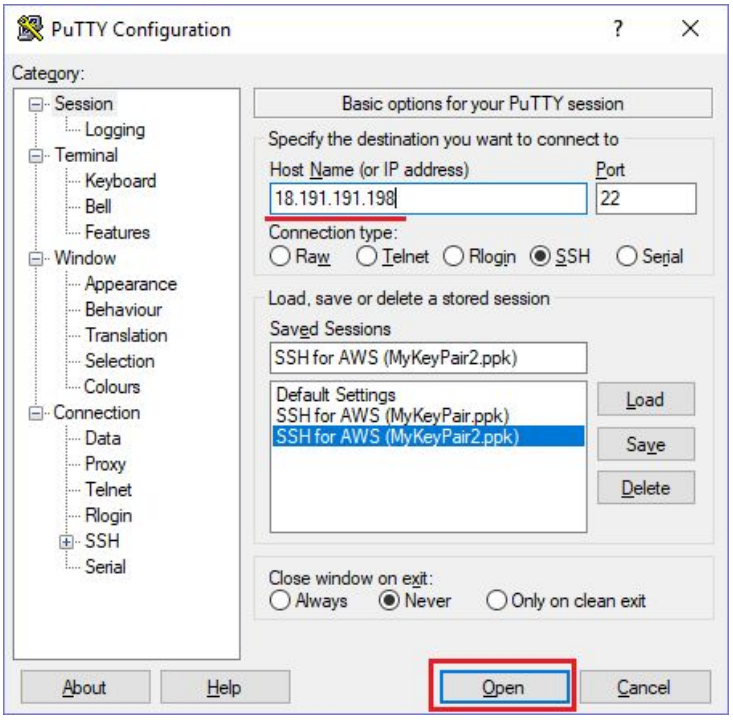
Finally click on “Creata alarm” button (shown above) to create and activate alarm and watch Alarm section:

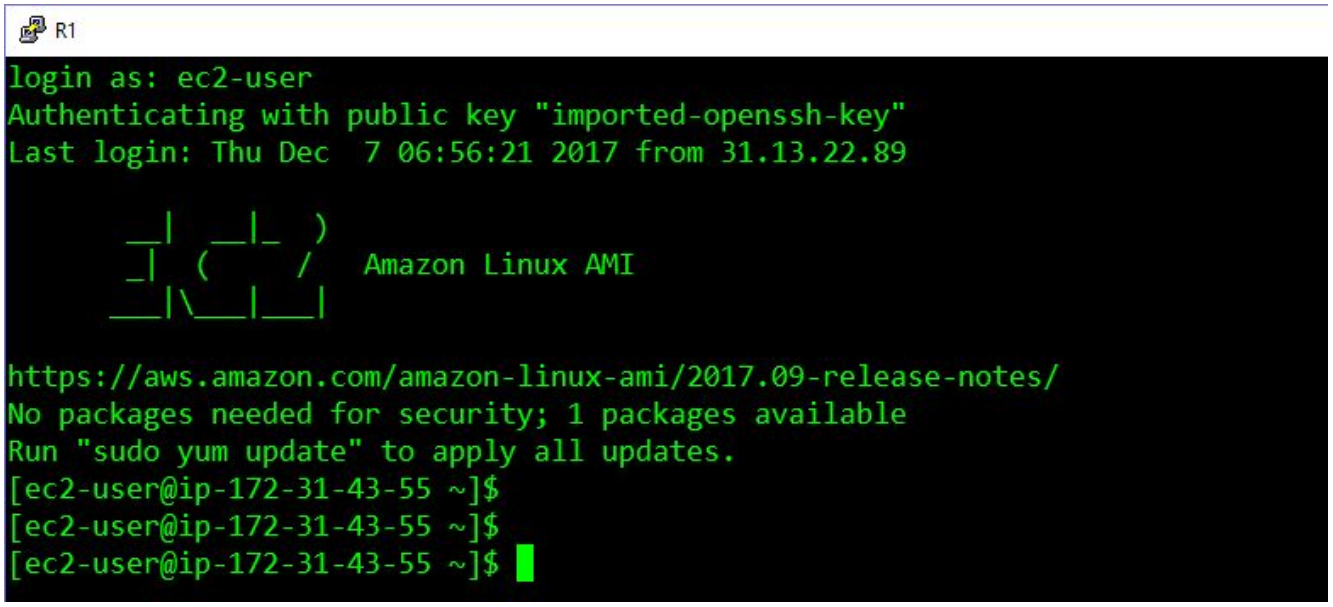
If everything is ok with your SNS topic, you will receive “OK” notification on e-mail address which was specified in SNS subscription.

	“INSUFFICIENT” value may be displayed for your alarm as intermediate state in short time just after creation. It will not be notified on e-mail.

Now let increase the computing load for our EC2 by calculating the number "pi" with an accuracy greater than 1000 decimal places.

Connect to your EC2 instance from PuTTY via SSH using public IP address as was described in MODULE 3 hands-on exercises:





and run the following command sequence:

	[ec2-user@ip-172-31-43-55 ~]$ **bc -lq** **scale=1000** **4*a(1)**

The output example is shown below:

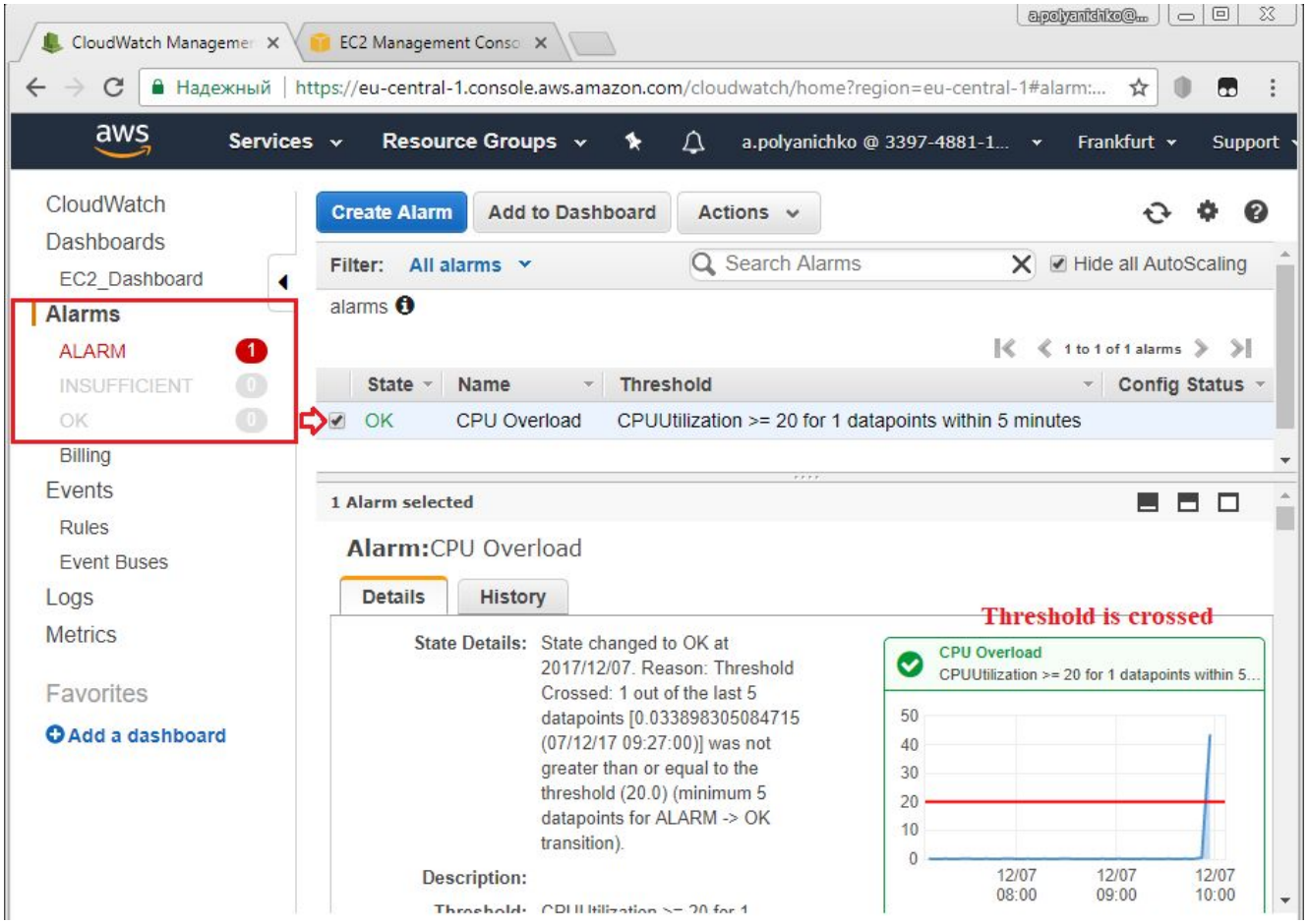
```
[ec2-user@ip-172-31-43-55 ~]$
[ec2-user@ip-172-31-43-55 ~]$
[ec2-user@ip-172-31-43-55 ~]$ bc -lq
scale=1000
4*a(1)
3.14159265358979323846264338327950288419716939937510582097494459230\
81640628620899862803482534211706798214808651328230664709384460955058\
22317253594081284811174502841027019385211055596446229489549303819644\
28810975665933446128475648233786783165271201909145648566923460348610\
45432664821339360726024914127372458700660631558817488152092096282925\
40917153643678925903600113305305488204665213841469519415116094330572\
70365759591953092186117381932611793105118548074462379962749567351885\
75272489122793818301194912983367336244065664308602139494639522473719\
07021798609437027705392171762931767523846748184676694051320005681271\
45263560827785771342757789609173637178721468440901224953430146549585\
37105079227968925892354201995611212902196086403441815981362977477130\
99605187072113499999983729780499510597317328160963185950244594553469\
08302642522308253344685035261931188171010003137838752886587533208381\
42061717766914730359825349042875546873115956286388235378759375195778\
18577805321712268066130019278766111959092164201988

quit
[ec2-user@ip-172-31-43-55 ~]$
[ec2-user@ip-172-31-43-55 ~]$
```

Repeat the sequence of commands, replacing the value of Scale by 10000:

```
[ec2-user@ip-172-31-43-55 ~]$
[ec2-user@ip-172-31-43-55 ~]$ bc -lq
scale=10000
4*a(1)
```

	The computing will take longer time comparing to previous example. You may interrupt the process by <Ctrl>+<C> combination.

After a few minutes you will receive ALARM notification on e-mail address and the status of alarm will be changed similar to example below:



	You may examine your dashboard to see exactly values of CPU utilization in the time

If you will be doing nothing during a few minutes and, of course, computing in EC2 was completed or interrupted, shortly you will receive OK notification on e-mail address and the status of alarm will be changed back to “green” state: