Cloud Profiling Workshop

PATIENT MONITORING

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Contents

Docker Installation

1. Download community edition docker based on the OS

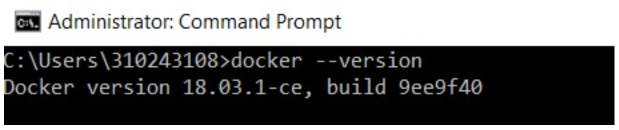
https://www.docker.com/community-edition

2. Follow the installer to complete installation.

Docker will enable virtualization on Windows at BIOS level.

More instruction in installation: https://docs.docker.com/docker-for-windows/

3. To confirm successful installation, give the command > docker –version

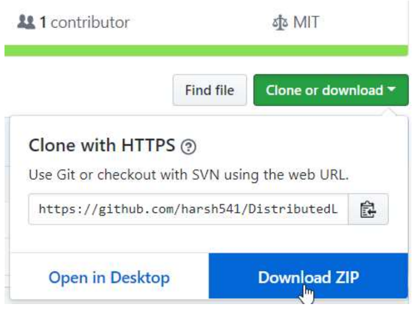


```
C:\Users\310243108>docker --version
Docker version 18.03.1-ce, build 9ee9f40
```

Download, Build JMeter Docker Image

1. Download JMeter Docker Image from https://tinyurl.com/y9wzvfvb

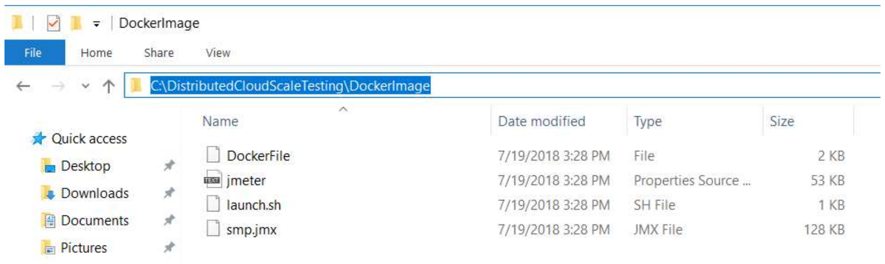
2. Clone the GIT repo and download as ZIP



Use Git or checkout with SVN using the web URL.

```
https://github.com/harsh541/DistributedL
```

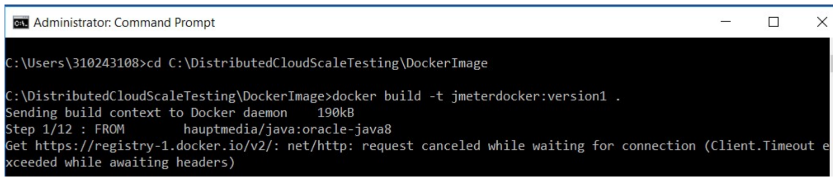
3. Unzip the archive to your local filesystem



C:\DistributedCloudScaleTesting\DockerImage

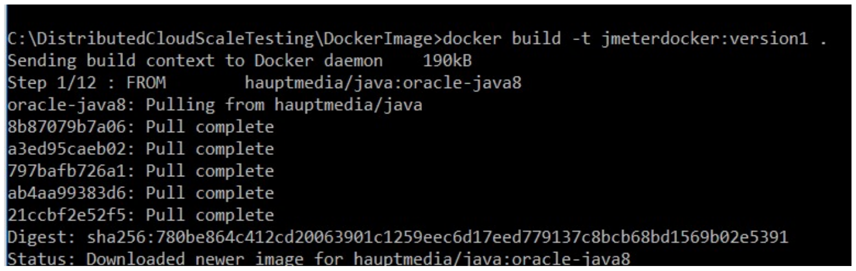
Name	Date modified	Type	Size
DockerFile	7/19/2018 3:28 PM	File	2 KB
jmeter	7/19/2018 3:28 PM	Properties Source ...	53 KB
launch.sh	7/19/2018 3:28 PM	SH File	1 KB
smp.jmx	7/19/2018 3:28 PM	JMX File	128 KB

4. Open command prompt and direct to the extracted folder, i.e. DocketImage folder



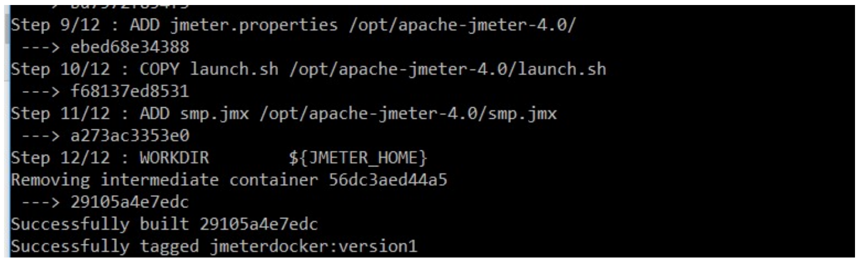
```
C:\Users\310243108>cd C:\DistributedCloudScaleTesting\DockerImage

C:\DistributedCloudScaleTesting\DockerImage>docker build -t jmeterdocker:version1 .
Sending build context to Docker daemon    190kB
Step 1/12 : FROM        hauptmedia/java:oracle-java8
Get https://registry-1.docker.io/v2/: net/http: request canceled while waiting for connection (Client.Timeout e
xceeded while awaiting headers)
```

5. Run the following command to build the docker image



```
C:\DistributedCloudScaleTesting\DockerImage>docker build -t jmeterdocker:version1 .
Sending build context to Docker daemon    190kB
Step 1/12 : FROM        hauptmedia/java:oracle-java8
oracle-java8: Pulling from hauptmedia/java
8b87079b7a06: Pull complete
a3ed95caeb02: Pull complete
797bafb726a1: Pull complete
ab4aa99383d6: Pull complete
21ccbf2e52f5: Pull complete
Digest: sha256:780be864c412cd20063901c1259eec6d17eed779137c8bcb68bd1569b02e5391
Status: Downloaded newer image for hauptmedia/java:oracle-java8
```

Following message is seen once docker image is successfully built



```
Step 9/12 : ADD jmeter.properties /opt/apache-jmeter-4.0/
 ---> ebed68e34388
Step 10/12 : COPY launch.sh /opt/apache-jmeter-4.0/launch.sh
 ---> f68137ed8531
Step 11/12 : ADD smp.jmx /opt/apache-jmeter-4.0/smp.jmx
 ---> a273ac3353e0
Step 12/12 : WORKDIR        ${JMETER_HOME}
Removing intermediate container 56dc3aed44a5
 ---> 29105a4e7edc
Successfully built 29105a4e7edc
Successfully tagged jmeterdocker:version1
```

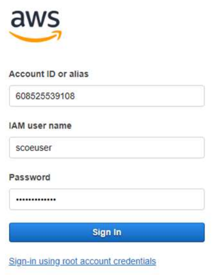
Getting Started with AWS Console and AWS Services

Login in AWS Console

Open the AWS Console login:

https://608525539108.signin.aws.amazon.com/console

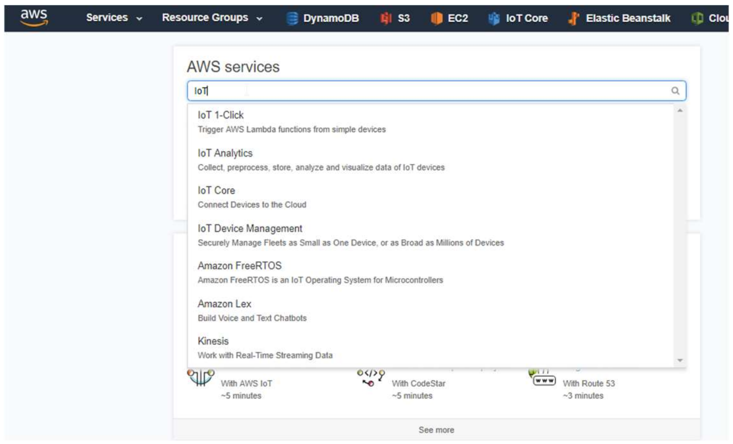
Using the ‘IAM user name’ and ‘Password’ login provided in the workshop. Click ‘Sign in’.



Account ID or alias
608525539108
IAM user name
scoeuser
Password
•••••••••••••

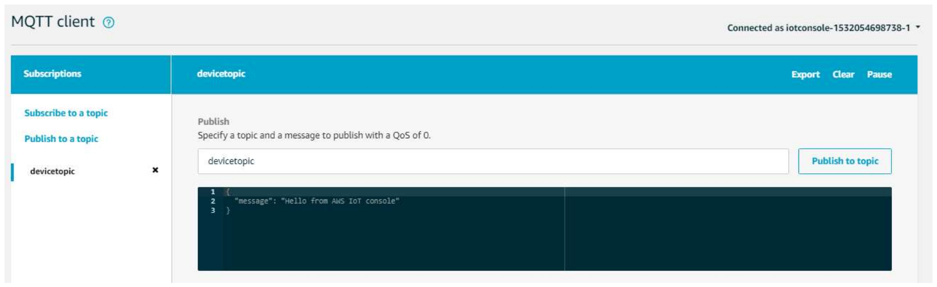
Find AWS Services in Console

To find other AWS services, type in a service name in search box below. For example, type ‘IoT; in search box, and click on ‘IoT Core’:


aws
Services
Resource Groups
DynamoDB
S3
EC2
IoT Core
Elastic Beanstalk
AWS services
IoT
IoT 1-Click
Trigger AWS Lambda functions from simple devices
IoT Analytics
Collect, preprocess, store, analyze and visualize data of IoT devices
IoT Core
Connect Devices to the Cloud
IoT Device Management
Securely Manage Fleets as Small as One Device, or as Broad as Millions of Devices
Amazon FreeRTOS
Amazon FreeRTOS is an IoT Operating System for Microcontrollers
Amazon Lex
Build Voice and Text Chatbots
Kinesis
Work with Real-Time Streaming Data
With AWS IoT ~5 minutes
With CodeStar ~5 minutes
With Route 53 ~3 minutes
See more

Subscribe to the IoT topics

Go to “IoT Core->Test” and see ‘MQTT client’ options:

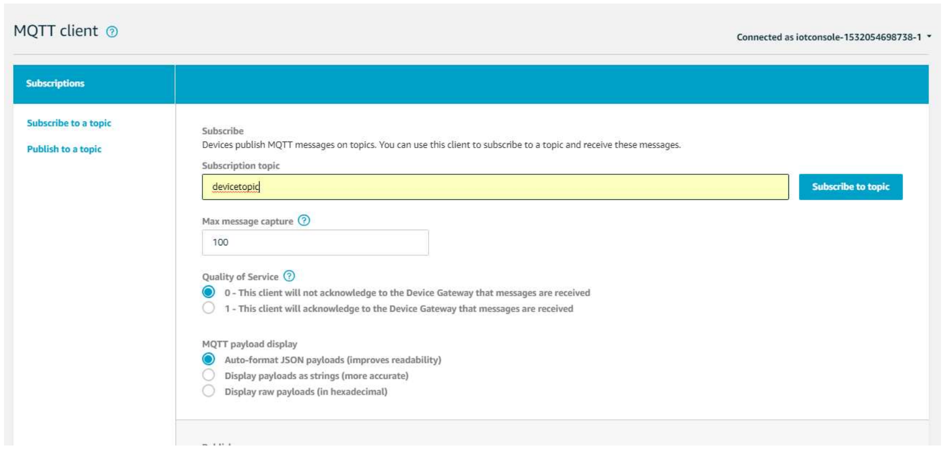


Specify a topic and a message to publish with a QoS of 0.

devicetopic

```
{
  "message": "Hello from AWS IoT console"
}
```

Click ‘Subscribe to a topic’ and type ‘devicetopic’



Devices publish MQTT messages on topics. You can use this client to subscribe to a topic and receive these messages.

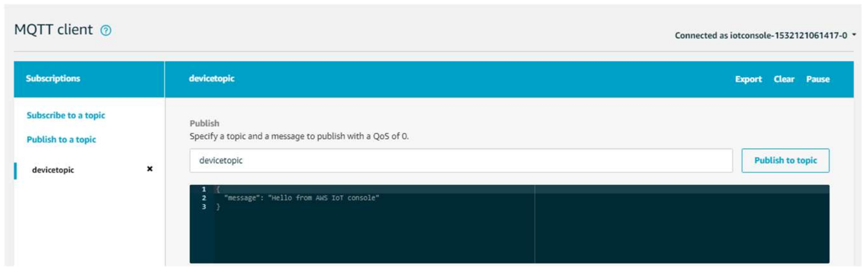
Subscription topic: devicetopic

Max message capture: 100

Quality of Service
- [✓ 0 - This client will not acknowledge to the Device Gateway that messages are received]
- 1 - This client will acknowledge to the Device Gateway that messages are received

MQTT payload display
- [✓ Auto-format JSON payloads (improves readability)]
- Display payloads as strings (more accurate)
- Display raw payloads (in hexadecimal)

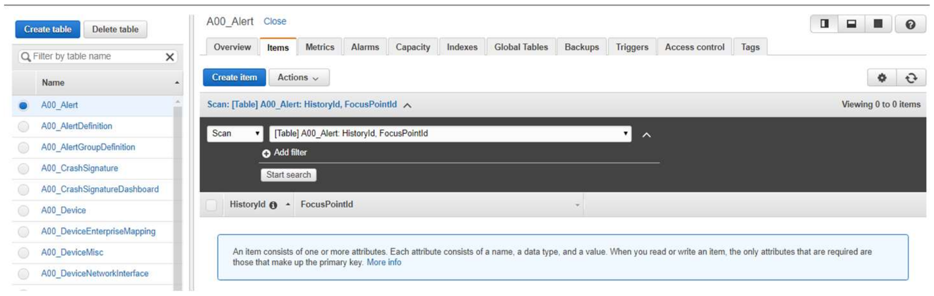
Click ‘Subscribe to topic’ button:



```
{
  "message": "Hello from AWS IoT console"
}
```

DynamoDB

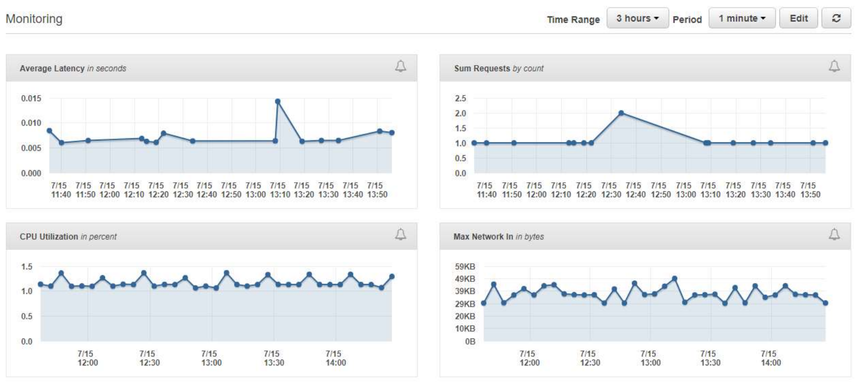
Open another browser tab, go to "DynamoDB->Tables" and select one Device table, the tables are empty:



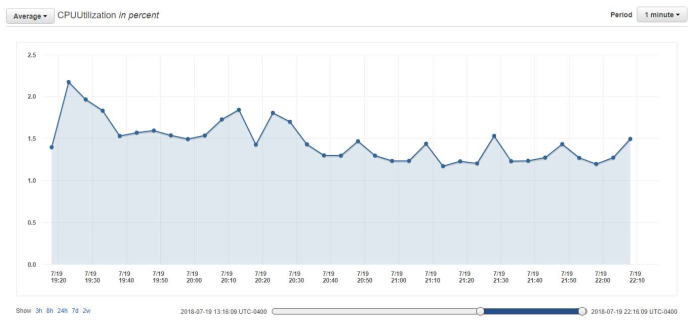
An item consists of one or more attributes. Each attribute consists of a name, a data type, and a value. When you read or write an item, the only attributes that are required are those that make up the primary key. More info

Elastic Beanstalk Monitoring and Configuration

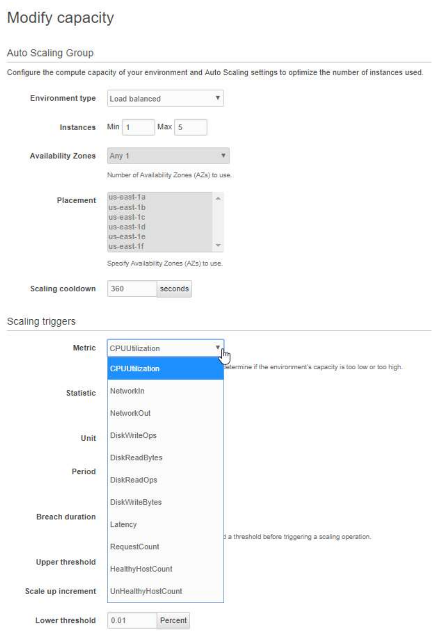
Open another browser tab, go to "Elastic Beanstalk->Monitoring" and see all the default monitoring charts for the baseline before sending data, change on the 'Time Range' 'Period' controls and refresh button to see charts get updated:



Click on 'CPU Utilization' and see the details. Change "Average" to other options, change 'Period' and slider on the chart



Go to “Elastic Beanstalk->Configuration->Capacity” and see the autoscaling settings and show all the default trigger options, ‘Statistics’, ‘Upper threshold’, ‘Lower threshold’ etc.



Modify capacity

Auto Scaling Group

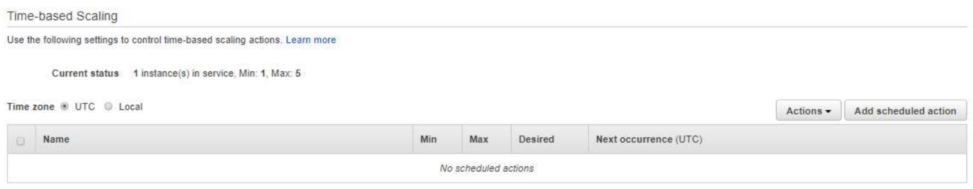
Configure the compute capacity of your environment and Auto Scaling settings to optimize the number of instances used.

Environment type	Load balanced
Instances	Min 1 Max 5
Availability Zones	Any 1 — Number of Availability Zones (AZs) to use.
Placement	us-east-1a, us-east-1b, us-east-1c, us-east-1d, us-east-1e, us-east-1f — Specify Availability Zones (AZs) to use.
Scaling cooldown	360 seconds

Scaling triggers

Metric	CPUUtilization
Statistic	
Unit	
Period	
Breach duration	
Upper threshold	
Scale up increment	
Lower threshold	0.01 Percent

And ‘Time-based Scaling’ at the end.



Time-based Scaling

Use the following settings to control time-based scaling actions. Learn more

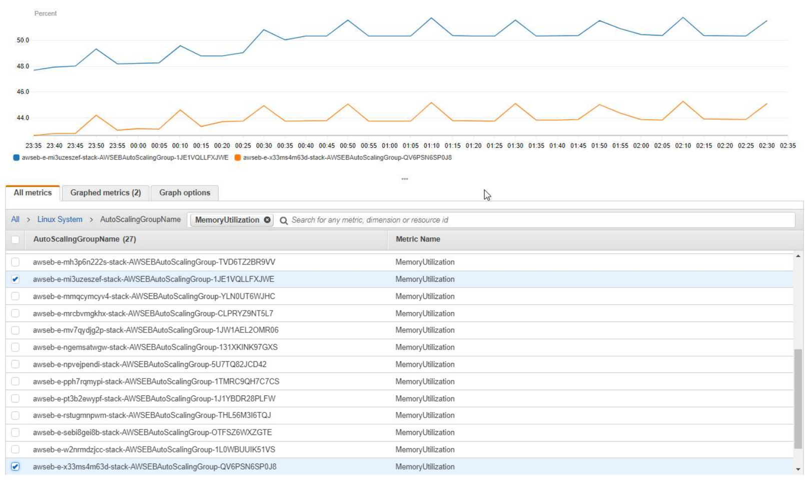
Current status 1 instance(s) in service, Min: 1, Max: 5

Time zone ● UTC ○ Local

Name	Min	Max	Desired	Next occurrence (UTC)
No scheduled actions				

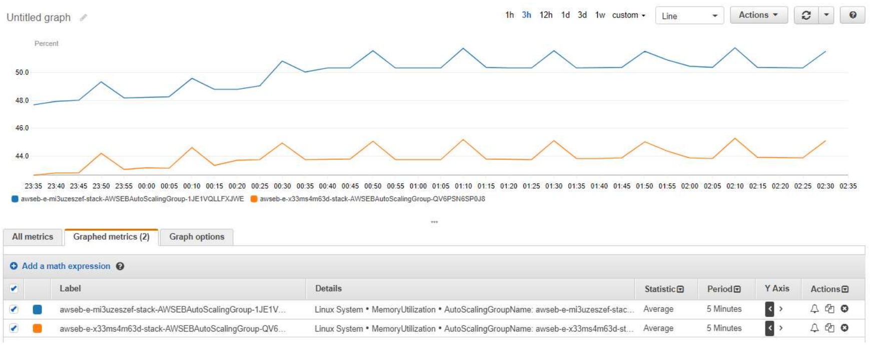
CloudWatch Metrics

Open another browser tab, go to “CloudWatch->metrics->Linux Systems->AutoScalingGroupName”, search ‘MemoryUtilization’, select ‘MemoryUtilization’ metric’s with data:



	AutoScalingGroupName (27)	Metric Name
	awseb-e-mh3p6n222s-stack-AWSEBAutoScalingGroup-TVD6TZ2BR9VV	MemoryUtilization
✓	awseb-e-mi3uzeszef-stack-AWSEBAutoScalingGroup-1JE1VQLLFXJWE	MemoryUtilization
	awseb-e-mmqcymcyv4-stack-AWSEBAutoScalingGroup-YLN0UT6WJHC	MemoryUtilization
	awseb-e-mrcbvmgkhx-stack-AWSEBAutoScalingGroup-CLPRYZ9NT5L7	MemoryUtilization
	awseb-e-mv7qydjg2p-stack-AWSEBAutoScalingGroup-1JW1AEL2OMR06	MemoryUtilization
	awseb-e-ngemsatwgw-stack-AWSEBAutoScalingGroup-131XKINK97GXS	MemoryUtilization
	awseb-e-npvejpendi-stack-AWSEBAutoScalingGroup-5U7TQ82JCD42	MemoryUtilization
	awseb-e-pph7rqmypi-stack-AWSEBAutoScalingGroup-1TMRC9QH7C7CS	MemoryUtilization
	awseb-e-pt3b2ewypf-stack-AWSEBAutoScalingGroup-1J1YBDR28PLFW	MemoryUtilization
	awseb-e-rstugmnpwm-stack-AWSEBAutoScalingGroup-THL56M3I6TQJ	MemoryUtilization
	awseb-e-sebi8gei8b-stack-AWSEBAutoScalingGroup-OTFSZ6WXZGTE	MemoryUtilization
	awseb-e-w2nrmdzjcc-stack-AWSEBAutoScalingGroup-1L0WBUUIK51VS	MemoryUtilization
✓	awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8	MemoryUtilization

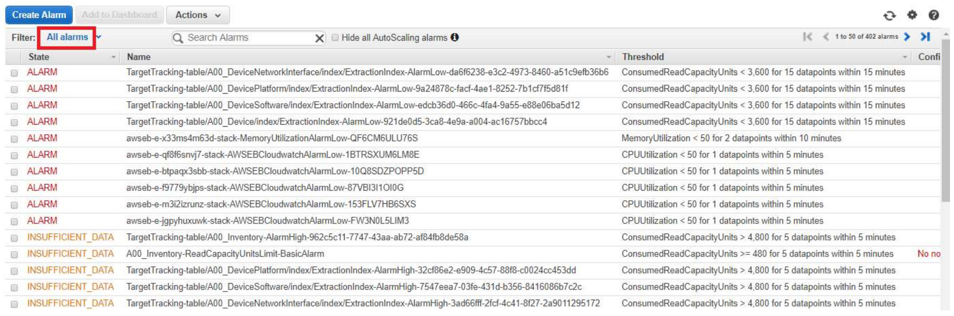
Click on ‘Graphed metrics’ and try with details:



✓		Label	Details	Statistic	Period	Y Axis	Actions
✓	🟦	awseb-e-mi3uzeszef-stack-AWSEBAutoScalingGroup-1JE1V...	Linux System • MemoryUtilization • AutoScalingGroupName: awseb-e-mi3uzeszef-stac...	Average	5 Minutes		
✓	🟧	awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6...	Linux System • MemoryUtilization • AutoScalingGroupName: awseb-e-x33ms4m63d-st...	Average	5 Minutes		

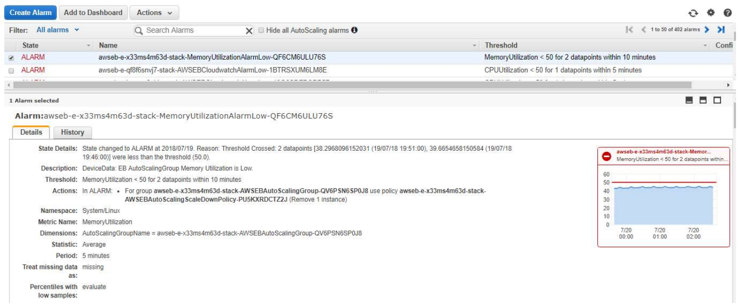
CloudWatch Alarms

Log in to AWS Console, go to “CloudWatch->Alarms”, see ‘All alarms’:



State	Name	Threshold	Confi
ALARM	TargetTracking-table/A00_DeviceNetworkInterface/index/ExtractionIndex-AlarmLow-da6f6238-e3c2-4973-8460-a51c9efb36b6	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	TargetTracking-table/A00_DevicePlatform/index/ExtractionIndex-AlarmLow-9a24878c-facf-4ae1-8252-7b1cf7f5d81f	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	TargetTracking-table/A00_DeviceSoftware/index/ExtractionIndex-AlarmLow-edcb36d0-466c-4fa4-9a55-e88e06ba5d12	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	TargetTracking-table/A00_Device/index/ExtractionIndex-AlarmLow-921de0d5-3ca8-4e9a-a004-ac16757bbcc4	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	awseb-e-x33ms4m63d-stack-MemoryUtilizationAlarmLow-QF6CM6ULU76S	MemoryUtilization < 50 for 2 datapoints within 10 minutes	
ALARM	awseb-e-qf8f6snvj7-stack-AWSEBCloudwatchAlarmLow-1BTRSXUM6LM8E	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-btpaqx3sbb-stack-AWSEBCloudwatchAlarmLow-10Q8SDZPOPP5D	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-f9779ybjps-stack-AWSEBCloudwatchAlarmLow-87VBI3I1OI0G	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-m3i2izrunz-stack-AWSEBCloudwatchAlarmLow-153FLV7HB6SXS	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-jgpyhuxuwk-stack-AWSEBCloudwatchAlarmLow-FW3N0L5LIM3	CPUUtilization < 50 for 1 datapoints within 5 minutes	
INSUFFICIENT_DATA	TargetTracking-table/A00_Inventory-AlarmHigh-962c5c11-7747-43aa-ab72-af84fb8de58a	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	
INSUFFICIENT_DATA	A00_Inventory-ReadCapacityUnitsLimit-BasicAlarm	ConsumedReadCapacityUnits >= 480 for 5 datapoints within 5 minutes	No no
INSUFFICIENT_DATA	TargetTracking-table/A00_DevicePlatform/index/ExtractionIndex-AlarmHigh-32cf86e2-e909-4c57-88f8-c0024cc453dd	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	
INSUFFICIENT_DATA	TargetTracking-table/A00_DeviceSoftware/index/ExtractionIndex-AlarmHigh-7547eea7-03fe-431d-b356-8416086b7c2c	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	
INSUFFICIENT_DATA	TargetTracking-table/A00_DeviceNetworkInterface/index/ExtractionIndex-AlarmHigh-3ad66fff-2fcf-4c41-8f27-2a9011295172	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	

Then select our customized MemoryUtilization Alarm and show ‘Details’ and ‘History’ tabs.



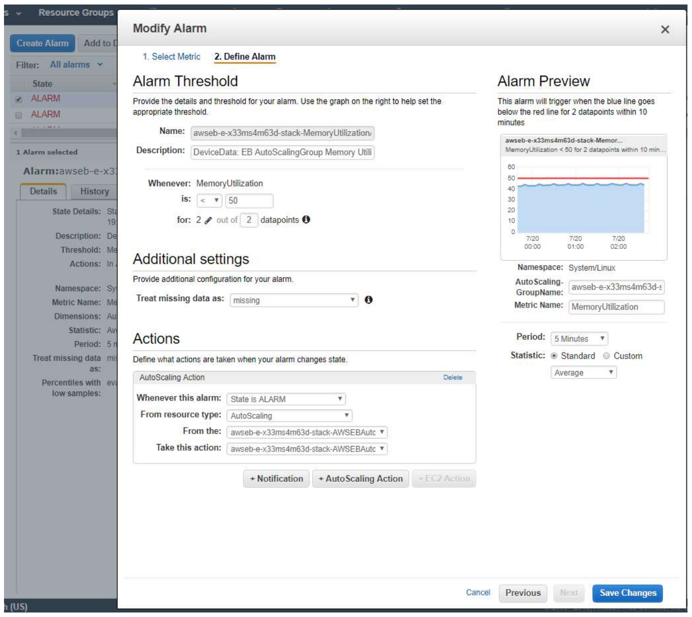
State	Name	Threshold	Confi
✓ ALARM	awseb-e-x33ms4m63d-stack-MemoryUtilizationAlarmLow-QF6CM6ULU76S	MemoryUtilization < 50 for 2 datapoints within 10 minutes	
ALARM	awseb-e-qf8f6snvj7-stack-AWSEBCloudwatchAlarmLow-1BTRSXUM6LM8E	CPUUtilization < 50 for 1 datapoints within 5 minutes	

1 Alarm selected

Alarm:awseb-e-x33ms4m63d-stack-MemoryUtilizationAlarmLow-QF6CM6ULU76S

State Details:	State changed to ALARM at 2018/07/19. Reason: Threshold Crossed: 2 datapoints [38.2968096152031 (19/07/18 19:51:00), 39.6654658150584 (19/07/18 19:46:00)] were less than the threshold (50.0).
Description:	DeviceData: EB AutoScalingGroup Memory Utilization is Low.
Threshold:	MemoryUtilization < 50 for 2 datapoints within 10 minutes
Actions:	In ALARM: • For group **awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8** use policy **awseb-e-x33ms4m63d-stack-AWSEBAutoScalingScaleDownPolicy-PU5KXRDCTZ2J** (Remove 1 instance)
Namespace:	System/Linux
Metric Name:	MemoryUtilization
Dimensions:	AutoScalingGroupName = awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8
Statistic:	Average
Period:	5 minutes
Treat missing data as:	missing
Percentiles with low samples:	evaluate

Click on ‘Action->Modify’ to try, and show the ‘AutoScaling Action’:



Modify Alarm

1. Select Metric 2. Define Alarm

Alarm Threshold

Provide the details and threshold for your alarm. Use the graph on the right to help set the appropriate threshold.

Name: awseb-e-x33ms4m63d-stack-MemoryUtilization

Description: DeviceData: EB AutoScalingGroup Memory Utili

Whenever: MemoryUtilization

is: < 50

for: 2 out of 2 datapoints

Additional settings

Provide additional configuration for your alarm.

Treat missing data as: missing

Actions

Define what actions are taken when your alarm changes state.

AutoScaling Action

Whenever this alarm: State is ALARM

From resource type: AutoScaling

From the: awseb-e-x33ms4m63d-stack-AWSEBAutc

Take this action: awseb-e-x33ms4m63d-stack-AWSEBAutc

Alarm Preview

This alarm will trigger when the blue line goes below the red line for 2 datapoints within 10 minutes

Namespace: System/Linux

AutoScaling-GroupName: awseb-e-x33ms4m63d-s

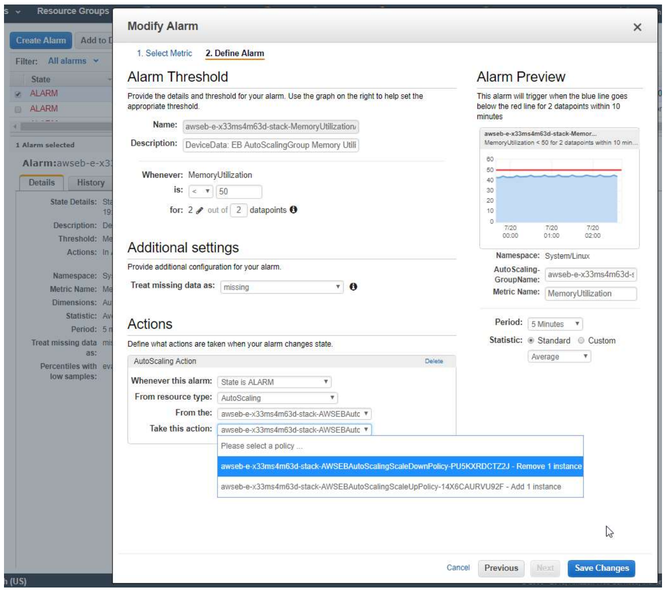
Metric Name: MemoryUtilization

Period: 5 Minutes

Statistic: [✓ Standard] Custom

Average

In the AutoScaling ‘Action’ section see the option in ‘Take this action’:



AutoScaling Action

Whenever this alarm: State is ALARM

From resource type: AutoScaling

From the: awseb-e-x33ms4m63d-stack-AWSEBAutc

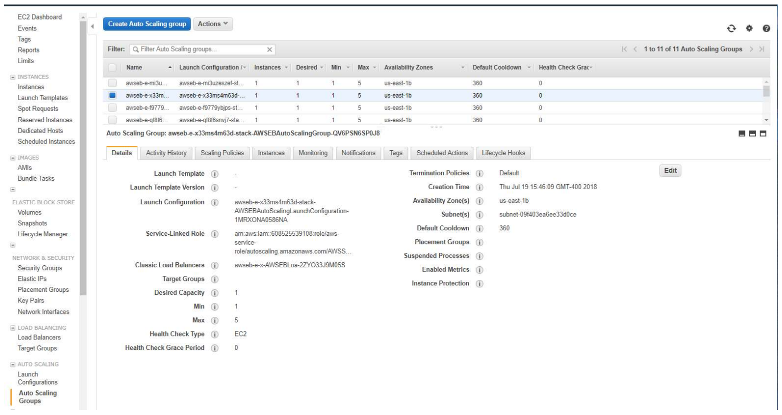
Take this action: awseb-e-x33ms4m63d-stack-AWSEBAutc

Please select a policy ...

awseb-e-x33ms4m63d-stack-AWSEBAutoScalingScaleDownPolicy-PU5KXRDCTZ2J - Remove 1 instance

awseb-e-x33ms4m63d-stack-AWSEBAutoScalingScaleUpPolicy-14X6CAURVU92F - Add 1 instance

Open another browser tab, go to “EC2->Auto Scaling Groups”, it should match one of the AutoScaling Policies:



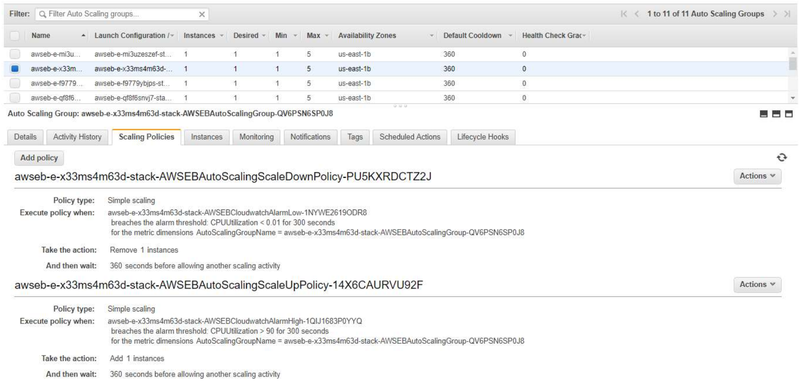
Filter: Filter Auto Scaling groups... — 1 to 11 of 11 Auto Scaling Groups

Name	Launch Configuration /	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grac
awseb-e-mi3u...	awseb-e-mi3uzeszef-st...	1	1	1	5	us-east-1b	360	0
awseb-e-x33m...	awseb-e-x33ms4m63d-...	1	1	1	5	us-east-1b	360	0
awseb-e-f9779...	awseb-e-f9779ybjps-st...	1	1	1	5	us-east-1b	360	0
awseb-e-qf8f6...	awseb-e-qf8f6snvj7-sta...	1	1	1	5	us-east-1b	360	0

Auto Scaling Group: awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8

Launch Template	-
Launch Template Version	-
Launch Configuration	awseb-e-x33ms4m63d-stack-AWSEBAutoScalingLaunchConfiguration-1MRXONA0586NA
Service-Linked Role	arn:aws:iam::608525539108:role/aws-service-role/autoscaling.amazonaws.com/AWSS...
Classic Load Balancers	awseb-e-x-AWSEBLoa-2ZYO33J9M05S
Target Groups	
Desired Capacity	1
Min	1
Max	5
Health Check Type	EC2
Health Check Grace Period	0
Termination Policies	Default
Creation Time	Thu Jul 19 15:46:09 GMT-400 2018
Availability Zone(s)	us-east-1b
Subnet(s)	subnet-09f403ea6ee33d0ce
Default Cooldown	360
Placement Groups	
Suspended Processes	
Enabled Metrics	
Instance Protection	

One of the ‘Scaling Policies’ should match the above “AutoScaling action”:



Filter: Filter Auto Scaling groups... — 1 to 11 of 11 Auto Scaling Groups

Name	Launch Configuration /	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grac
awseb-e-mi3u...	awseb-e-mi3uzeszef-st...	1	1	1	5	us-east-1b	360	0
awseb-e-x33m...	awseb-e-x33ms4m63d-...	1	1	1	5	us-east-1b	360	0
awseb-e-f9779...	awseb-e-f9779ybjps-st...	1	1	1	5	us-east-1b	360	0
awseb-e-qf8f6...	awseb-e-qf8f6snvj7-sta...	1	1	1	5	us-east-1b	360	0

Auto Scaling Group: awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8

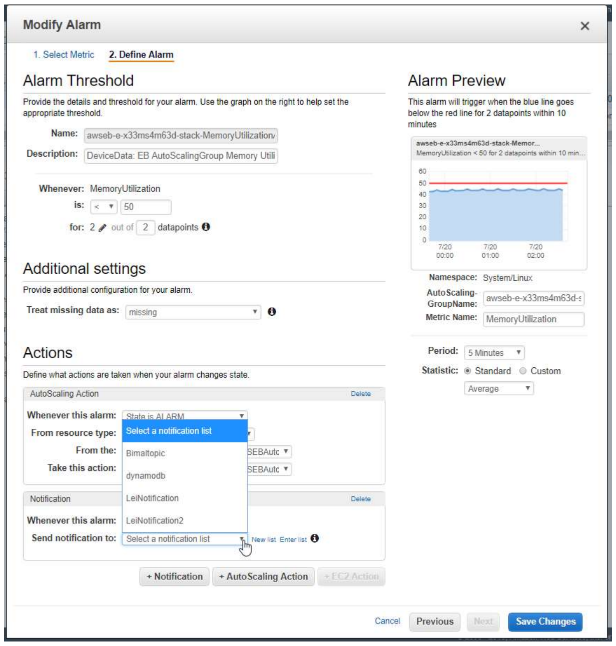
awseb-e-x33ms4m63d-stack-AWSEBAutoScalingScaleDownPolicy-PU5KXRDCTZ2J

```
Policy type:          Simple scaling
Execute policy when:  awseb-e-x33ms4m63d-stack-AWSEBCloudwatchAlarmLow-1NYWE2619ODR8
                       breaches the alarm threshold: CPUUtilization < 0.01 for 300 seconds
                       for the metric dimensions AutoScalingGroupName = awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8
Take the action:      Remove 1 instances
And then wait:        360 seconds before allowing another scaling activity
```

awseb-e-x33ms4m63d-stack-AWSEBAutoScalingScaleUpPolicy-14X6CAURVU92F

```
Policy type:          Simple scaling
Execute policy when:  awseb-e-x33ms4m63d-stack-AWSEBCloudwatchAlarmHigh-1QIJ1683P0YYQ
                       breaches the alarm threshold: CPUUtilization > 90 for 300 seconds
                       for the metric dimensions AutoScalingGroupName = awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8
Take the action:      Add 1 instances
And then wait:        360 seconds before allowing another scaling activity
```

Try adding ‘Notification’ action on ‘Modify Alarm’:



Modify Alarm

1. Select Metric 2. Define Alarm

Alarm Threshold

Provide the details and threshold for your alarm. Use the graph on the right to help set the appropriate threshold.

Name: awseb-e-x33ms4m63d-stack-MemoryUtilization
Description: DeviceData: EB AutoScalingGroup Memory Utili
Whenever: MemoryUtilization
is: < 50
for: 2 out of 2 datapoints

Additional settings

Provide additional configuration for your alarm.

Treat missing data as: missing

Actions

Define what actions are taken when your alarm changes state.

AutoScaling Action
Whenever this alarm: State is ALARM
From resource type:
From the: SEBAutc
Take this action: SEBAutc

Notification
Whenever this alarm:
Send notification to: Select a notification list

Alarm Preview

This alarm will trigger when the blue line goes below the red line for 2 datapoints within 10 minutes

awseb-e-x33ms4m63d-stack-Memor...
MemoryUtilization < 50 for 2 datapoints within 10 min...

Namespace: System/Linux
AutoScaling-GroupName: awseb-e-x33ms4m63d-s
Metric Name: MemoryUtilization
Period: 5 Minutes
Statistic: [✓ Standard] Custom
Average

Run JMeter Docker Image to emulate data to cloud

Run the docker image giving following command:

```
docker run -d=false -i -t jmeterdocker:version1 sh launch.sh <tenant-name> <access-key>
```

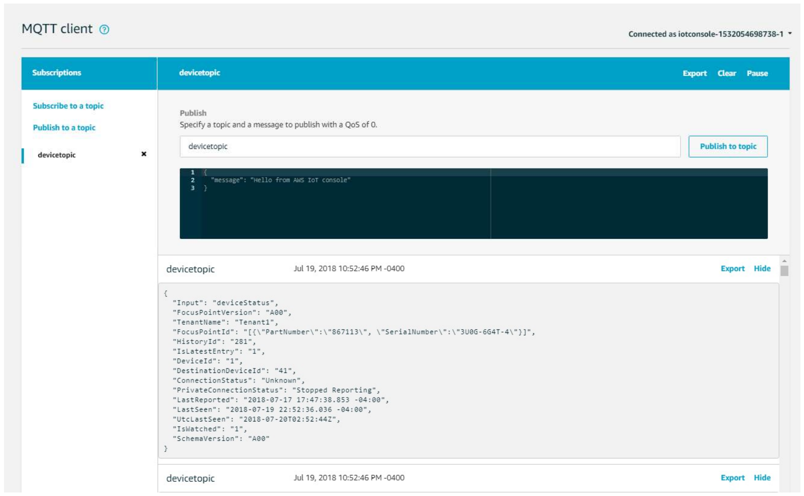
tenant-name = will be provided in the workshop

access-key = will be provided in the workshop

AWS Resources Observation after load test has started

MQTT watch for receiving payloads

Go to tab for "IoT Core->Test", watch receiving JMeter test payloads:



```
{
  "message": "Hello from AWS IoT console"
}
```

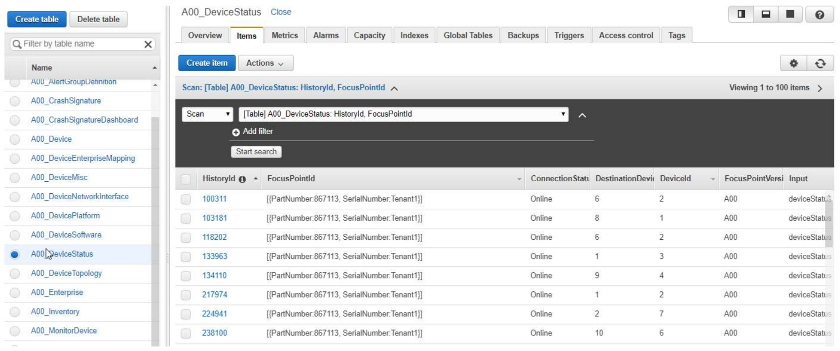
devicetopic   Jul 19, 2018 10:52:46 PM -0400

```
{
  "Input": "deviceStatus",
  "FocusPointVersion": "A00",
  "TenantName": "Tenant1",
  "FocusPointId": "[{\"PartNumber\":\"867113\", \"SerialNumber\":\"3U0G-6G4T-4\"}]",
  "HistoryId": "281",
  "IsLatestEntry": "1",
  "DeviceId": "1",
  "DestinationDeviceId": "41",
  "ConnectionStatus": "Unknown",
  "PrivateConnectionStatus": "Stopped Reporting",
  "LastReported": "2018-07-17 17:47:38.853 -04:00",
  "LastSeen": "2018-07-19 22:52:36.036 -04:00",
  "UtcLastSeen": "2018-07-20T02:52:44Z",
  "IsWatched": "1",
  "SchemaVersion": "A00"
}
```

devicetopic   Jul 19, 2018 10:52:46 PM -0400

DynamoDB

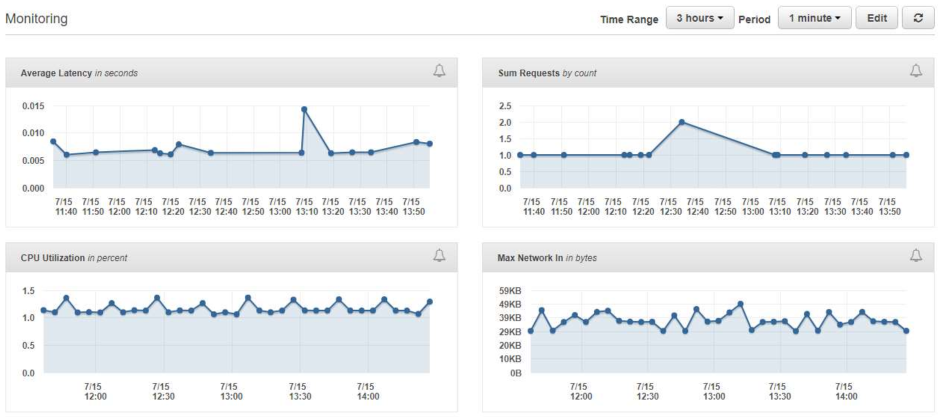
Go to tab for "DynamoDB->Tables" and select one Device table, watch for new items inserted into table as JMeter sending payloads:



HistoryId	FocusPointId	ConnectionStatu	DestinationDevi	DeviceId	FocusPointVersi	Input
100311	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	6	2	A00	deviceStatus
103181	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	8	1	A00	deviceStatus
118202	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	6	2	A00	deviceStatus
133963	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	1	3	A00	deviceStatus
134110	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	9	4	A00	deviceStatus
217974	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	1	2	A00	deviceStatus
224941	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	2	7	A00	deviceStatus
238100	[{PartNumber:867113, SerialNumber:Tenant1}]	Online	10	6	A00	deviceStatus

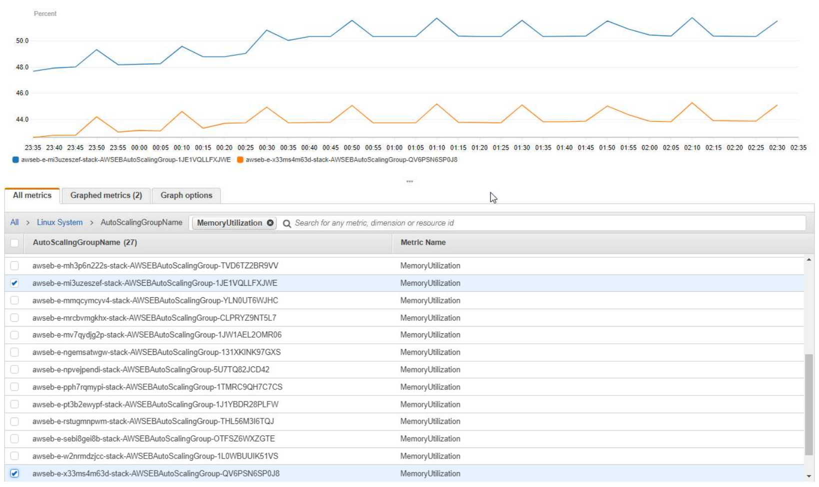
Elastic Beanstalk Monitoring

Go to the tab for “Elastic Beanstalk->Monitoring” and see all the “CPU Utilization” goes up upon receiving data:



CloudWatch memory utilization metrics

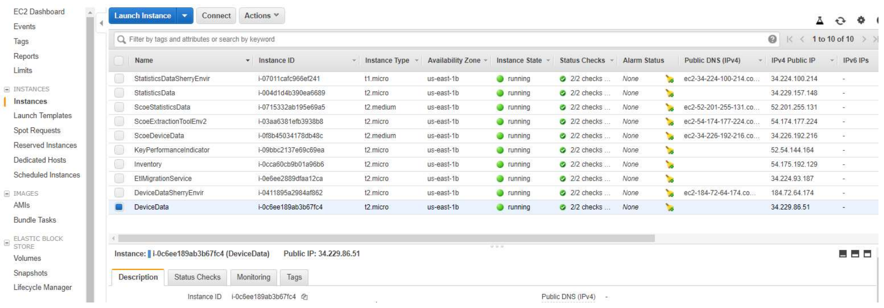
Go to the tab for “CloudWatch->metrics->Linux Systems->AutoScalingGroupName”, search ‘MemoryUtilization’, watch for ‘MemoryUtilization’ metrics’ increase:



	AutoScalingGroupName (27)	Metric Name
☐	awseb-e-mh3p6n222s-stack-AWSEBAutoScalingGroup-TVD6TZ2BR9VV	MemoryUtilization
✓	awseb-e-mi3uzeszef-stack-AWSEBAutoScalingGroup-1JE1VQLLFXJWE	MemoryUtilization
☐	awseb-e-mmqcymcyv4-stack-AWSEBAutoScalingGroup-YLN0UT6WJHC	MemoryUtilization
☐	awseb-e-mrcbvmgkhx-stack-AWSEBAutoScalingGroup-CLPRYZ9NT5L7	MemoryUtilization
☐	awseb-e-mv7qydjg2p-stack-AWSEBAutoScalingGroup-1JW1AEL2OMR06	MemoryUtilization
☐	awseb-e-ngemsatwgw-stack-AWSEBAutoScalingGroup-131XKINK97GXS	MemoryUtilization
☐	awseb-e-npvejpendi-stack-AWSEBAutoScalingGroup-5U7TQ82JCD42	MemoryUtilization
☐	awseb-e-pph7rqmypi-stack-AWSEBAutoScalingGroup-1TMRC9QH7C7CS	MemoryUtilization
☐	awseb-e-pt3b2ewypf-stack-AWSEBAutoScalingGroup-1J1YBDR28PLFW	MemoryUtilization
☐	awseb-e-rstugmnpwm-stack-AWSEBAutoScalingGroup-THL56M3I6TQJ	MemoryUtilization
☐	awseb-e-sebi8gei8b-stack-AWSEBAutoScalingGroup-OTFSZ6WXZGTE	MemoryUtilization
☐	awseb-e-w2nrmdzjcc-stack-AWSEBAutoScalingGroup-1L0WBUUIK51VS	MemoryUtilization
✓	awseb-e-x33ms4m63d-stack-AWSEBAutoScalingGroup-QV6PSN6SP0J8	MemoryUtilization

EC2 autoscaled

Log in to AWS Console, go to “EC2->All Instances”, watch autoscaled instances, e.g. 2 ‘DeviceData’ instances.



Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
StatisticsDataSherryEnvir	i-07011cafc966ef241	t1.micro	us-east-1b	running	2/2 checks ...	None	ec2-34-224-100-214.co...	34.224.100.214	-
StatisticsData	i-004d1d4b390ea6689	t2.micro	us-east-1b	running	2/2 checks ...	None		34.229.157.148	-
ScoeStatisticsData	i-0715332ab195e69a5	t2.medium	us-east-1b	running	2/2 checks ...	None	ec2-52-201-255-131.co...	52.201.255.131	-
ScoeExtractionToolEnv2	i-03aa6381efb3938b8	t2.micro	us-east-1b	running	2/2 checks ...	None	ec2-54-174-177-224.co...	54.174.177.224	-
ScoeDeviceData	i-0f8b45034178db48c	t2.medium	us-east-1b	running	2/2 checks ...	None	ec2-34-226-192-216.co...	34.226.192.216	-
KeyPerformanceIndicator	i-09bbc2137e69c69ea	t2.micro	us-east-1b	running	2/2 checks ...	None		52.54.144.164	-
Inventory	i-0cca60cb9b01a96b6	t2.micro	us-east-1b	running	2/2 checks ...	None		54.175.192.129	-
EtlMigrationService	i-0e6ee2889dfaa12ca	t2.micro	us-east-1b	running	2/2 checks ...	None		34.224.93.187	-
DeviceDataSherryEnvir	i-0411895a2984af862	t2.micro	us-east-1b	running	2/2 checks ...	None	ec2-184-72-64-174.co...	184.72.64.174	-
DeviceData	i-0c6ee189ab3b67fc4	t2.micro	us-east-1b	running	2/2 checks ...	None		34.229.86.51	-

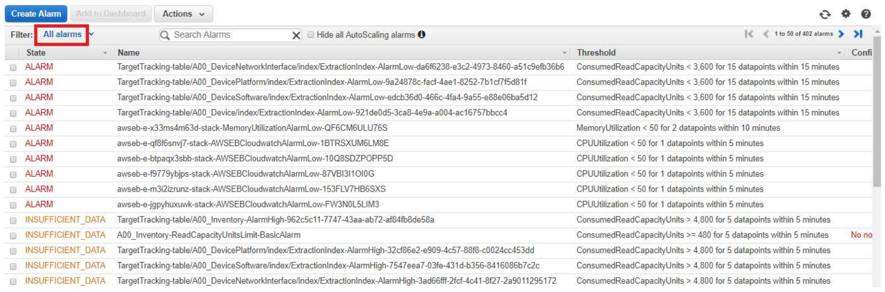
Instance: i-0c6ee189ab3b67fc4 (DeviceData) Public IP: 34.229.86.51

Description | Status Checks | Monitoring | Tags

Instance ID i-0c6ee189ab3b67fc4 Public DNS (IPv4) -

CloudWatch Alarms

Go to the tab “CloudWatch->Alarms”, watch ‘‘MemoryUtilization’ metrics’ in ‘Alarm’ state:



State	Name	Threshold	Confi
ALARM	TargetTracking-table/A00_DeviceNetworkInterface/index/ExtractionIndex-AlarmLow-da6f6238-e3c2-4973-8460-a51c9efb36b6	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	TargetTracking-table/A00_DevicePlatform/index/ExtractionIndex-AlarmLow-9a24878c-facf-4ae1-8252-7b1cf7f5d81f	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	TargetTracking-table/A00_DeviceSoftware/index/ExtractionIndex-AlarmLow-edcb36d0-466c-4fa4-9a55-e88e06ba5d12	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	TargetTracking-table/A00_Device/index/ExtractionIndex-AlarmLow-921de0d5-3ca8-4e9a-a004-ac16757bbcc4	ConsumedReadCapacityUnits < 3,600 for 15 datapoints within 15 minutes	
ALARM	awseb-e-x33ms4m63d-stack-MemoryUtilizationAlarmLow-QF6CM6ULU76S	MemoryUtilization < 50 for 2 datapoints within 10 minutes	
ALARM	awseb-e-qf8f6snvj7-stack-AWSEBCloudwatchAlarmLow-1BTRSXUM6LM8E	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-btpaqx3sbb-stack-AWSEBCloudwatchAlarmLow-10Q8SDZPOPP5D	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-f9779ybjps-stack-AWSEBCloudwatchAlarmLow-87VBI3I1OI0G	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-m3i2izrunz-stack-AWSEBCloudwatchAlarmLow-153FLV7HB6SXS	CPUUtilization < 50 for 1 datapoints within 5 minutes	
ALARM	awseb-e-jgpyhuxuwk-stack-AWSEBCloudwatchAlarmLow-FW3N0L5LIM3	CPUUtilization < 50 for 1 datapoints within 5 minutes	
INSUFFICIENT_DATA	TargetTracking-table/A00_Inventory-AlarmHigh-962c5c11-7747-43aa-ab72-af84fb8de58a	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	
INSUFFICIENT_DATA	A00_Inventory-ReadCapacityUnitsLimit-BasicAlarm	ConsumedReadCapacityUnits >= 480 for 5 datapoints within 5 minutes	No no
INSUFFICIENT_DATA	TargetTracking-table/A00_DevicePlatform/index/ExtractionIndex-AlarmHigh-32cf86e2-e909-4c57-88f8-c0024cc453dd	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	
INSUFFICIENT_DATA	TargetTracking-table/A00_DeviceSoftware/index/ExtractionIndex-AlarmHigh-7547eea7-03fe-431d-b356-8416086b7c2c	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	
INSUFFICIENT_DATA	TargetTracking-table/A00_DeviceNetworkInterface/index/ExtractionIndex-AlarmHigh-3ad66fff-2fcf-4c41-8f27-2a9011295172	ConsumedReadCapacityUnits > 4,800 for 5 datapoints within 5 minutes	

And if configured notification, should expect an email on this alarm.

DataDog Charts

Login to DataDog console

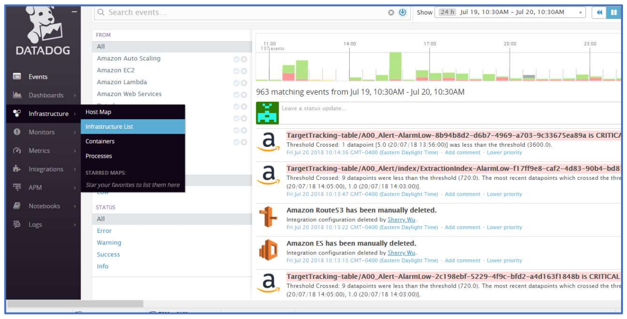
https://www.datadoghq.com/

Credentials will be provided in the handout during the workshop

Use Dashboards and Metrics to observe high workload that has been emulated through JMeter Docker

1. Network Spikes on Elastic Load Balancer

   On Home page, choose "Infrastructure" from menu bar -> choose "Infrastructure List"



963 matching events from Jul 19, 10:30AM - Jul 20, 10:30AM

TargetTracking-table/A00_Alert-AlarmLow-8b94b8d2-d6b7-4969-a703-9c33675ea89a is CRITICA
Threshold Crossed: 1 datapoint [5.0 (20/07/18 13:56:00)] was less than the threshold (3600.0).
Fri Jul 20 2018 10:14:36 GMT-0400 (Eastern Daylight Time) · Add comment · Lower priority

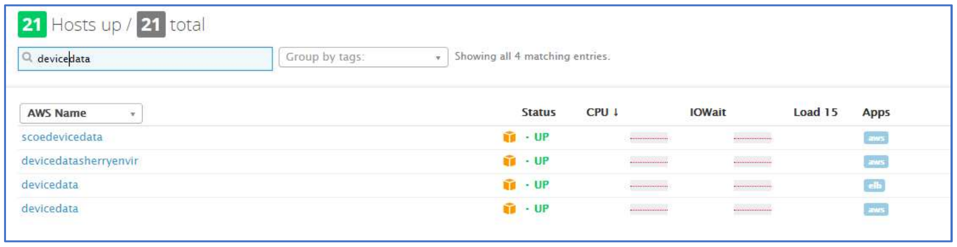
TargetTracking-table/A00_Alert/index/ExtractionIndex-AlarmLow-f17ff9e8-caf2-4d83-90b4-bd8
Threshold Crossed: 9 datapoints were less than the threshold (720.0). The most recent datapoints which crossed the thre
(20/07/18 14:05:00), 1.0 (20/07/18 14:03:00)].
Fri Jul 20 2018 10:13:47 GMT-0400 (Eastern Daylight Time) · Add comment · Lower priority

Amazon Route53 has been manually deleted.
Integration configuration deleted by Sherry Wu.
Fri Jul 20 2018 10:13:22 GMT-0400 (Eastern Daylight Time) · Add comment · Lower priority

Amazon ES has been manually deleted.
Integration configuration deleted by Sherry Wu.
Fri Jul 20 2018 10:13:15 GMT-0400 (Eastern Daylight Time) · Add comment · Lower priority

TargetTracking-table/A00_Alert-AlarmLow-2c198ebf-5229-4f9c-bfd2-a4d163f1848b is CRITICAL
Threshold Crossed: 9 datapoints were less than the threshold (720.0). The most recent datapoints which crossed the thre
(20/07/18 14:05:00), 1.0 (20/07/18 14:03:00)].

   Click on "devicedata" which has "elb" listed under its Apps


21 Hosts up / 21 total

devicedata

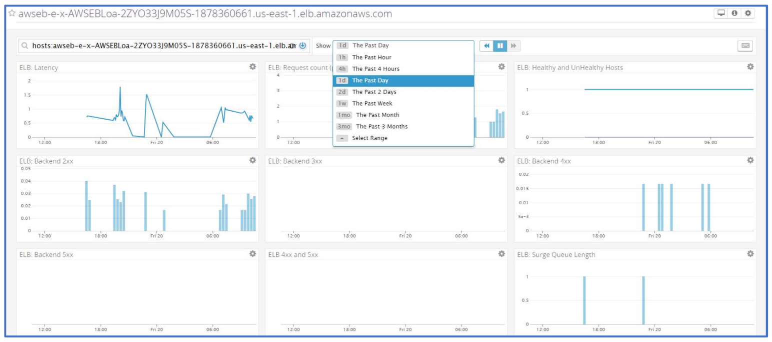
Group by tags:

Showing all 4 matching entries.

AWS Name	Status	CPU ↓	IOWait	Load 15	Apps
scoedevicedata	UP				aws
devicedatasherryenvir	UP				aws
devicedata	UP				elb
devicedata	UP				aws

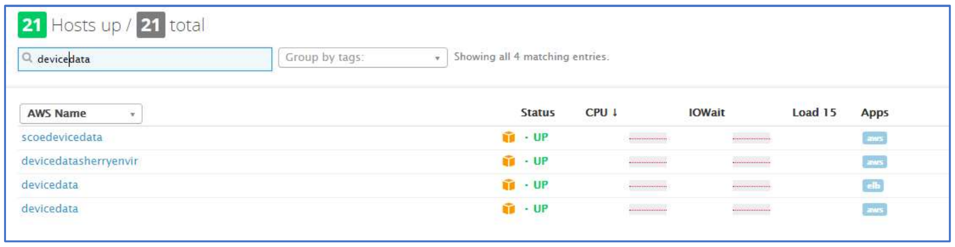
   You will be redirected to this ELB's dashboard and can observe network traffic spikes through this load gateway created by JMeter load simulator.

   Adjust the time interval to be "Past 4 Hours", "Past Day", etc. to monitor the traffic trends.



2. High Disk I/O on EC2

   Follow the same steps as in 2.1, but instead of choosing the “devicedata” that has “elb” under its Apps, choose the other one that has “aws” in the Apps column.



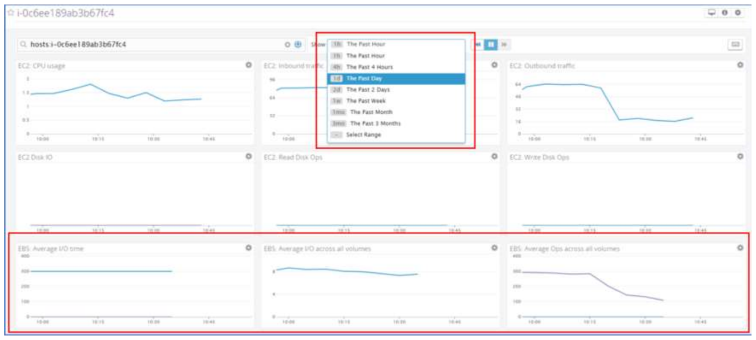
21 Hosts up / **21** total

devicedata | Group by tags: | Showing all 4 matching entries.

AWS Name	Status	CPU ↓	IOWait	Load 15	Apps
scoedevicedata	UP				aws
devicedatasherryenvir	UP				aws
devicedata	UP				elb
devicedata	UP				aws

   You will be redirected to this EC2 instance’s dashboard and can observe high disk I/O caused by load pressure added by JMeter load simulator

   Note that disk I/O is against EBS (elastic block storage) instead of EC2, this is because we attached EBS to EC2 as storage.

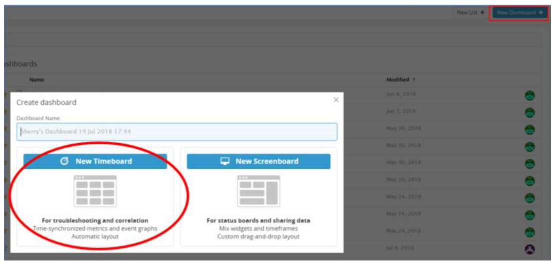


   Adjust time interval to “Past 4 Hours”, “Past Day”, etc. to monitor traffic trends.

Create your own DataDog Dashboard to observe spikes in other resources

1. Create your own dashboard and metric to observe increasing DynamoDB write throughput

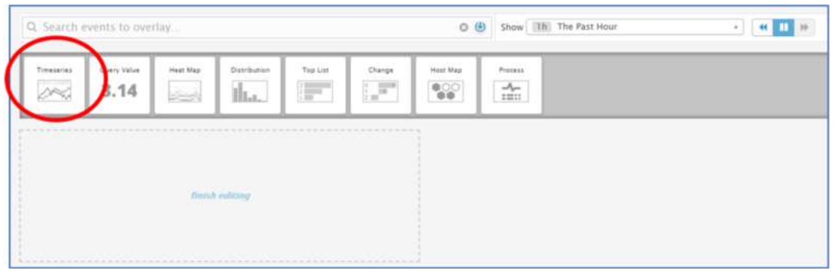
   Click “New Dashboard +”


Create dashboard

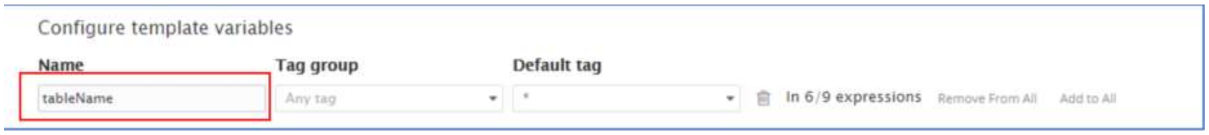
Dashboard Name: Sherry's Dashboard 19 Jul 2018 17:44

New List
New Dashboard
New Timeboard
For troubleshooting and correlation
Time-synchronized metrics and event graphs
Automatic layout
New Screenboard
For status boards and sharing data
Mix widgets and timeframes
Custom drag-and-drop layout

Choose “New Timeboard” -> “Timeseries” since we want to see the throughput changes against timeline:

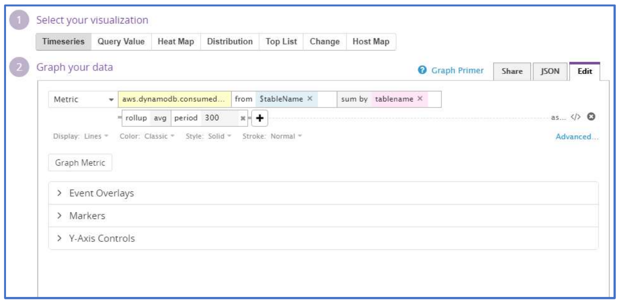


Configure template variables as follows so that statistics can be aggregated per table:


Configure template variables

Name	Tag group	Default tag	
tableName	Any tag	*	In 6/9 expressions

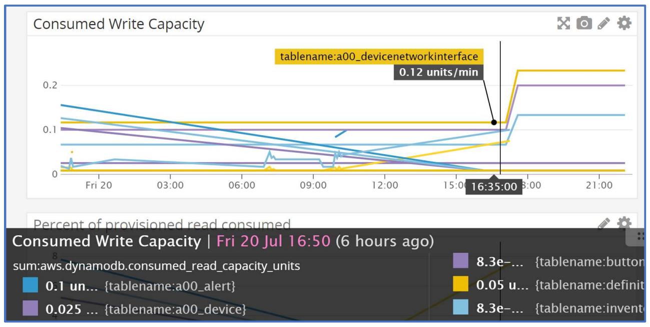
Choose “aws.dynamodb.provisioned_write_capacity_units” from “$tableName” sum by “tablename”


1 Select your visualization: Timeseries

2 Graph your data

```
Metric  aws.dynamodb.consumed...  from $tableName  sum by tablename
rollup avg  period 300
Display: Lines   Color: Classic   Style: Solid   Stroke: Normal
```

You should be able to observe the increasing write throughput in the metric just created:


Consumed Write Capacity | Fri 20 Jul 16:50 (6 hours ago)

sum:aws.dynamodb.consumed_read_capacity_units

🟦 0.1 un... {tablename:a00_alert}	🟪 8.3e-... {tablename:button
🟪 0.025 ... {tablename:a00_device}	🟨 0.05 u... {tablename:definit
	🟦 8.3e-... {tablename:invent

2. Question: Can you please create a metric that allows us to observe percentage of consumed read capacity of each dynamo table?