Autoscaling Group

Step 1: Create a Launch Template

A launch template is a reusable configuration for launching EC2 instances with predefined settings like AMI, instance type, key pair, etc.

1.1 Navigate to Launch Templates

1. Go to the **AWS Management Console** and navigate to the **EC2 Dashboard**.
2. From the left-hand menu, select **Launch Templates**.
3. Click on the **Create Launch Template** button.

1.2 Configure the Launch Template

1. **Template Name**: Give your launch template a unique name (e.g., MyApp-Launch-Template).
2. **Template Version**: Leave this as 1 (for the first version).
3. **AMI (Amazon Machine Image)**: Choose the Amazon Machine Image (AMI) that contains the OS and applications you need. You can select Windows, Ubuntu, or any other OS. Make sure the AMI includes the software your EC2 instances will run.
4. **Instance Type**: Select an instance type (e.g., t2.micro for basic workloads).
5. **Key Pair**: Choose or create an existing key pair for RDP (Windows) access.
6. **Network Settings**:
   - **VPC**: Select the VPC where you want the instances to launch.
   - **Subnet**: Select the subnet(s) (if needed). If you want instances to be launched in multiple Availability Zones, you can leave this unset.

1.3 Review and Create

1. Review the configuration.
2. Click **Create Launch Template**.

Step 2: Create an Auto Scaling Group (ASG)

An Auto Scaling Group automatically manages a group of EC2 instances, scaling them based on demand.

2.1 Navigate to Auto Scaling Groups

1. Go to the **EC2 Dashboard**.
2. From the left-hand menu, select **Auto Scaling Groups**.
3. Click **Create Auto Scaling Group**.

2.2 Configure the Auto Scaling Group

1. **Auto Scaling Group Name**: Provide a unique name (e.g., myasg).
2. **Launch Template**: Select the launch template created in Step 1.
3. **Version**: Choose the latest version of the launch template.

2.3 Select Network Settings

1. **VPC**: Choose the VPC where your instances will run.
2. **Subnets**: Select multiple subnets in different Availability Zones to improve fault tolerance

2.4 Configure Group Size and Scaling Policies

1. **Desired Capacity**: Set the number of instances that should always be running (e.g., 2).
2. **Minimum Capacity**: Set the minimum number of instances (e.g., 1).
3. **Maximum Capacity**: Set the maximum number of instances (e.g., 3).

2.5 Health Check

1. **Health Check Type**: Choose **EC2** or **ELB** depending on whether you're using a load balancer.
2. **Health Check Grace Period**: Set a time (in seconds) for how long an instance can be in the "initializing" state before it's considered healthy (e.g., 120 seconds).

2.6 Review and Create

1. Review the settings.
2. Click **Create Auto Scaling Group**.

Step 3: Configure Target Tracking Scaling

Target tracking scaling automatically adjusts the number of instances based on a target metric (e.g., CPU utilization).

3.1 Navigate to Auto Scaling Group Policies

1. Once your ASG is created, navigate to the **Auto Scaling Group** you just created.
2. Click the **Automatic Scaling** tab.
3. Click **Add Policy** to create a scaling policy.

3.2 Create Target Tracking Scaling Policy

1. **Policy Type**: Select **Target Tracking Scaling**.
2. **Metric Type**: Choose **Average CPU Utilization** (other metrics like request count, network throughput, or custom CloudWatch metrics can also be used).
3. **Target Value**: Set the CPU utilization target. For your case, set this to **35%**.
   - This means AWS will automatically adjust the number of instances to maintain an average CPU utilization of 35%.
4. **Instance Warm-up Time**: Specify a warm-up period (e.g., 120 seconds) to allow new instances to stabilize before contributing to metrics.
5. **Disable Scale-in (Optional)**: If you only want to scale out and not scale in, you can enable this. Usually, you leave it unchecked to allow both scaling out and in.

3.3 Review and Create Policy

1. Review your settings and click **Create Policy**.

Step 4: Monitor and Adjust Auto Scaling

1. **Monitor Scaling**: Go to **Amazon CloudWatch** to monitor the metrics (e.g., CPU utilization) and see how instances are scaling.
2. **Tune Settings**: If needed, adjust the **target value**, **min/max capacity**, or other parameters based on how your application behaves under load.

Target Tracking Scaling Overview

Target tracking scaling automatically adjusts the size of your Auto Scaling Group to maintain a specified target for a predefined metric, typically **average CPU utilization**. When you set a target value (e.g., 35% CPU utilization), the Auto Scaling Group adjusts the number of instances to keep this target value. If CPU usage goes above 35%, it adds more instances. If usage falls below 35%, it terminates instances.

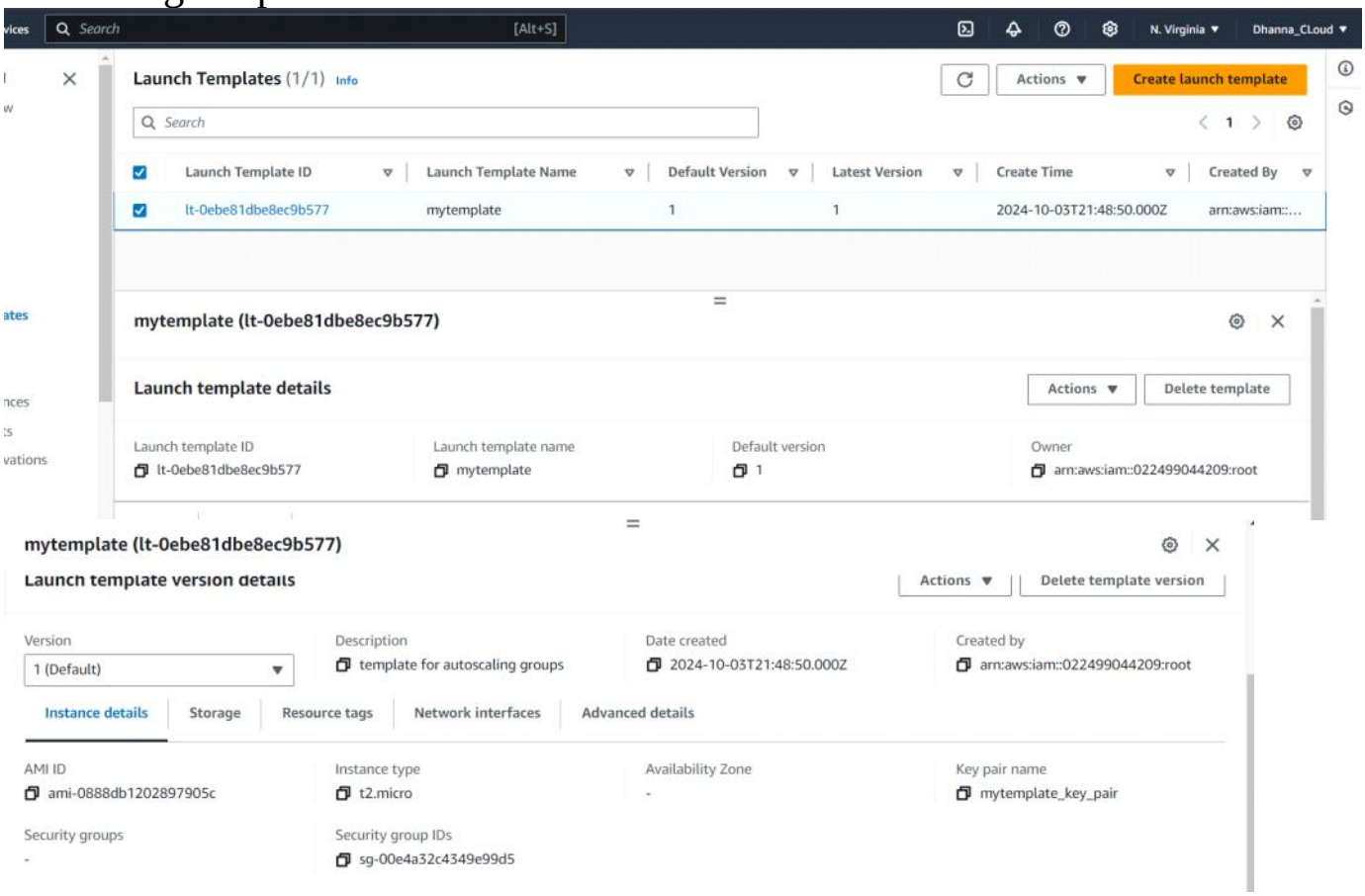
Key Benefits:

- **Hands-off Scaling**: AWS automatically manages the scaling of your instances, requiring minimal manual intervention.

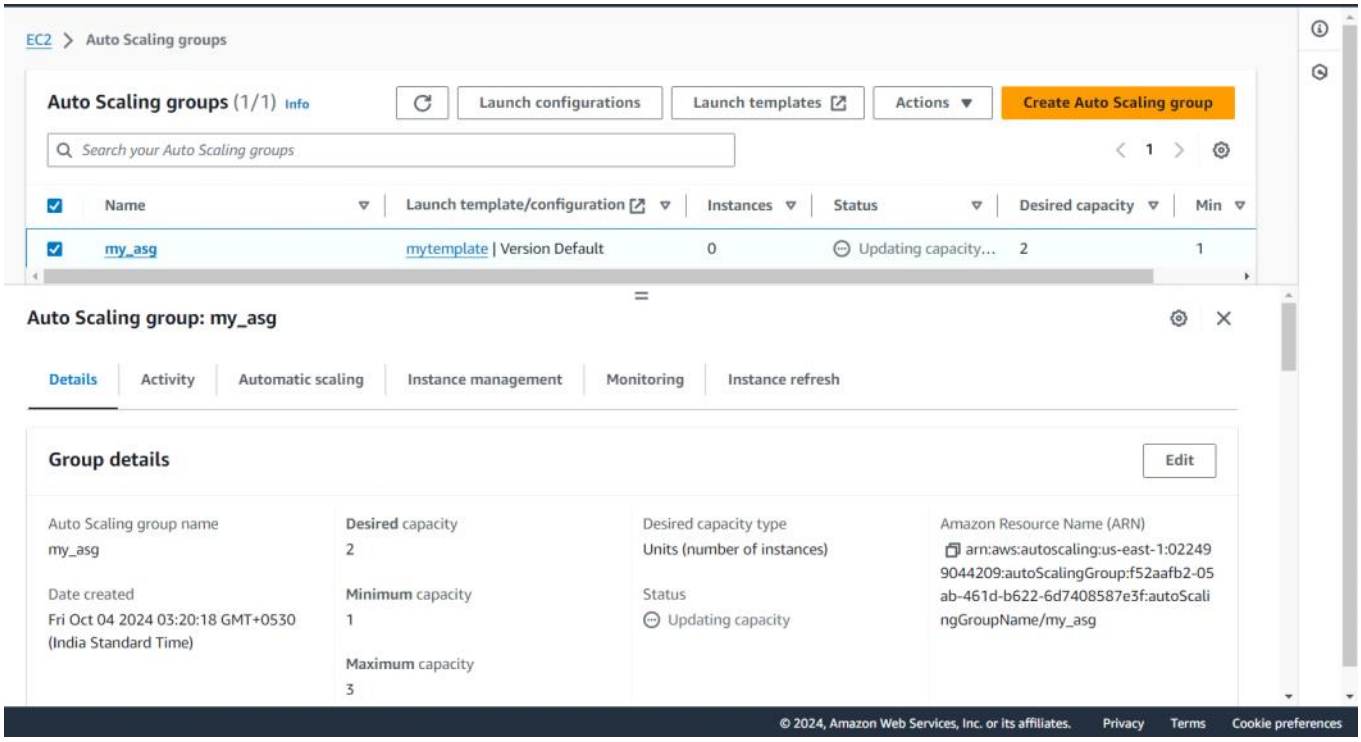
- **Improved Performance**: Ensures consistent performance for your application by keeping CPU (or other metrics) within the desired range.
- **Cost Efficiency**: Reduces costs by terminating instances when demand decreases, ensuring you are only paying for what you need.

Below are screenshot of implementation

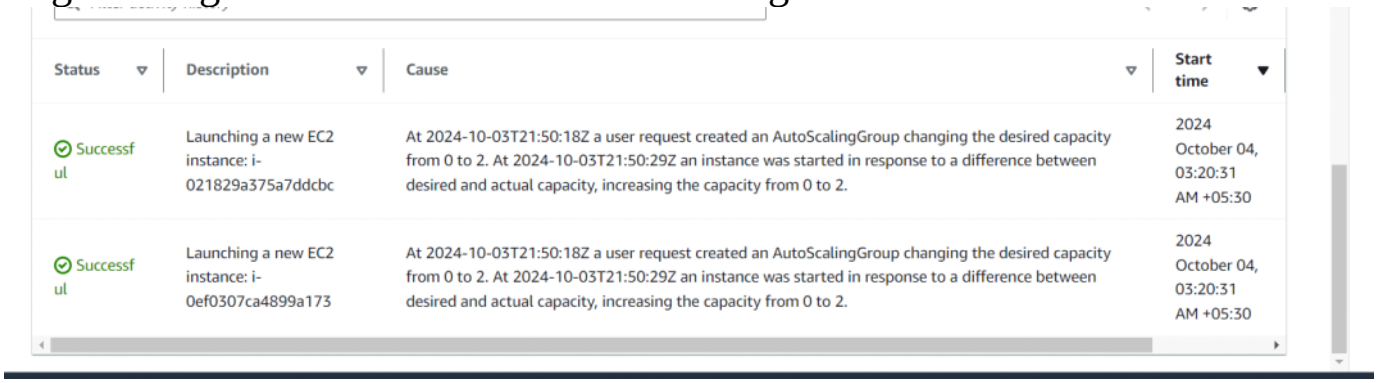
Launching template:

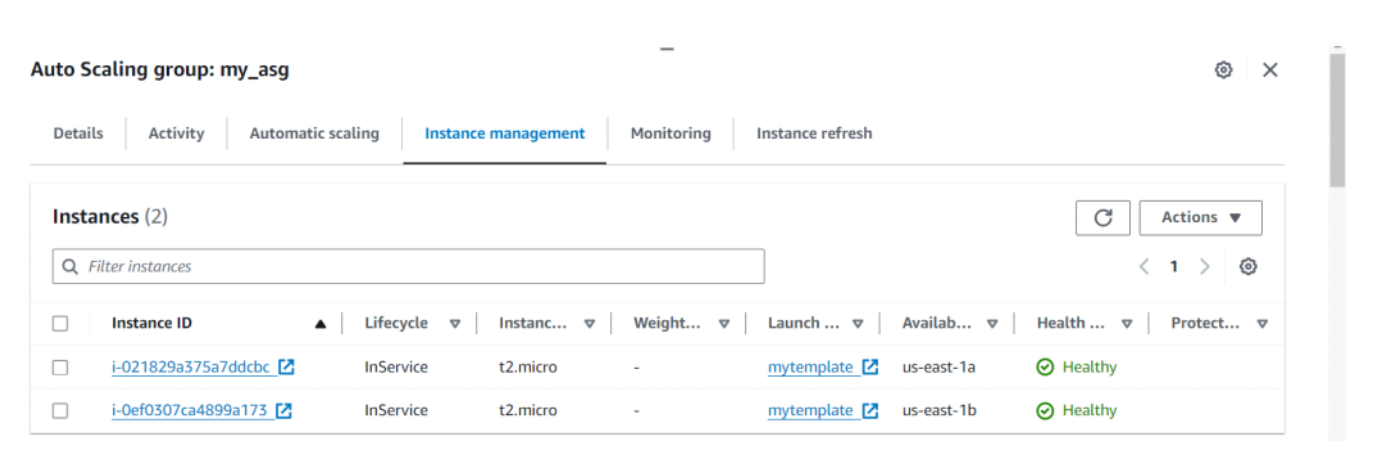


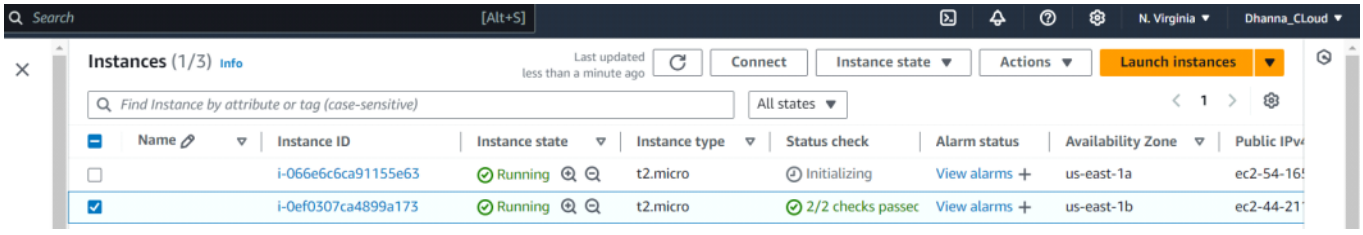
Creating autoscaling group with template created



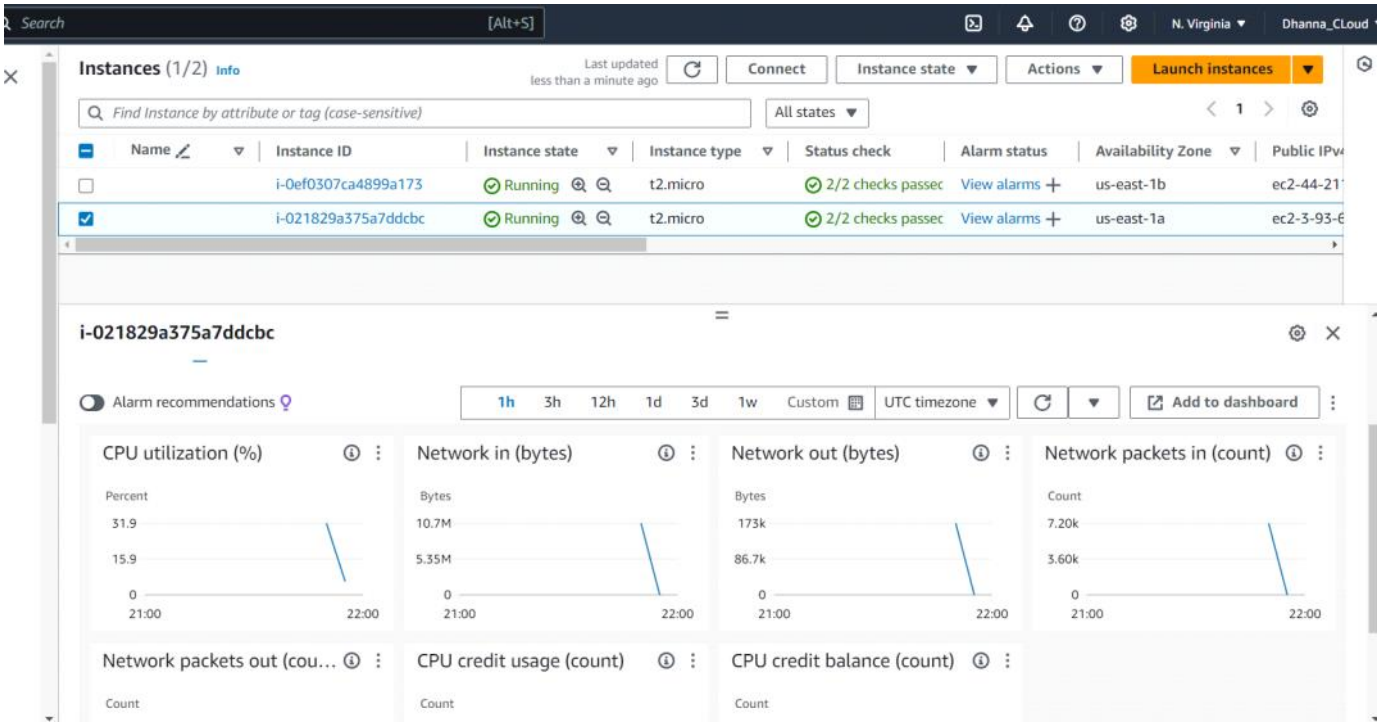
Asg creating desired instances after launching it.

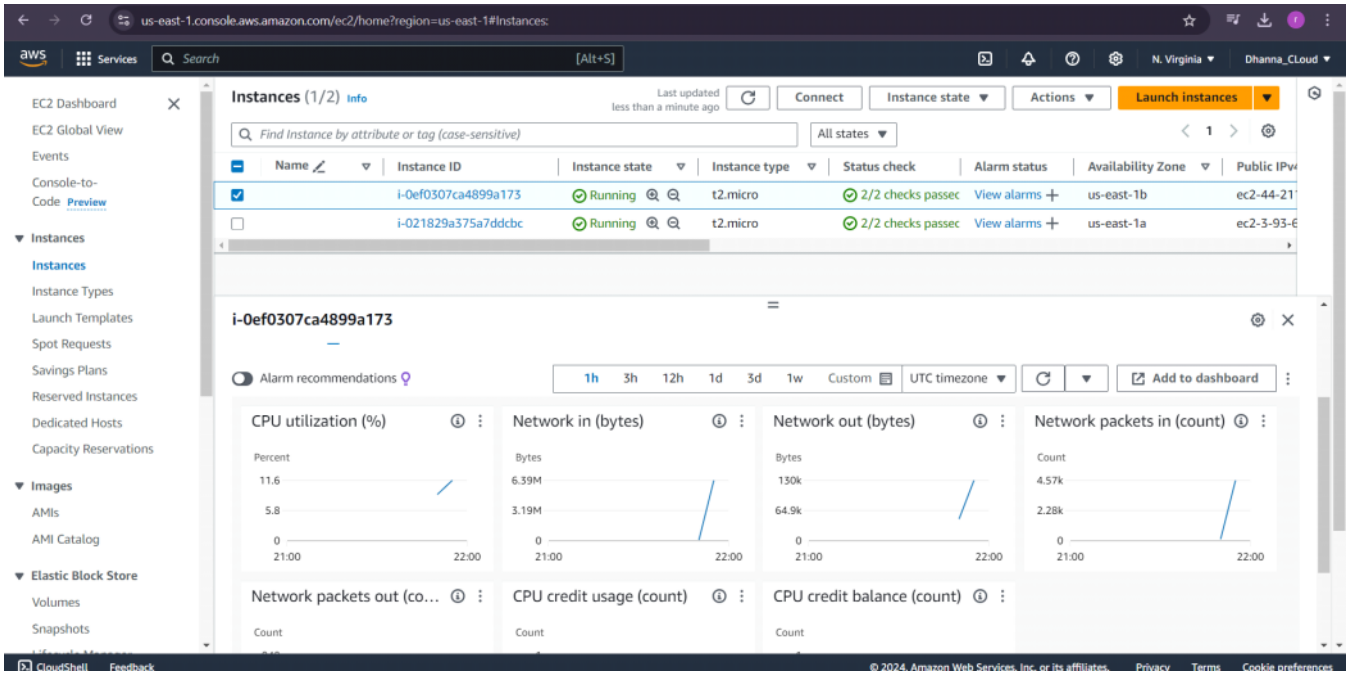






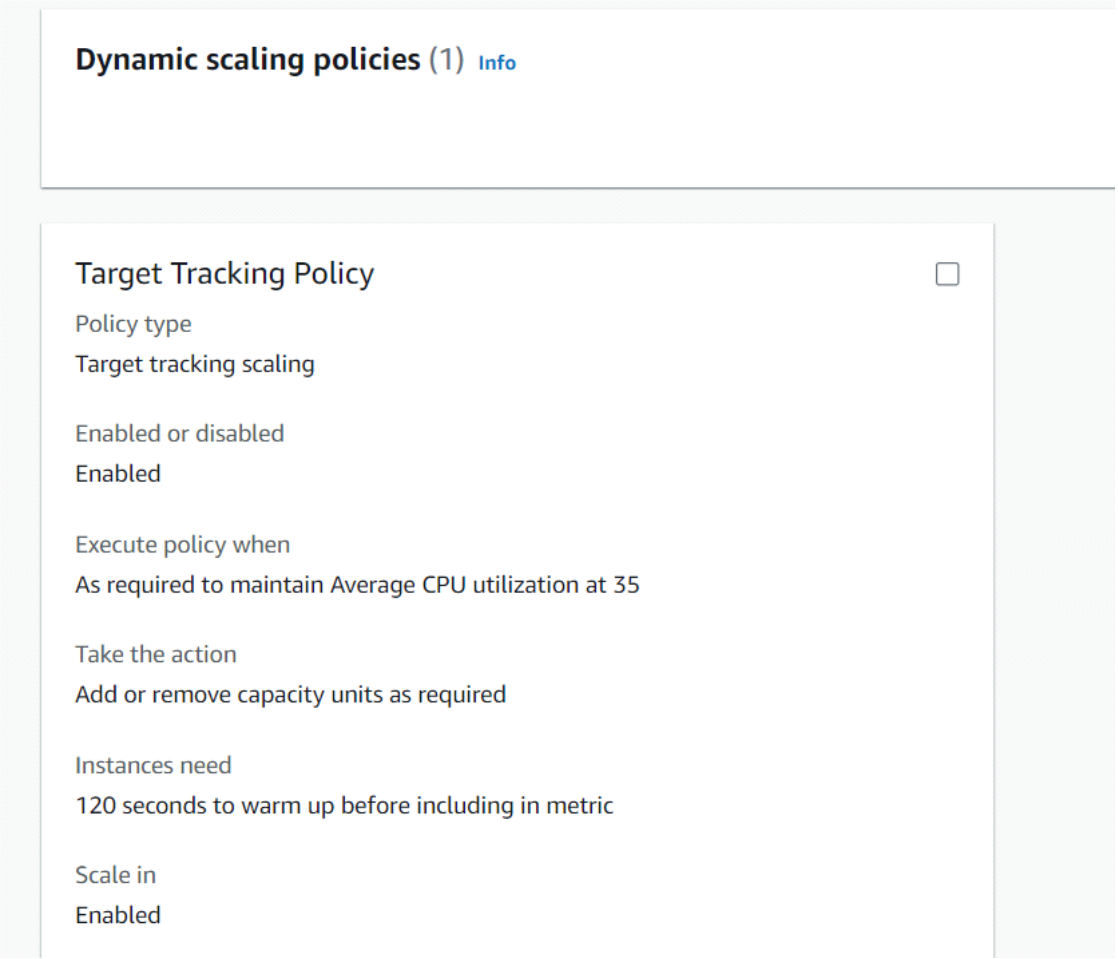
Cpu utilization stats before updating dynamic policies.



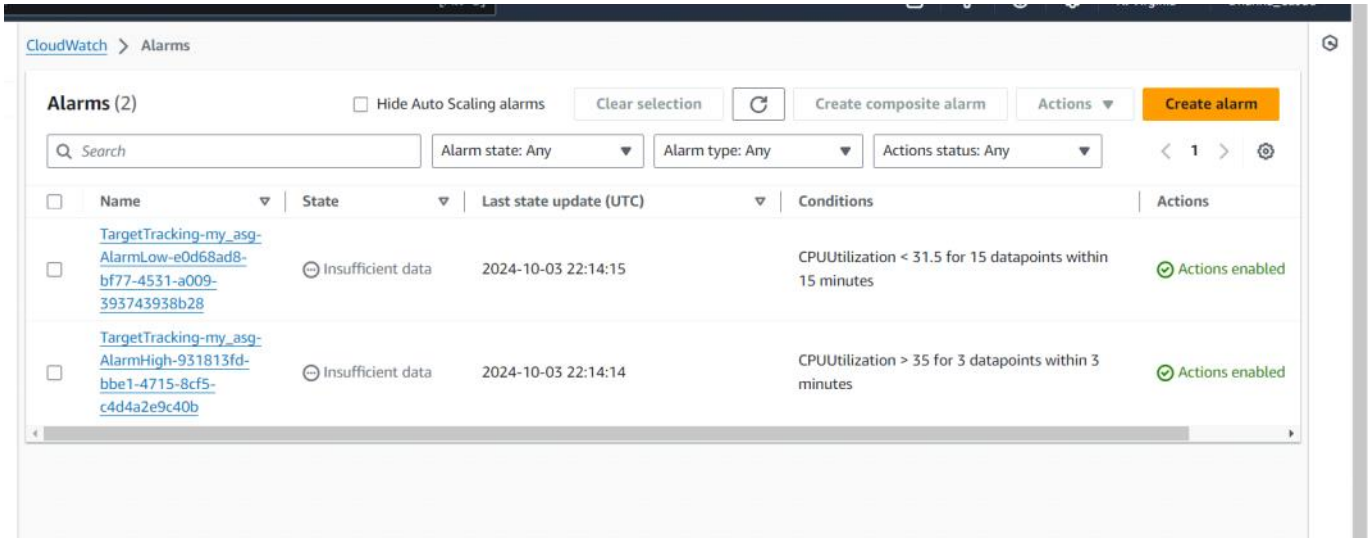


Now setting dynamic policies for automating asg based on cpu utilization.

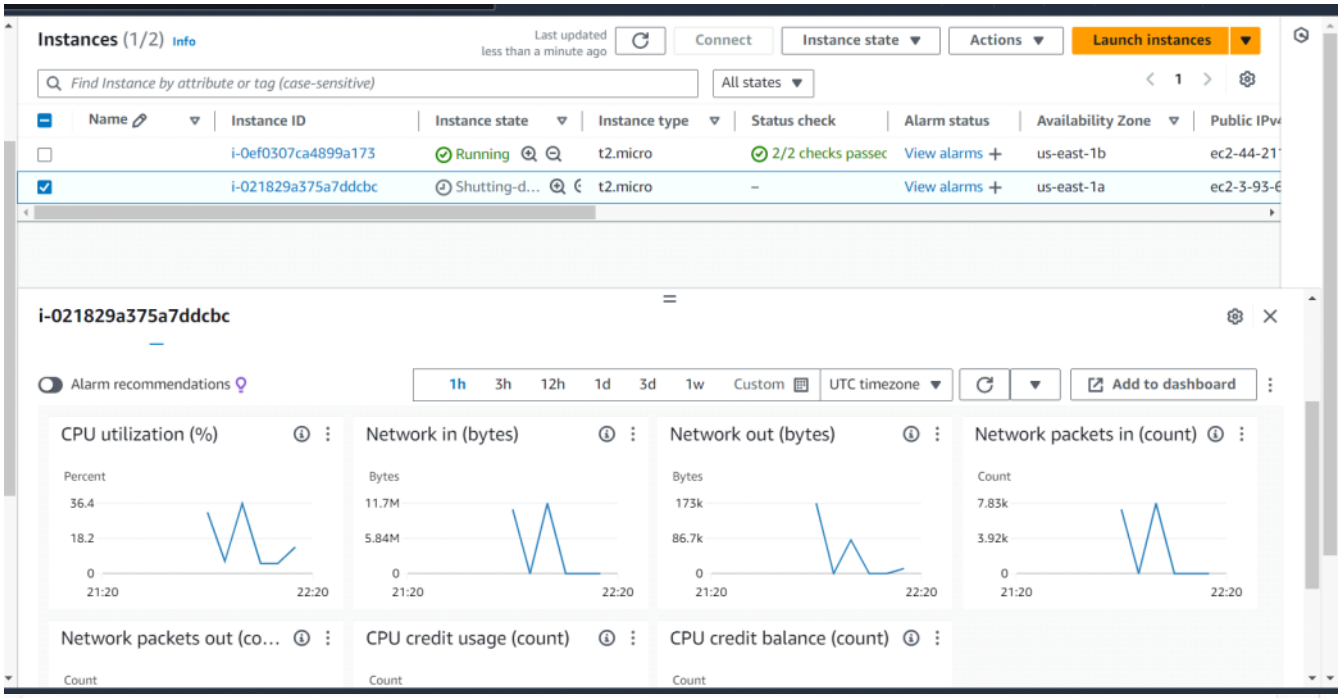
Setting cpu utilization : 35 percent (this will maintain the minimum instances as the cpu utilization till now is very less)

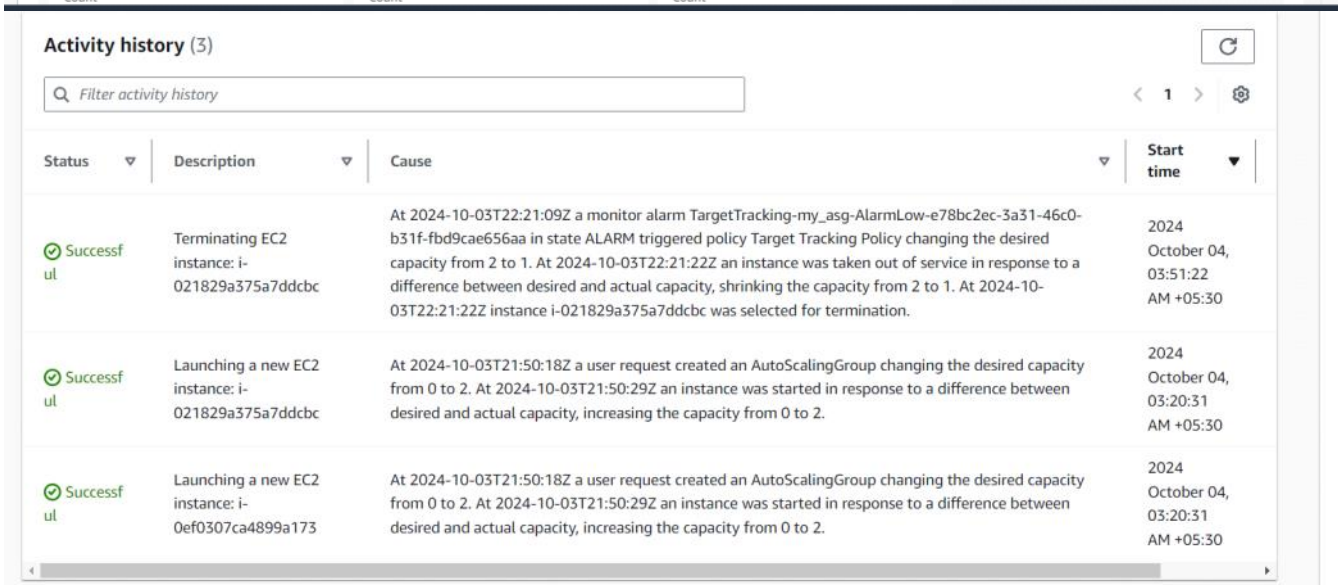


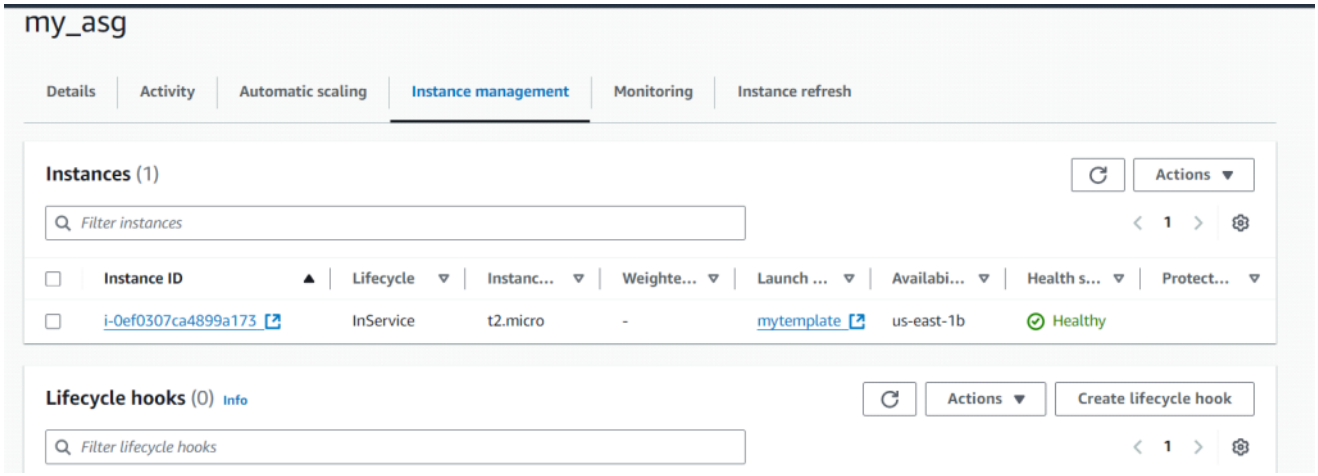
Cloudwatch alarm created automatically after setting dynamic policies.



As the utilization is very low it is automatically switing off the unnecessary instances and maintaining the minimum quantity specifies by me while setting synamic policy (i.e 1)

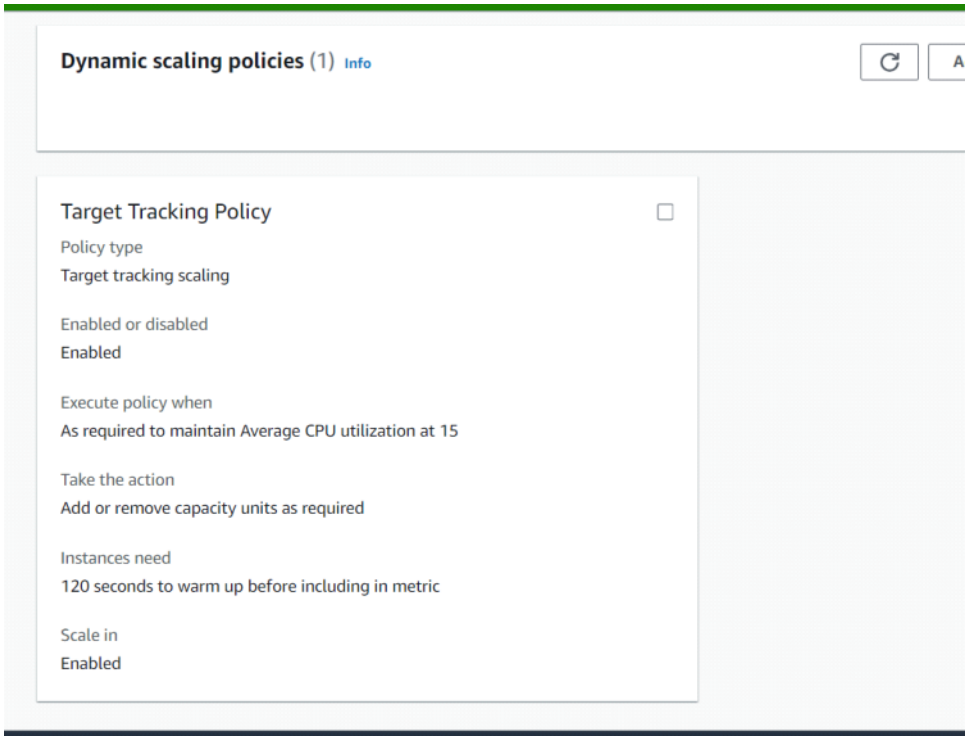




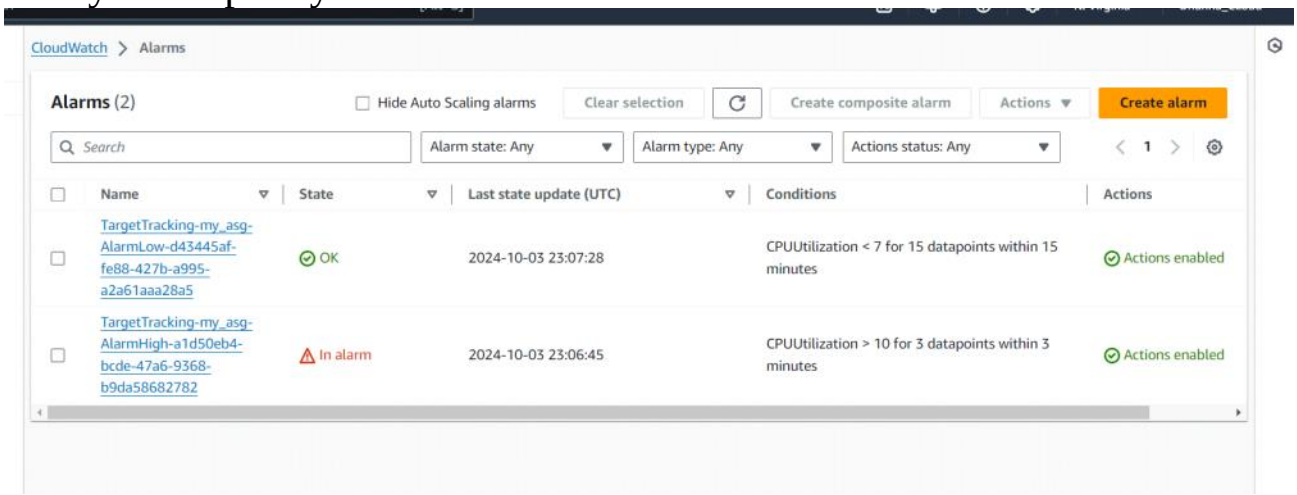


For maximum capacity of asg, updating the dynamic policy i.e to decreasing the cpu utilization to 15 percent. (the cpu utilization

was not going above 35 percent as no that much load to ec2s , that's why for showing decreasing the cpu utilization in dynamic policy)



Again the cloud watch alarm is created automatically after setting the dynamic policy.



Now as the cpu utilization goes up than the specified limit
So the cloudwatch alarmed and hence started launching ec2 in to its maximum level. (i.e here 3)

Activity history (5)

Filter activity history

Status	Description	Cause	Start time
Waiting for instance warmup	Launching a new EC2 instance: i-040569cbd14d599da	At 2024-10-03T23:09:45Z a monitor alarm TargetTracking-my_asg-AlarmHigh-a1d50eb4-bcde-47a6-9368-b9da58682782 in state ALARM triggered policy Target Tracking Policy changing the desired capacity from 2 to 3. At 2024-10-03T23:09:57Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 2 to 3.	2024 October 04, 04:39:59 AM +05:30
Successful	Launching a new EC2 instance: i-066e6c6ca91155e63	At 2024-10-03T23:06:45Z a monitor alarm TargetTracking-my_asg-AlarmHigh-a1d50eb4-bcde-47a6-9368-b9da58682782 in state ALARM triggered policy Target Tracking Policy changing the desired capacity from 1 to 2. At 2024-10-03T23:06:52Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 1 to 2.	2024 October 04, 04:36:53 AM +05:30

Status	Description	Cause	Start time
Successful	Launching a new EC2 instance: i-040569cbd14d599da	At 2024-10-03T23:09:45Z a monitor alarm TargetTracking-my_asg-AlarmHigh-a1d50eb4-bcde-47a6-9368-b9da58682782 in state ALARM triggered policy Target Tracking Policy changing the desired capacity from 2 to 3. At 2024-10-03T23:09:57Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 2 to 3.	2024 October 04, 04:39:59 AM +05:30
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EC2 > Auto Scaling groups > my_asg

my_asg

Details | Activity | Automatic scaling | Instance management | Monitoring | Instance refresh

Instances (3)

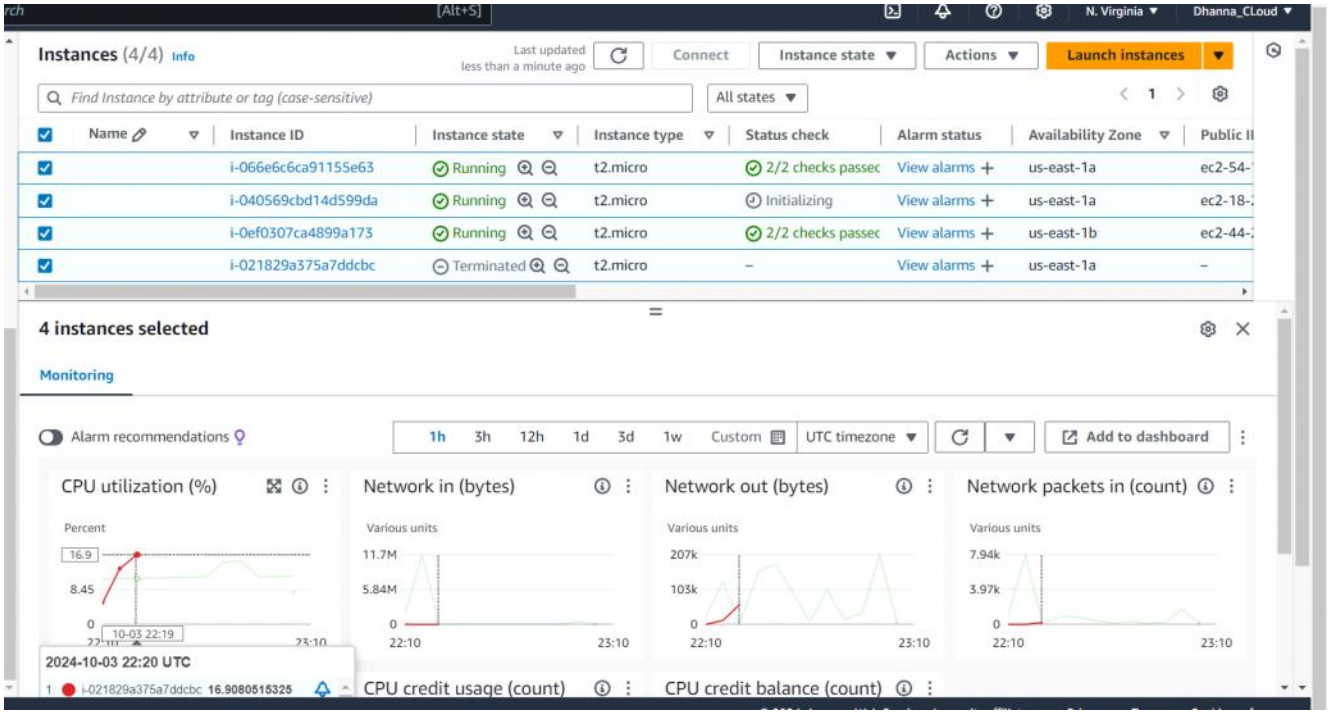
Filter instances

Instance ID	Lifecycle	Instanc...	Weight...	Launch ...	Availab...	Health ...	Protect...
i-040569cbd14d599da	InService	t2.micro	-	mytemplate	us-east-1a	Healthy	
i-066e6c6ca91155e63	InService	t2.micro	-	mytemplate	us-east-1a	Healthy	
i-0ef0307ca4899a173	InService	t2.micro	-	mytemplate	us-east-1b	Healthy	

Lifecycle hooks (0) Info

Actions | Create lifecycle hook

Now three instances are in healthy running state.


Instances (4/4) Info
Last updated less than a minute ago
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
i-066e6c6ca91155e63 Running t2.micro 2/2 checks passed View alarms us-east-1a
i-040569cbd14d599da Running t2.micro Initializing View alarms us-east-1a
i-0ef0307ca4899a173 Running t2.micro 2/2 checks passed View alarms us-east-1b
i-021829a375a7ddcbc Terminated t2.micro View alarms us-east-1a
4 instances selected
Monitoring
Alarm recommendations
1h 3h 12h 1d 3d 1w Custom
UTC timezone
Add to dashboard
CPU utilization (%)
Network in (bytes)
Network out (bytes)
Network packets in (count)
Percent
Various units
2024-10-03 22:20 UTC
i-021829a375a7ddcbc 16.9080515325
CPU credit usage (count)
CPU credit balance (count)