

Create EC2 Image of Shared Instance

```
aws ec2 create-image --region us-east-1 --instance-id i-0f8ebb12c5c8d9c70 --name "csye-sh-team-green-c01_v01" --no-reboot
```

```
venkata@sh01:~$ aws ec2 create-image --region us-east-1 --instance-id i-0f8ebb12c5c8d9c70 --name "csye-sh-team-green-c01_v01" --no-reboot
{
  "ImageId": "ami-09a40cf6d36bc5128"
}
```

Use the following YAML file for cloud formation template to launch an ec2 instance with shared server image

AWSTemplateFormatVersion: "2010-09-09"

Description: 'AWS CloudFormation Template EC2 Instance'

Parameters:

InstanceTypeT3M:

Description: EC2 instance type

Type: String

Default: t3.medium

ConstraintDescription: must be a valid EC2 instance type.

AssetNameDC03:

Description: EC2 Instance Name

Type: String

Default: csye-t-green-c03

EC2C03ImageId:

Description: AMI ID for EC2 instance, Image from shared server

Type: String

Default: ami-09a40cf6d36bc5128

KeyName:

Description: The EC2 Key Pair to allow SSH Access to the Instance

Type: "AWS::EC2::KeyPair::KeyName"

Default: CSYE7374Spring23

VpcId:

Description: VPC to launch into

Type: AWS::EC2::VPC::Id

Default: vpc-07ca61e3eaaf4073d

SubnetBId:

Description: Subnets for instance to use

Type: AWS::EC2::Subnet::Id

Default: "subnet-0583ac8cb2fda0cb1"

IpAddress:

Description: Private Ip Address to be allocated to ec2

Type: String
Default: 172.31.86.97

EBSSize20G:
Description: Root VolumeSize
Type: Number
Default: 20

Resources:

InstanceProfile:
Type: "AWS::IAM::InstanceProfile"
Properties:
Path: "/"
Roles: ["csye-f22-01"]

EC2InstanceIcn:
Type: AWS::EC2::Instance
Properties:
ImageId:
Ref: EC2C03ImageId
InstanceType:
Ref: InstanceTypeT3M
KeyName:
Ref: KeyName
SubnetId:
Ref: SubnetBld
SecurityGroupIds: ["sg-0ea8e13b13489cde5", "sg-03d46d15f2068a311"]
IamInstanceProfile:
Ref: InstanceProfile
BlockDeviceMappings:
- DeviceName: "/dev/sda1"
Ebs:
DeleteOnTermination: true
VolumeType: gp3
VolumeSize:
Ref: EBSSize20G
Tags:
-
Key: "Name"
Value:
Ref: AssetNameDC03
PrivateIpAddress:
Ref: IpAddress

Create an Cloud formation stack with above yaml

aws cloudformation create-stack --stack-name csye-t-green-c03 --template-body file:///home/venkata/test/cfm/csye-t-green-c03.yaml --region us-east-1

```
venkata@sh01:~/test/cfm$ aws cloudformation delete-stack --stack-name csye-t-green-c03 --region us-east-1
venkata@sh01:~/test/cfm$ aws cloudformation create-stack --stack-name csye-t-green-c03 --template-body file:///home/venkata/test/cfm/csye-t-green-c03.yaml --region us-east-1
{
  "StackId": "arn:aws:cloudformation:us-east-1:332987686862:stack/csye-t-green-c03/050e61e0-acff-11ed-b94c-0a55d38b49ed"
}
venkata@sh01:~/test/cfm$
```

"StackId":

"arn:aws:cloudformation:us-east-1:332987686862:stack/csye-t-green-c03/050e61e0-acff-11ed-b94c-0a55d38b49ed"

EC2 Instance

```
venkata@sh01:~/test/cfm$ aws ec2 describe-instances --query "Reservations[*].Instances[*].[InstanceId,InstanceType,State.Name,PrivateIpAddress,Placement.AvailabilityZone,Tags[?Key == 'Name']|[0].Value,PublicDnsName ]" --filters "Name=tag:Name,Values=*green*" --output text --region us-east-1
i-00208ecd0c294deba    t3.medium    running 172.31.86.97    us-east-1b    csye-t-green-c03    ec2-18-208-128-207.compute-1.amazonaws.com
```

Private IP: 172.31.86.97 has been allocated

```
Last login: Wed Feb 15 00:42:37 on ttys000
[saiteja@Sais-MacBook-Pro ~ % ssh venkata@ec2-18-208-128-207.compute-1.amazonaws.com]

System information as of Wed Feb 15 12:51:10 PST 2023

System load:                0.0
Usage of /:                  45.1% of 193.81GB
Memory usage:               22%
Swap usage:                 0%
Processes:                  189
Users logged in:            0
IPv4 address for br-7ba9ed9e3311: 172.18.0.1
IPv4 address for docker0:   172.17.0.1
IPv4 address for ens5:      172.31.86.97

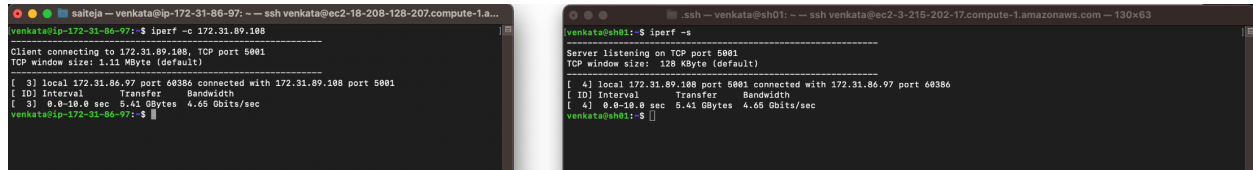
Welcome to Advanced Computing Infrastructure
Last login: Wed Feb 15 12:45:43 2023 from 76.118.234.43
[venkata@ip-172-31-86-97:~]$ hostname -I
172.31.86.97 172.18.0.1 172.17.0.1
venkata@ip-172-31-86-97:~$
```

Iperf (TCP)

Default Settings:

Commands

Shared Server(server): `iperf -s`
Team green EC2 instance(client): `iperf -c 172.31.89.108`



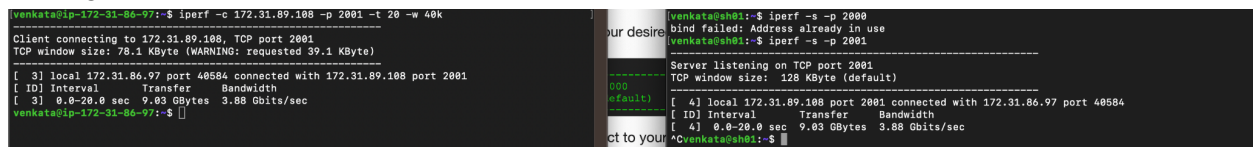
```
venkata@ip-172-31-86-97:~$ iperf -c 172.31.89.108
Client connecting to 172.31.89.108, TCP port 5801
TCP window size: 1.11 MByte (default)
[ 3] local 172.31.86.97 port 60386 connected with 172.31.89.108 port 5801
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  5.43 GBytes 4.65 Gbits/sec
venkata@ip-172-31-86-97:~$

venkata@sh01:~$ iperf -s
Server listening on TCP port 5801
TCP window size: 128 KByte (default)
[ 4] local 172.31.89.108 port 5801 connected with 172.31.86.97 port 60386
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.0-10.0 sec  5.43 GBytes 4.65 Gbits/sec
venkata@sh01:~$
```

Different Port and window size:

Commands

Shared Server(server): `iperf -s -p 2001`
Team green EC2 instance(client): `iperf -c 172.31.89.108 -p 2001 -t 20 -w 40k`



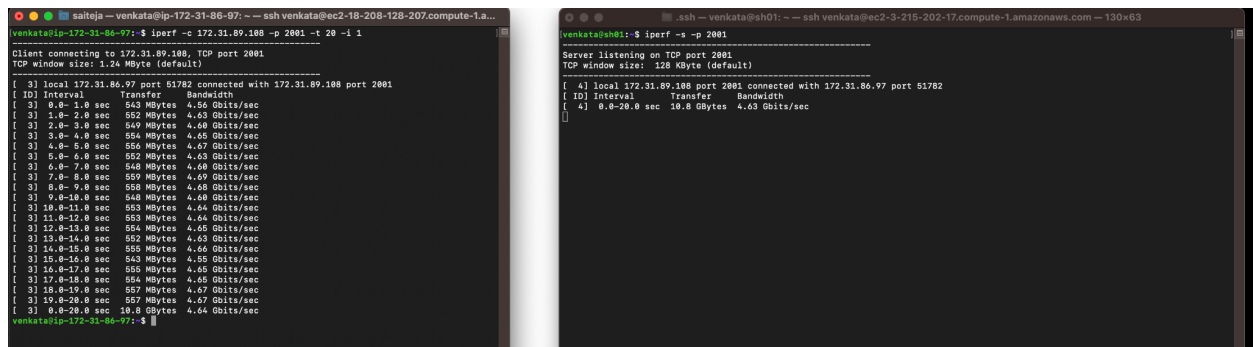
```
venkata@ip-172-31-86-97:~$ iperf -c 172.31.89.108 -p 2001 -t 20 -w 40k
Client connecting to 172.31.89.108, TCP port 2001
TCP window size: 78.1 KByte (WARNING: requested 39.1 KByte)
[ 3] local 172.31.86.97 port 40584 connected with 172.31.89.108 port 2001
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-20.0 sec  9.03 GBytes 3.88 Gbits/sec
venkata@ip-172-31-86-97:~$

venkata@sh01:~$ iperf -s -p 2001
bind failed: Address already in use
venkata@sh01:~$ iperf -s -p 2001
Server listening on TCP port 2001
TCP window size: 128 KByte (default)
[ 4] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 40584
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.0-20.0 sec  9.03 GBytes 3.88 Gbits/sec
venkata@sh01:~$
```

Varying Interval rate:

Commands

Shared Server(server): `iperf -s -p 2001`
Team green EC2 instance(client): `iperf -c 172.31.89.108 -p 2001 -t 20 -i 1`



```
venkata@ip-172-31-86-97:~$ iperf -c 172.31.89.108 -p 2001 -t 20 -i 1
Client connecting to 172.31.89.108, TCP port 2001
TCP window size: 1.24 MByte (default)
[ 3] local 172.31.86.97 port 51782 connected with 172.31.89.108 port 2001
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-1.0 sec  543 MBytes 4.56 Gbits/sec
[ 3] 1.0-2.0 sec  552 MBytes 4.63 Gbits/sec
[ 3] 2.0-3.0 sec  549 MBytes 4.60 Gbits/sec
[ 3] 3.0-4.0 sec  554 MBytes 4.65 Gbits/sec
[ 3] 4.0-5.0 sec  556 MBytes 4.67 Gbits/sec
[ 3] 5.0-6.0 sec  552 MBytes 4.63 Gbits/sec
[ 3] 6.0-7.0 sec  548 MBytes 4.60 Gbits/sec
[ 3] 7.0-8.0 sec  559 MBytes 4.69 Gbits/sec
[ 3] 8.0-9.0 sec  550 MBytes 4.68 Gbits/sec
[ 3] 9.0-10.0 sec 548 MBytes 4.68 Gbits/sec
[ 3] 10.0-11.0 sec 553 MBytes 4.64 Gbits/sec
[ 3] 11.0-12.0 sec 553 MBytes 4.64 Gbits/sec
[ 3] 12.0-13.0 sec 554 MBytes 4.65 Gbits/sec
[ 3] 13.0-14.0 sec 552 MBytes 4.63 Gbits/sec
[ 3] 14.0-15.0 sec 555 MBytes 4.66 Gbits/sec
[ 3] 15.0-16.0 sec 543 MBytes 4.58 Gbits/sec
[ 3] 16.0-17.0 sec 555 MBytes 4.65 Gbits/sec
[ 3] 17.0-18.0 sec 554 MBytes 4.65 Gbits/sec
[ 3] 18.0-19.0 sec 557 MBytes 4.67 Gbits/sec
[ 3] 19.0-20.0 sec 557 MBytes 4.67 Gbits/sec
[ 3] 0.0-20.0 sec 10.8 GBytes 4.64 Gbits/sec
venkata@ip-172-31-86-97:~$

venkata@sh01:~$ iperf -s -p 2001
Server listening on TCP port 2001
TCP window size: 128 KByte (default)
[ 4] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 51782
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.0-20.0 sec 10.8 GBytes 4.63 Gbits/sec
venkata@sh01:~$
```

Parallel Threads:

Commands

Shared Server(server): `iperf -s -p 2001`

Team green EC2 instance(client): iperf -c 172.31.89.108 -p 2001 -P 20

```
venkata@ip-172-31-86-97: ~ -- ssh venkata@ec2-18-208-128-207.compute-1.a...
venkata@ip-172-31-86-97:~$ iperf -c 172.31.89.108 -p 2001 -P 20
Client connecting to 172.31.89.108, TCP port 2001
TCP window size: 528 KByte (default)
[ 3] local 172.31.86.97 port 56272 connected with 172.31.89.108 port 2001
[ 8] local 172.31.86.97 port 56328 connected with 172.31.89.108 port 2001
[ 9] local 172.31.86.97 port 56318 connected with 172.31.89.108 port 2001
[11] local 172.31.86.97 port 56338 connected with 172.31.89.108 port 2001
[10] local 172.31.86.97 port 56352 connected with 172.31.89.108 port 2001
[ 4] local 172.31.86.97 port 56284 connected with 172.31.89.108 port 2001
[ 5] local 172.31.86.97 port 56300 connected with 172.31.89.108 port 2001
[ 7] local 172.31.86.97 port 56304 connected with 172.31.89.108 port 2001
[21] local 172.31.86.97 port 56410 connected with 172.31.89.108 port 2001
[ 4] local 172.31.86.97 port 56386 connected with 172.31.89.108 port 2001
[16] local 172.31.86.97 port 56380 connected with 172.31.89.108 port 2001
[22] local 172.31.86.97 port 56432 connected with 172.31.89.108 port 2001
[12] local 172.31.86.97 port 56362 connected with 172.31.89.108 port 2001
[19] local 172.31.86.97 port 56482 connected with 172.31.89.108 port 2001
[15] local 172.31.86.97 port 56378 connected with 172.31.89.108 port 2001
[13] local 172.31.86.97 port 56356 connected with 172.31.89.108 port 2001
[14] local 172.31.86.97 port 56438 connected with 172.31.89.108 port 2001
[ 7] local 172.31.86.97 port 56396 connected with 172.31.89.108 port 2001
[18] local 172.31.86.97 port 56488 connected with 172.31.89.108 port 2001
[20] local 172.31.86.97 port 56426 connected with 172.31.89.108 port 2001
[10] Interval Transfer Bandwidth
[ 9] 0.0-10.0 sec 198 MBytes 166 Mbits/sec
[11] 0.0-10.0 sec 255 MBytes 213 Mbits/sec
[10] 0.0-10.0 sec 201 MBytes 168 Mbits/sec
[ 4] 0.0-10.0 sec 196 MBytes 164 Mbits/sec
[ 5] 0.0-10.0 sec 195 MBytes 163 Mbits/sec
[ 7] 0.0-10.0 sec 285 MBytes 172 Mbits/sec
[21] 0.0-10.0 sec 181 MBytes 84.2 Mbits/sec
[16] 0.0-10.0 sec 288 MBytes 174 Mbits/sec
[22] 0.0-10.0 sec 281 MBytes 168 Mbits/sec
[12] 0.0-10.0 sec 213 MBytes 178 Mbits/sec
[19] 0.0-10.0 sec 199 MBytes 167 Mbits/sec
[15] 0.0-10.0 sec 676 MBytes 565 Mbits/sec
[ 4] 0.0-10.0 sec 208 MBytes 168 Mbits/sec
[13] 0.0-10.0 sec 637 MBytes 528 Mbits/sec
[14] 0.0-10.0 sec 198 MBytes 166 Mbits/sec
[ 7] 0.0-10.0 sec 647 MBytes 558 Mbits/sec
[18] 0.0-10.0 sec 138 MBytes 115 Mbits/sec
[20] 0.0-10.1 sec 647 MBytes 548 Mbits/sec
[20] 0.0-10.2 sec 192 MBytes 158 Mbits/sec
[SUM] 0.0-10.2 sec 5.58 GBytes 4.71 Gbits/sec
venkata@ip-172-31-86-97:~$
```

```
venkata@sh01:~$ iperf -s -p 2001
Server listening on TCP port 2001
TCP window size: 128 KByte (default)
[ 4] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56272
[ 5] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56284
[ 6] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56388
[ 9] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56318
[ 8] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56304
[14] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56378
[13] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56352
[15] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56338
[11] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56328
[18] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56362
[ 7] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56386
[16] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56380
[19] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56356
[20] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56488
[21] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56482
[12] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56438
[23] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56496
[22] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56410
[18] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56426
[26] local 172.31.89.108 port 2001 connected with 172.31.86.97 port 56426
[10] Interval Transfer Bandwidth
[ 9] 0.0-10.0 sec 258 MBytes 213 Mbits/sec
[22] 0.0-10.0 sec 181 MBytes 84.2 Mbits/sec
[ 4] 0.0-10.0 sec 676 MBytes 564 Mbits/sec
[ 5] 0.0-10.0 sec 196 MBytes 164 Mbits/sec
[ 6] 0.0-10.1 sec 195 MBytes 163 Mbits/sec
[ 8] 0.0-10.0 sec 208 MBytes 171 Mbits/sec
[14] 0.0-10.1 sec 213 MBytes 178 Mbits/sec
[13] 0.0-10.1 sec 201 MBytes 168 Mbits/sec
[15] 0.0-10.0 sec 197 MBytes 164 Mbits/sec
[11] 0.0-10.0 sec 196 MBytes 165 Mbits/sec
[ 7] 0.0-10.1 sec 288 MBytes 167 Mbits/sec
[18] 0.0-10.0 sec 138 MBytes 115 Mbits/sec
[21] 0.0-10.0 sec 199 MBytes 166 Mbits/sec
[10] 0.0-10.0 sec 201 MBytes 168 Mbits/sec
[19] 0.0-10.1 sec 637 MBytes 527 Mbits/sec
[16] 0.0-10.1 sec 208 MBytes 173 Mbits/sec
[19] 0.0-10.1 sec 647 MBytes 539 Mbits/sec
[27] 0.0-10.1 sec 647 MBytes 556 Mbits/sec
[23] 0.0-10.1 sec 198 MBytes 165 Mbits/sec
[26] 0.0-10.2 sec 192 MBytes 158 Mbits/sec
[SUM] 0.0-10.2 sec 6.58 GBytes 4.71 Gbits/sec
```

IPERF (UDP)

Default Settings:

Commands

Shared Server(server): iperf -s -u

Team green EC2 instance(client): iperf -c 172.31.89.108 -u

```
venkata@ip-172-31-86-97: ~ -- ssh venkata@ec2-18-208-128-207.compute-1.a...
venkata@ip-172-31-86-97:~$ iperf -c 172.31.89.108 -u
Client connecting to 172.31.89.108, UDP port 5001
Sending 1470 byte datagrams, IPG target: 11215.21 us (kcalman adjust)
UDP buffer size: 288 KByte (default)
[ 3] local 172.31.86.97 port 33176 connected with 172.31.89.108 port 5001
[10] Interval Transfer Bandwidth
[ 3] 0.0-10.0 sec 1.25 MBytes 1.05 Mbits/sec
[ 3] Sent 892 datagrams
[ 3] Server Report:
[ 3] 0.0-10.0 sec 1.25 MBytes 1.05 Mbits/sec 0.820 ms 0/ 892 (0%)
venkata@ip-172-31-86-97:~$
```

```
venkata@sh01:~$ iperf -s -u
Server listening on UDP port 5001
Receiving 1470 byte datagrams
UDP buffer size: 288 KByte (default)
[ 3] local 172.31.89.108 port 5001 connected with 172.31.86.97 port 33176
[10] Interval Transfer Bandwidth Jitter Lost/Total Datagrams
[ 3] 0.0-10.0 sec 1.25 MBytes 1.05 Mbits/sec 0.822 ms 0/ 892 (0%)
```

Varying different Settings:

Commands

Shared Server(server): iperf -s -u

Team green EC2 instance(client): iperf -c 172.31.89.108 -u -P 2 -t 12 -i 3 -b 1000m

```
venkata@ip-172-31-86-97:~$ ssh venkata@ec2-18-208-128-207.compute-1.a...
venkata@ip-172-31-86-97:~$ iperf -c 172.31.89.108 -u -P 2 -t 12 -i 3 -b 1000m
Client connecting to 172.31.89.108, UDP port 5801
Sending 1470 byte datagrams, 190 trials, 11.76 us (kalman adjust)
UDP buffer size: 288 KByte (default)

[ 4] local 172.31.86.97 port 37996 connected with 172.31.89.108 port 5801
[ 3] local 172.31.86.97 port 57551 connected with 172.31.89.108 port 5801
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.0-3.0 sec    358 MBytes 1000 Mbits/sec
[ 3] 0.0-3.0 sec    358 MBytes 1000 Mbits/sec
[SUM] 0.0-3.0 sec    715 MBytes 2.00 Gbits/sec
[ 4] 3.0-6.0 sec    358 MBytes 1000 Mbits/sec
[ 3] 3.0-6.0 sec    358 MBytes 1.00 Gbits/sec
[SUM] 3.0-6.0 sec    715 MBytes 2.00 Gbits/sec
[ 4] 6.0-9.0 sec    358 MBytes 1000 Mbits/sec
[ 3] 6.0-9.0 sec    358 MBytes 1000 Mbits/sec
[SUM] 6.0-9.0 sec    715 MBytes 2.00 Gbits/sec
[ 4] 9.0-12.0 sec    358 MBytes 1000 Mbits/sec
[ 3] 9.0-12.0 sec    358 MBytes 1000 Mbits/sec
[SUM] 9.0-12.0 sec    715 MBytes 2.00 Gbits/sec
[ 4] 0.0-12.0 sec    1.48 GBytes 1000 Mbits/sec
[ 3] 0.0-12.0 sec    1.48 GBytes 1000 Mbits/sec
[SUM] 0.0-12.0 sec    2.97 GBytes 2.00 Gbits/sec
[SUM] Sent 2848818 datagrams
[ 3] Server Report:
[ 3] 0.0-12.0 sec    1.35 GBytes 968 Mbits/sec 0.811 ms 32718/1828409 (3.2%)
[ 4] Server Report:
[ 4] 0.0-12.0 sec    1.35 GBytes 969 Mbits/sec 0.813 ms 31531/1828409 (3.1%)
[ 4] 0.0000-11.9994 sec 22 datagrams received out-of-order
venkata@ip-172-31-86-97:~$

venkata@sh01:~$ ssh venkata@ec2-3-215-202-17.compute-1.amazonaws.com -- 130x63
venkata@sh01:~$ iperf -s -u
Server listening on UDP port 5801
Receiving 1470 byte datagrams
UDP buffer size: 288 KByte (default)

[ 3] local 172.31.89.108 port 5801 connected with 172.31.86.97 port 37996
[ 4] local 172.31.89.108 port 5801 connected with 172.31.86.97 port 57551
[ ID] Interval      Transfer    Bandwidth    Jitter    Lost/Total Datagrams
[ 3] 0.0-12.0 sec    1.35 GBytes 969 Mbits/sec 0.014 ms 31531/1828409 (3.1%)
[ 3] 0.0000-11.9994 sec 22 datagrams received out-of-order
[ 4] 0.0-12.0 sec    1.35 GBytes 968 Mbits/sec 0.011 ms 32718/1828409 (3.2%)
[ 4] 0.0-12.0 sec    2.71 GBytes 1.94 Gbits/sec 0.014 ms 64241/2848818 (3.1%)
[SUM] 0.0000-11.9994 sec 22 datagrams received out-of-order
[ ]
```

Conclusion:

The network connectivity is efficient and reliable, based on the iperf results from the network performance test between the class-shared server and the team's EC2 instance. During the trial, the average bandwidth achieved was consistent and within the expected range for the t3.medium instance type.

Using a reserved IP address also ensured a stable connection and allowed simple communication between the shared server and the team's instance. Overall, the EC2 instance deployment was successful, and the network performance test confirmed that the configuration met the desired specifications.