

AWS Application Migration Service:

Move and improve your on-premises and cloud-based applications

Use Case

You are running workloads/servers on your On-Prem Data Center or Any Other popular cloud and you are looking for a solution, that can help you to migrate them to AWS Cloud.

Well For that AWS Application Migration Service is a perfect solution but before that let's understand the concept of Cloud Migration.

What is Cloud Migration?

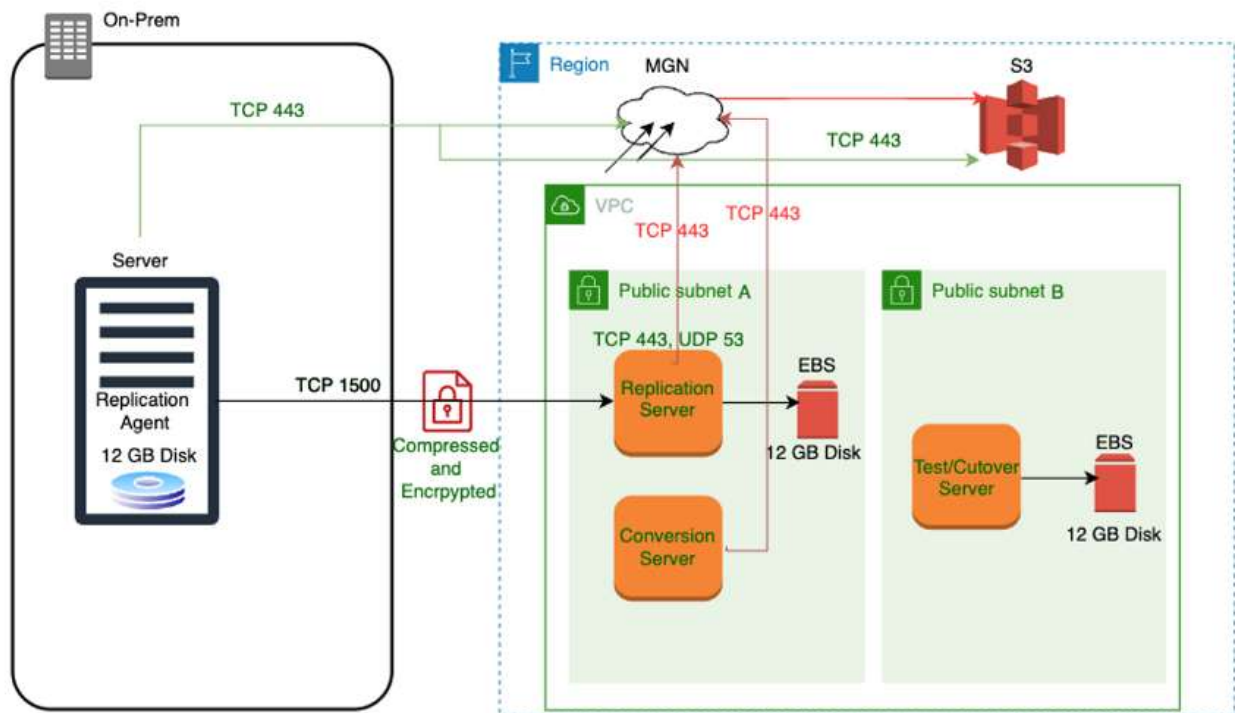
Cloud migration is the process of moving a company's data, servers, applications, databases, and workloads to a cloud provider's platform. Migration can be from on-prem to the cloud or from one cloud provider to another cloud provider.

Advantages of Cloud Migration?

Although the cloud has many advantages, I have listed the main ones below.

- Scalability,
- Cost-effectiveness,
- Disaster Recovery,
- Flexibility,
- Security,
- Maintenance,
- Speed and Agility,
- Reliability.

- **AWS Application Migration Service**
- AWS Application Migration Service is the primary migration service recommended for lift-and-shift (rehost) migrations to AWS. You can use AWS MGN to migrate all your applications and databases that run on supported versions of Windows and Linux os.



AWS Application Migration Service Flow

1. Install the AWS Replication Agent on the source server.
2. Wait until Initial Sync is finished.
3. Launch Test instances.
4. Perform acceptance tests on the servers. After the Test instance is tested successfully, finalize the Test and delete the Test instance.
5. Wait for the Cutover window.
6. Confirm that there is no Lag.
7. Stop all operational services on the source server.
8. Launch a Cutover instance.
9. Confirm that the Cutover instance was launched successfully and then finalize the Cutover.

10. Archive the source server.

Environment Details For This Walkthrough

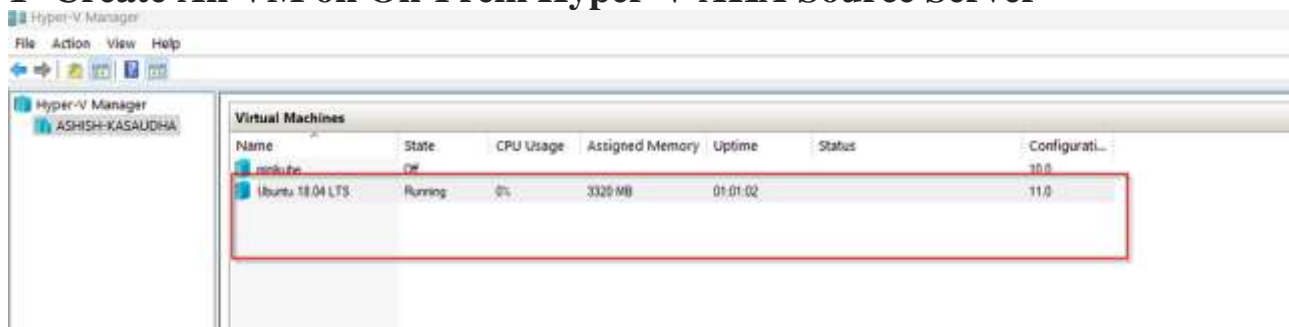
- 1- We are running an ubuntu 18.04 based VM over Microsoft Hyper V.
- 2- We are having around 12 gb data into that VM.
- 3- We have to migrate this VM to AWS cloud with Validation and Testing.

Pre-requisites

- 1- A Set Of IAM Keys, which can be used for Agent initialization.
 - Create an IAM user with credentials, along with the required permission. You can refer to the following link for this.

Let's Get Started

1- Create An VM on On-Prem Hyper-V AKA Source Server



2- Create Files for Migration validation

You can create files, As per your use case.

```
$ head -c 5MB /dev/zero > ostechnix.txt
$ head -c 2048MB /dev/zero > migration.txt

$ head -c 500MB /dev/zero > mgn.txt
```

```
ashishk@Ashishk-On-Prem:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            933M   0    933M   0% /dev
tmpfs           192M  1.4M  191M   1% /run
/dev/sda1       12G   8.1G   3.5G  71% /
tmpfs           959M   0    959M   0% /dev/shm
tmpfs           5.0M   0    5.0M   0% /run/lock
tmpfs           959M   0    959M   0% /sys/fs/cgroup
/dev/loop2      255M  255M   0 100% /snap/gnome-3-38-2004/106
/dev/loop0      219M  219M   0 100% /snap/gnome-3-34-1804/77
/dev/loop3      128K  128K   0 100% /snap/bare/5
/dev/loop4      640K  640K   0 100% /snap/gnome-logs/112
/dev/loop1      114M  114M   0 100% /snap/core/13308
/dev/loop5       62M   62M   0 100% /snap/core20/1518
/dev/loop6      768K  768K   0 100% /snap/gnome-characters/741
/dev/loop7       82M   82M   0 100% /snap/gtk-common-themes/1534
/dev/loop8      2.7M  2.7M   0 100% /snap/gnome-calculator/920
/dev/loop9       56M   56M   0 100% /snap/core18/2409
/dev/loop10     2.7M  2.7M   0 100% /snap/gnome-system-monitor/174
/dev/sda15      105M  4.4M  100M   5% /boot/efi
tmpfs           192M  16K  192M   1% /run/user/121
tmpfs           192M  32K  192M   1% /run/user/1000
ashishk@Ashishk-On-Prem:~$ ls -l | wc -l
20
ashishk@Ashishk-On-Prem:~$
```

Disk Space On Server Before MGN Agent Initialization

3- Adjust Application Migration Service Settings

You can customize settings for Application Migration Service as per your use case.

For Our Use case, We have adjusted the following configuration.

Subnet ID

Security Group

Install SSM Agent In Post launch Action

Ec2-launch template for MGN

Default EC2 Launch Template [Info](#)

Configure the default settings that will be applied to the EC2 launch template of every target server.

Default target subnet

This is the target subnet to be associated with any instance launched by this service.

Aws-Devops-subnet-public1-us-east-1a
vpc-05b591cae1a280a98

Additional security groups

These are the security groups to associate with all instances launched by this service.

Select additional security groups

ssh-access
sg-09f022dee857f9b05

Default instance type

This is the default instance type to be used for all instances launched by this service.

Choose an instance type

EBS volume type

This is the default volume type used for EBS volumes. You can overwrite this value for small volumes, using API.

General Purpose SSD (gp3)

IOPS

General Purpose SSD (gp3) volumes support a baseline of 3,000 IOPS. Additionally, you can provision up to 500 IOPS per GiB up to a maximum of 16,000 IOPS.

3000

Min: 3000 IOPS, max: 16,000 IOPS (up to 500 IOPS per GiB).

Throughput

General Purpose SSD (gp3) volumes have a baseline performance of 125 MiB/s. You can provision additional throughput of 0.25 MiB/s per provisioned IOPS up to a maximum of 1,000 MiB/s (at 4,000 IOPS or higher).

125

Min: 125 MiB/s, max: 1000 MiB/s.

MAP program tagging [Info](#)

Configure MAP resource tags to be applied to all instances launched by this service.

▼ Instance type [Info](#)

Simple

☒ Manually select instance type

Select an instance type that meets your computing, memory, networking, or storage needs.

☐ Specify instance type attributes

Specify instance attributes that match your compute requirements.

Instance type

Don't include in launch template

[Compare instance types](#)

▼ Key pair (login) [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name

ashishk

[Create new key pair](#)

▼ Network settings [Info](#)

Subnet [Info](#)

subnet-0609ea9601a72af88 Aws-Devops-subnet-public1-us-east-1a
VPC: vpc-05b591cae1a280a98 Owner: 225449093466
Availability Zone: us-east-1a IP addresses available: 4091 CIDR: 10.0.0.0/20

[Create new subnet](#)

When you specify a subnet, a network interface is automatically added to your template.

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Select existing security group

☐ Create security group

Common security groups [Info](#)

Select security groups

ssh-access sg-09f022dee857f9b05 ✕
VPC: vpc-05b591cae1a280a98

[Compare security group rules](#)

Security groups that you add or remove here will be added to or removed from all your network interfaces.

[► Advanced network configuration](#)

▼ Summary

Software Image (AMI)

Virtual server type (instance type)

Firewall (security group)

ssh-access

Storage (volumes)

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

[Cancel](#)

[Create template version](#)

Application Migration Service > Post-launch template > Edit post-launch settings

Post-launch template [Info](#)

Configure actions to be executed on every server, upon server launch

Post-launch actions [Info](#)

MGN can execute actions on your servers, after they are launched, using Systems Manager. MGN will install the SSM agent, and execute the actions you select.

☒ Install the Systems Manager agent and allow executing actions on launched servers

i By continuing, you are allowing AWS Application Migration Service to install the SSM agent and create the IAM roles required to execute automation on launched servers.

Deployment [Info](#)

Choose whether to execute the post-launch actions on your cutover instances only, or on both your cutover and test instances.

☒ **Test and cutover instances (recommended)**

All post-launch actions will be executed on test and cutover instances.

☐ **Cutover instances only**

All post-launch actions will only be executed on the cutover instances.

☐ **Test instances only**

All post-launch actions will only be executed on the test instances.

Disaster recovery [Info](#)

Configure disaster recovery using the AWS Elastic Disaster Recovery Service. Charges are applied based on usage.

☐ **Configure disaster recovery on migrated servers**

Install the AWS Elastic Disaster Recovery Service agent on each of the launched servers, and configure replication to the target region.

Target disaster recovery region

Select the region the recovery instances will be deployed in. AWS Elastic Disaster Recovery service must be available in the selected region, and set up for your account in that region.

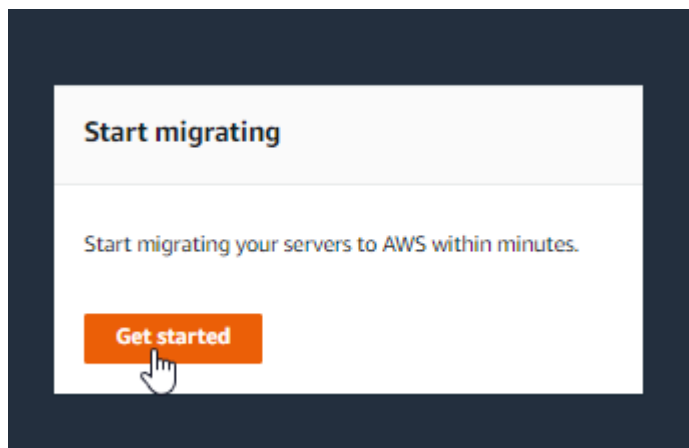
Europe (Ireland) ▼

4- Generate IAM Keys

You can refer to Section 3 in the Pre-requisites section for steps.

5- Configure MGN for Agent Installation

- Click on Get Started



- Provide all the details required for AWS Replication Agent installation and copy both commands.

Add servers

To add your source servers to this console, you need to install the AWS Replication Agent on them. Use the options below to construct the installation command, then copy the command and download the installer. [Learn more](#)

Agentless replication is available. [Learn more](#)

AWS Replication Agent installation

- Select your operating system
 - ☒ Linux
 - ☐ Windows
 - Legacy OS: Windows Server 2003 or Windows Server 2008
- Select your replication preferences [Info](#)

Choose which disks to replicate

You will be prompted to select disks during agent installation
- IAM access key ID [Info](#)

AKIAT17OQFFNMBZB5SUL

Create IAM user

IAM secret access key

This form does not send the secret – it only adds it to the installation command you can copy

.....

Show

✓ Command copied
- Download the installer using this command:

us-east-1.amazonaws.com/latest/linux/aws-replication-installer-init.py

If you need to validate the installer hash, the correct hash can be found here:
<https://aws-application-migration-service-hashtes-us-east-1.s3.us-east-1.amazonaws.com/latest/linux/aws-replication-installer-init.py.sha512>
- Copy and input the command below into the command line on your source server:

sudo python3 aws-replication-installer-init.py --region us-east-1 --s

Copy

Back

6- Download Replication Agent on the source server

```
ashishk@Ashishk-On-Prem:~$ wget -O ./aws-replication-installer-init.py https://aws-application-migration-service-us-east-1.s3.us-east-1.amazonaws.com/latest/linux/aws-replication-installer-init.py
--2023-01-19 19:31:12-- https://aws-application-migration-service-us-east-1.s3.us-east-1.amazonaws.com/latest/linux/aws-replication-installer-init.py
Resolving aws-application-migration-service-us-east-1.s3.us-east-1.amazonaws.com (aws-application-migration-service-us-east-1.s3.us-east-1.amazonaws.com)... 52.216.216.18, 52.219.136.34, 52.219.82.232, ...
Connecting to aws-application-migration-service-us-east-1.s3.us-east-1.amazonaws.com (aws-application-migration-service-us-east-1.s3.us-east-1.amazonaws.com)|52.216.216.18|:443... connect
ed.
HTTP request sent, awaiting response... 200 OK
Length: 25289 (25K) [binary/octet-stream]
Saving to: './aws-replication-installer-init.py'

./aws-replication-installer-init.py 100%[=====] 24,704 41.8KB/s in 0.6s

2023-01-19 19:31:14 (41.8 KB/s) = './aws-replication-installer-init.py' saved [25289/25289]
```

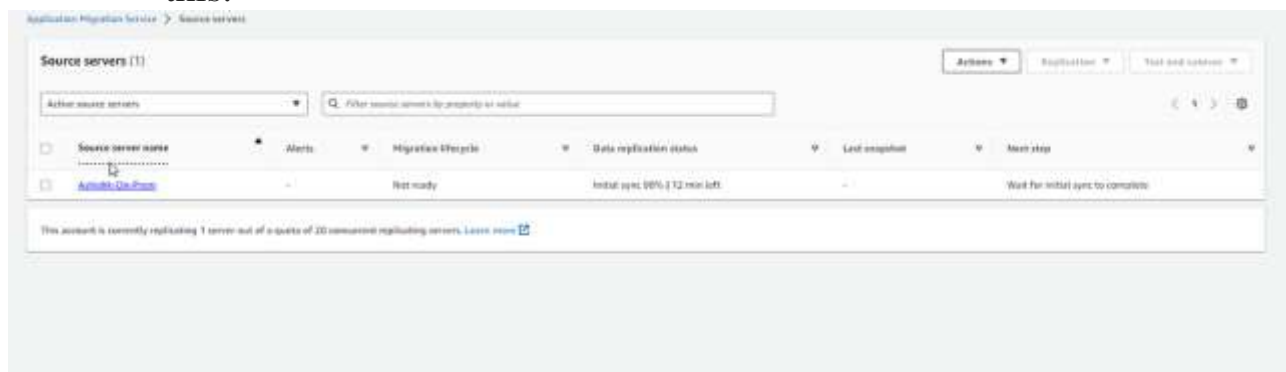
7- Initialized Replication Agent on On-Prem Instance.

You can refer to Section 4 in the Pre-requisites section for command.

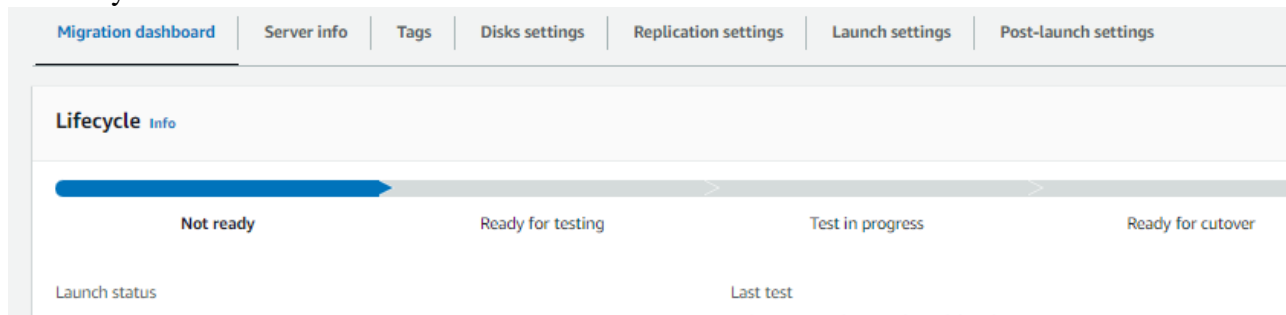
```
ashishk@Ashishk-On-Prem:~$ sudo python3 aws-replication-installer-init.py --region us-east-1 --aws-access-key-id [redacted]
--aws-secret-access-key [redacted] --no-prompt
[sudo] password for ashishk:
The installation of the AWS Replication Agent has started.
Identifying volumes for replication.
Identified volume for replication: /dev/sda of size 12 GiB
All volumes for replication were successfully identified.
Downloading the AWS Replication Agent onto the source server... Finished.
Installing the AWS Replication Agent onto the source server... Finished.
Syncing the source server with the Application Migration Service Console... Finished.
The following is the source server ID: s-3b8a7b6ee0e22d0bf.
You now have 1 active source server out of a total quota of 20.
Learn more about increasing source servers limit at https://docs.aws.amazon.com/mgn/latest/ug/MGN-service-limits.html
The AWS Replication Agent was successfully installed.
ashishk@Ashishk-On-Prem:~$
```

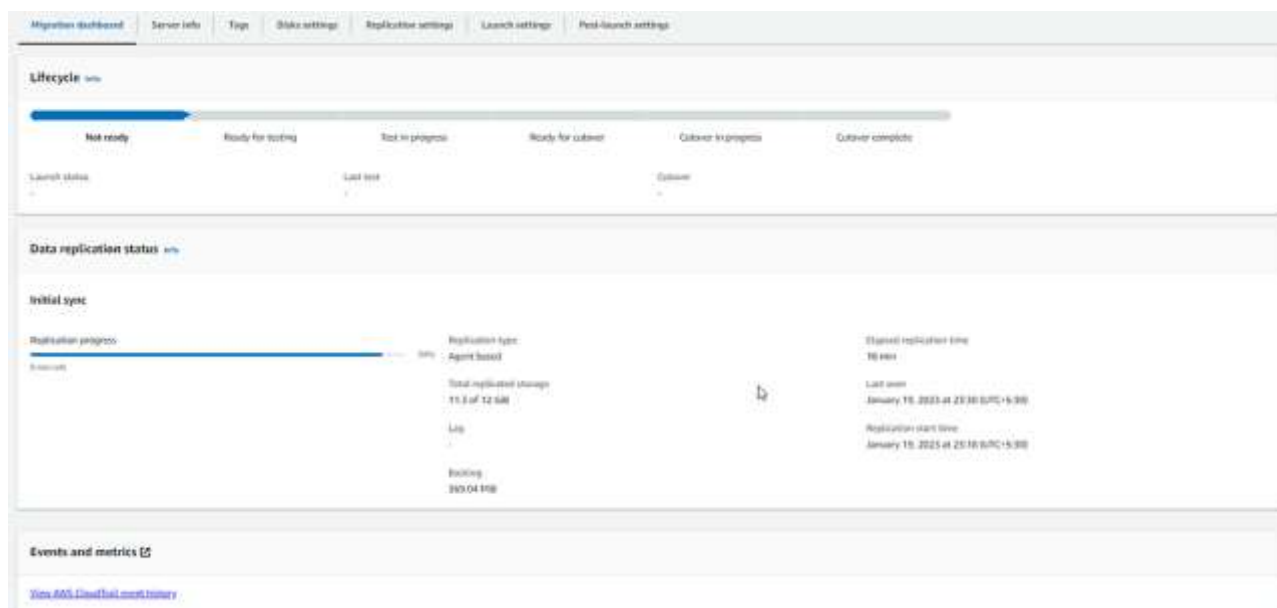
8- Status of Initialization of MGN Console

- Click on Source Server and you will have your server status similar to this.

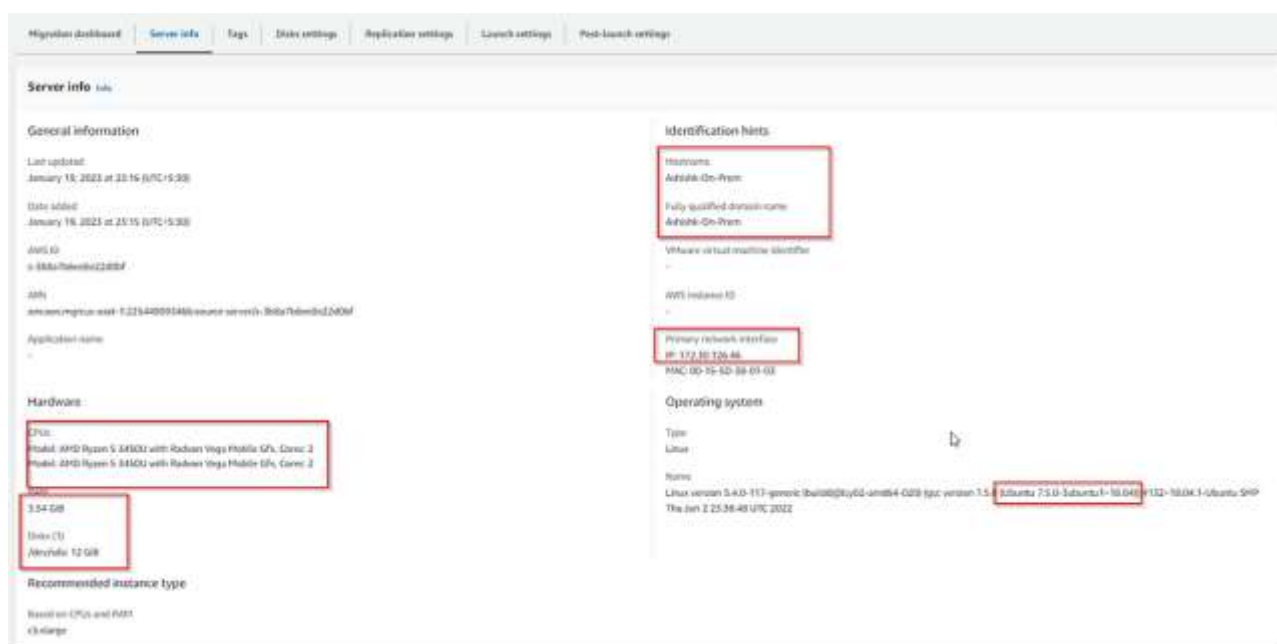


Initial Sync Details



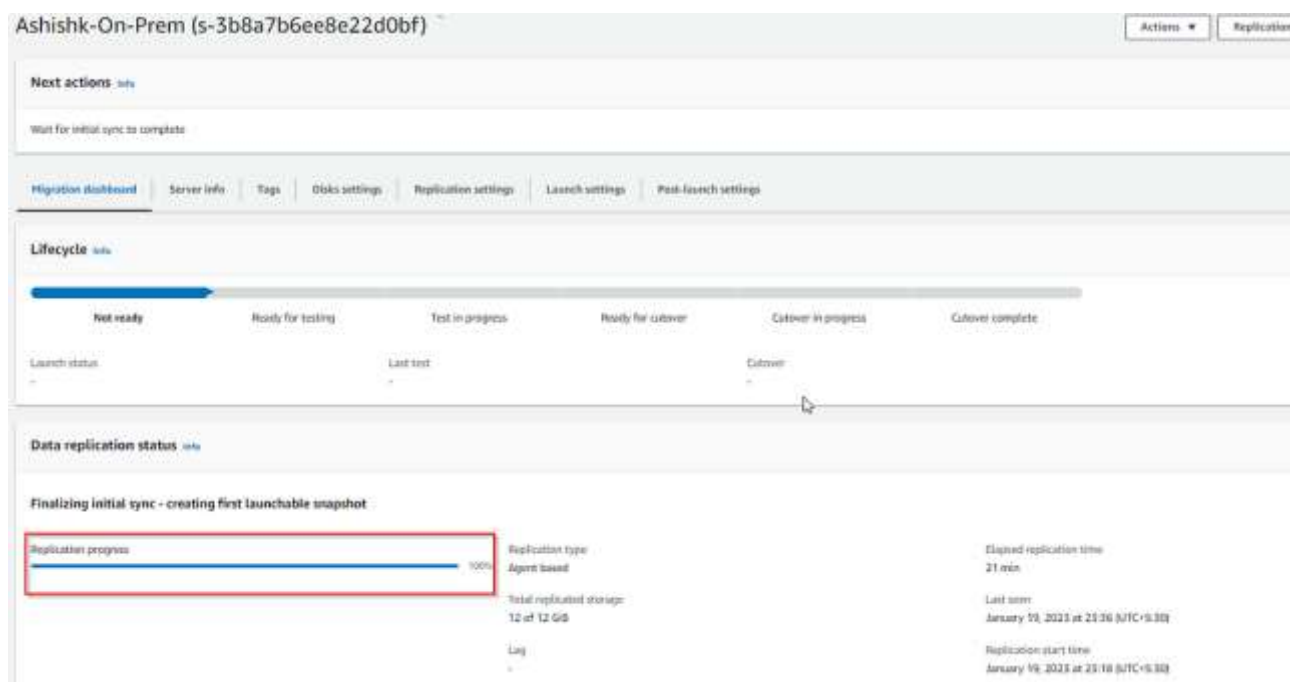


Replication Progress



Server Info

- Wait for Replication Progress to be caught with 100%.



- Once your replication progress is completed, then you will see a replication server running on EC2. This is the main instance for replication, throughout this entire migration.

The screenshot shows the AWS Management Console instance list. A search filter "instance state = running" is applied. The table below lists the instances:

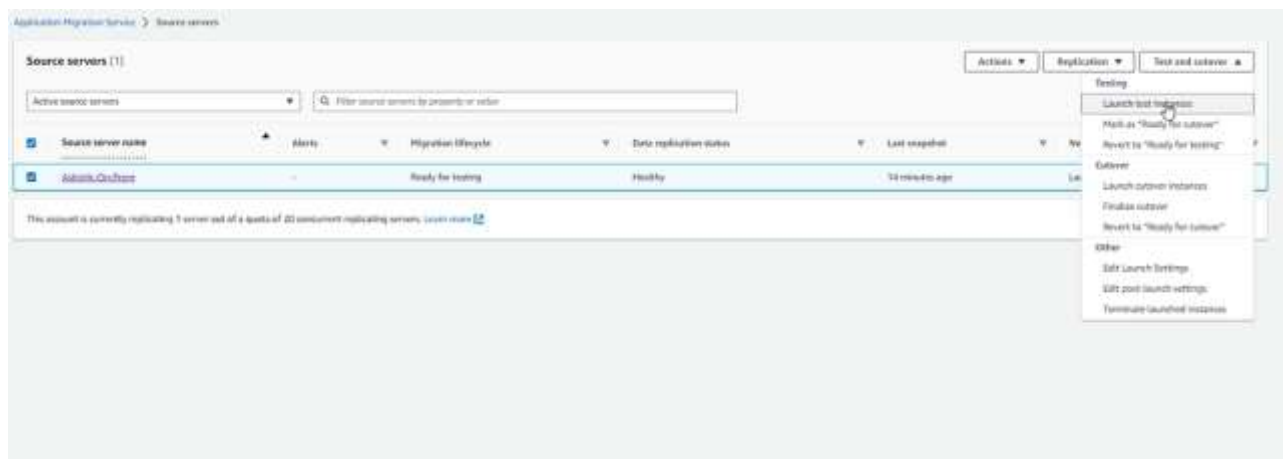
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
AWS Application Migration Service Replication Server	i-09570568495fd5c3b	Running	t3.small	2/2 checks passed	No alarms	us-east-1b

Note: Select the size of replication instance as per your migration capacity. Having a wrong size of replication instance, potentially delay to replication time or it could cause you enormous billing.

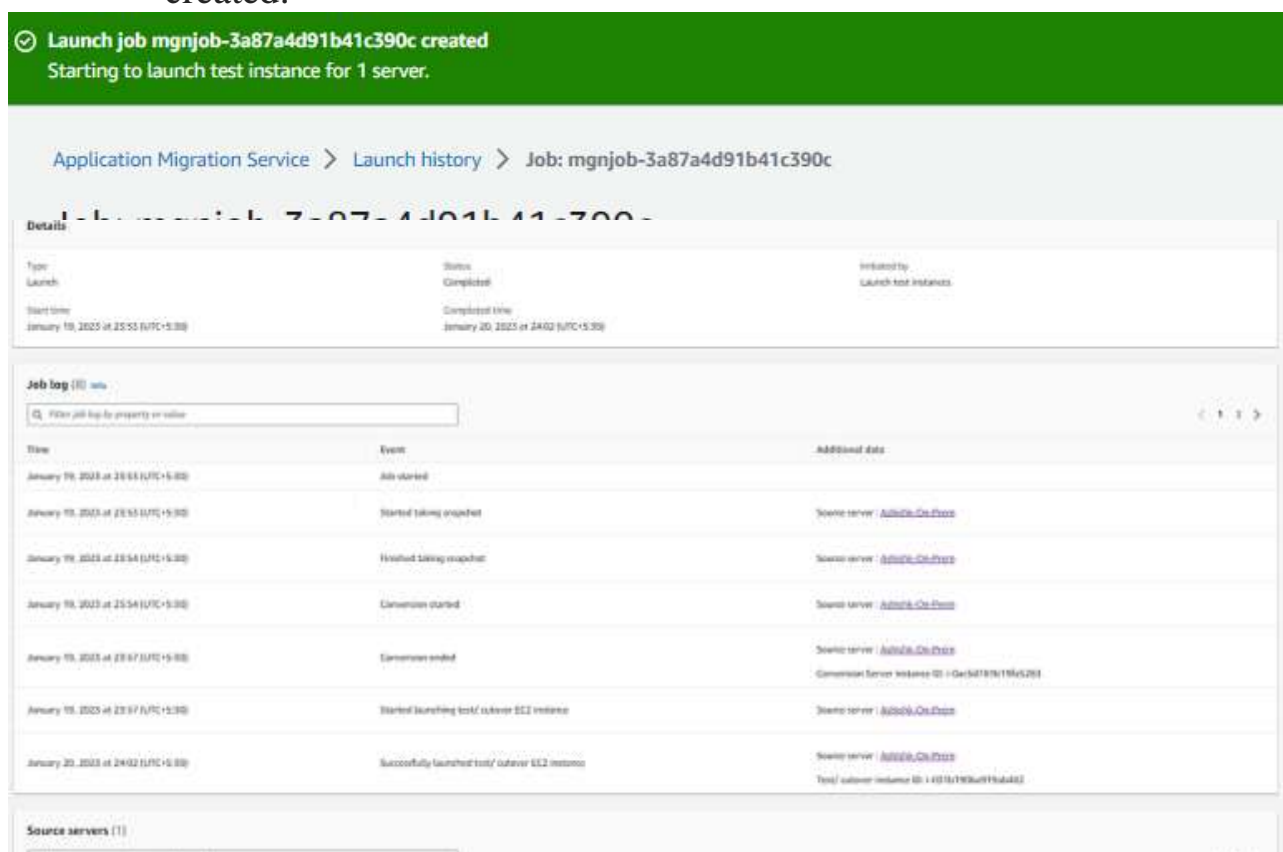
9- Launch Test Instance and Validation

As our replication progress has been completed, now its time to launch test instance.

- Click on Launch test instance.



- After Completing the step mentioned above, a launch job will gets created.



- After completion, you can see an ec2 instance running which is an MGN test instance for validation. You can log in to the instance by using aws native method or ssh

```
File Edit View Search Terminal Help
ashish@ashishh-On-Prem:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            933M   0 933M   0% /dev
tmpfs           192M   0 192M   0% /run
/dev/sda1       12G   8.1G 3.5G  71% /
tmpfs           959M   0 959M   0% /dev/shm
tmpfs           5.0M   0 5.0M   0% /run/lock
tmpfs           959M   0 959M   0% /sys/fs/cgroup
/dev/loop2     255M  255M   0 100% /snap/gnome-3-38-2004/106
/dev/loop0     219M  219M   0 100% /snap/gnome-3-34-1804/77
/dev/loop3     128K  128K   0 100% /snap/bare/5
/dev/loop4     640K  640K   0 100% /snap/gnome-logs/112
/dev/loop1     114M  114M   0 100% /snap/core/13308
/dev/loop5      62M   62M   0 100% /snap/core20/1518
/dev/loop6     768K  768K   0 100% /snap/gnome-characters/741
/dev/loop7      82M   82M   0 100% /snap/gtk-common-themes/1534
/dev/loop8      2.7M   2.7M   0 100% /snap/gnome-calculator/920
/dev/loop9      56M   56M   0 100% /snap/core18/2409
/dev/loop10     2.7M   2.7M   0 100% /snap/gnome-system-monitor/174
/dev/sda15     105M  4.4M 100M   5% /boot/efi
tmpfs          192M  16K 192M   1% /run/user/121
tmpfs          192M  32K 192M   1% /run/user/1000
ashish@ashishh-On-Prem:~$ ls -l | wc -l
20
ashish@ashishh-On-Prem:~$
```

```
ashish@ashishh-On-Prem:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            3.7G   0 3.7G   0% /dev
tmpfs           761M  1.1M 760M   1% /run
/dev/nvme0n1p1  12G   8.0G 3.5G  70% /
tmpfs           3.8G   0 3.8G   0% /dev/shm
tmpfs           5.0M   0 5.0M   0% /run/lock
tmpfs           3.8G   0 3.8G   0% /sys/fs/cgroup
/dev/loop4     219M  219M   0 100% /snap/gnome-3-34-1804/77
/dev/loop1      56M   56M   0 100% /snap/core18/2409
/dev/loop6     114M  114M   0 100% /snap/core/13308
/dev/loop0      62M   62M   0 100% /snap/core20/1518
/dev/loop3     768K  768K   0 100% /snap/gnome-characters/741
/dev/loop5     255M  255M   0 100% /snap/gnome-3-38-2004/106
/dev/loop2      2.7M   2.7M   0 100% /snap/gnome-calculator/920
/dev/loop9      2.7M   2.7M   0 100% /snap/gnome-system-monitor/174
/dev/loop7     640K  640K   0 100% /snap/gnome-logs/112
/dev/loop8      82M   82M   0 100% /snap/gtk-common-themes/1534
/dev/loop10     128K  128K   0 100% /snap/bare/5
/dev/nvme0n1p5  105M  4.4M 100M   5% /boot/efi
tmpfs          761M  16K 761M   1% /run/user/121
$ ls -l | wc -l
20
$
```

As you can see, All the major partitions size is similar between On-Prem and AWS along with file count. With this, Our migration testing has been completed and we can move to the next phase.

Actions ▼

Replication ▼

Test and cutover ▲

Testing

Launch test instances

Mark as "Ready for cutover"

Revert to "Ready for testing"

Cutover

Launch cutover instances

Finalize cutover

Revert to "Ready for cutover"

Other

Edit Launch Settings

Edit post-launch settings

Terminate launched instances

delete

Services marked as ready for cutover

1 server marked as ready for cutover

Starting to terminate launched instance for 1 server

View job details

10- Launch Cutover Instance and Finalize Cutover

- As our testing phase has been completed, Now we have moved to Cutover stage. Click on cutover instances and wait for the initiated job to get complete.

The screenshot displays the AWS Application Migration Service console for the 'Ashishk-On-Prem' source server. The 'Lifecycle' section shows a progress bar with stages: Not ready, Ready for testing, Test in progress, **Ready for cutover**, Cutover in progress, and Cutover complete. The 'Ready for cutover' stage is currently active. A dropdown menu is open, showing options like 'Launch cutover instances', 'Finalize cutover', and 'Revert to "Ready for testing"'. A confirmation dialog box is overlaid on the screen, titled 'Launch cutover instance for 1 server'. The dialog contains the following text: 'You are about to launch EC2 instance for 1 server. These instances will be launched according to the Launch Settings you have configured for them. Launched instances accrue EC2 charges as per your AWS account's rates. [Learn more](#)'. Below this, it states 'The action will be applied to the following servers' and lists 'Ashishk-On-Prem'. At the bottom of the dialog are 'Cancel' and 'Launch' buttons.

Application Migration Service > Source servers > Ashishk-On-Prem

Ashishk-On-Prem (s-3b8a7b6ee8e22d0bf)

Next actions [info](#)

Launch cutover instance

Migration dashboard | Server info | Tags | Bids settings | Application settings | Launch settings | Post-launch settings

Lifecycle [info](#)

Not ready | Ready for testing | Test in progress | **Ready for cutover** | Cutover in progress | Cutover complete

Launch status: Last hour: [View logs](#) Cutover

Actions | Replication | Test and cutover

Testing

- Launch test instances
- Mark as "Ready for cutover"
- Revert to "Ready for testing"

Cutover

- Launch cutover instances**
- Finalize cutover
- Revert to "Ready for cutover"

Other

- Edit Launch Settings
- Edit post-launch settings
- Terminate launched instances

Launch cutover instance for 1 server

You are about to launch EC2 instance for 1 server.

These instances will be launched according to the Launch Settings you have configured for them. Launched instances accrue EC2 charges as per your AWS account's rates. [Learn more](#)

▼ The action will be applied to the following servers

Ashishk-On-Prem

Cancel Launch

🟢 Launch job mgnjob-396bf07a4b47df706 created
Starting to launch cutover instance for 1 server.

Application Migration Service > Source servers > Ashishk-On-Prem

Ashishk-On-Prem (s-3b8a7b6ee8e22d0bf)

Next actions Info

Finalize cutover

Migration dashboard | Server info | Tags | Disks settings | Replication settings | Launch settings | Post-launch settings

Lifecycle Info

Not ready | Ready for testing | Test in progress | Ready for cutover | **Cutover in progress** | Cutover complete

Launch status: ⏸️ Waiting

Last test
Job ID: [mgnjob-3b33a824115929a0](#)
Started: January 20, 2023 at 09:42 (UTC+5:30)

Cutover
Job ID: [mgnjob-396bf07a4b47df706](#)
Started: January 20, 2023 at 10:12 (UTC+5:30)

Type Launch	Status Completed	Initiated by Launch cutover instances
Start time January 20, 2023 at 10:12 (UTC+5:30)	Completed time January 20, 2023 at 10:21 (UTC+5:30)	

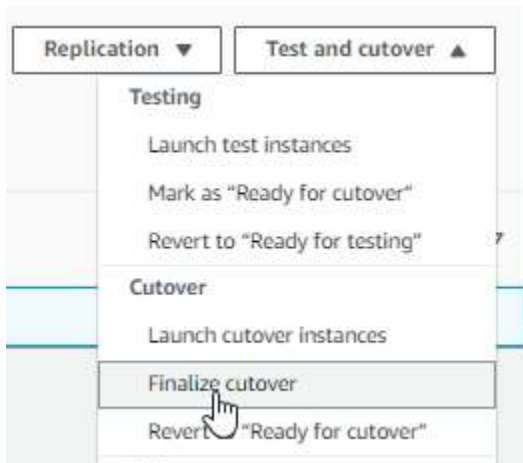
Job log (5) Info

🔍 Filter job log by property or value

Time	Event	Additional data
January 20, 2023 at 10:12 (UTC+5:30)	Job started	
January 20, 2023 at 10:12 (UTC+5:30)	Started taking snapshot	Source server: Ashishk-On-Prem
January 20, 2023 at 10:13 (UTC+5:30)	Finished taking snapshot	Source server: Ashishk-On-Prem
January 20, 2023 at 10:13 (UTC+5:30)	Conversion started	Source server: Ashishk-On-Prem
January 20, 2023 at 10:16 (UTC+5:30)	Conversion ended	Source server: Ashishk-On-Prem Conversion Server Instance ID: i-0321833c3cd521e0
January 20, 2023 at 10:16 (UTC+5:30)	Started launching test/ cutover EC2 instance	Source server: Ashishk-On-Prem
January 20, 2023 at 10:21 (UTC+5:30)	Successfully launched test/ cutover EC2 instance	Source server: Ashishk-On-Prem Test/ cutover instance ID: i-0f4b2516620be5eb

Wait for the cutover instance job to get completed. Now login into the Cutover instance for final validation. Perform your validation and if all looks fine, then move to the next step.

- Click on Finalize Cutover and wait for the job to get completed.



6ee8e22d0bf)

×

Finalize cutover for 1 server

You are about to finalize cutover for 1 server.

This action cannot be reversed. This will cause all replicated data to be discarded, and all AWS resources used for data replication to be terminated. [Learn more](#)

▼ The action will be applied to the following servers

Ashishk-On-Prem

Cancel

Finalize

ng	Test in progress	Ready for cutover	Cutover in progress	Cutover complete
Last test				
Job ID: mggjob-3b33aa824113929a0	Cutover			
Started: January 20, 2023 at 09:42 (UTC+5:30)	Job ID: mggjob-396bf07a4b47df706			
	Started: January 20, 2023 at 10:12 (UTC+5:30)			

🟢 Launch job mgnjob-396b07a4b47d706 created
Starting to launch cutover instance for 1 server.

🟢 Cutover finalized
Cutover finalized for 1 server.

Application Migration Service > Source servers > Ashishk-On-Prem

Ashishk-On-Prem (s-3b8a7b6ee8e22d0bf)

Next actions Info

🟢 Launched
Mark as archived

Migration dashboard | Server info | Tags | Disks settings | Replication settings | Launch settings | Post-launch settings

Lifecycle Info

Not ready → Ready for testing → Test in progress → Ready for cutover → Cutover in progress → Cutover complete

Launch status	Last test	Cutover
Launched First boot: Succeeded View in EC2 console	Job ID: mgnjob-3b55a824113929a0 Started: January 20, 2023 at 09:42 (UTC+5:30)	Job ID: mgnjob-396b07a4b47d706 Started: January 20, 2023 at 10:12 (UTC+5:30) Finalized: January 20, 2023 at 10:27 (UTC+5:30)

Application Migration Service > Source servers

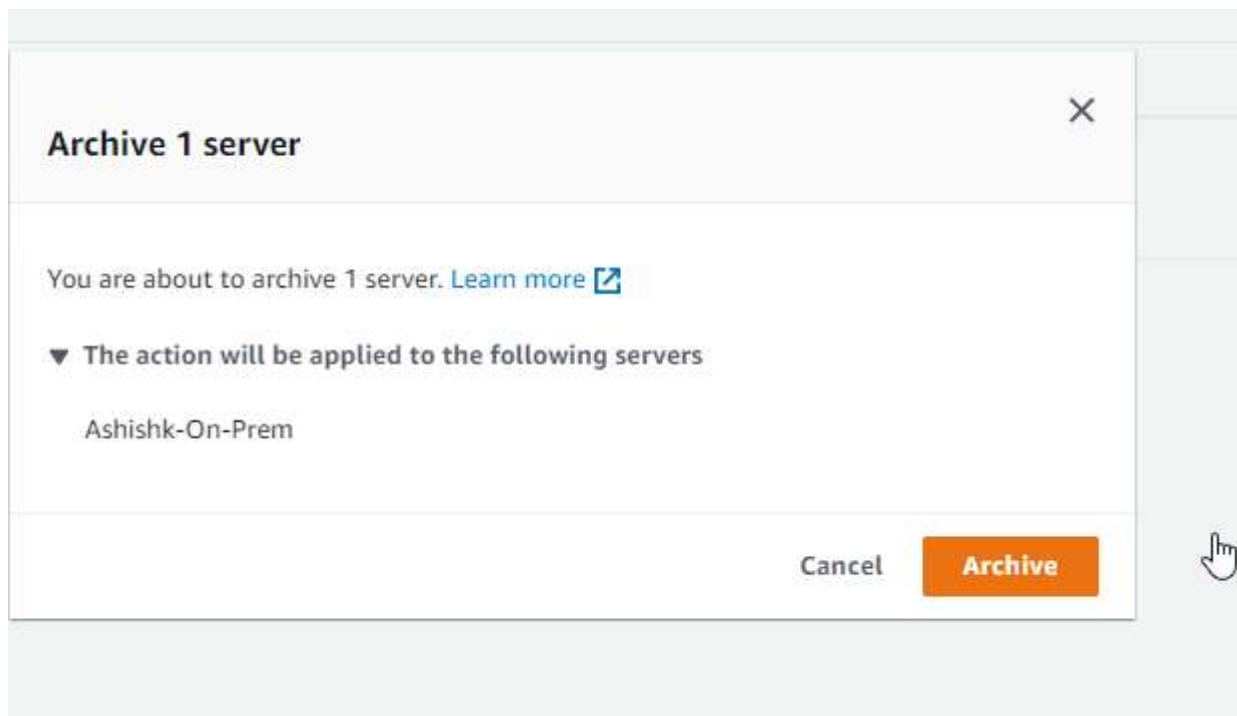
Source servers (1)

Active source servers

Source server name	Alerts	Migration lifecycle	Data replication status	Last snapshot	Next step
Ashishk-On-Prem	🟢 Launched	Cutover complete	Disconnected	-	Mark as archived

11- Archive Source Server

As our migration has been completed, now we can archive our source server. **Once you archive your server, the AWS Replication Instance will also get terminated as the job has been completed.**



Archived source servers (1)

Source server name	Alerts	Migration lifecycle	Data replication status
<input type="checkbox"/> Ashishk-On-Prem	<input checked="" type="checkbox"/> Launched	<input checked="" type="checkbox"/> Cutover complete	<input checked="" type="checkbox"/> Disconnected

- Aws Application Migration Service Creates a Conversation instance at each lifecycle event. The life of these instances depends on data volume, if you see some instances getting launched and terminated quickly then do not panic.



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happy migration