IDFC-DB/DC Migration

PREPARED BY

Sushil Kumar Dubey(2018BtechCSE016)

FACULTY GUIDE

Dr. Suman Saha



Department of Computer Science Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

May 2022

IDFC-DB/DC Migration

Practice School-2

Submitted in partial fulfilment of the requirements

for the degree of

Bachelor of Technology in
Computer Science Engineering

By:
Sushil Kumar Dubey(2018BtechCSE016)

Faculty Guide:
Dr. Suman Saha



Department of Computer Science Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

May 2022

CERTIFICATE

This is to certify that the Practice School-2 project work entitled "**IDFC-DB/DC Migration**" submitted by **Sushil Kumar Dubey(2018BtechCSE016)**, towards the partial fulfilment of the requirements for the degree of **Bachelor of Technology in Computer Science Engineering** of JK Lakshmipat University Jaipur is the record of work carried out by them under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted for Practice School-II examination.

Dr. Suman Saha	Dr. Gireesh Kumar
Supervisor/Guide and Professor/Associate Professor/Assistant Professor/Lecturer,	The Co-Ordinator, Associate Professor
Department of Computer Science Engineering	Department of Computer Science Engineering
Institute of Engineering & Technology (IET)	Institute of Engineering & Technology (IET)
JK Lakshmipat University Jaipur	JK Lakshmipat University Jaipur

Date of Submission _____

Prof. Dr. – Sanjay Goel
Director
Institute of Engineering & Technology
JK Lakshmipat University Jaipur

ACKNOWLEDGEMENTS

Firstly, with much pride and delight I would like to express my sincere thanks to **Mr. Anirudh Manchikanti** my project manager for valuable suggestions throughout the project work and for his excellent guidance and without his sustained interest and encouragement, this work could not have been possible to reach the state of completion with satisfaction.

The project training here at Celebal Technologies Pvt. Ltd. has been very useful and enlightening experience for me. The knowledge I gained here in the field of Migration of databases and datacenters from on-prem to Azure Cloud would greatly help me in future for the organization.

I would like to express my heartfelt gratitude to **Dr.-Sanjay Goel, Director**, Institute of Engineering & Technology for his valuable time and guidance that made the project work a success. I would also like to thank Dr. Suman Saha, Supervisor and Associate Professor, Dept. of Computer Science Engineering, JK Lakshmipat University Jaipur for their valuable time and support in making my PS-II success.

Your sincerely,

Sushil Kumar Dubey(2018btechCse016)

ABSTRACT

As we know we have a lot of data nowadays. In every organization or industry we have data for example manufacturing industry, IT industry. Finance industry etc. And for storing all this data we need many datacenters which is very costly as well as hard to maintain and retrieve the data. So here the concept of migration comes. We can migrate all the databases and datacenters to azure whether it is on-prem or on hyper-visor. Here, in **IDFC-DB/DC Migration** we have done migration of Database as well as datacenters using various tools and azure migrate to migrate all the data on azure. All the databases of IDFC which includes (HRM, Bank details, etc) of all the datacenters are migrated.

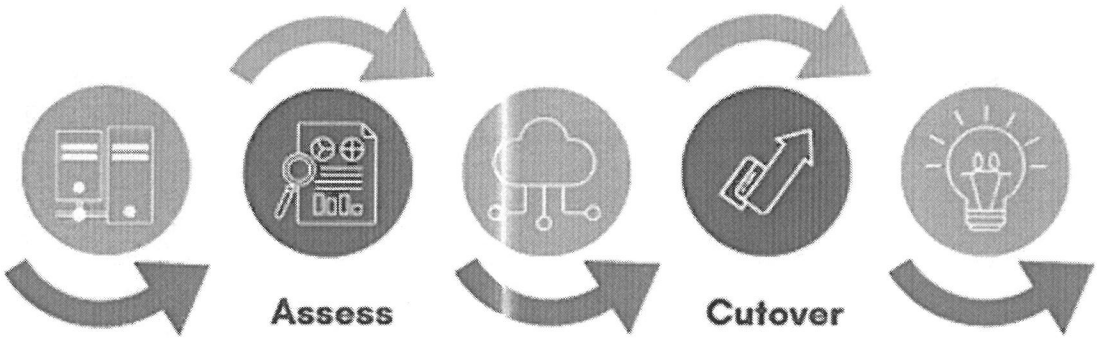


Fig1.

List of Figures

Figure No.	Description
Fig1	Flow of Migration Process.
Fig2	Azure Migrate Flow
Fig3	Company detail
Fig4	Planning Migration
Fig5	Types of Migration
Fig6	Azure Migrate Flow

Contents

Sr. No.	Page Description	Page Number
1	**Personal Details**	**1**
2	**PS-2 Details**	**2**
3	**Certificate**	**3**
4	**Acknowledgement**	**4**
5	**Abstract**	**5**
6	**List of Figure**	**6**
7	**Contents**	**7**
8	**Chapter-1 Introduction**	**8**
	Problem statement, Objective-1,2,3, Methodology-1,2,3	**8-9**
9	**Chapter-2 About the Company**	**10**
10	**Chapter-3 Technology Used**	**11**
11	**Chapter-4 Project Specification**	**12**
12	**Chapter-5 Project Setup Stepwise**	**13**
	Types of Migration, objective setup-1,2,3	**13-84**
13	**Chapter 6- Results**	**85**
	Migration flow, Results of objective-1,2,3	**85-96**
14	**Chapter-7 Summary, Conclusion and Future Scope**	**97-98**
15	**References**	**99**

CHAPTER 1 : INTRODUCTION

1.1 Problem Statement

Most of the companies use various cloud platforms for their use but Celebal uses only Microsoft Azure for their clients. So, in this project we are migrating database and datacentre of bank to the cloud(azure) using azure migrate and other tools.

1.2 Training Objective:

OBJECTIVE 1: To migrate Hyper-V to Azure using Azure Migrate (DC for Windows and Linux both).

OBJECTIVE 2: To migrate Physical Server (on prem) to Azure Using Azure Migrate (DC Migration).

OBJECTIVE 3: Assess and migrate database using Azure migrate (DB Migration) with DMA and DMS.

1.3 Methodology

Methodology Adopted for Objective1:

To migrate Hyper-V, we need to make Hyper-V environment on virtual machine and configure it properly which includes net connectivity in Hyper-V and make switch for connecting to the internet by using PowerShell commands. Then start working on discovery after successful discovery we can move to next step assessment. Always remember after setting up all the environments firstly we must run test migration then main failover otherwise our main migration may get error.

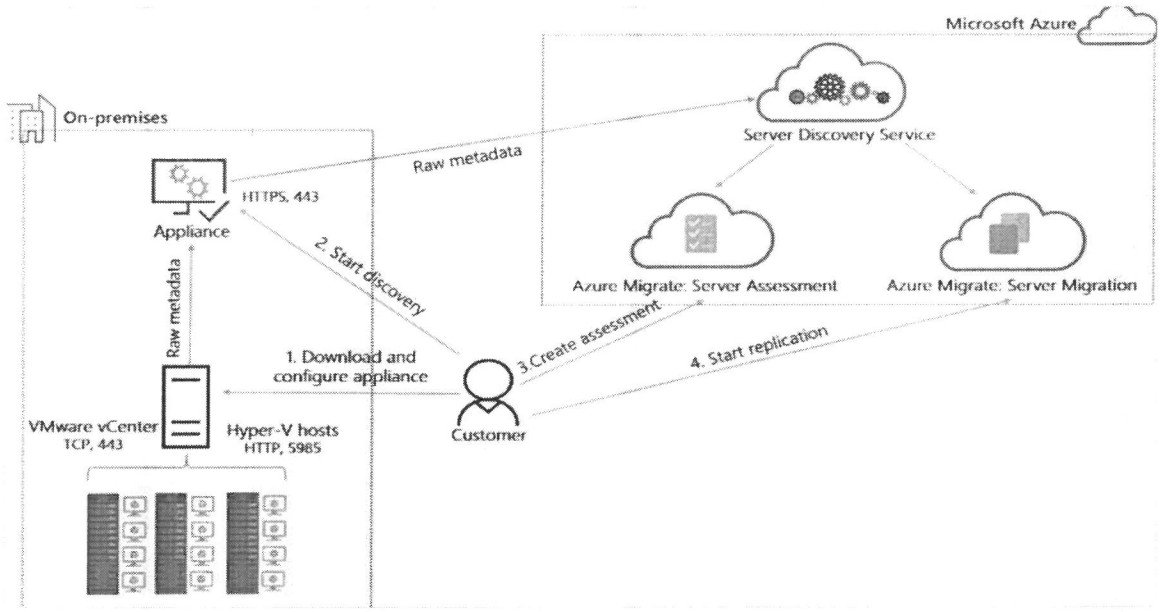


Fig. 2

Methodology Adopted for Objective 2:

Firstly, create a windows virtual machine and then install Hyper-V role in the host VM. After installing Hyper-V, we will be installing windows server 2016 essential VM and make switch using PowerShell and connect to the internet. And then start migration process which we will be seeing in detail below.

Methodology Adopted for Objective 3:

The first assessment for migrating to on-premises SQL Server, SQL Server running on an Azure VM, or Azure SQL Database by using Data Migration Assistant. Data Migration Assistant v5.0 introduces support for analyzing database connectivity and embedded SQL queries in the application code. Applications typically connect and persist data to a database. The data access layer of the application provides simplified access to this data. Data Migration Assistant (DMA) has enabled users to assess their databases and related objects. The latest version of DMA (v5.0) introduces support for analysing database connectivity and embedded SQL queries in the application code.

Methodology Adopted for Objective 4:

Firstly, we will start with assess and evaluate your on-premises database for any blocking issues by using the Data Migration Assistant. And then use the Data Migration Assistant to migrate the database sample schema. After this register the Azure Data Migration resource provider. Then Create an instance of Azure Database Migration Service. Create a migration project by using Azure Database Migration Service. And then run the migration.

CHAPTER 2 : ABOUT THE COMPANY

- Celebal Technologies is a premier software services company in the field of Data Science, Big Data, and Enterprise Cloud. Our solutions are powered by Robotics, Artificial Intelligence, and Machine Learning algorithms which offer improved business efficiency in this interconnected world.
- Our talented team of industry professionals has strong expertise in diverse industry-standard technologies along with niche emerging areas including Blockchain, Analytics & Visualization, IoT, Chatbot, Data Science- AI & ML. We help modernize legacy and on-premises applications by leveraging modern cloud paradigms such as Microservices, Advanced Analytics, API Management, and other Cloud-native services.
- Celebal Technologies recognized as the winner of 2021 Microsoft India Country Partner of the Year. Celebal Technologies has won the prestigious Microsoft India Country Partner of the Year Award, 2021, becoming the first company in Rajasthan to have received this accreditation.

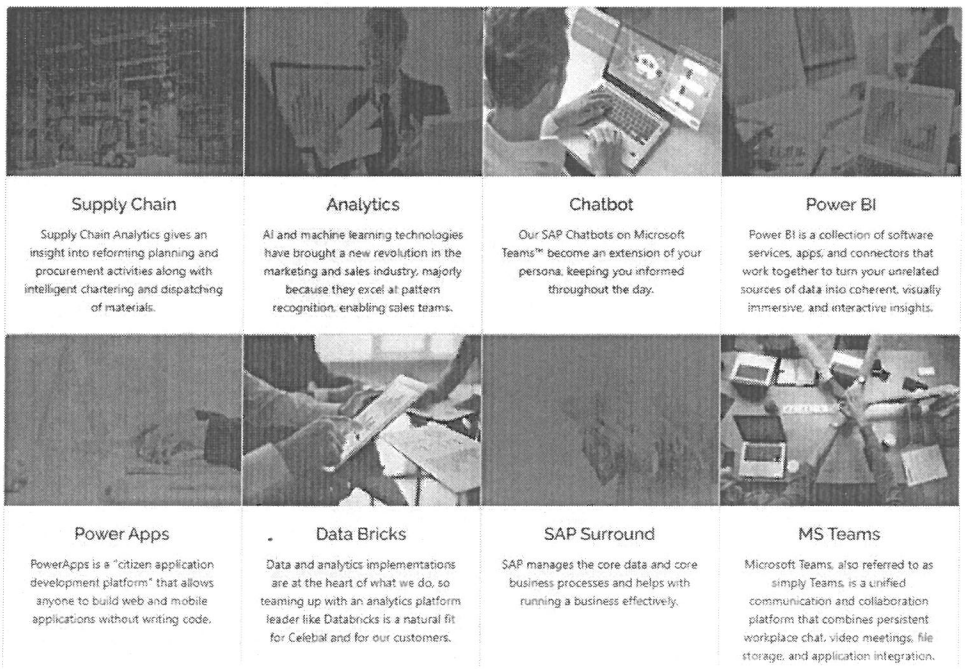


Fig.3

CHAPTER 3 : TECHNOLOGY USED

3.1 Microsoft Azure

Azure is a public cloud computing platform—with solutions including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) that can be used for services such as analytics, virtual computing, storage, networking, and much more. Platform which we have used to migrate the data.

3.2 Azure Migrate

Azure Migrate provides a centralized hub to assess and migrate on-premises servers, infrastructure, applications, and data to Azure. It provides the following: Unified migration platform: A single portal to start, run, and track your migration to Azure. Range of tools: A range of tools for assessment and migration.

3.3 Azure Database Migration Service

Azure Database Migration Service (DMS) provides fully managed assistance for anyone migrating on-premises databases to Azure database offerings. You can use DMS to migrate any type of database, data type, and migration type. You can also automate the process with PowerShell command lets.

3.4 Database Migration Assistant

The Data Migration Assistant (DMA) helps you upgrade to a modern data platform by detecting compatibility issues that can impact database functionality in your new version of SQL Server or Azure SQL Database.

3.5 SQL Server Management studio

SQL Server Management Studio is a software application first launched with Microsoft SQL Server 2005 that is used for configuring, managing, and administering all components within Microsoft SQL Server. It is the successor to the Enterprise Manager in SQL 2000 or before.

CHAPTER 4 : PROJECT SPECIFICATION

4.1 Overview:

IDFC-DB/DC Migration here we have done migration on various aspects like Sql server to Azure SQL VM using DMS, Hyper-V to Azure using Azure Migrate . IN this we involved many steps. We started by preparing the environment then discovery to failover(migration). We need to take care of every single data which is migrated from one source to other. VM should have static IPs and hyper-v manager should have windows/linux. Hyper-v should have internet connectivity and ports (TCP, UDP and ICMPv4) need to be allow. Firewall setting and sql server configuration settings also need to be checked as below process mentioned. Various steps are involved in different different types of migration.

Cloud migration and modernisation is a continuous process that involves significant organisational change management spanning people, process and technology. Taking a holistic approach will not only help you navigate the journey successfully but also help ensure that your organisation realises new benefits—including efficiency, agility and scale—once your workloads are running in the cloud.

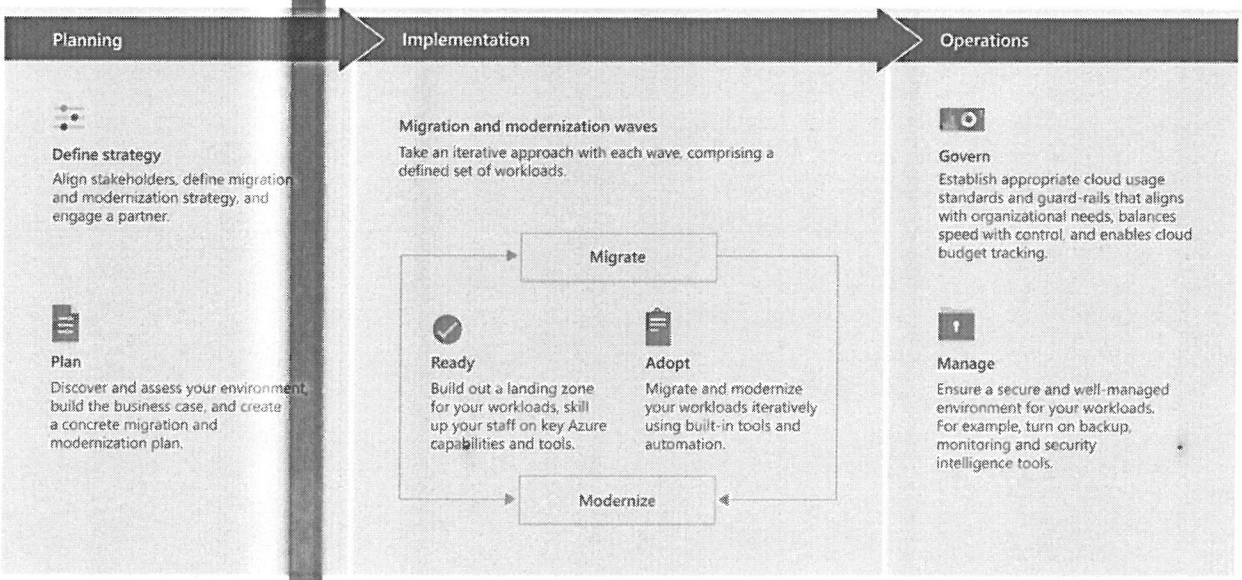


Fig4.

Types of Migration:

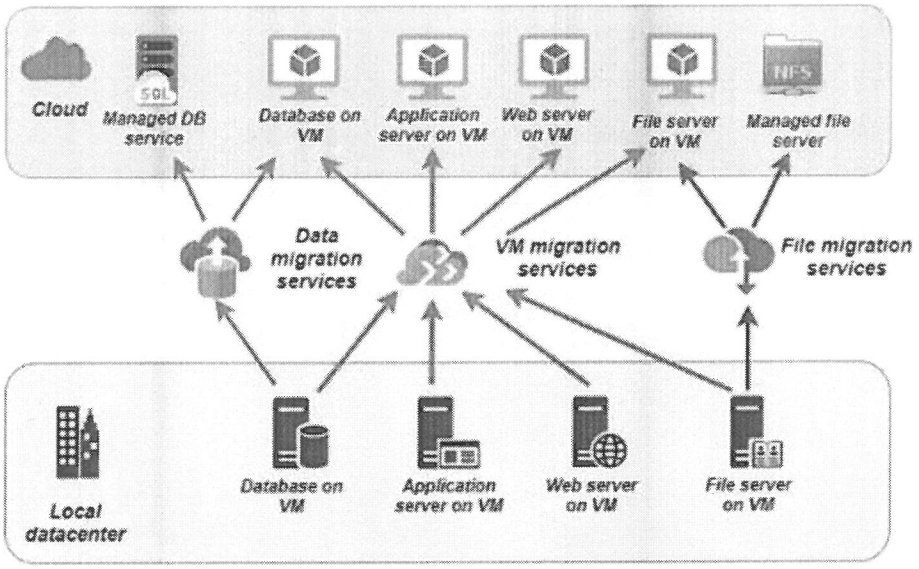
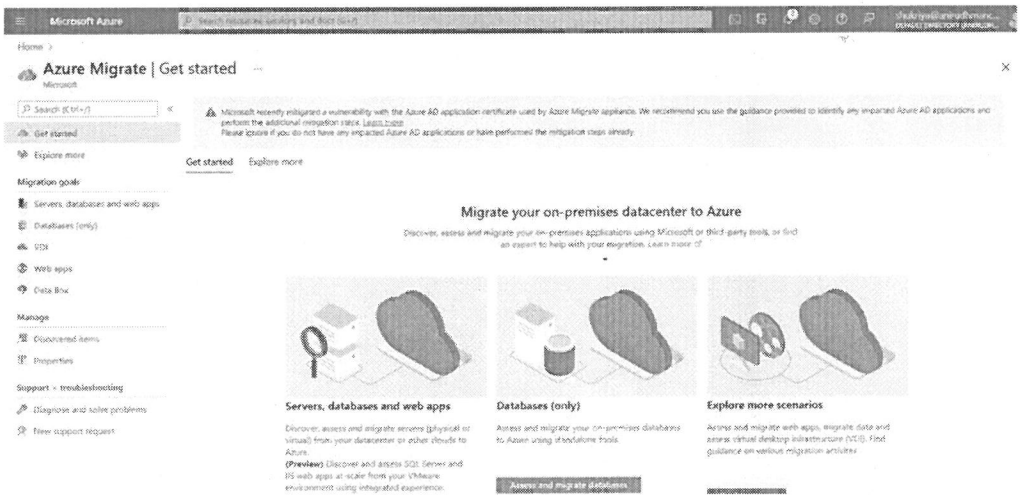


Fig.5

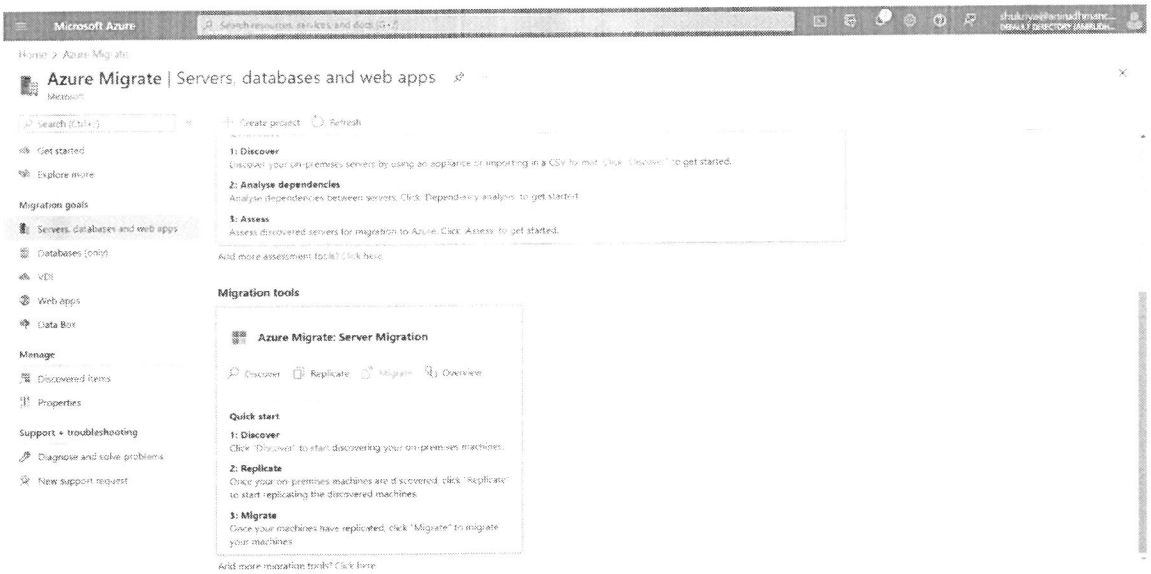
5.1 OBJECTIVE 1 SETUP:

Hyper-V to Azure using Azure Migrate

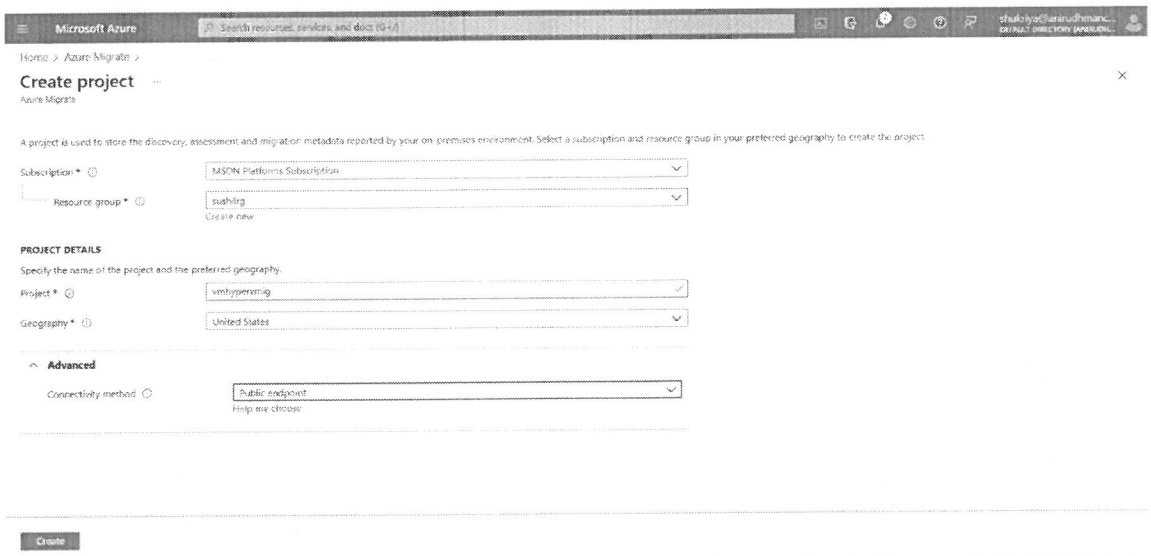
Step1: Go to portal and search for Azure migrate.



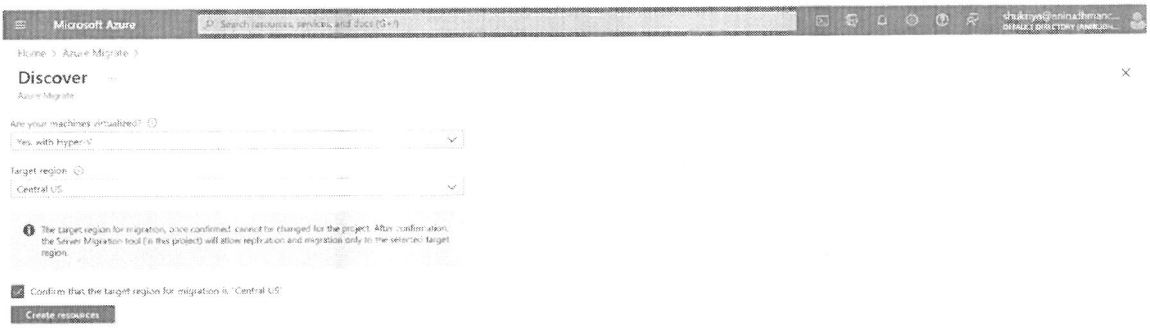
Step2: Go to servers, databases, and web apps.



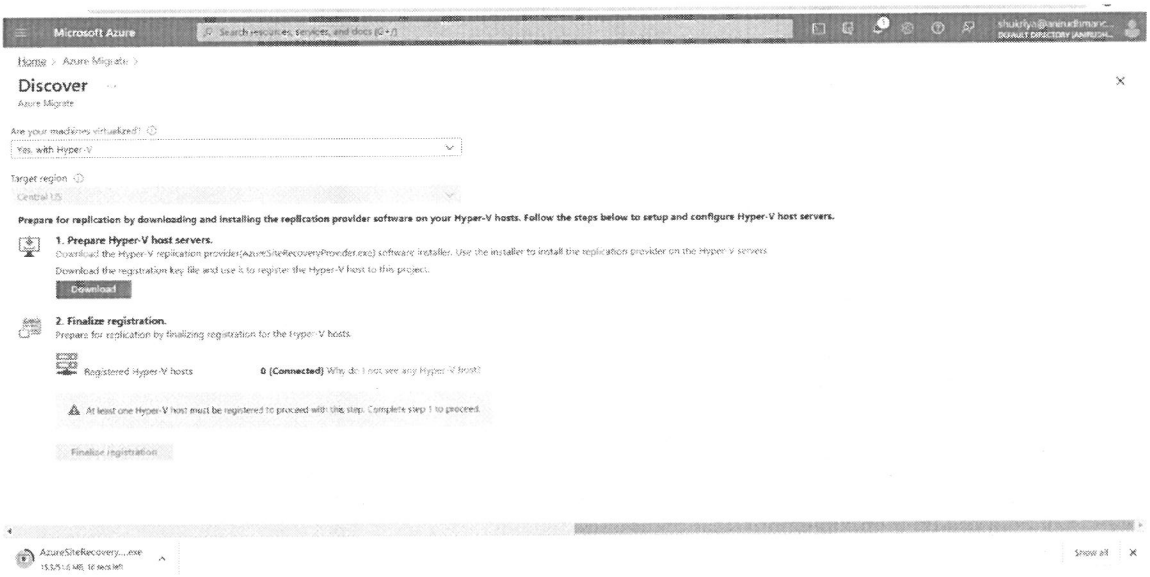
Step3: Create a project and fill the required details as below.



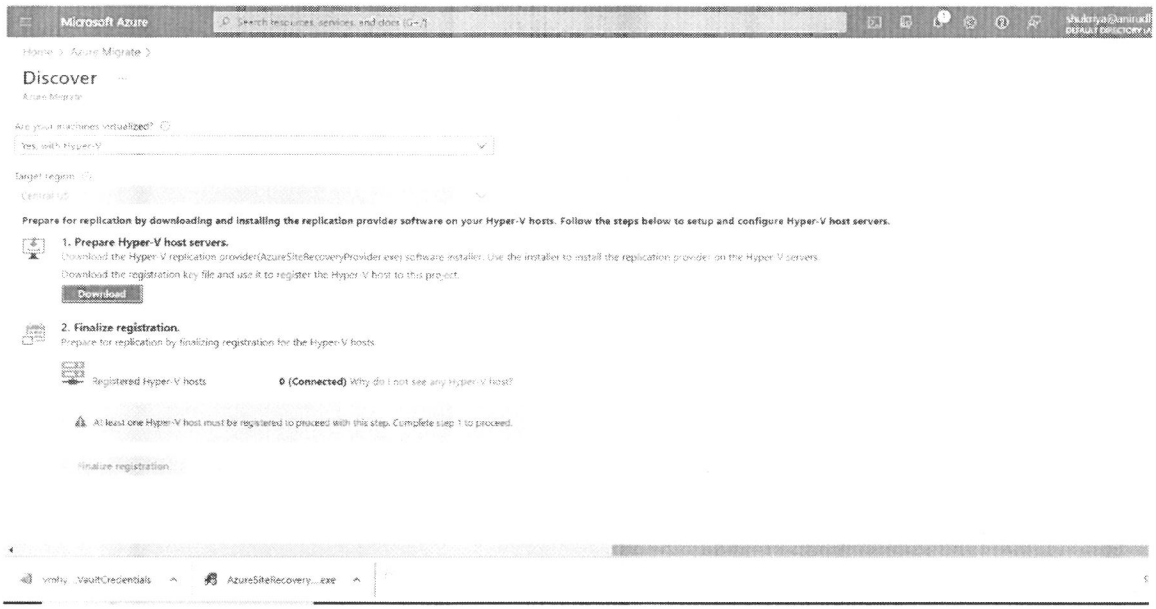
Step4: Azure server: migrate click on discover and then choose yes with Hyper-V and different location. Location should not be same as VM(Main).



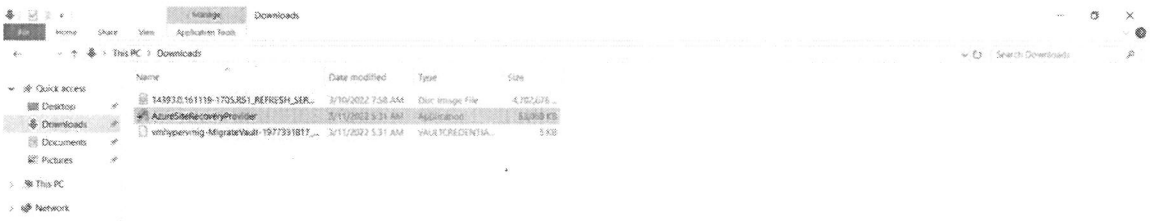
Step5: Download both files from here and paste in the main VM(RDP)



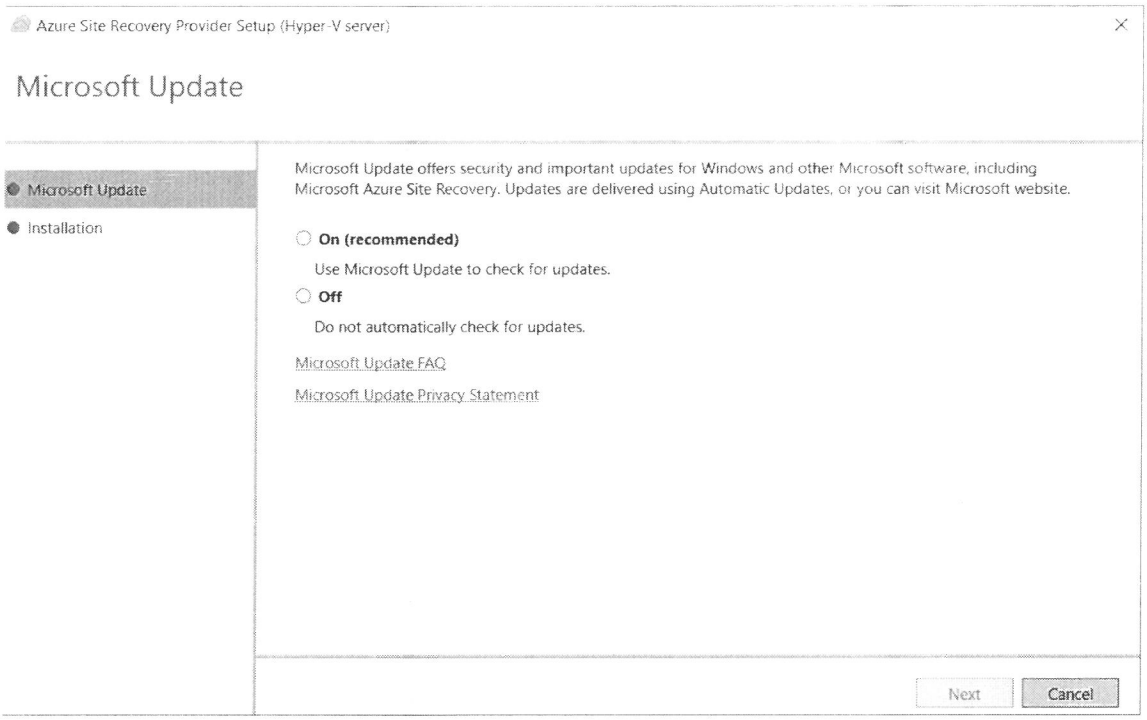
Step6: Download other file and copy this also to the main vm.



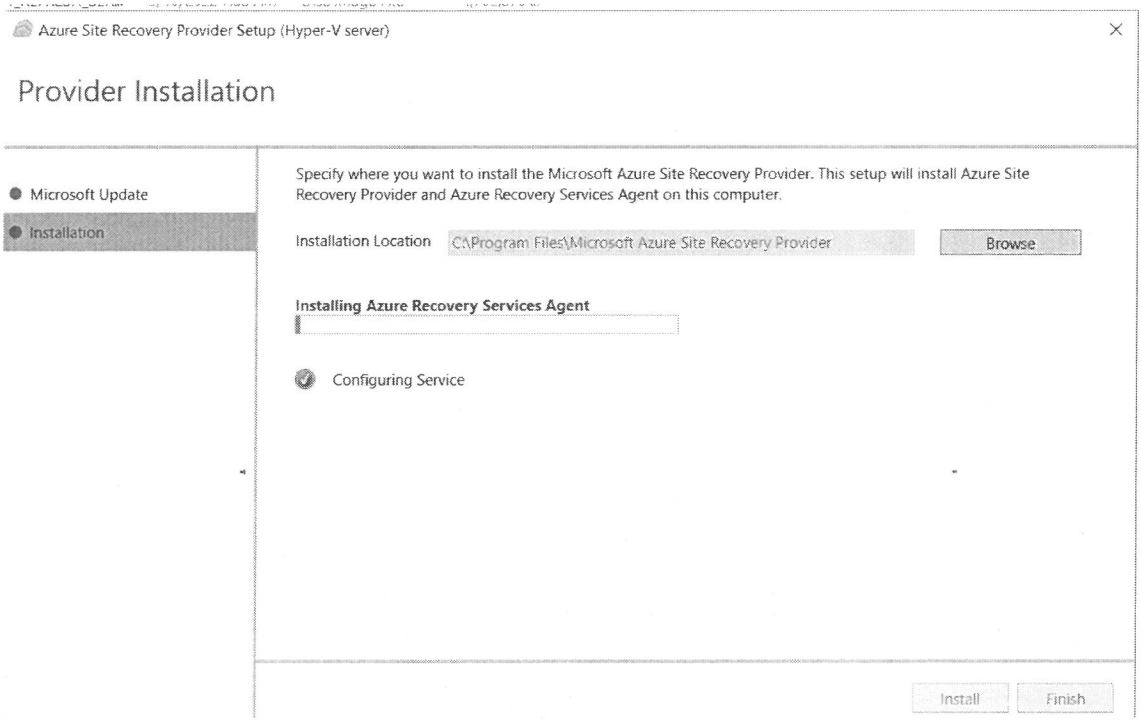
Step7: Install AzureSiteRecovery.exe



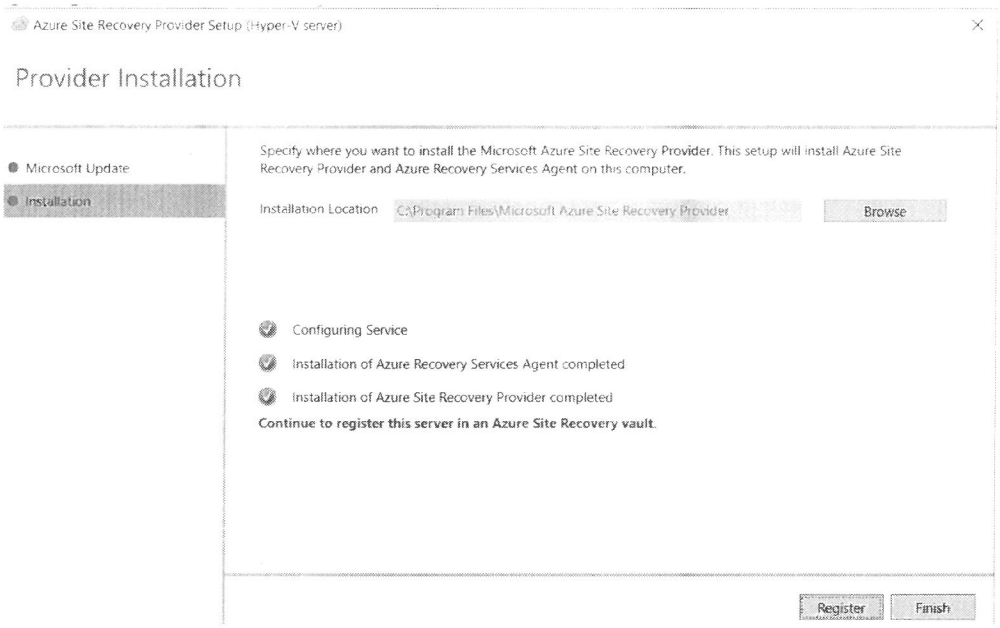
Step8: Select on(recommended).



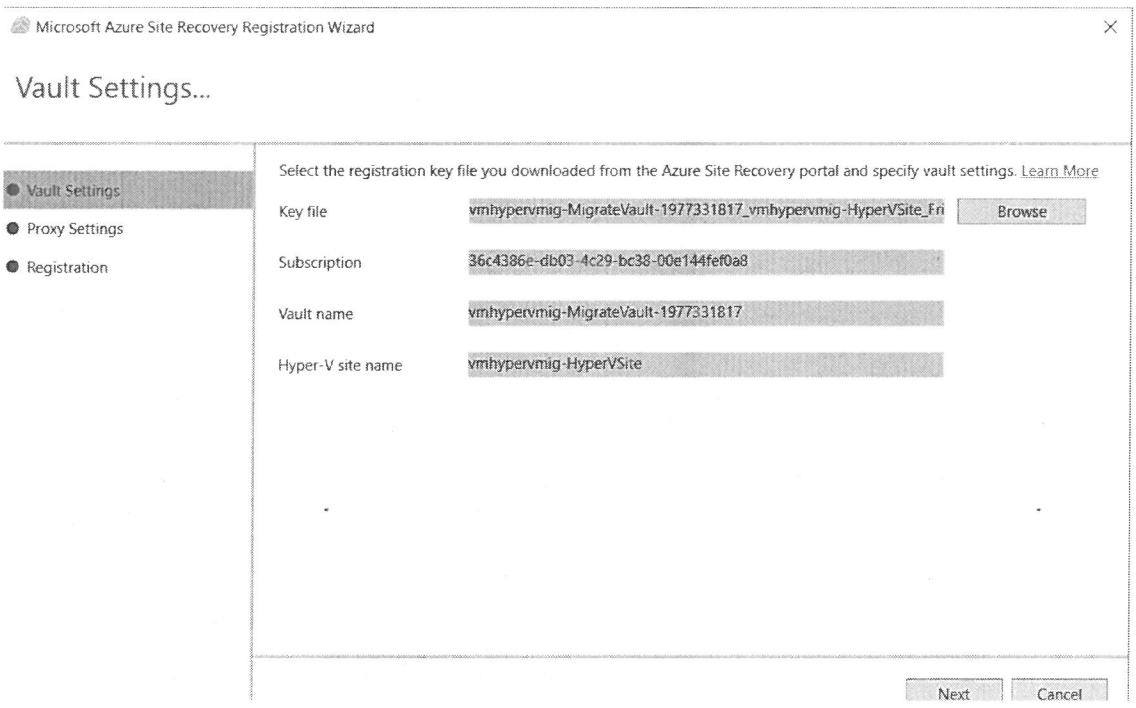
Step9: It will start installing.



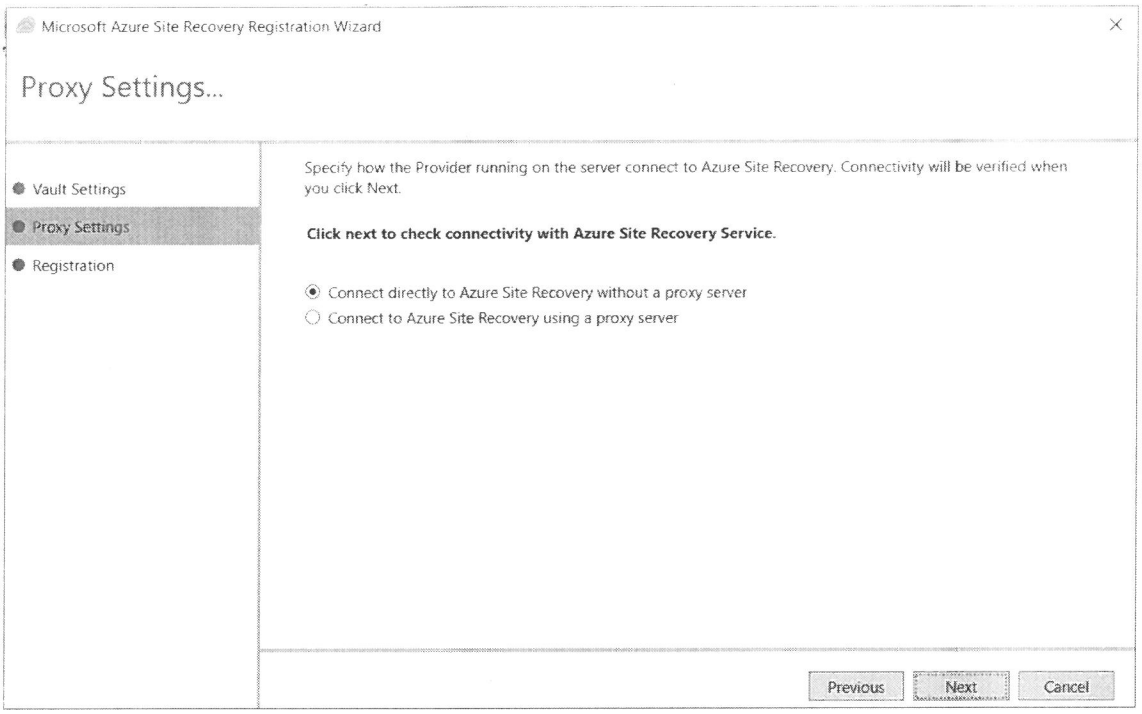
Step10: After installation click Register.



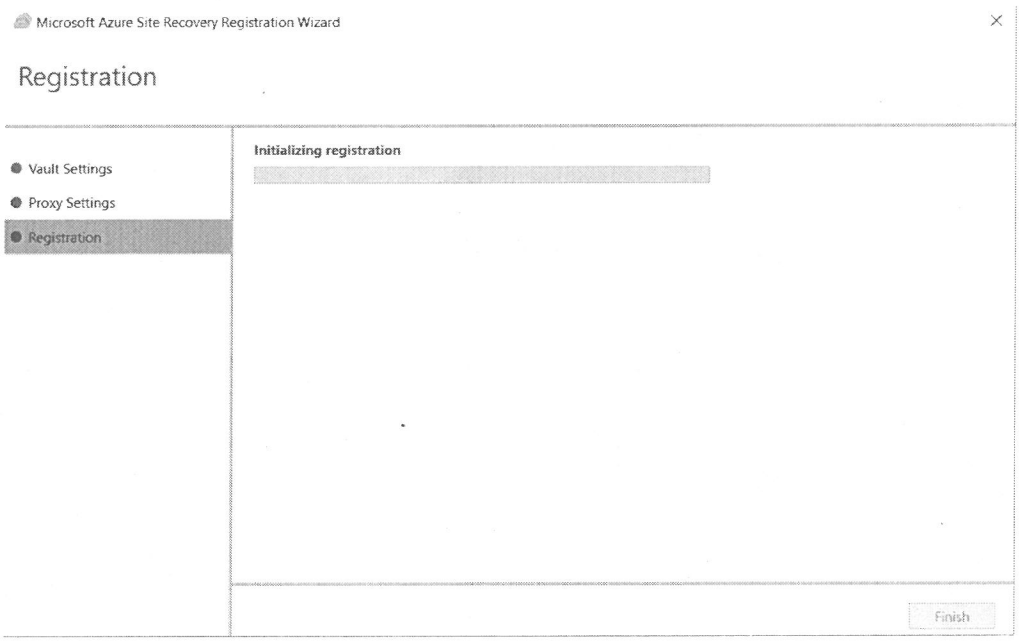
Step11: Click on browse and select the Vaultkey file rest things will get automatically field.



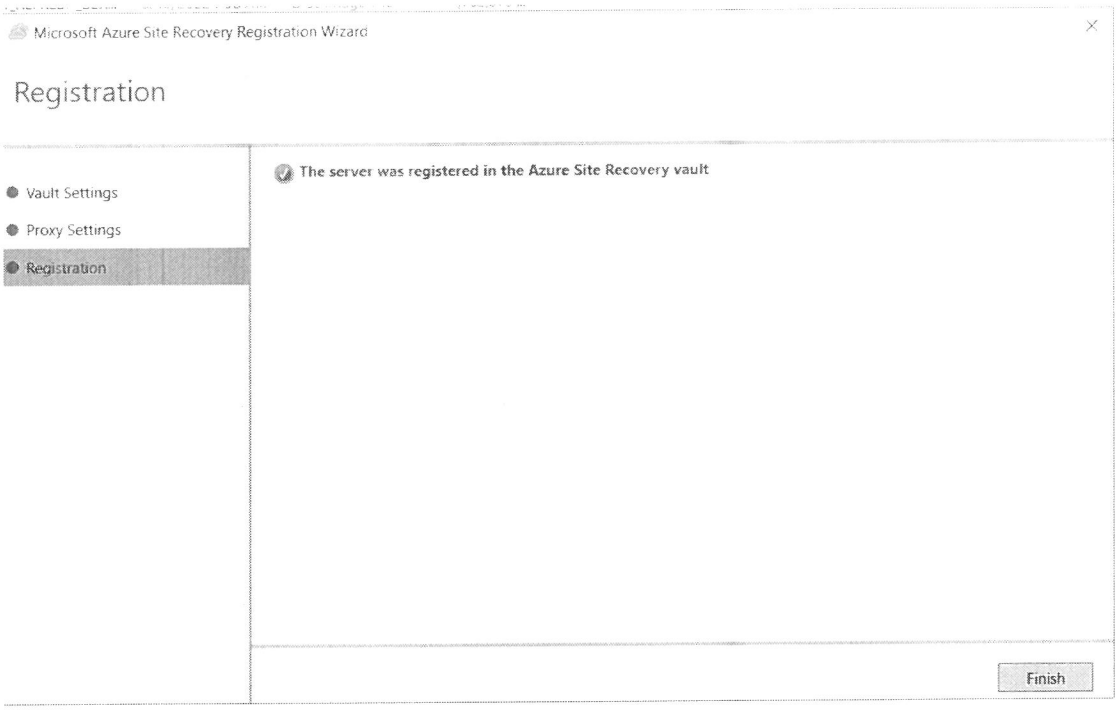
Step12: Choose Connect without a proxy server.



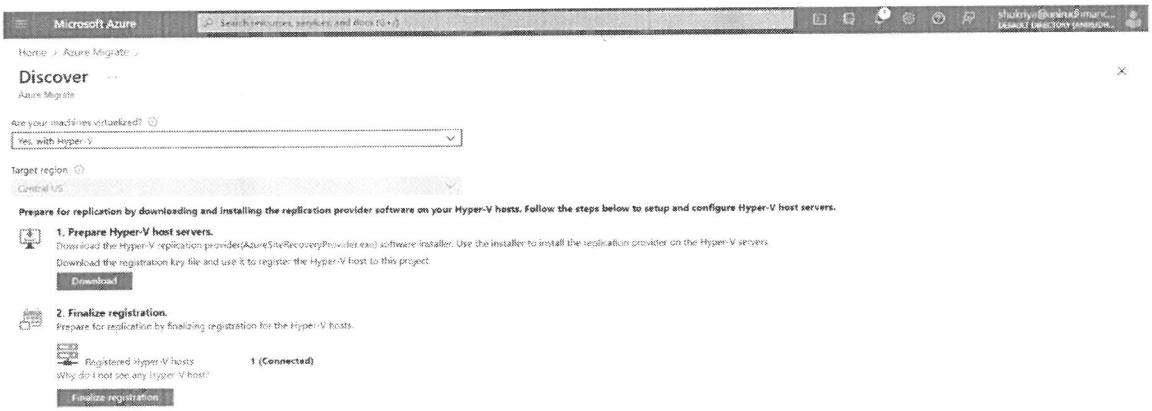
Step13: It will start registration.



Step14: Registration is completed, click on finish.



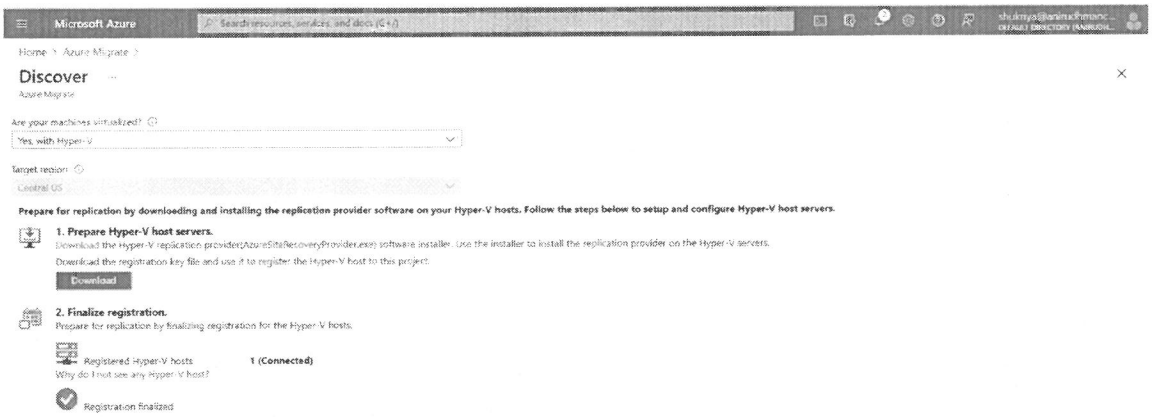
Step15: Go to portal and refresh and see the connected status.



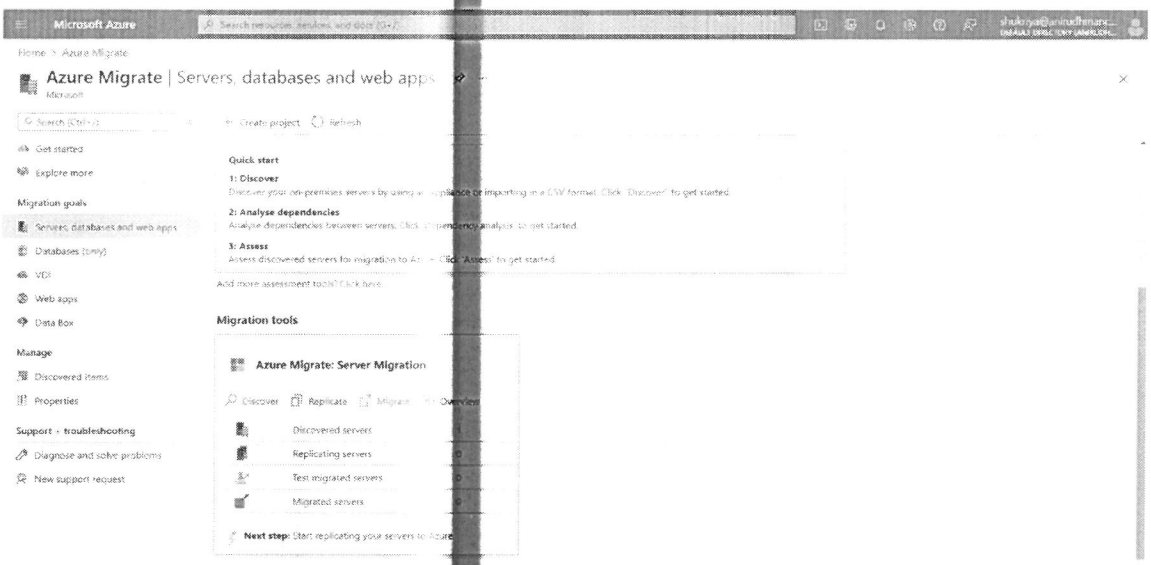
Step16: Click on finalize registration.



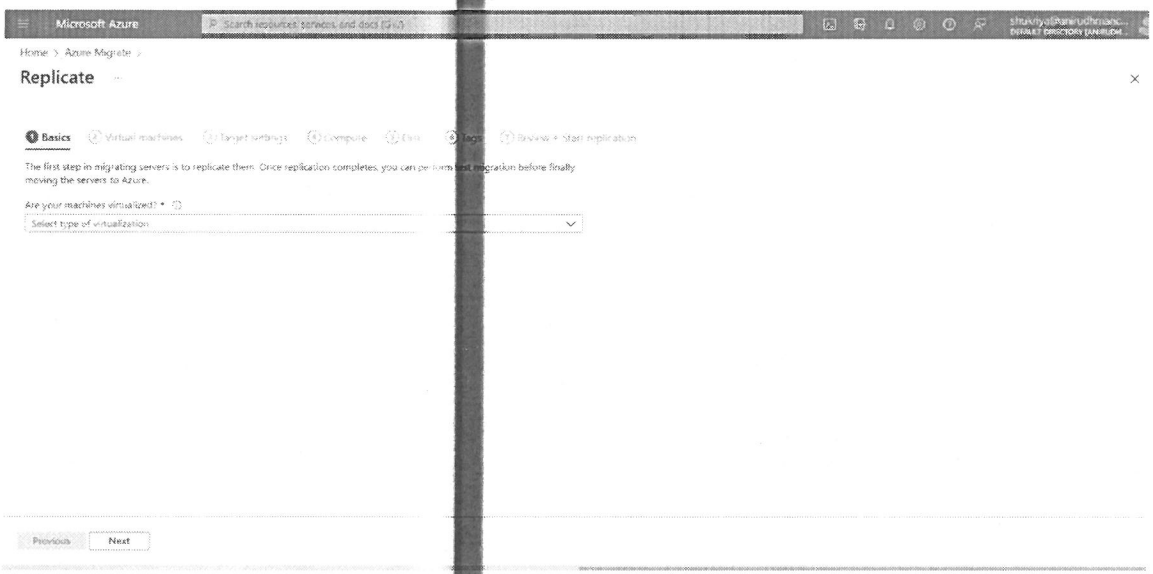
Step17: Registered.



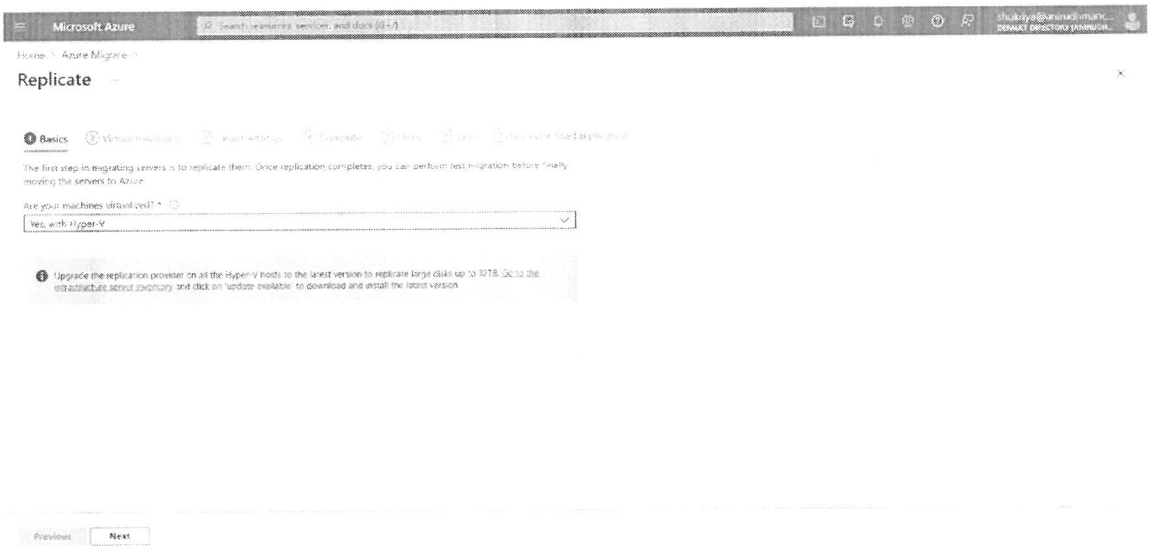
Step18:Go to main azure migrate page and refresh and you will be able to see discovered servers.



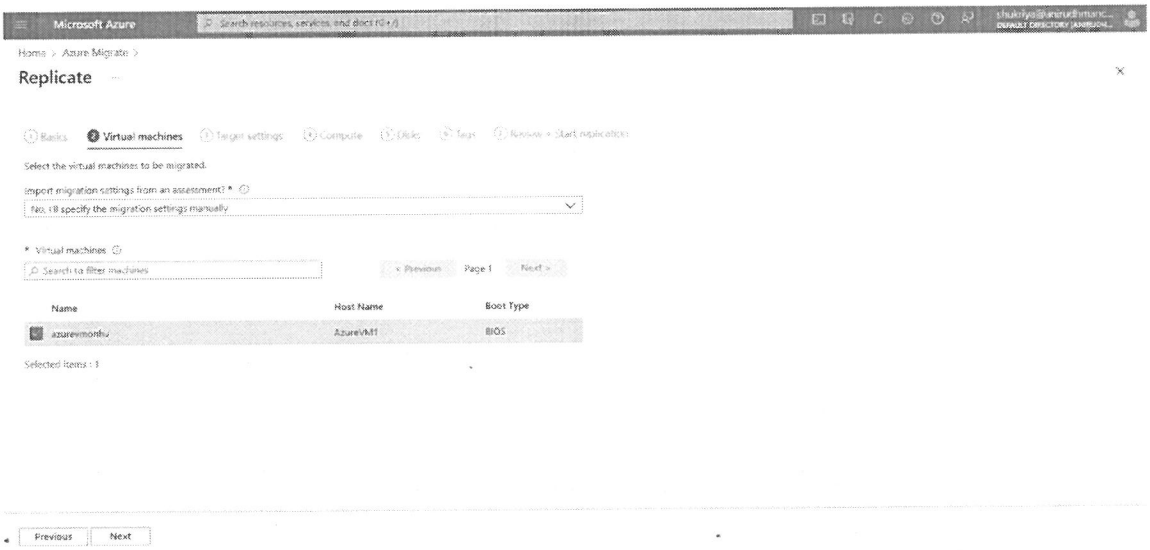
Step19: Below discovered server there is option for replication, now start replication.



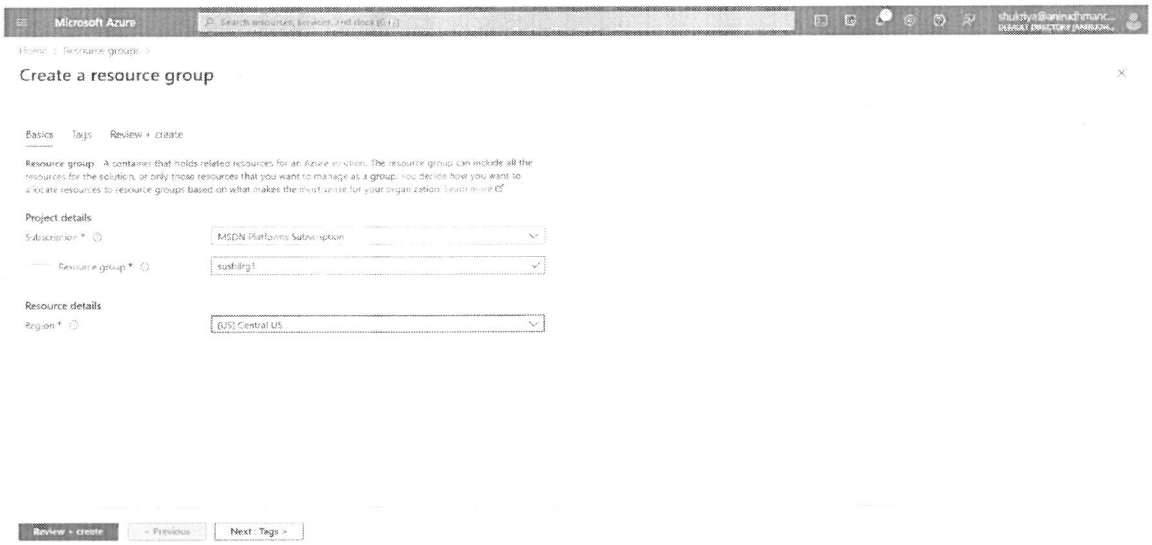
Step20: Choose yes with Hyper-V.



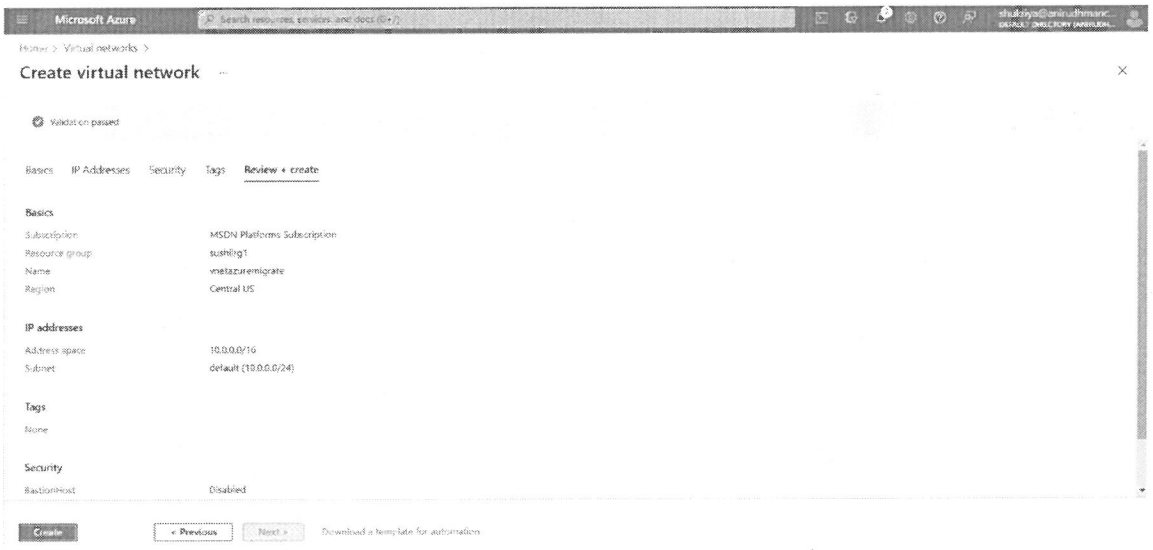
Step21: Choose No I will choose manually and select the vm.



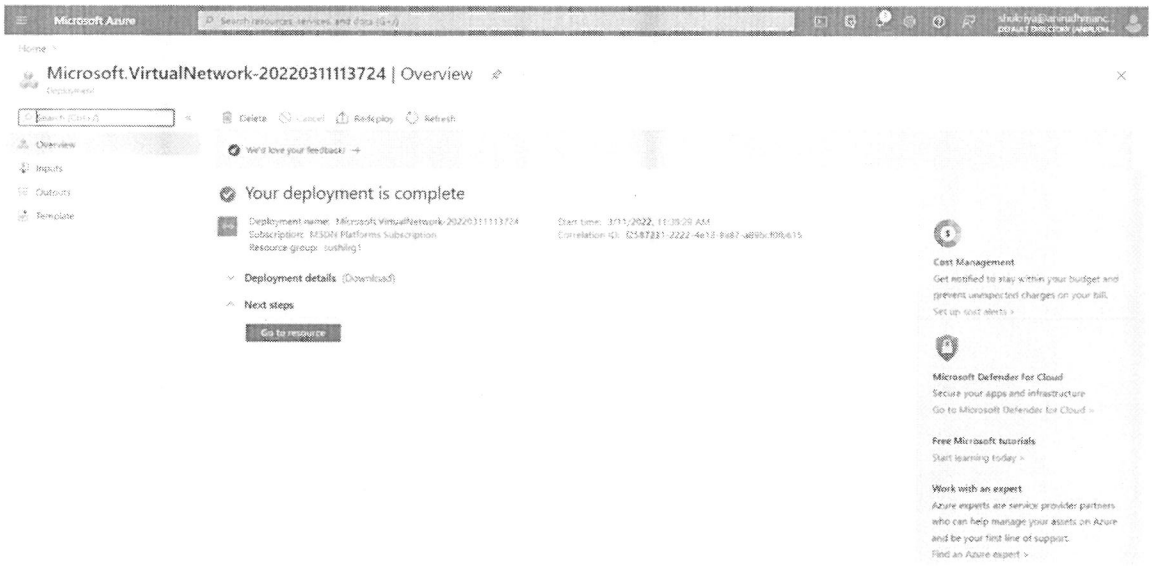
Step22: Create a new resource group having same region which was in creating azure migrate project.



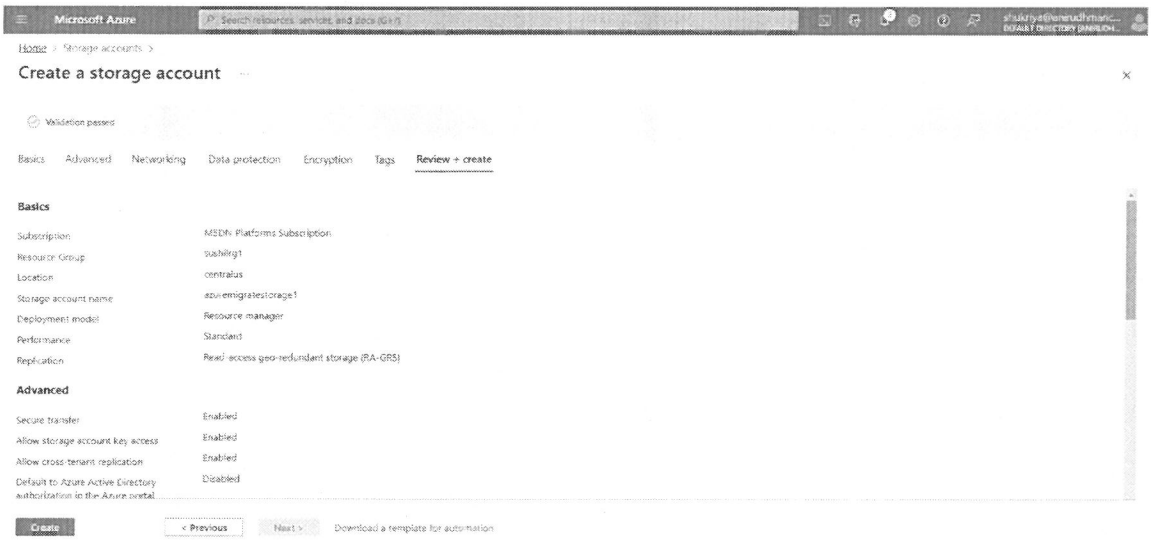
Step23: Create a virtual network within new resource group with same region.



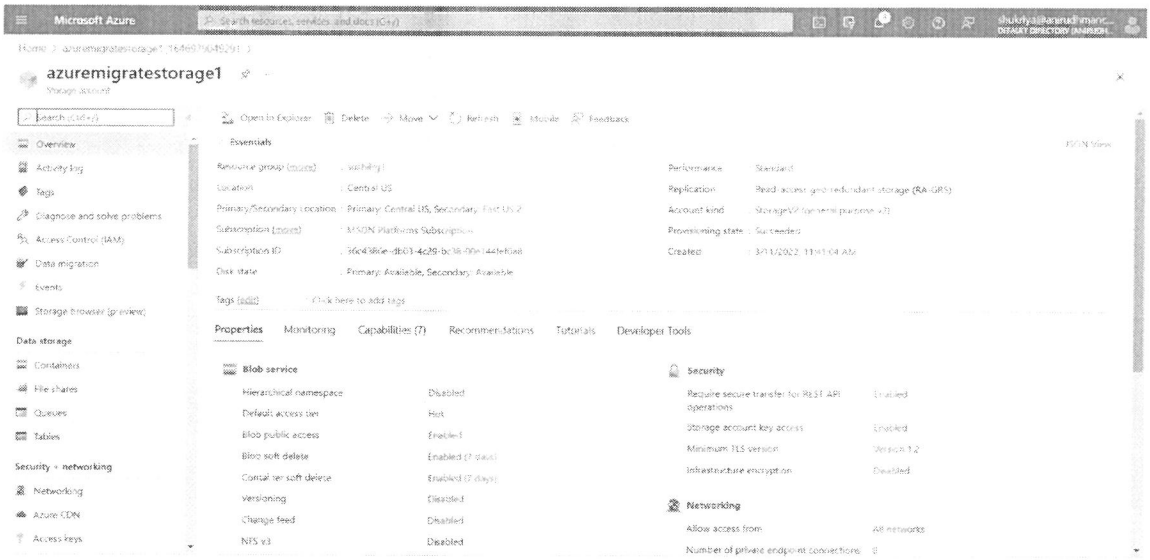
Step24: Resource Group ccreated.



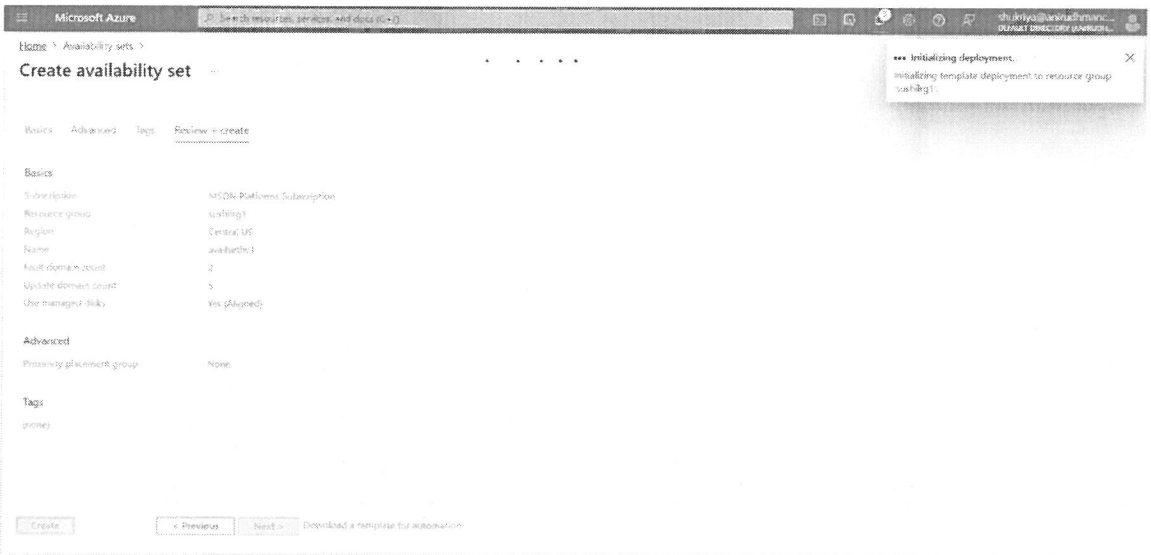
Step25: Create a storage account with same new resource group with same region.



Step26: Resource group created.



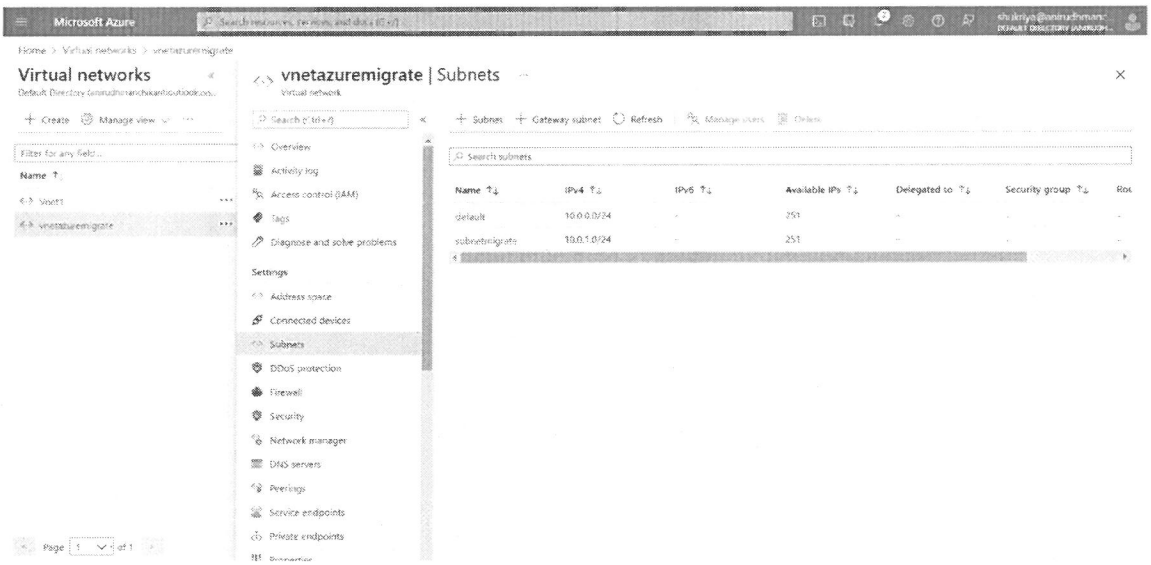
Step27: Create a avail set within new resource group and same region.



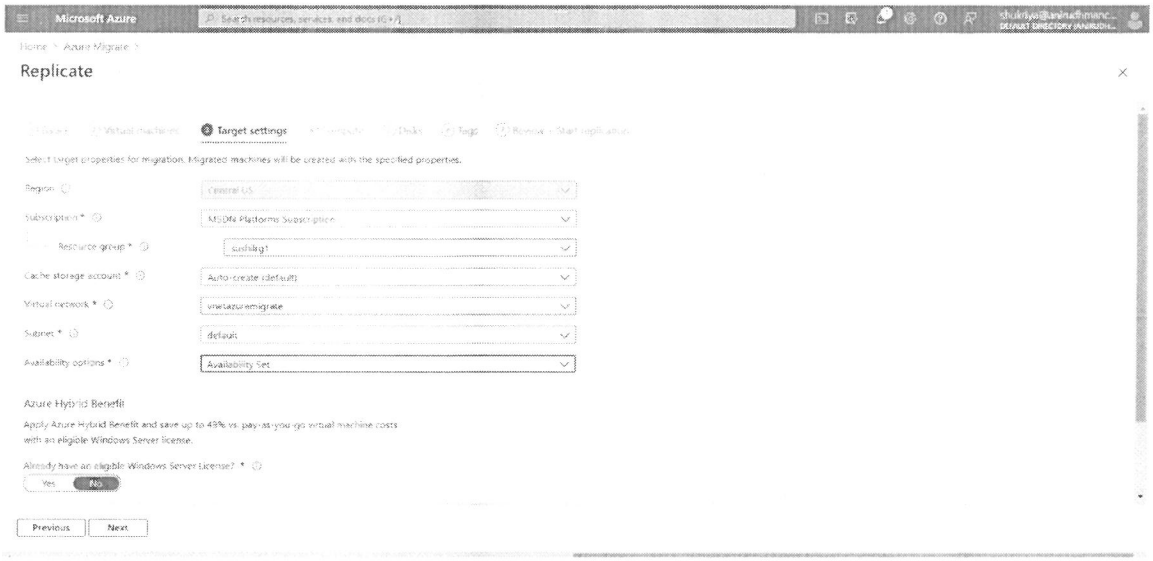
Step27: Same with this.



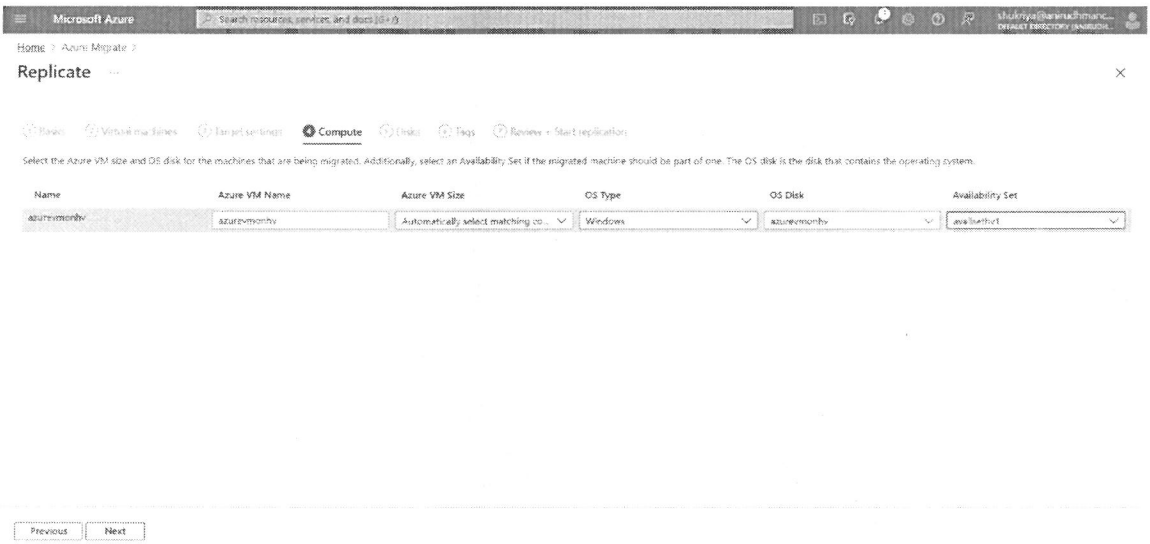
Step28: Create subnet with new resource group and same region.



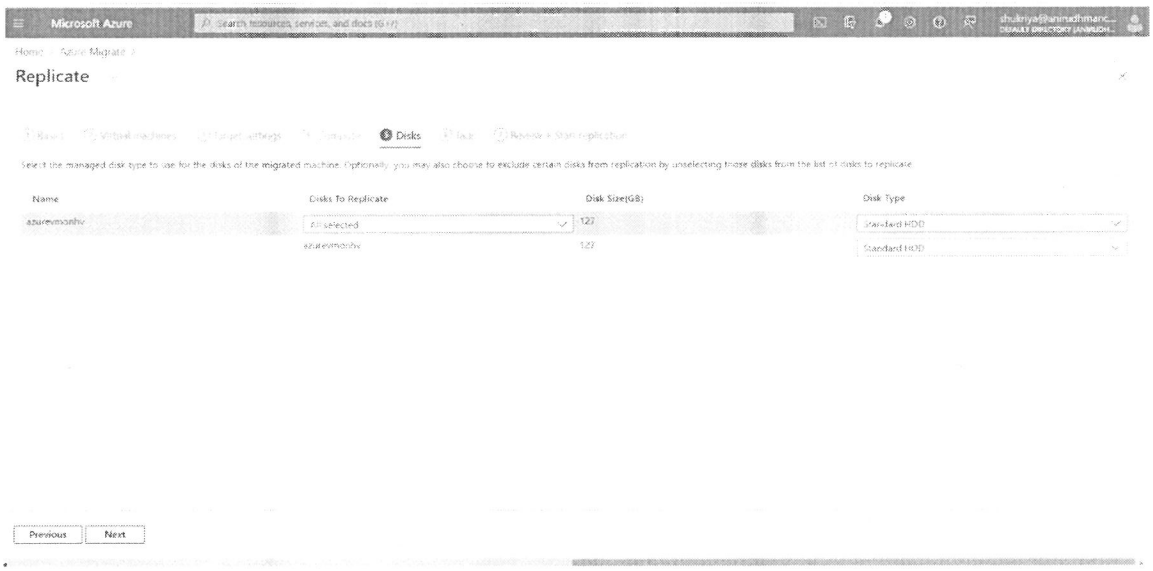
Step29: Fill the required details as we created in previous steps.



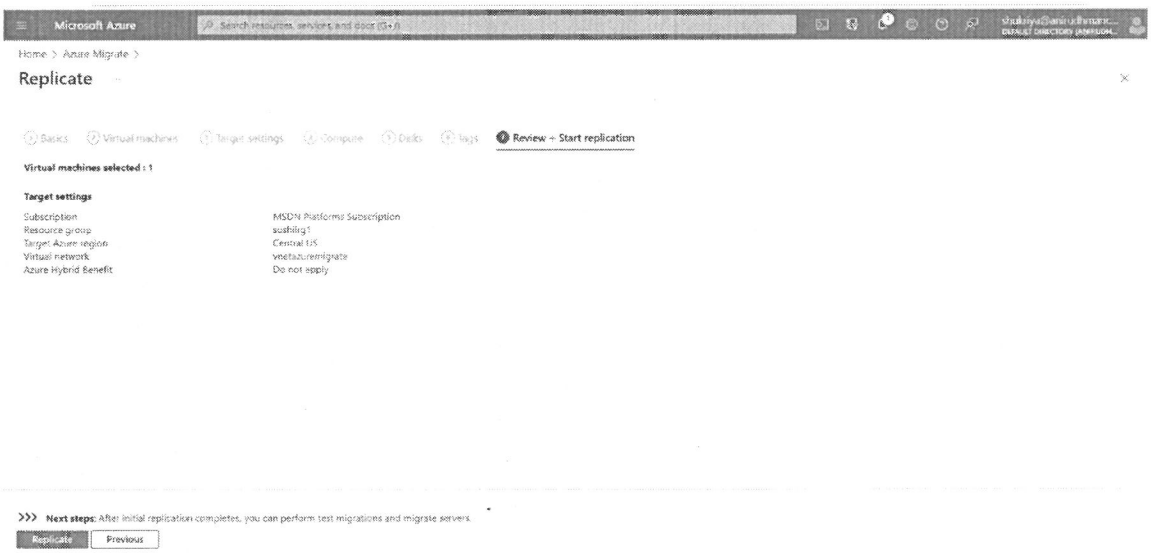
Step30: Select OS type, OS disk, availability set.



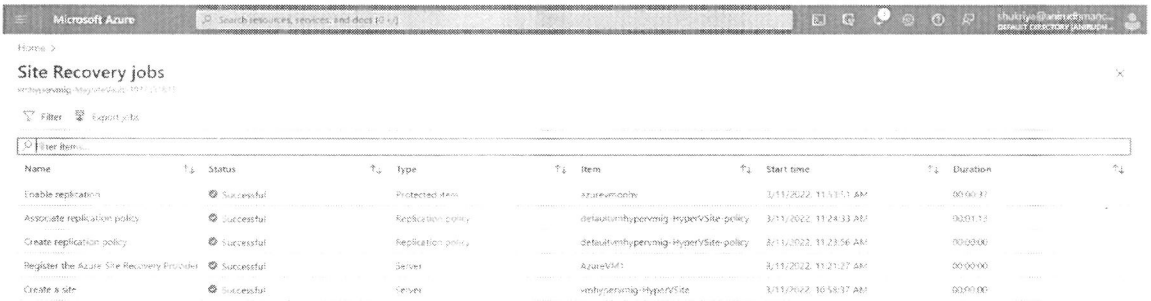
Step31: Select as below.



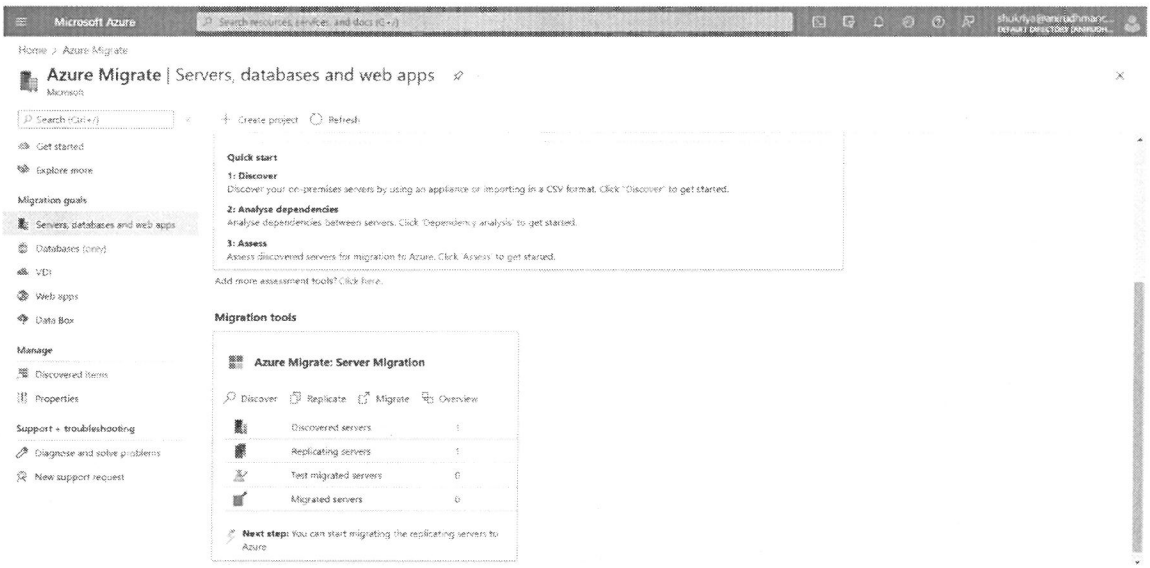
Step32: Replication summary.



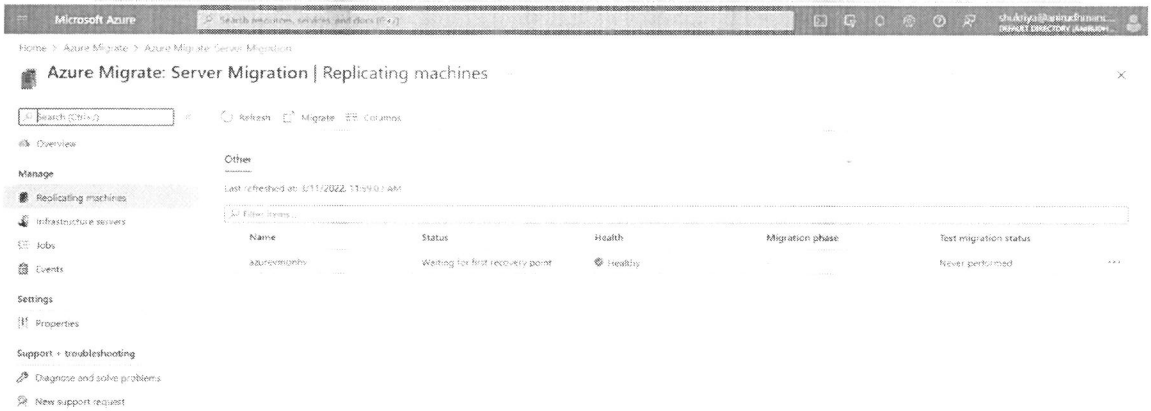
Step33: Replicating.



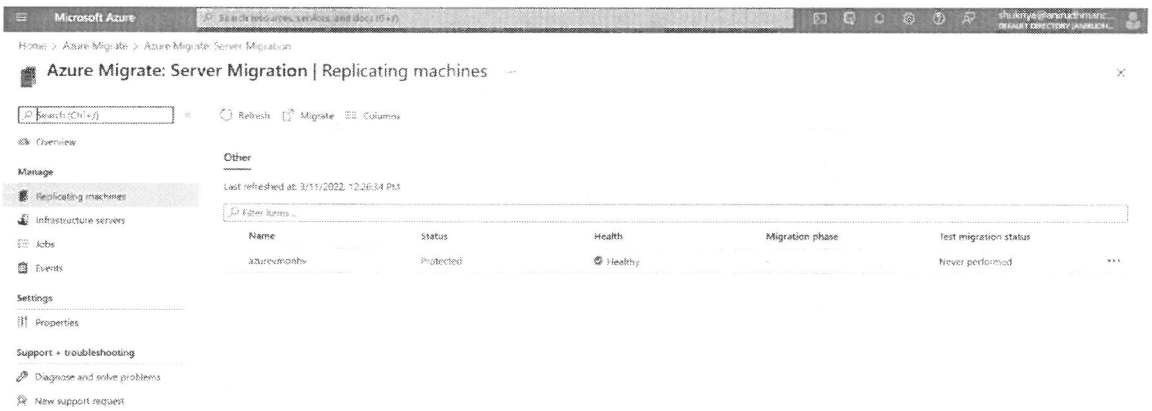
Step34: Here replicating server is showing.



Step35: It is showing waiting status wait for 15mins.



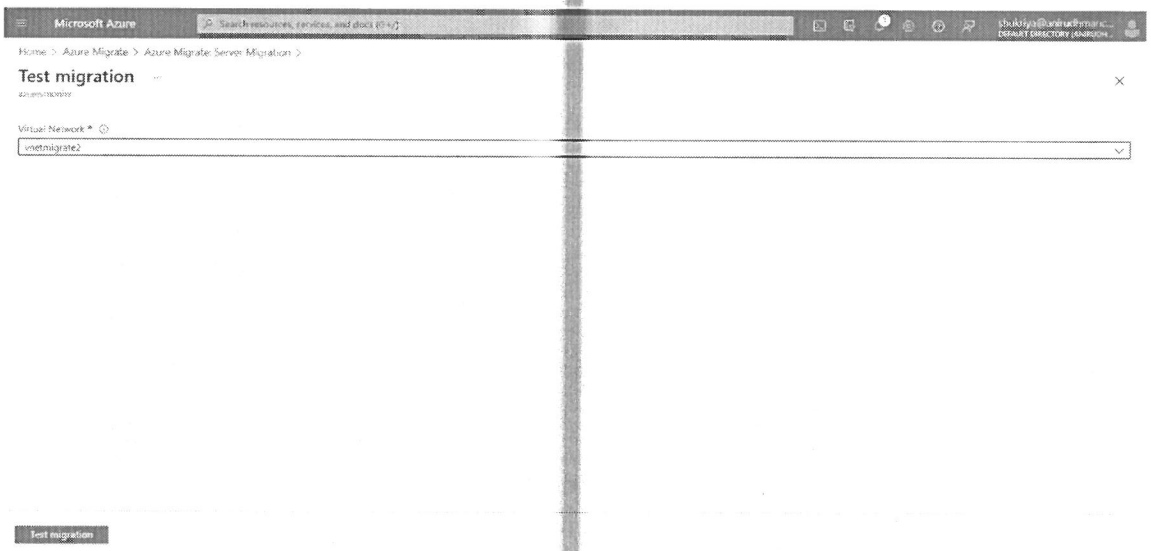
Step36: It is now showing protected status.



Step37: No issues found.



Step38: Test migration.



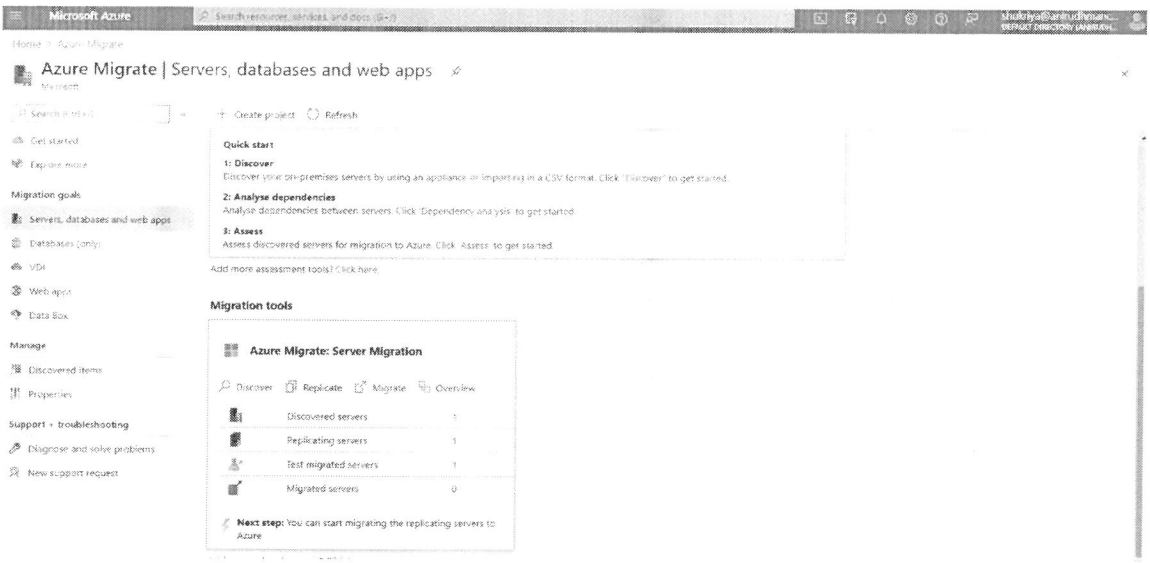
Step39: In progress migration test.



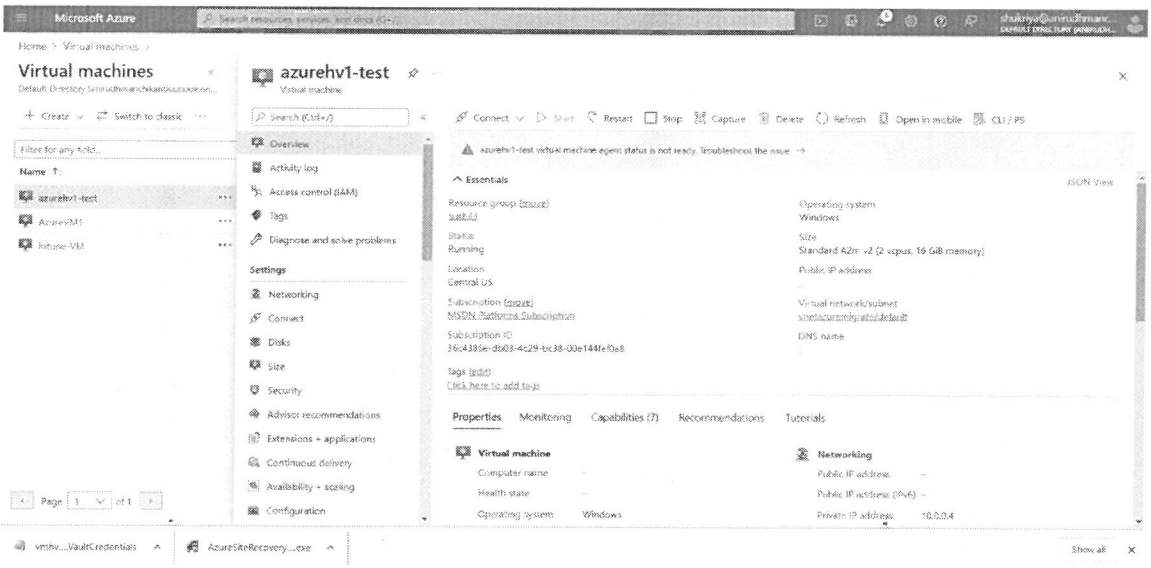
Step40: Successful test migration.



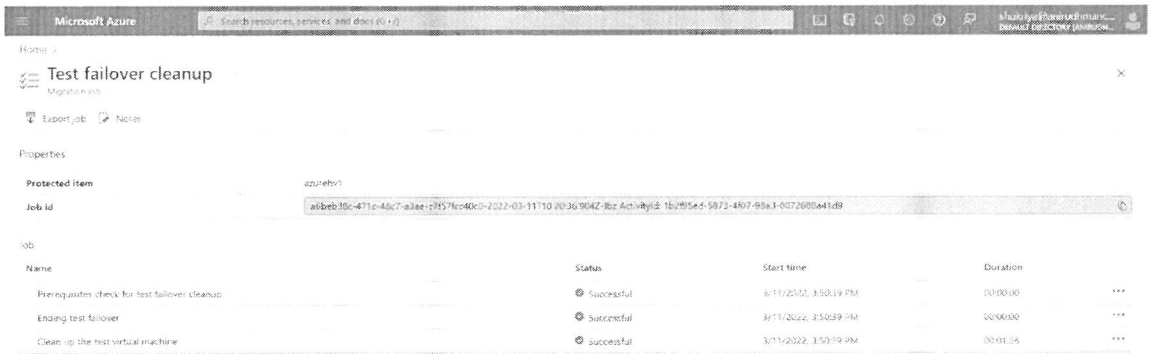
Step41: Test migration server can be seen.



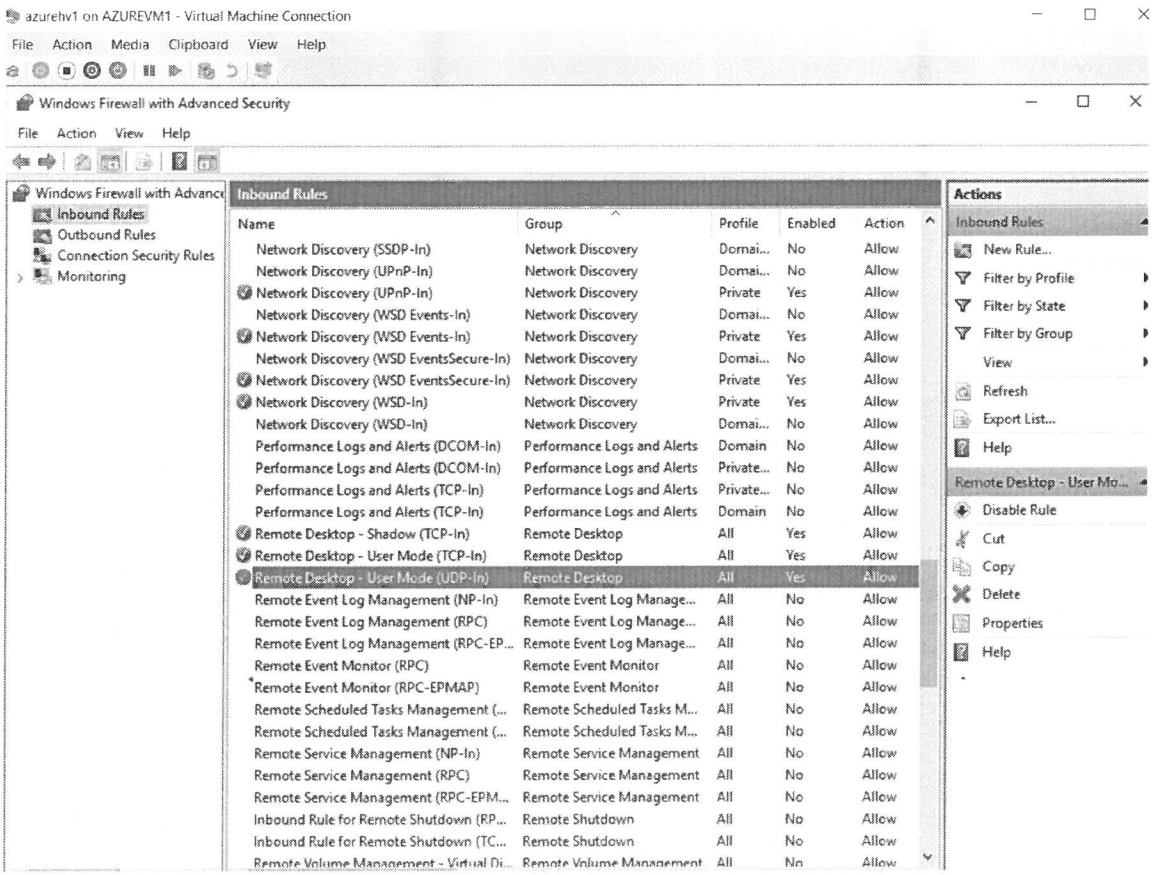
Step43: Take RDP of test vm created.



Step44: Test migration cleanup. Successful.

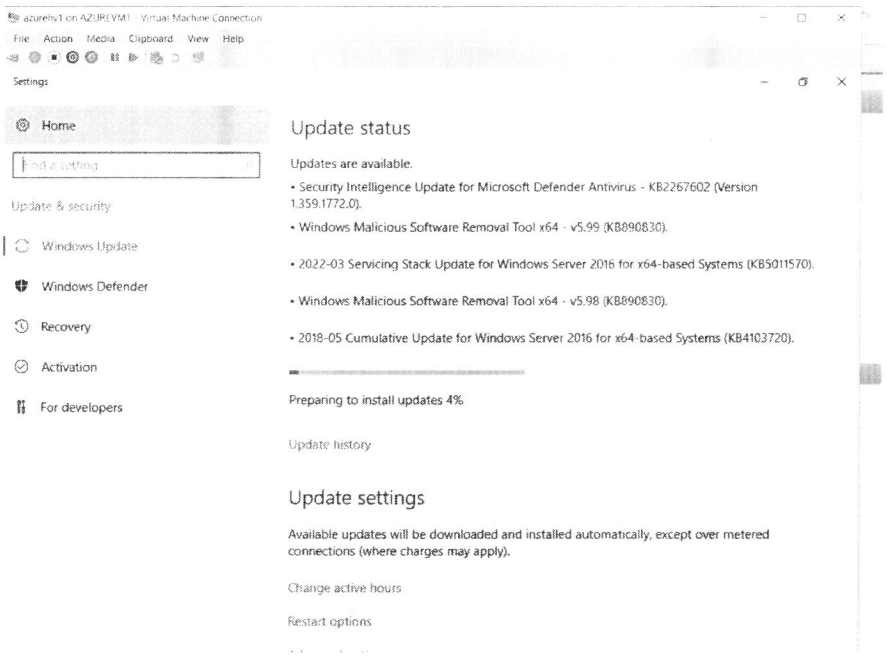


Step45: Enable Remote desktop-shadow, udp.

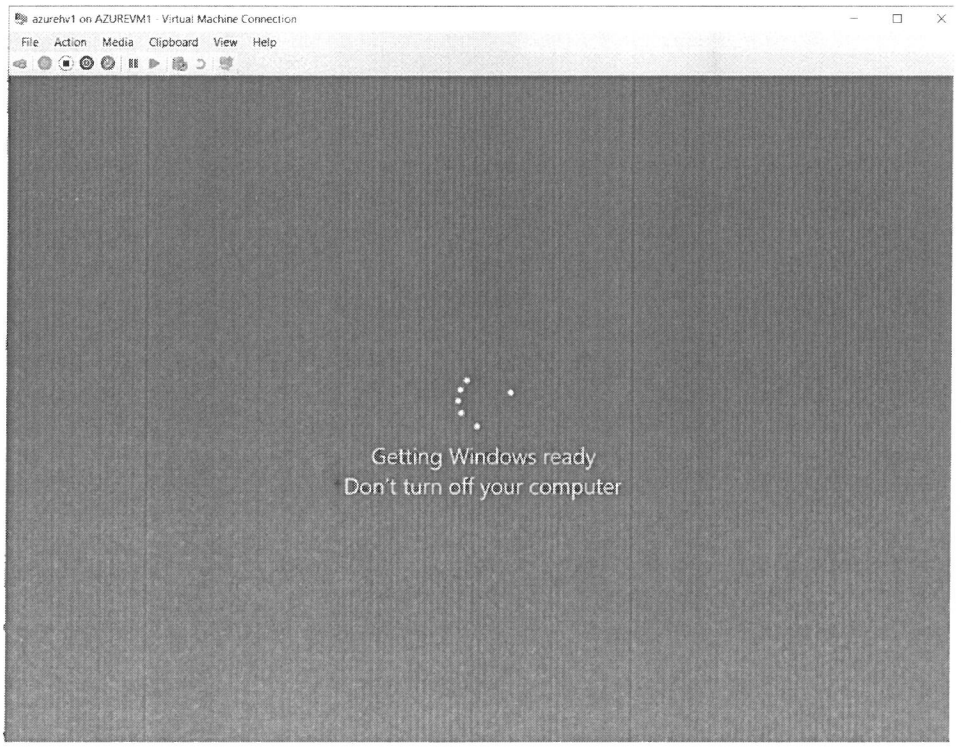


Step46: Enable remote access and make it public.

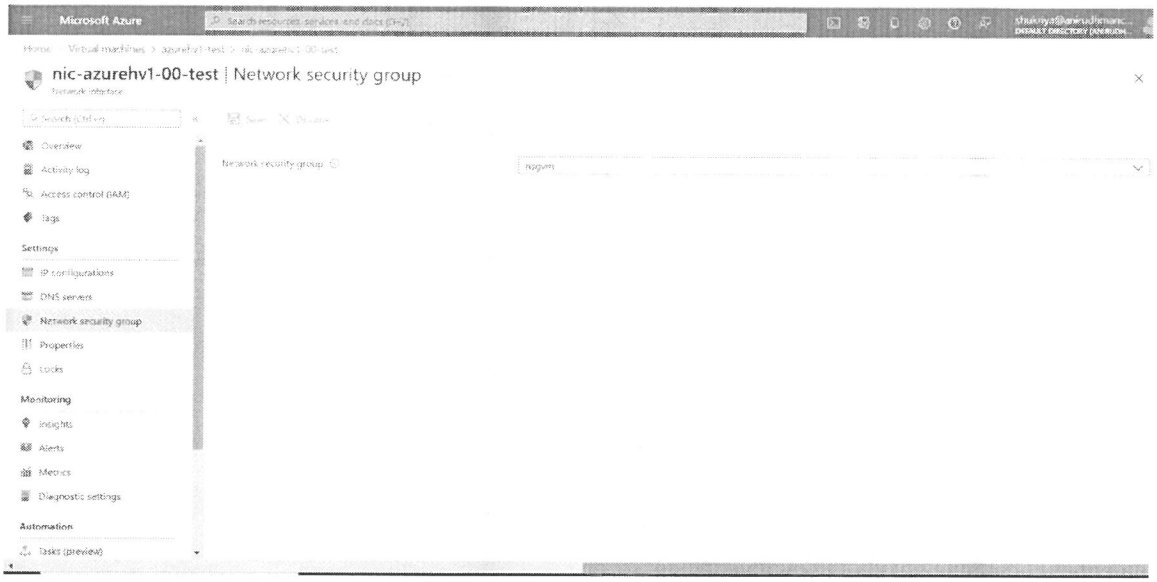
Step47: Installation takes time.



Step48: Getting windows ready

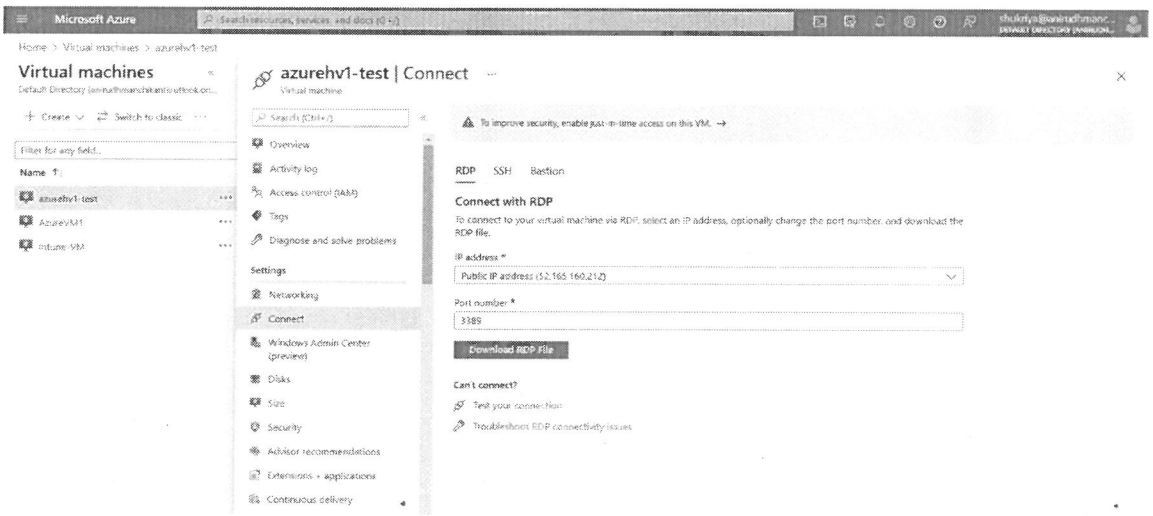


Step49: Create a new nsg rule and add it by going to networking then click on network interface.



Step50: Then go to networking add inbound port 3389.

Save and go to overview we will able to see public ip.



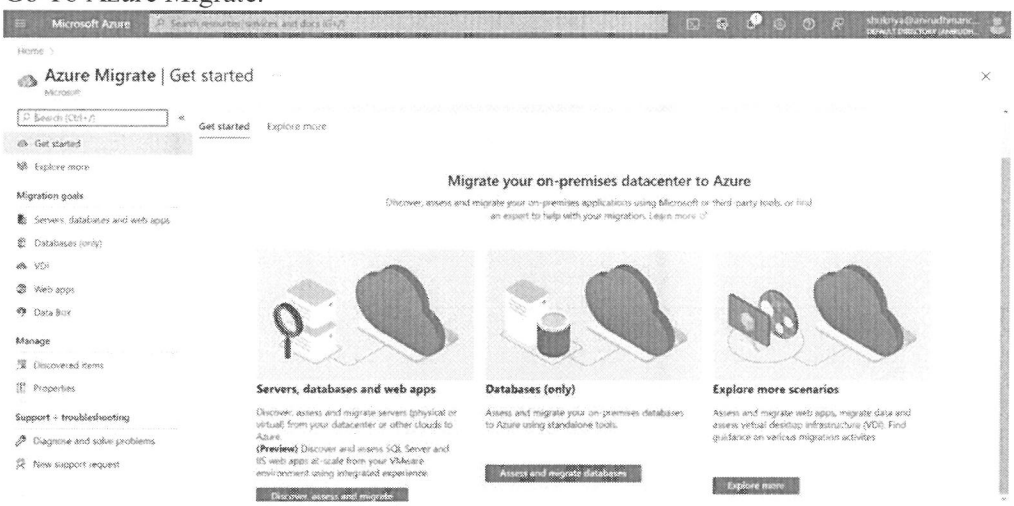
Step51: Give credentials and remote desktop get started.

Project Setup Objective2:

Physical Server (on prem) to Azure Using Azure Migrate.

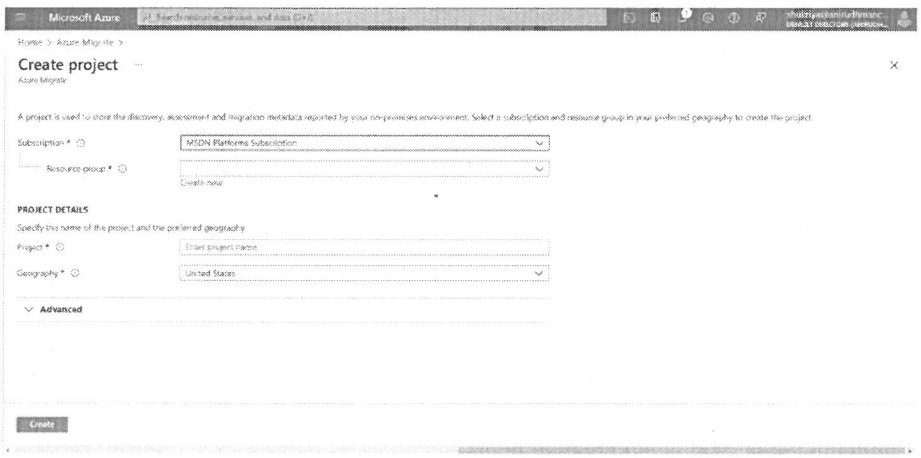
Prerequisites:

1. Windows Virtual Machine.
2. Hyper-V Role in Host VM.
3. Inside Hyper-V Manager-windows server 2016 essential VM.
4. Windows 2016 should have internet access.
5. Go To Azure Migrate.



6.Select server, databases, and web apps.

7. Create a new project



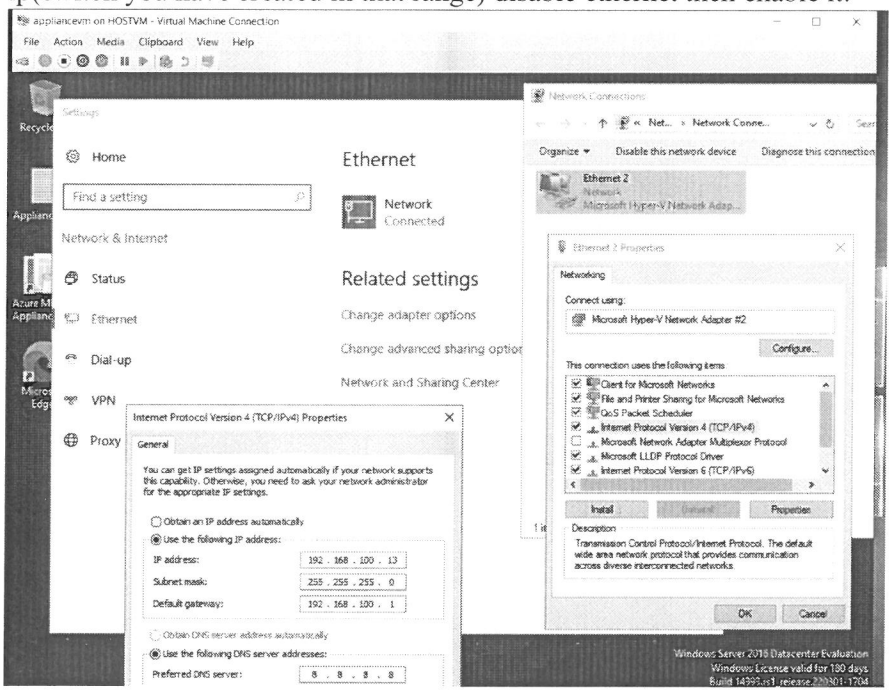
8. Then Azure Migrate: Discover and assessment. Click on discover yes with Hyper-V

9. Generate key and then download 10gb VHD file in the main (Host VM).

10: Extract the downloaded AzureAppliance file and do the below steps further.

Important:

- After creating appliance VM in Hyper-V Manager very important to check the net access if not go to network setting change adapter and then properties then use ip give your ip(switch you have created in that range) disable ethernet then enable it.



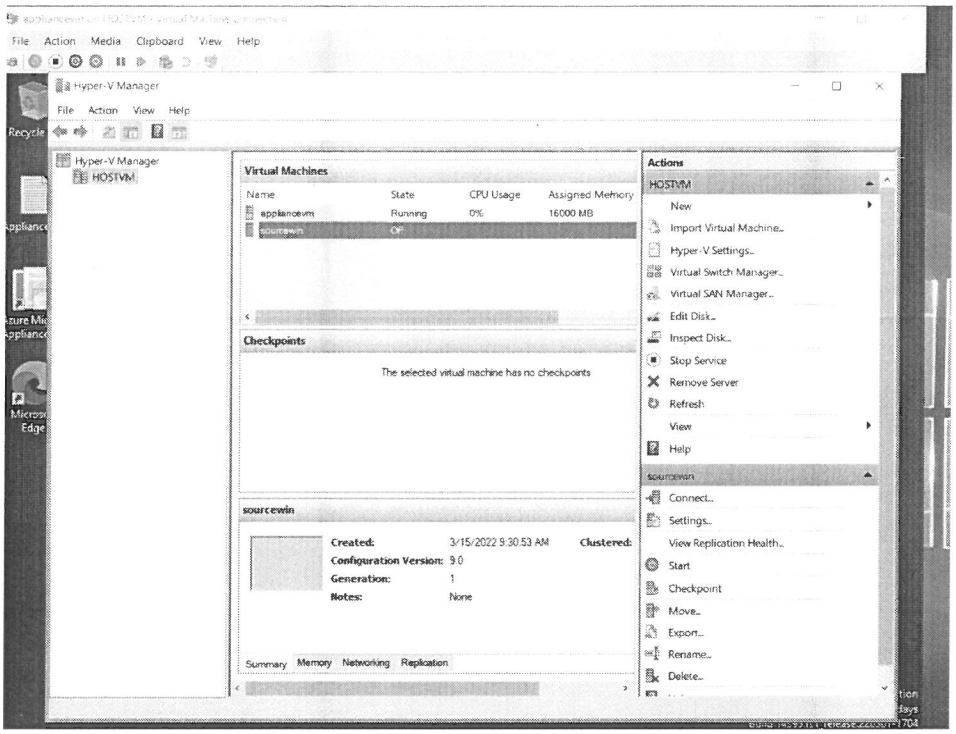
- While installation of Appliance be careful to use Existing VHD it is mentioned in below steps.

Step1: Go to Hyper-V

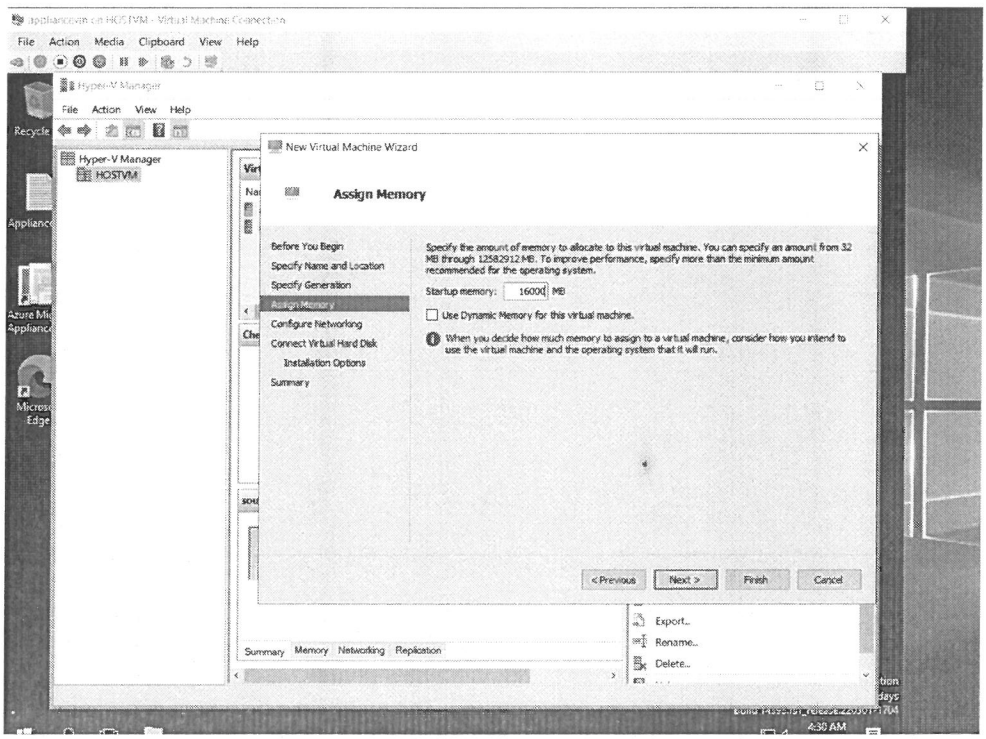
Step2: Right Click on your host VM.

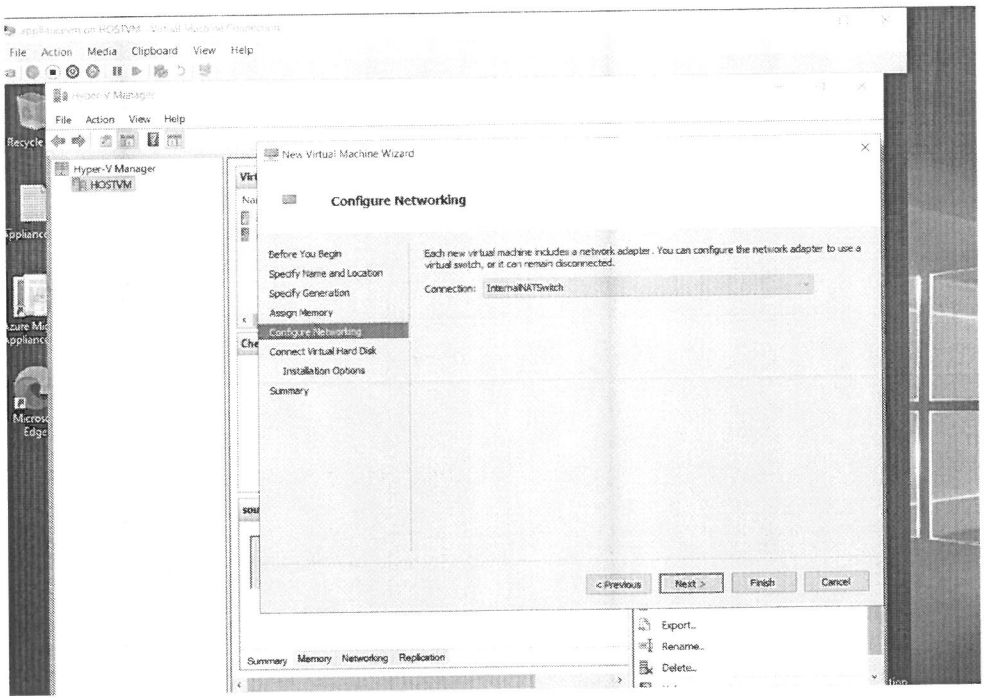
Step3: Click on New.

Step4: Click on virtual machine.

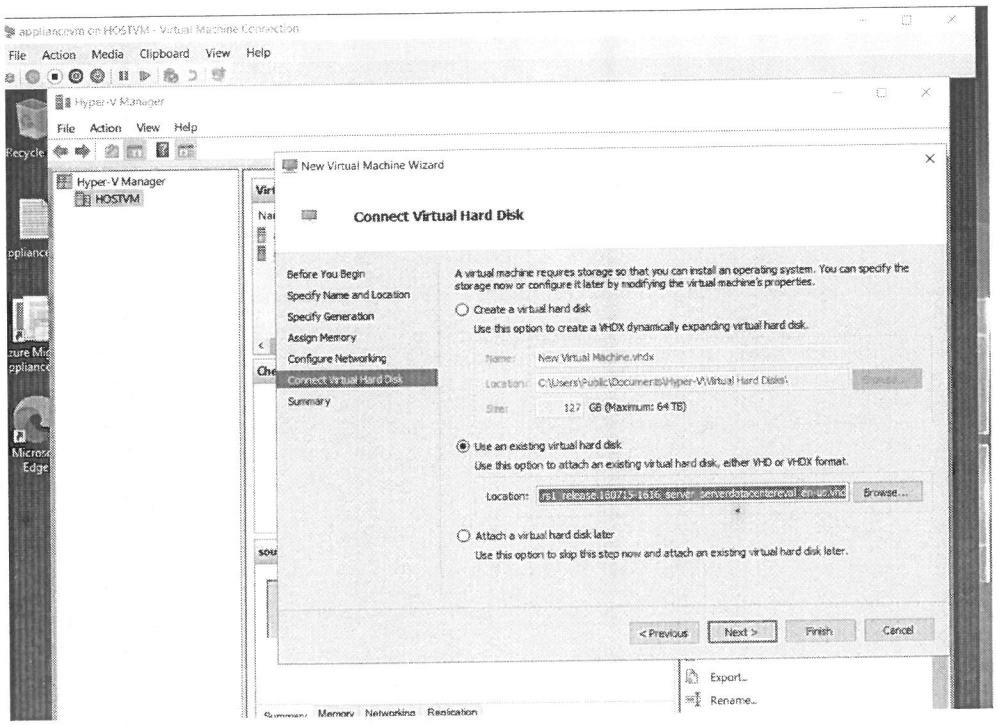


Step5: Select 1600GB as memory and create switch(using powershell).



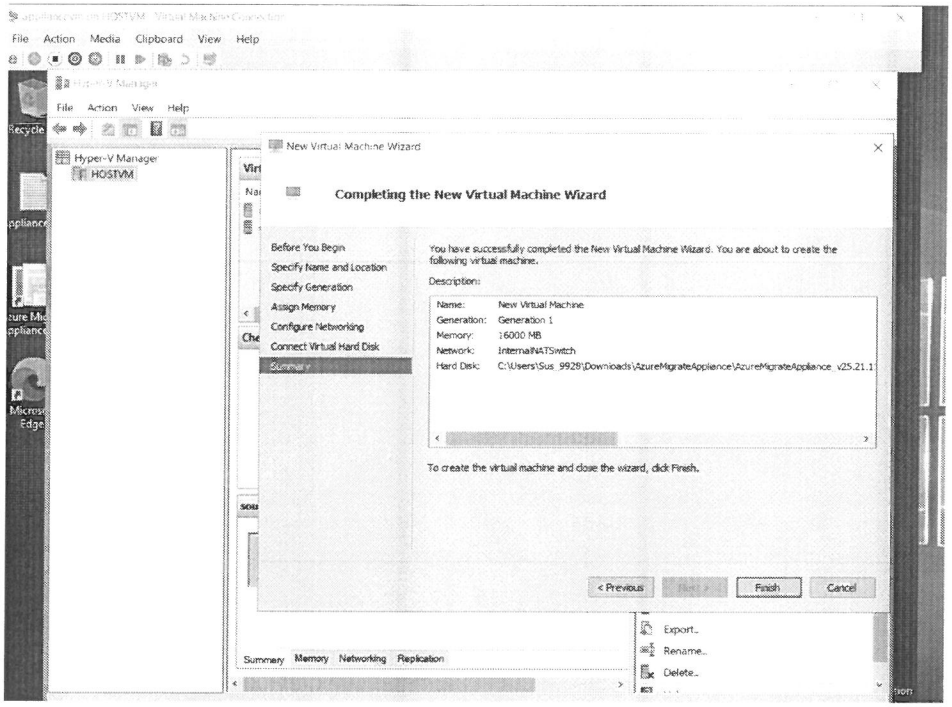


Step6: Select use existing VHD.

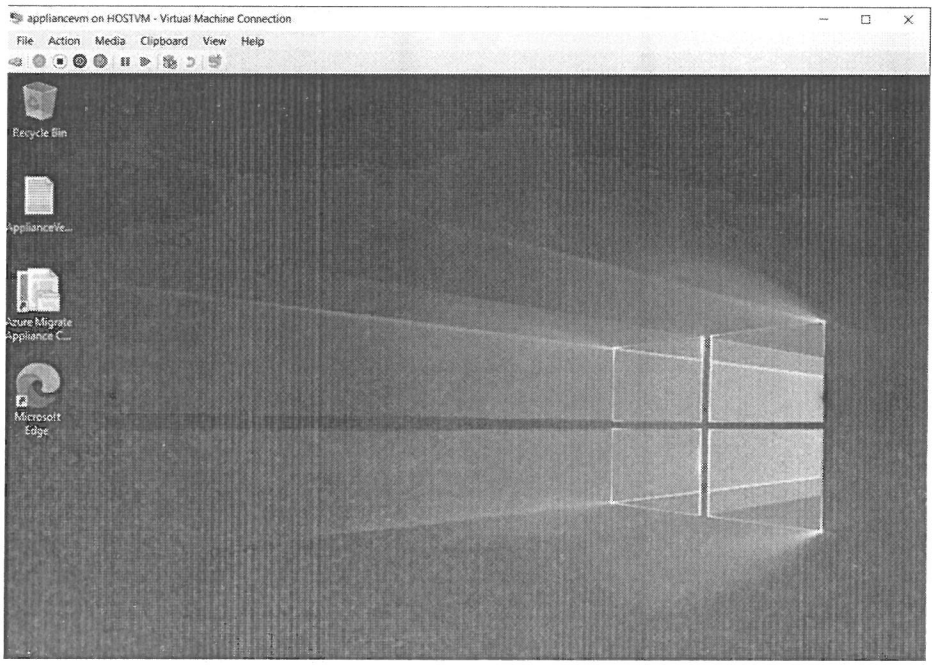


Step7: Browse and give the path of your appliance .VHD (downloaded from portal).

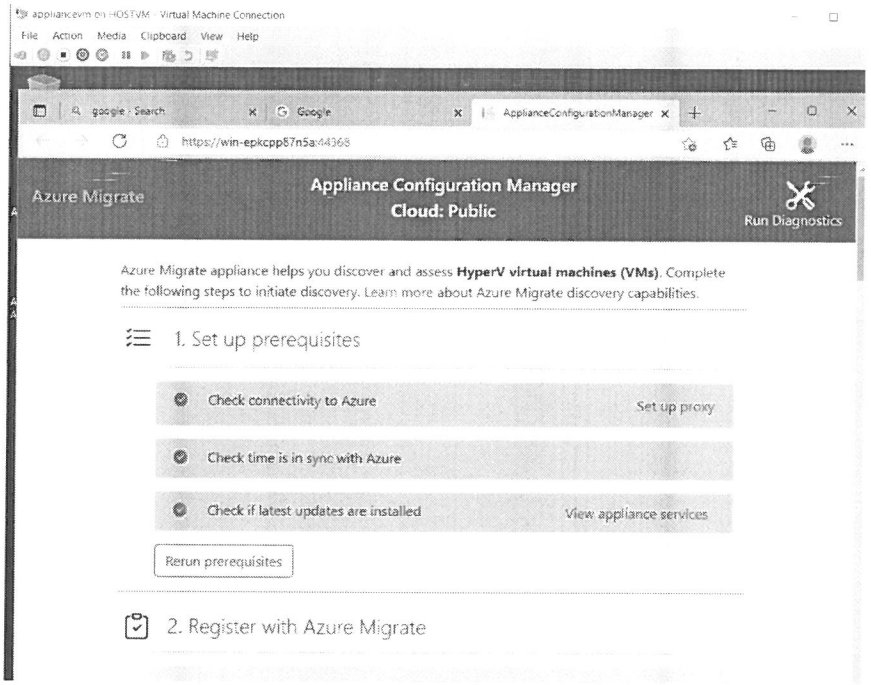
Step8: Hit finish.



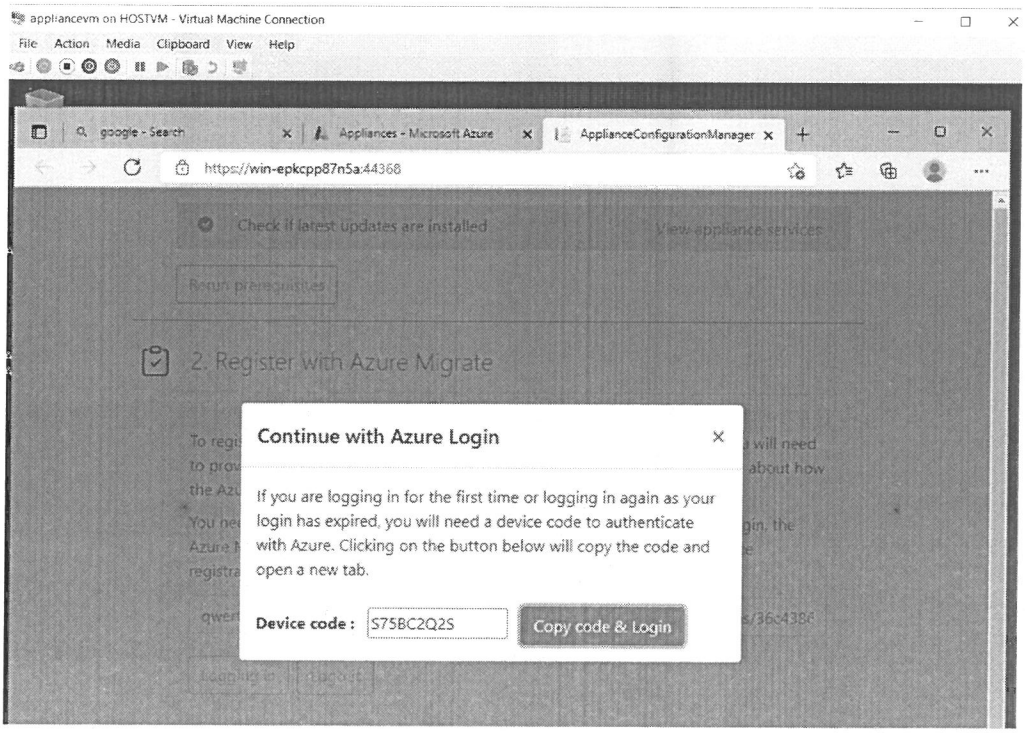
Step9: Go to desktop and open appliance configuration manager file (will automatically get generated on desktop after above process.)



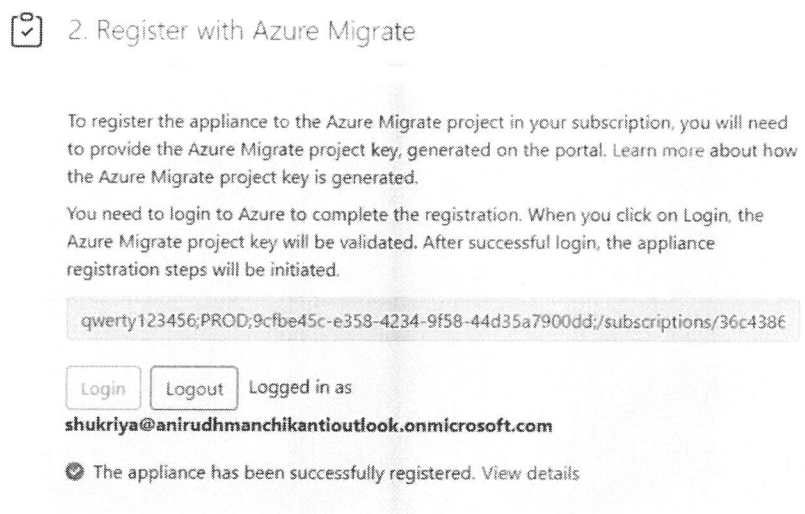
Step10: It will run prerequisites and install the required things if needed automatically.



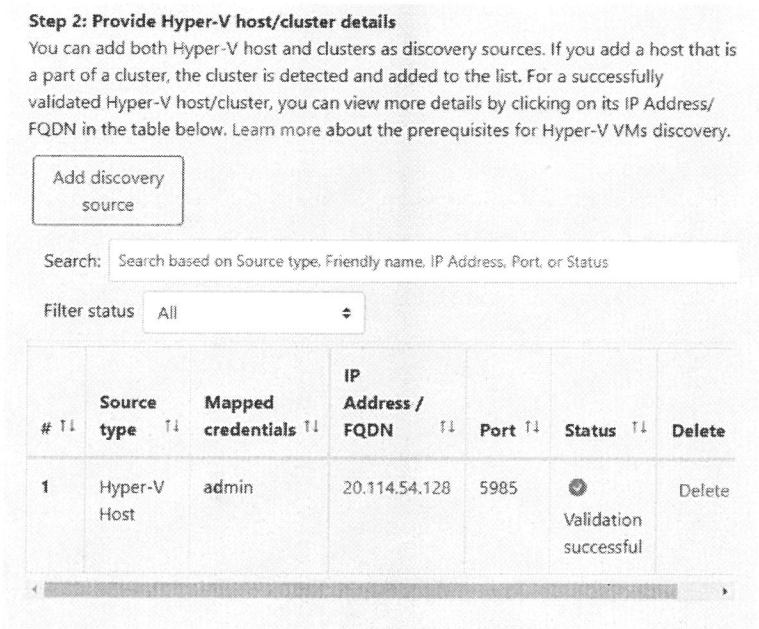
Step11: Copy Code and Login.



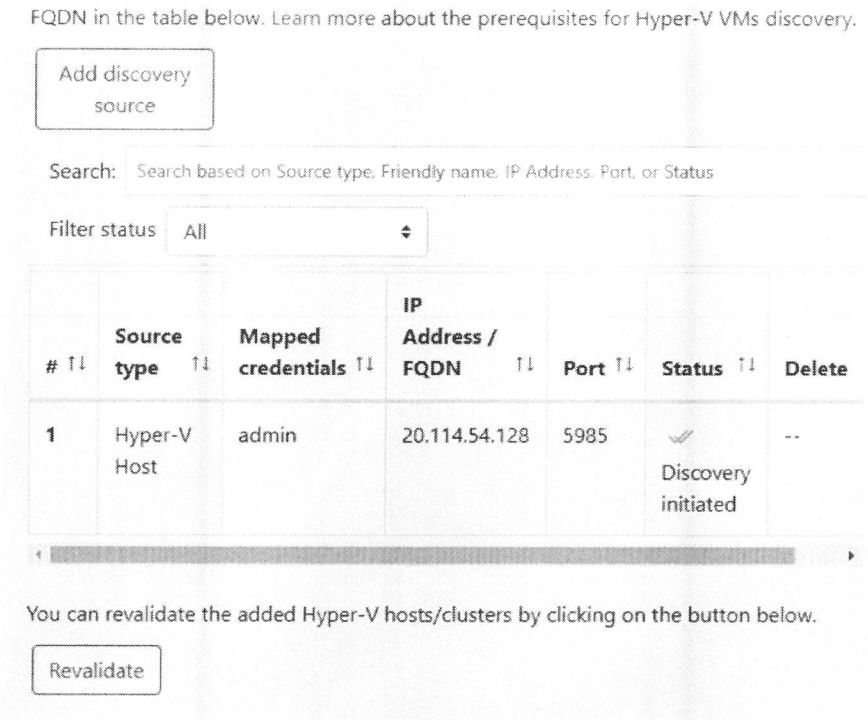
Step12: Successfully registered with login id.



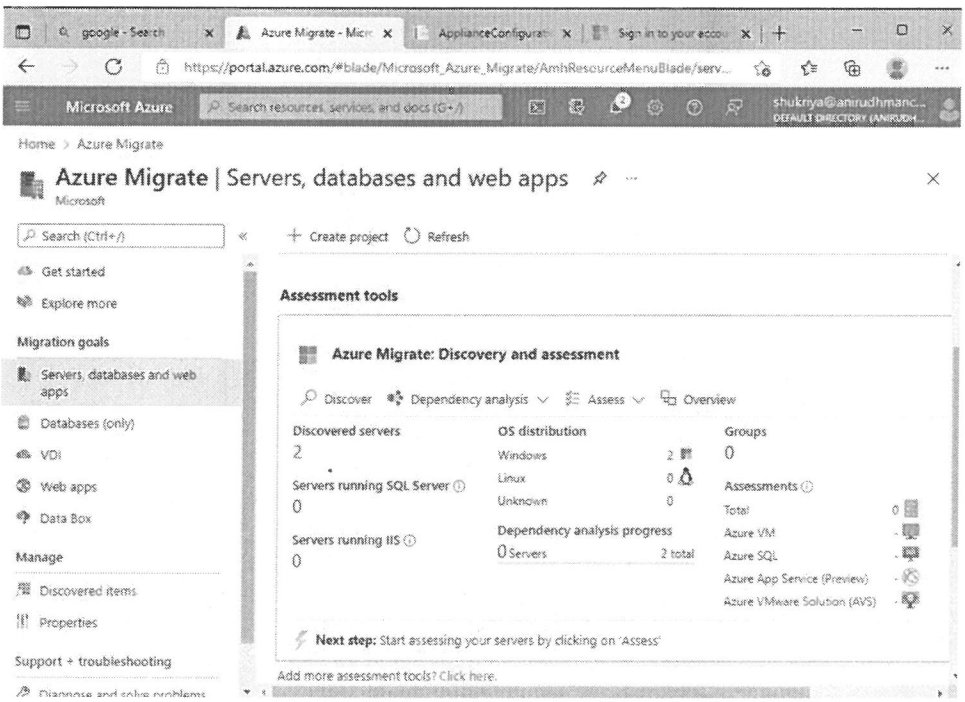
Step13: Give the details of host-vm and source vm.



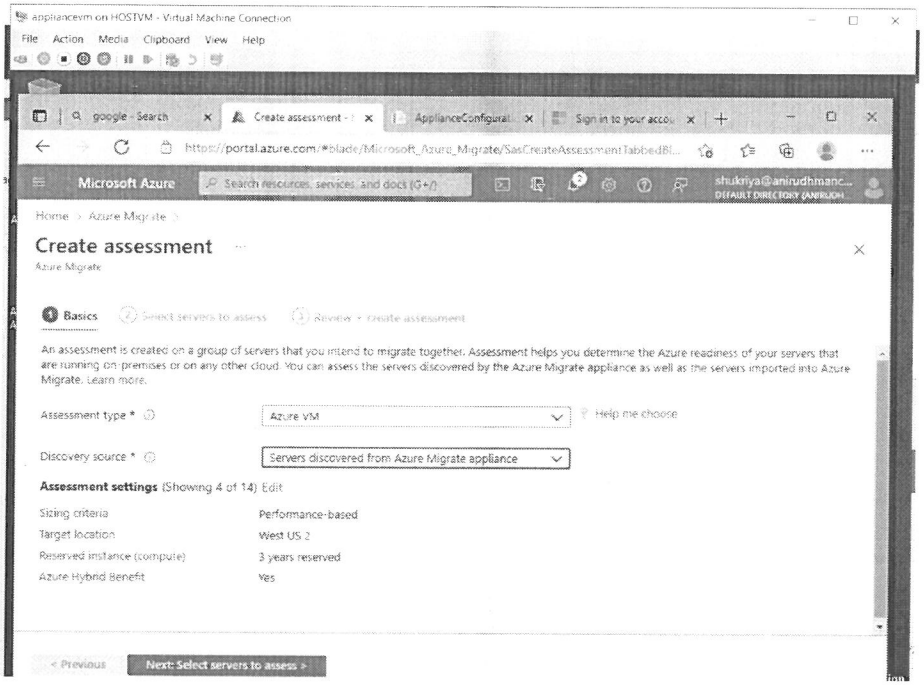
Step14: Hit host and start discovery.



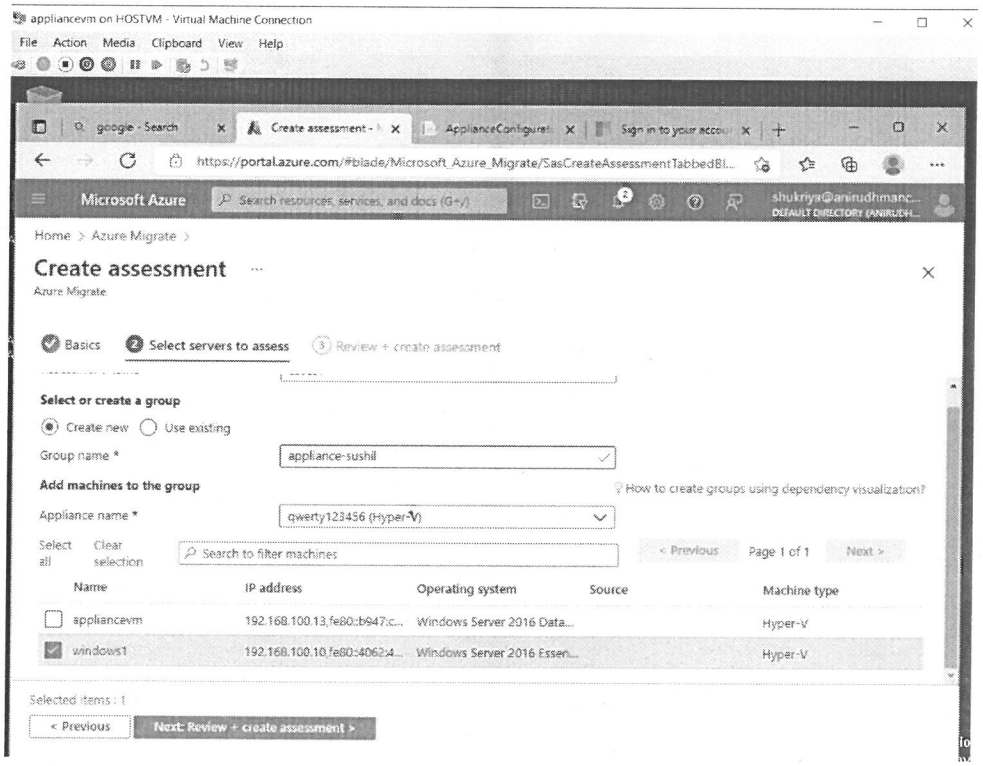
Step15:After discover, start assessment.



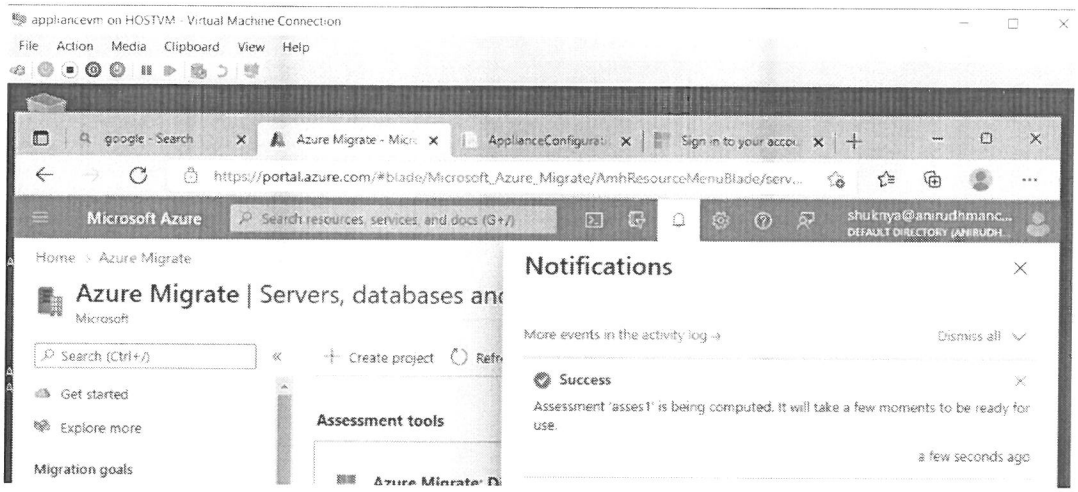
Step16: Create new assessment.



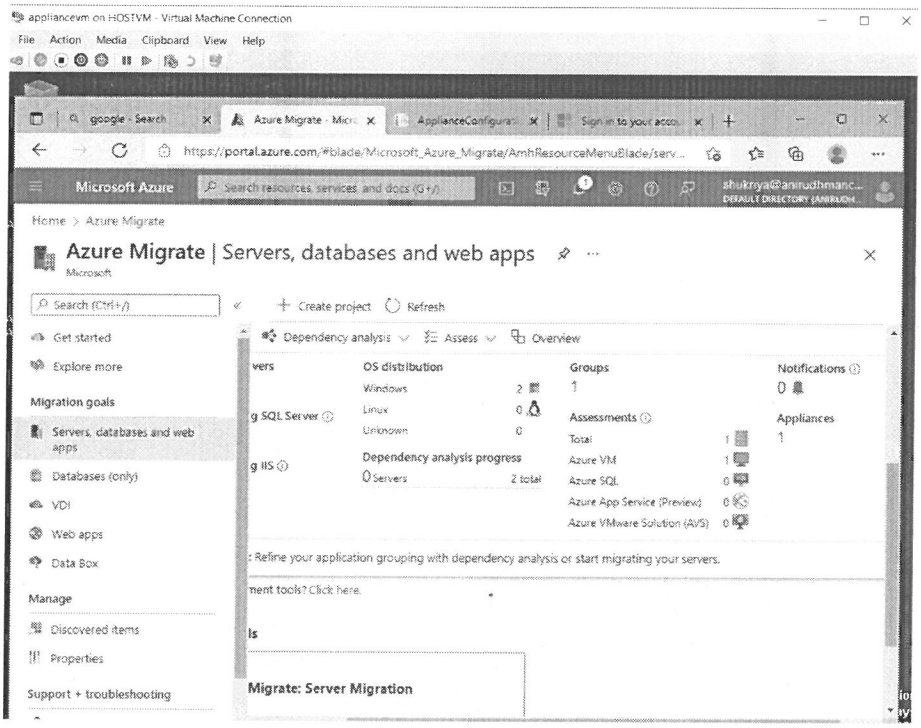
Step17: Give server details and select your server need to be migrated.



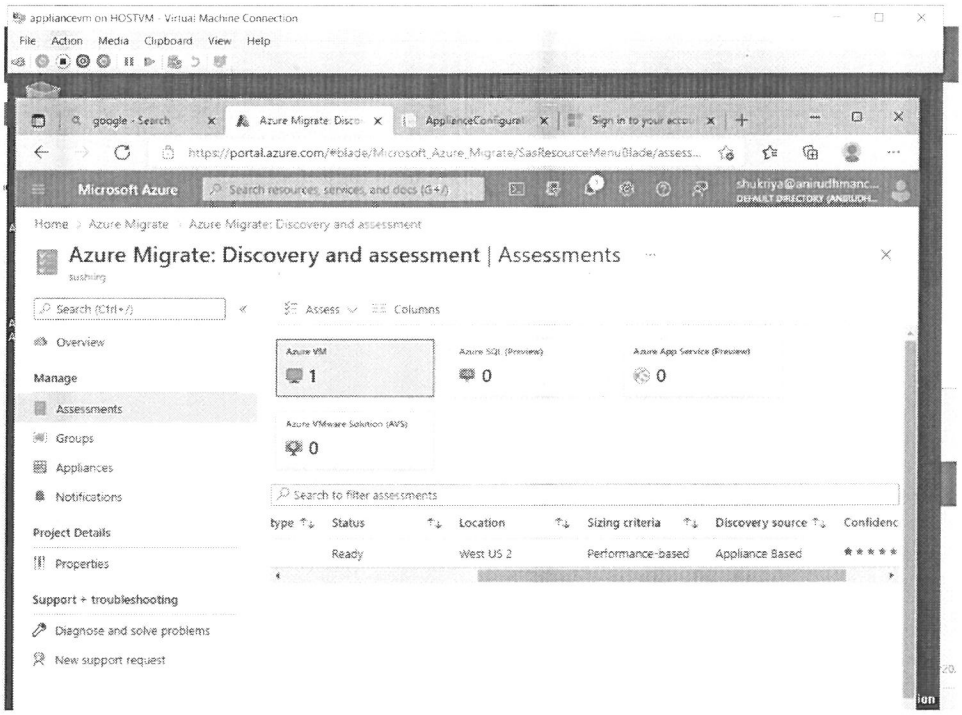
Step18: Review + Create and it get creates successfully,



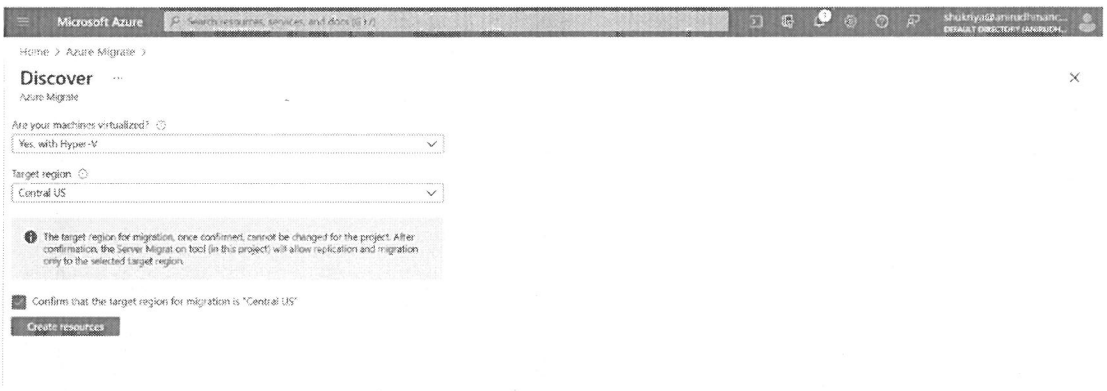
Step19: Azure Migrate: Discovery and assessment: We can see overview.



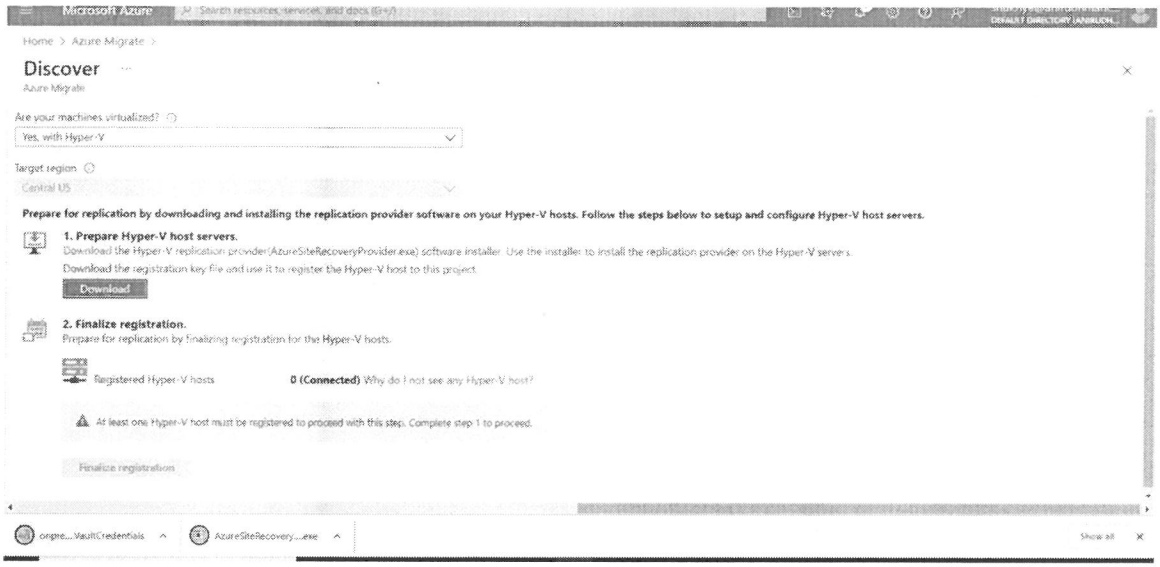
Step20: We can see azure vm.



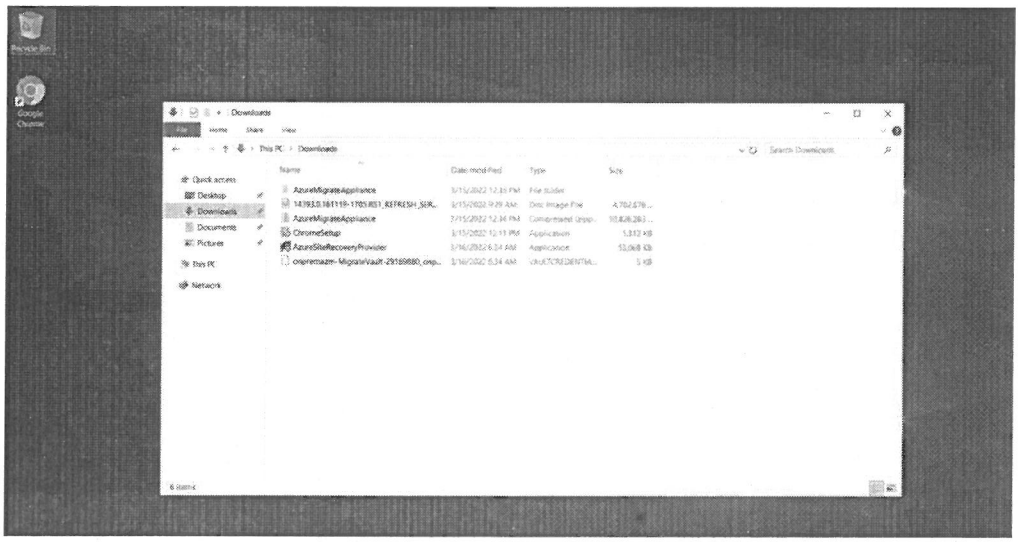
Step21: After this go to Azure migrate: Migration Tool. And click on discover.



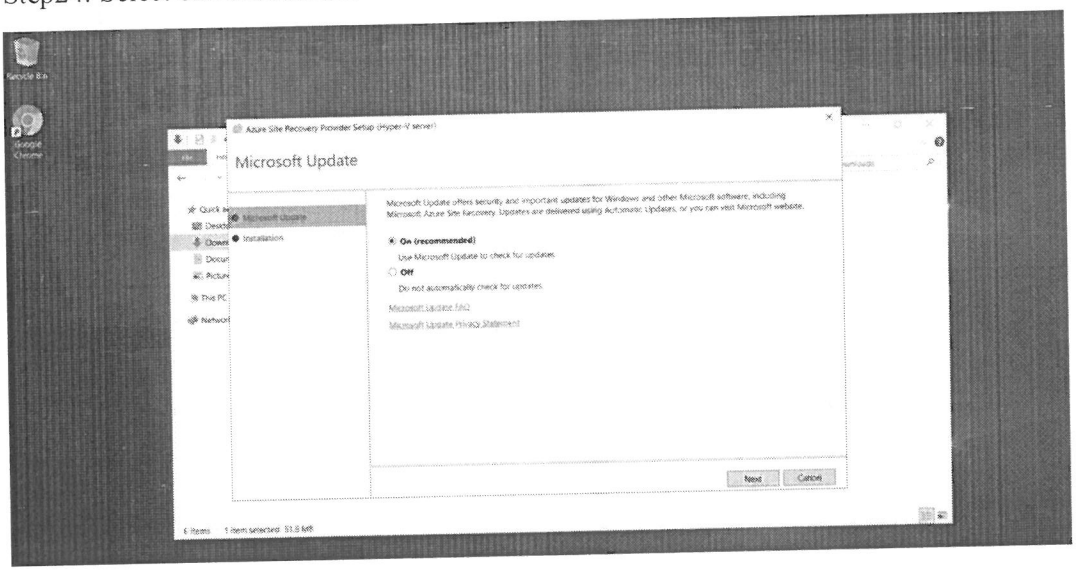
Step22: Download AzureSiteRecovery.exe file and key vault file and install it in main(host)VM.



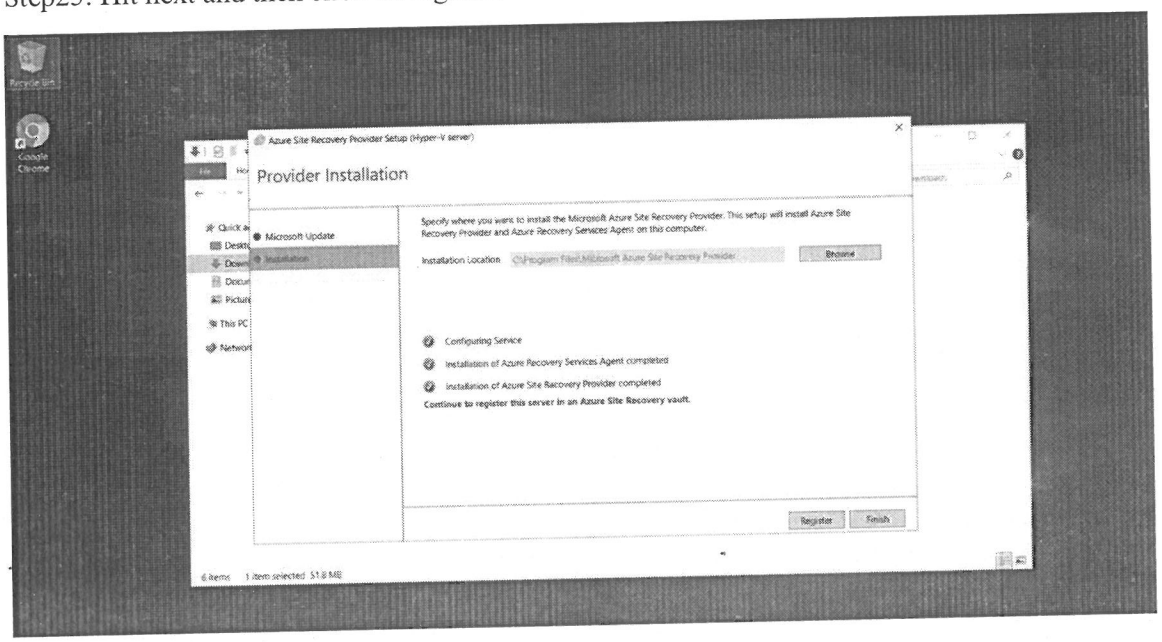
Step23: Install AzureSiteRecovery by double click.



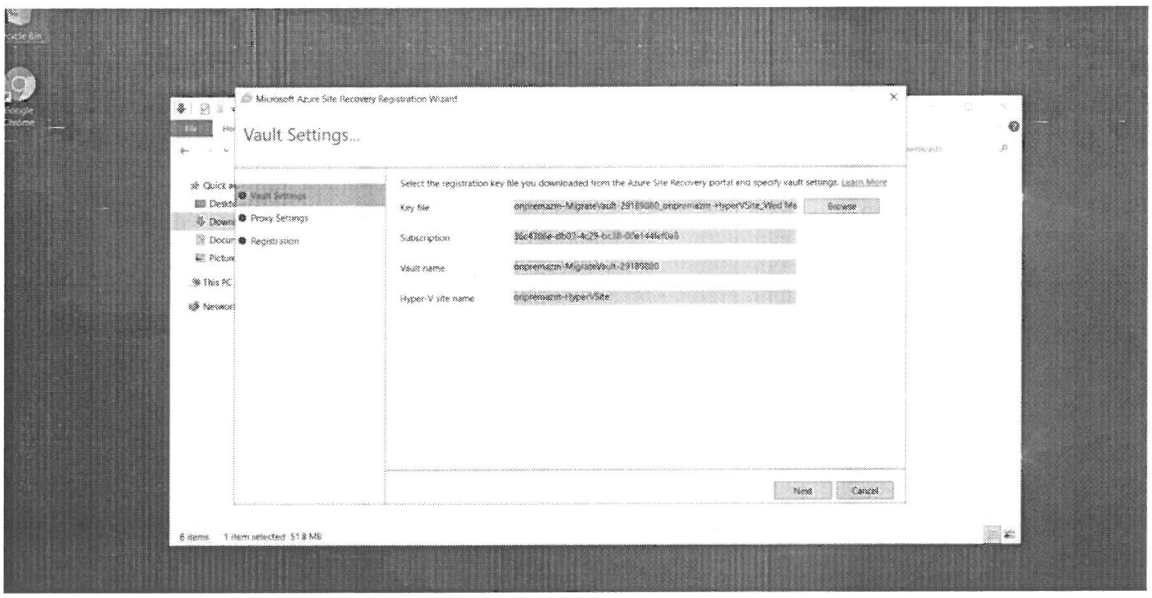
Step24: Select on recommend.



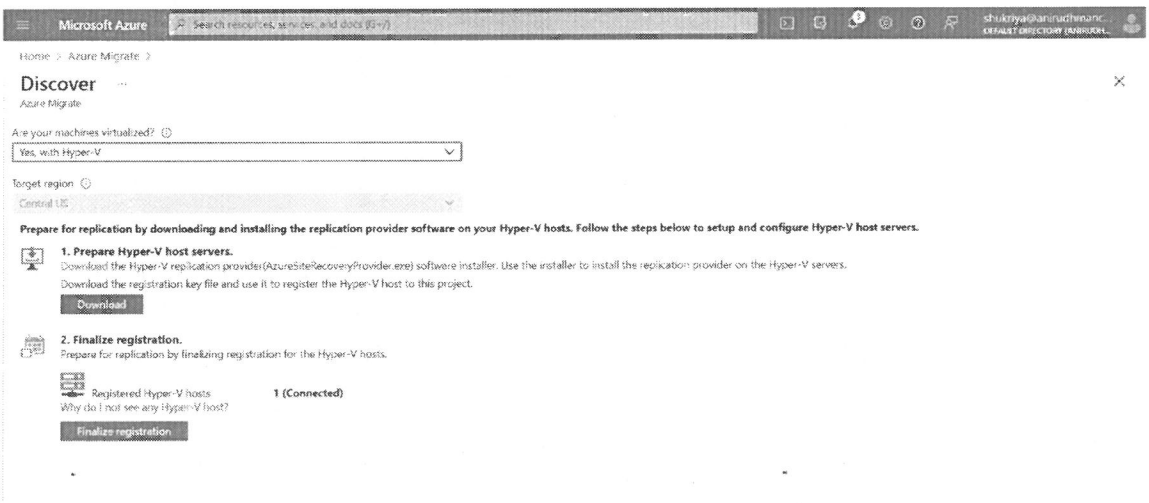
Step25: Hit next and then click on register.



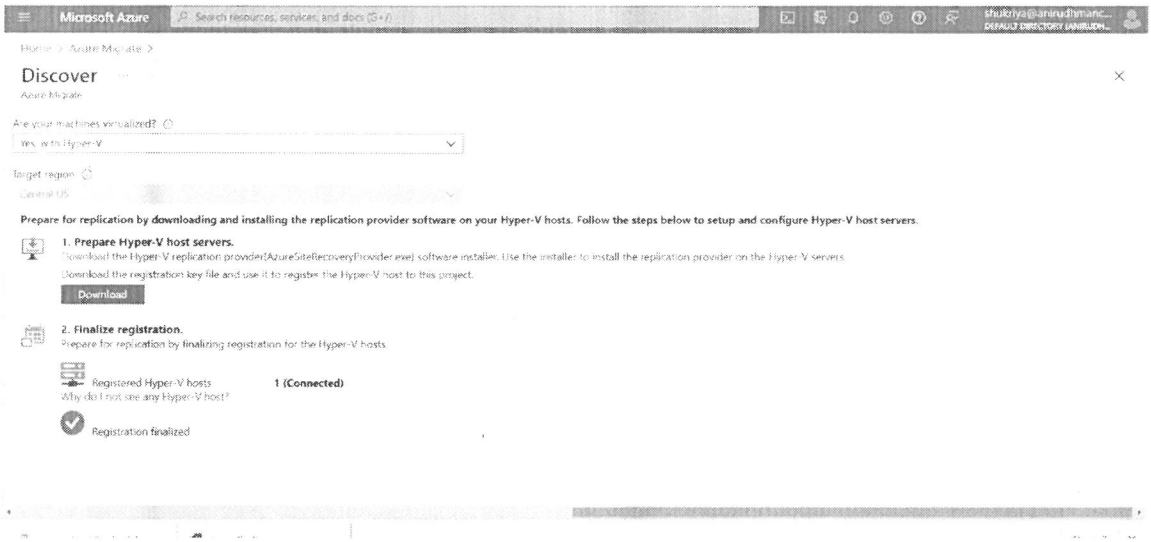
Step26: From browse select the downloaded key vault it will automatically fetch all other required details.



Step27: After Installation in host-vm refresh this face then you will be able to see I connected server as below.



Step28: Click on Finalize registration and after registration it will show registration finalized.

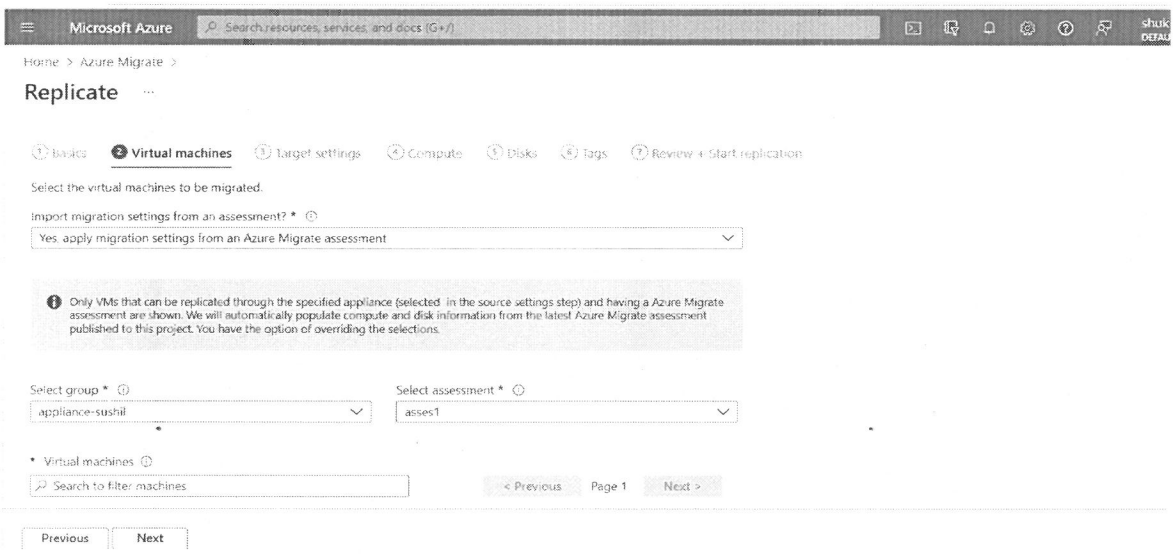


Step29: Go to Azure Migrate: Migration Tool.

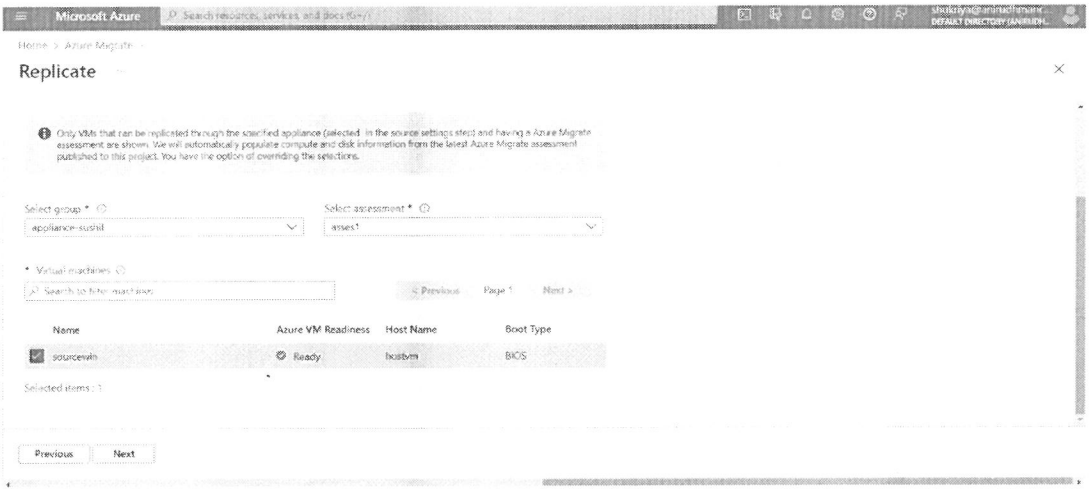
Step30: Click on Replicate.

Step32: In Basic choose yes with Hyper-V.

Step33: Choose the details as below.



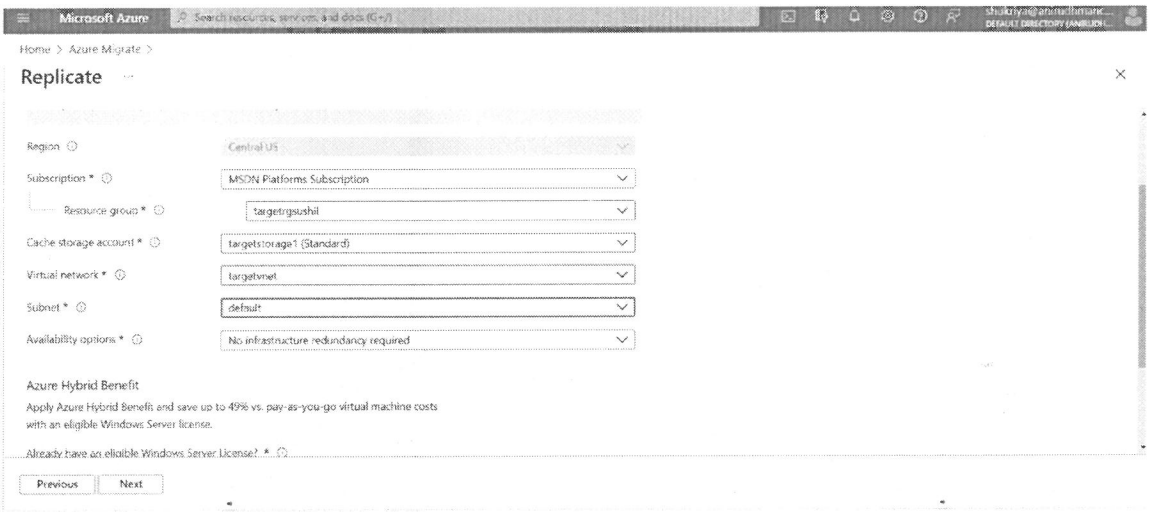
Step34: Select server need to be migrated.



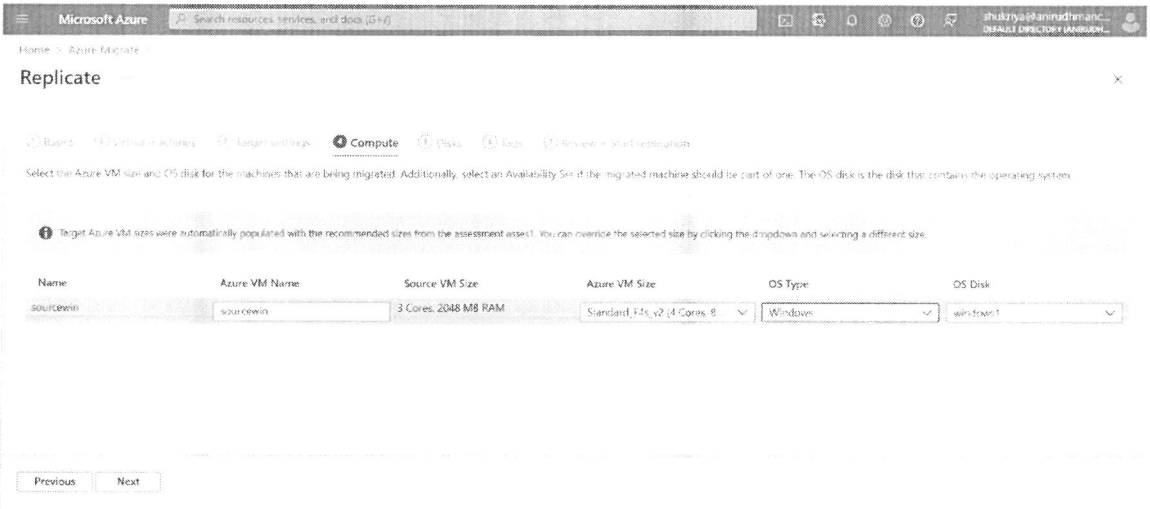
Step35: Create a resource group in different region (previous group was in East Us) Target Resource group region is Central US.

Step36: In target resource group create 1 target vnet, 1 dummy vnet, 1 target storage.

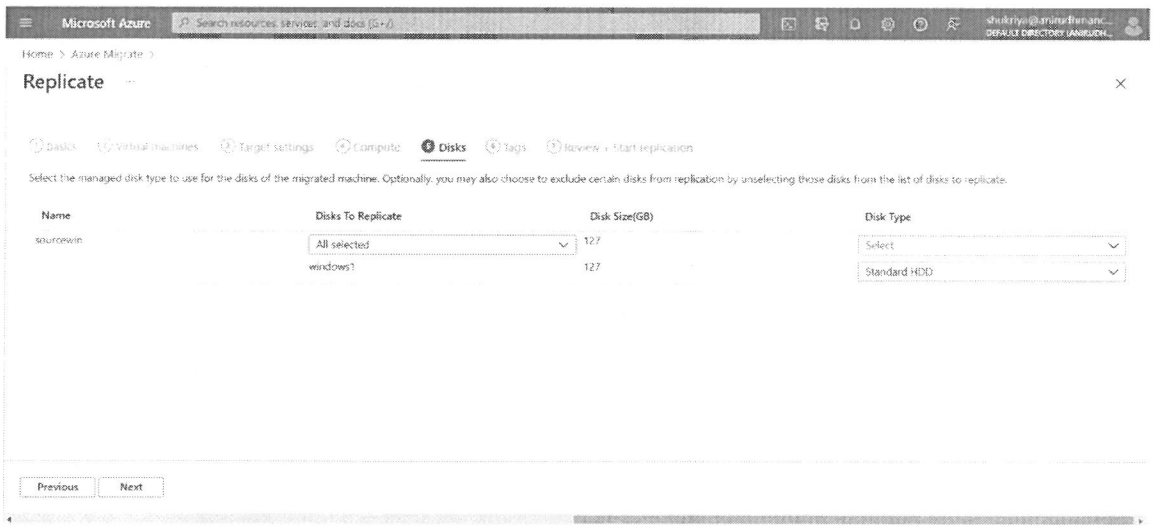
Step37: Then Fill the required details as below.



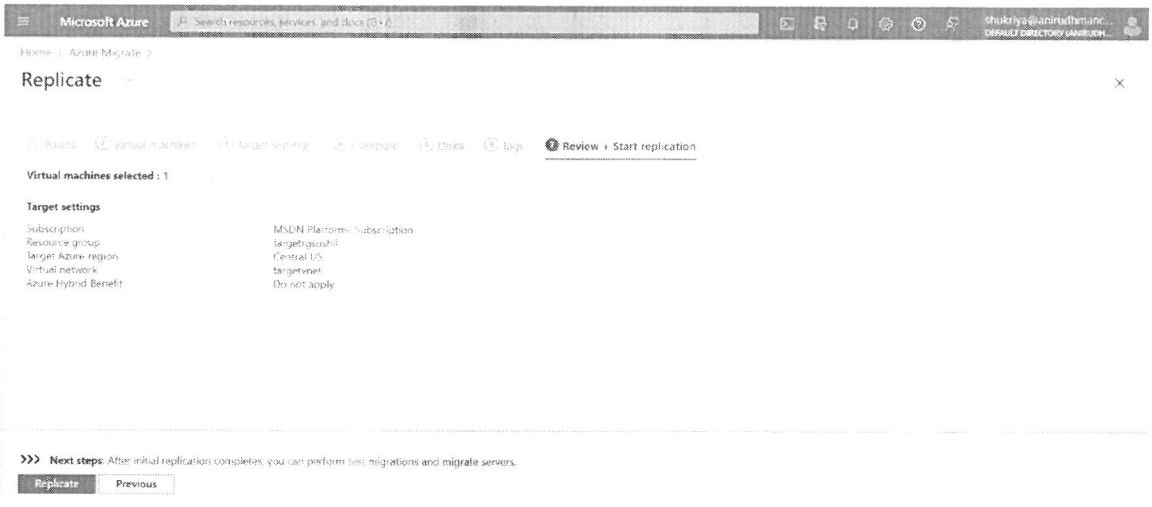
Step38: Select OS as windows rest default.



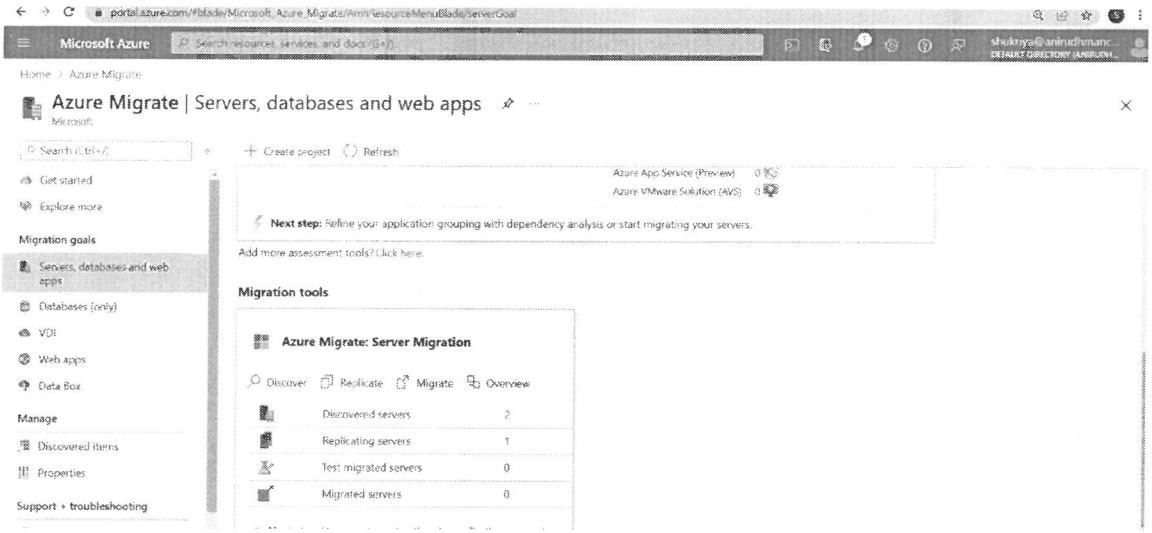
Step39: Default.



Step40: Replication summary.



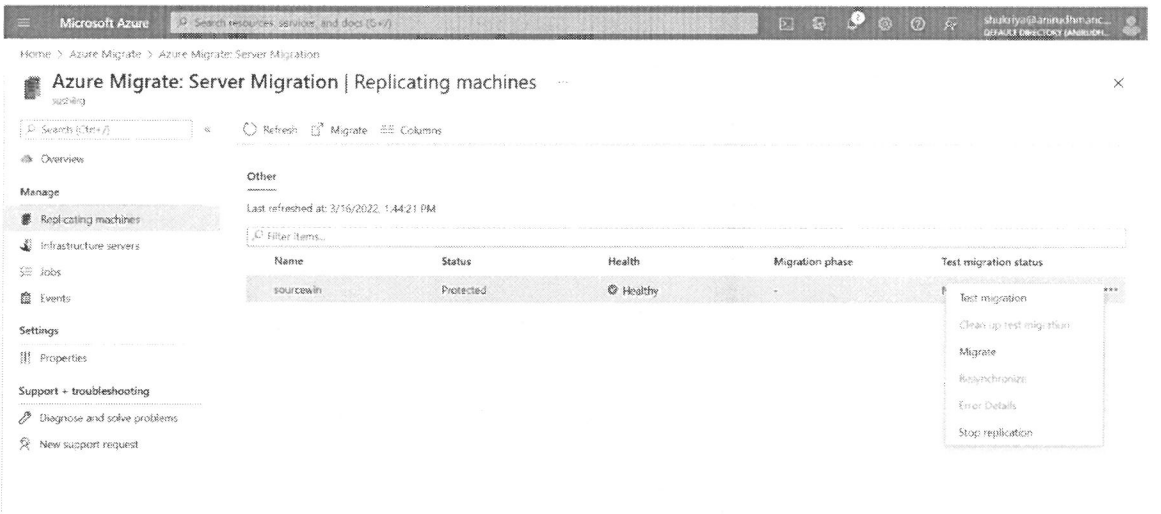
Step41: Here we can see 1discoverd server and 1 replicated server.



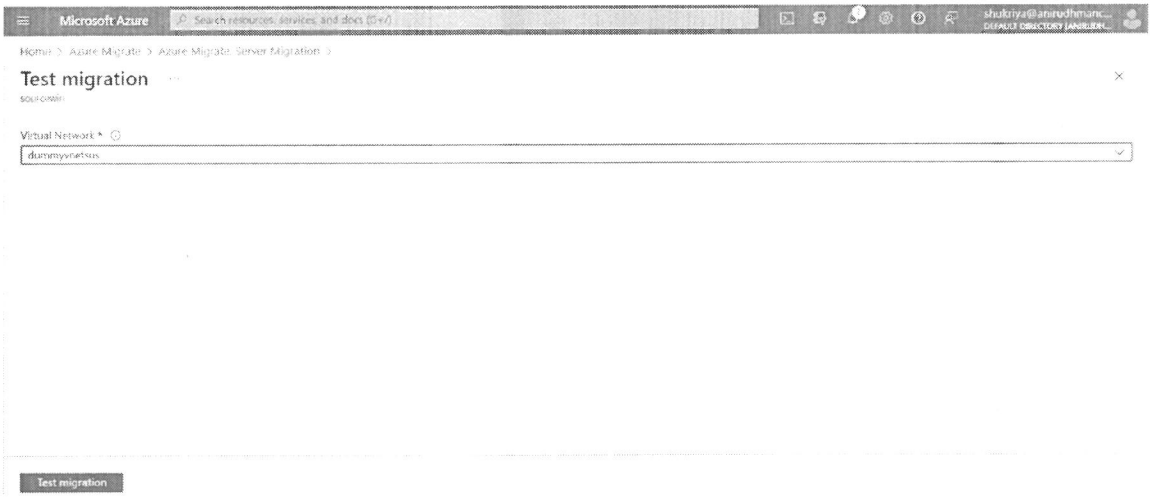
Step42: It takes time to show status as protected wait till it shows protected status(20mins approx.)



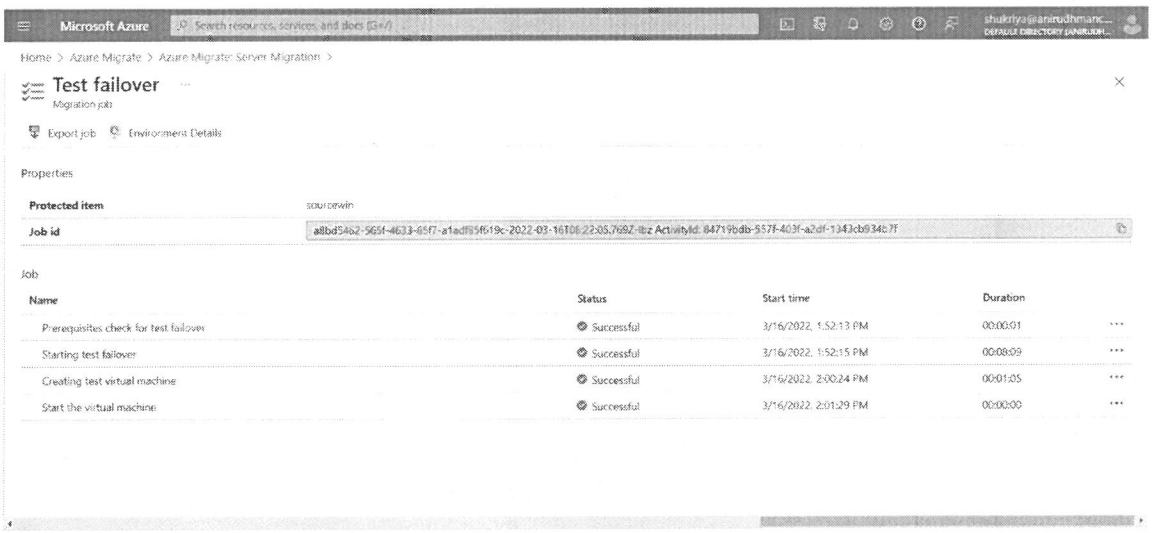
Step43: Click on three dots then click on test migration.



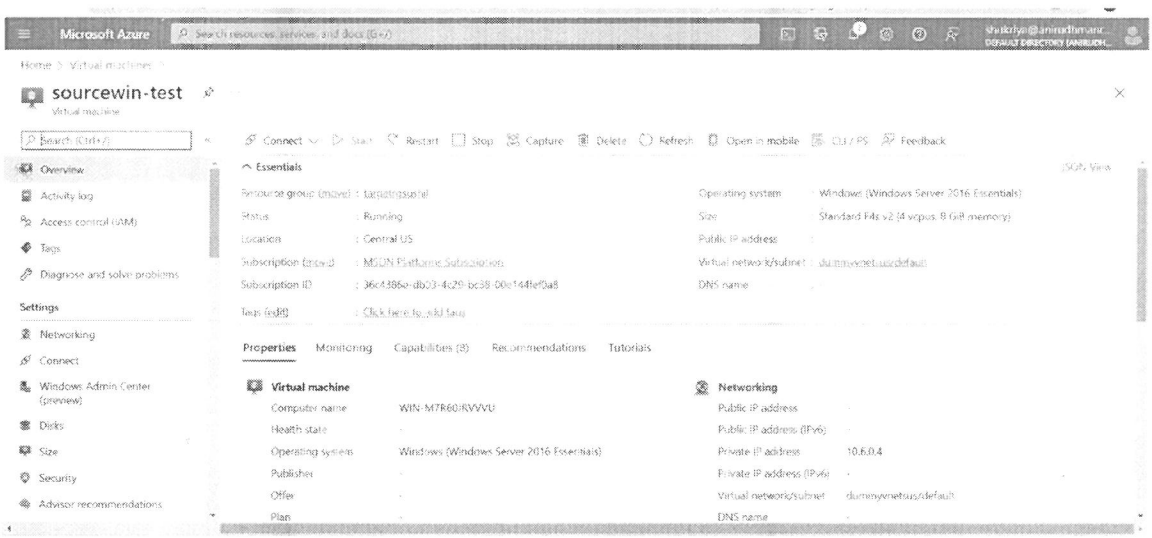
Step44: Choose dummy vnet for testing purpose.



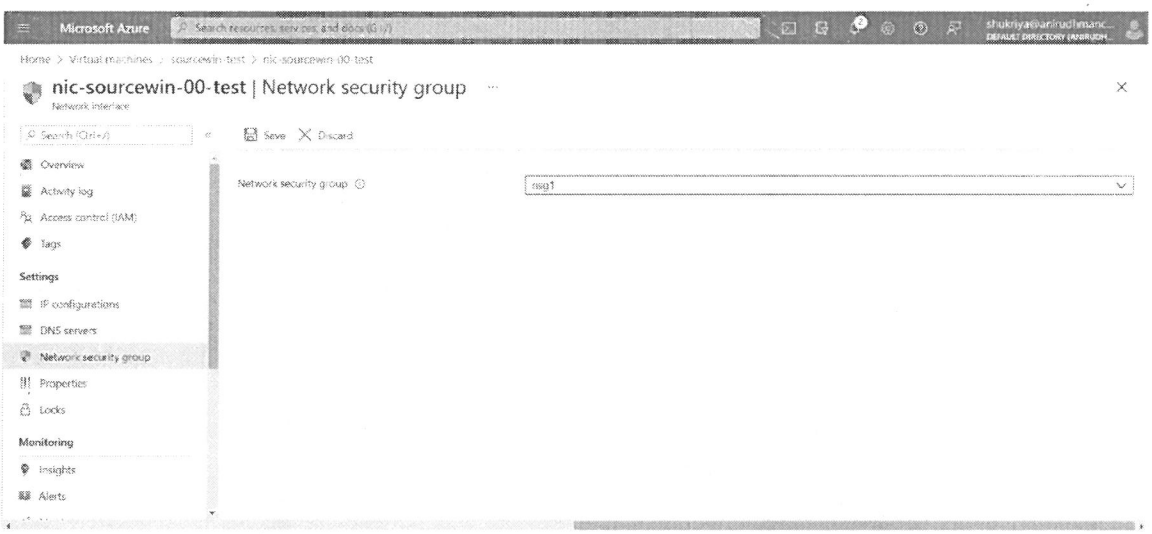
Step45: Test migration got successful.



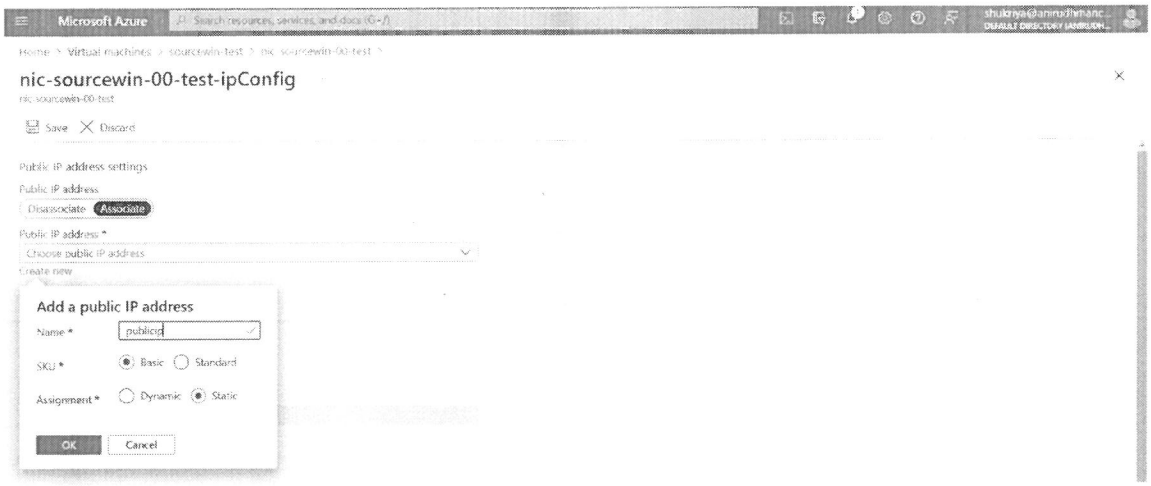
Step46: On Virtual Machine tab we can see the test server installed.



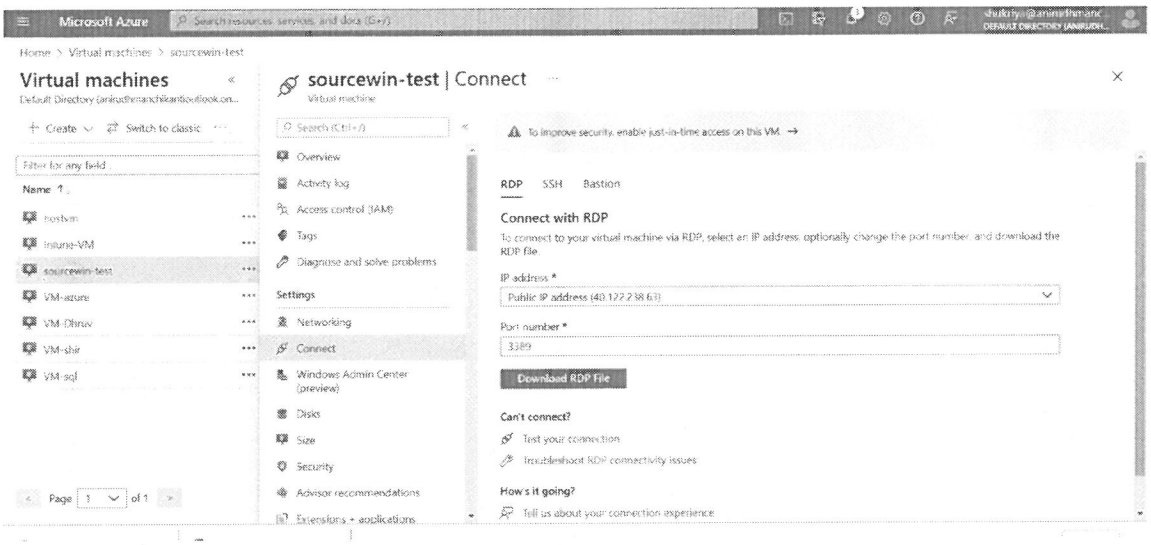
Step47: Go to test vm then create one nsg then associate nsg and then



Step48: Go to IP configuration then associate public-ip.



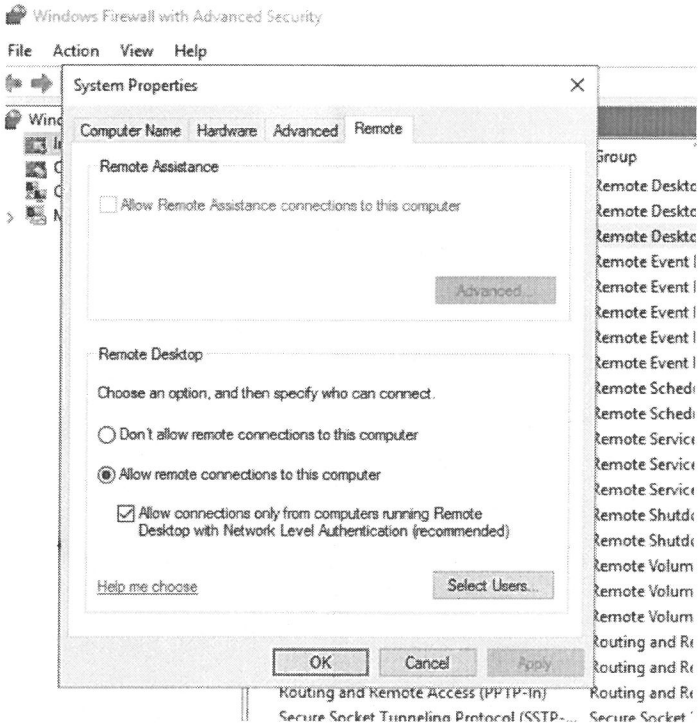
Step49: Then we will be able to see public ip for RDP.



Step50: Go to firewall advance in Hyper-V source server and allow the inbounds as below.



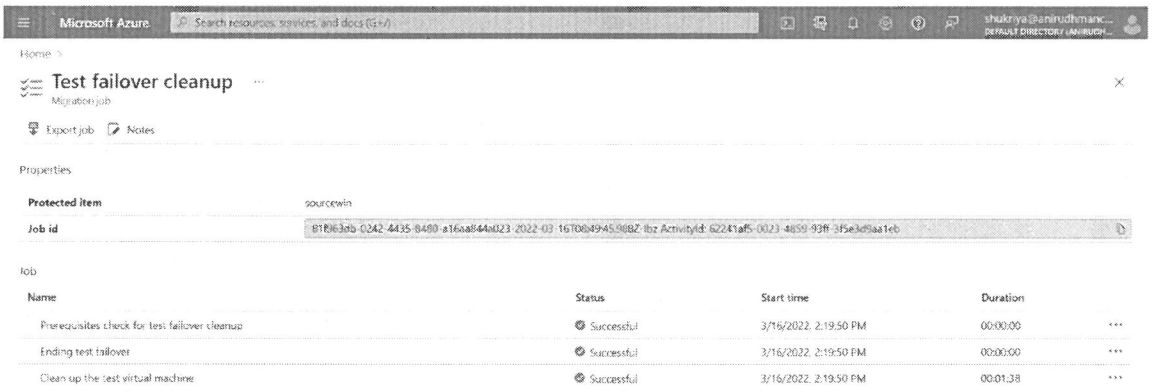
Step51: Allow access to remote desktop.



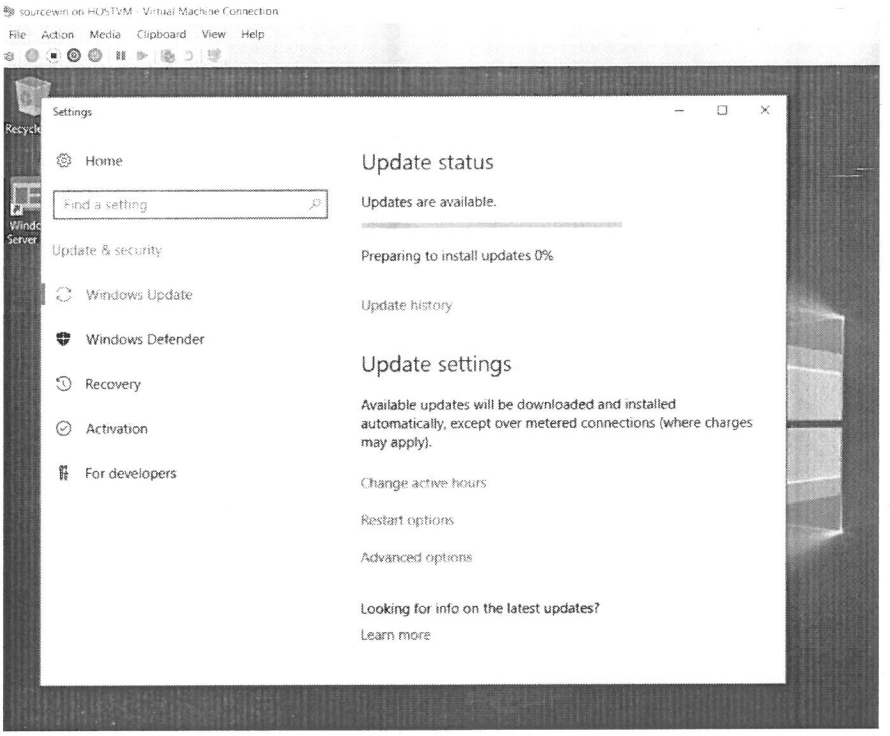
Step52: After test migration get successful. Start test migration cleanup.



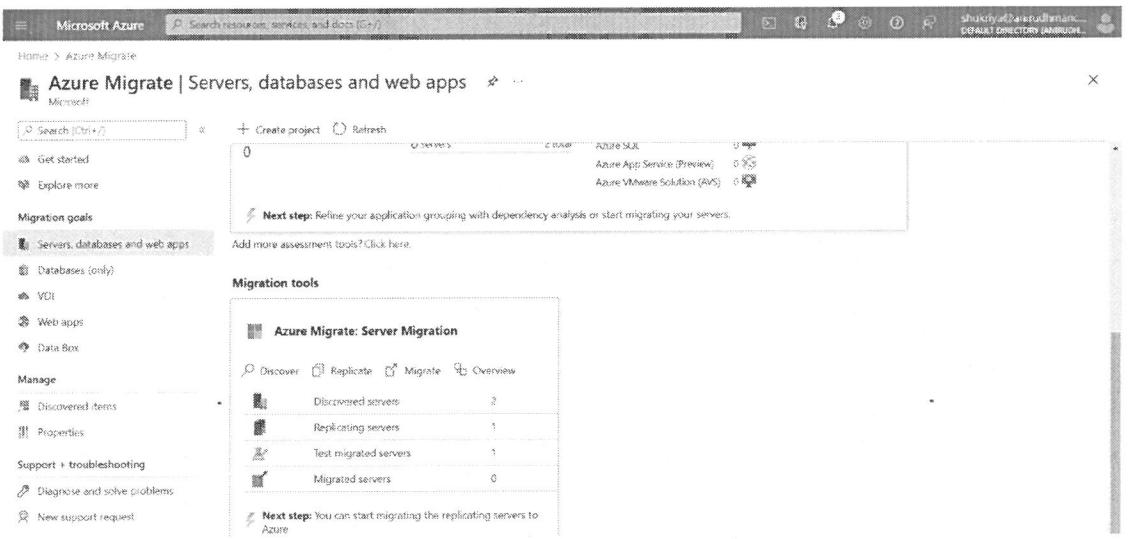
Step53: Test migration cleanup got successful.



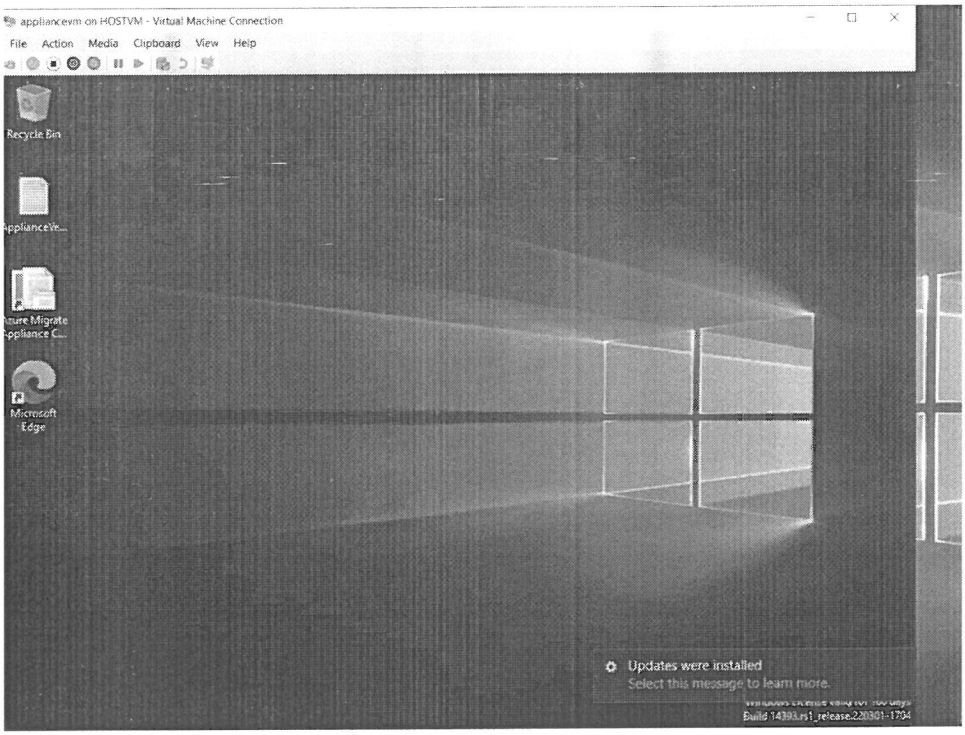
Step54: windows Update source vm after giving public remote access.



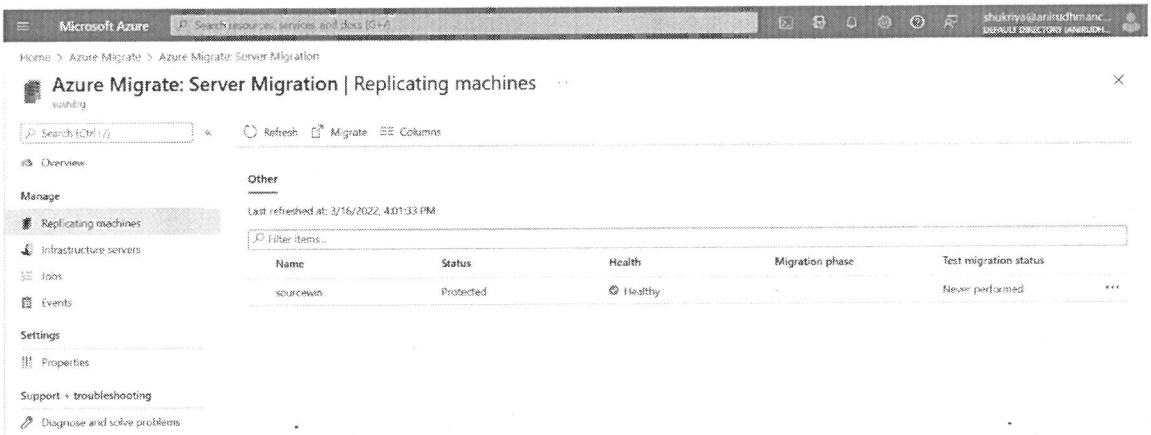
Step55: Here we can see one test migrated server.



Step56: Updates got installed in source vm.



Step57: Check replication if it shows critical then deleted it and start new replication process as above.



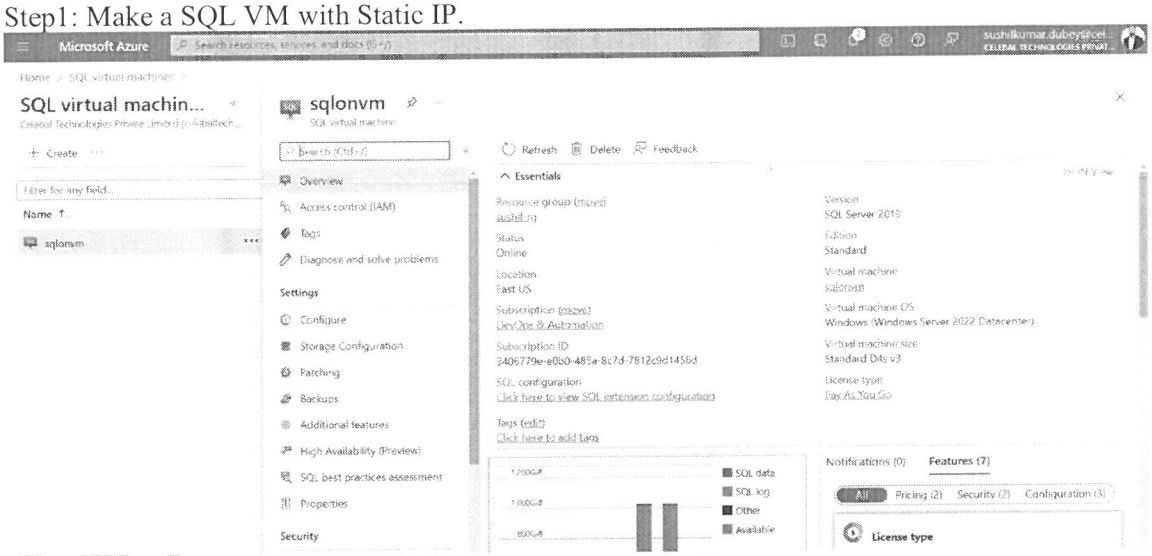
Step58: It shows protected status.



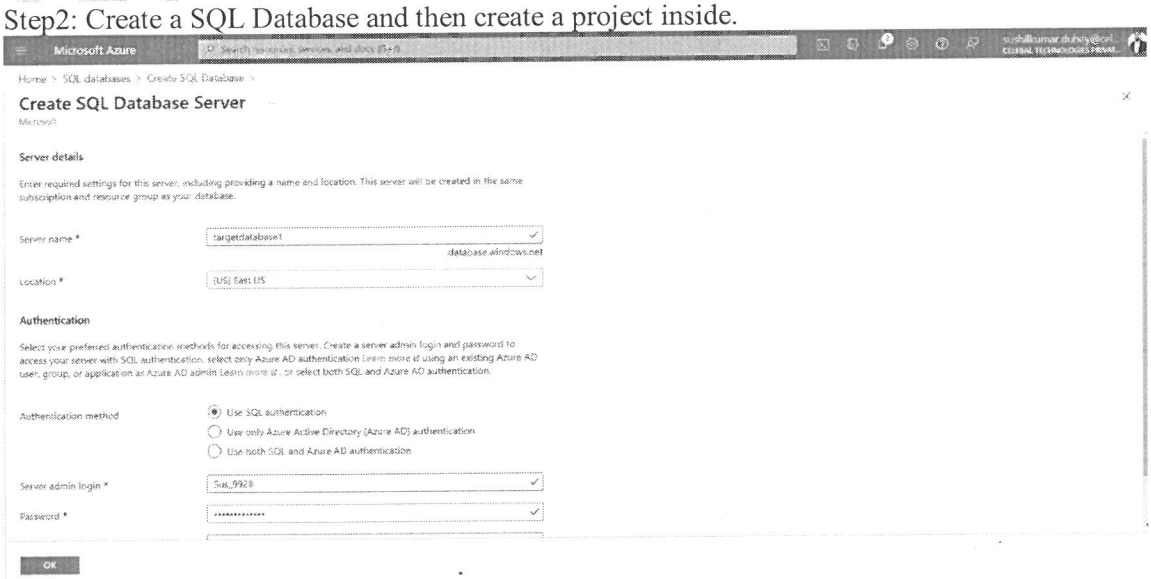
Project Setup Objective 3:

Assessment and discovery steps are same as above I have mentioned in azure migrate part. The process is mentioned below:

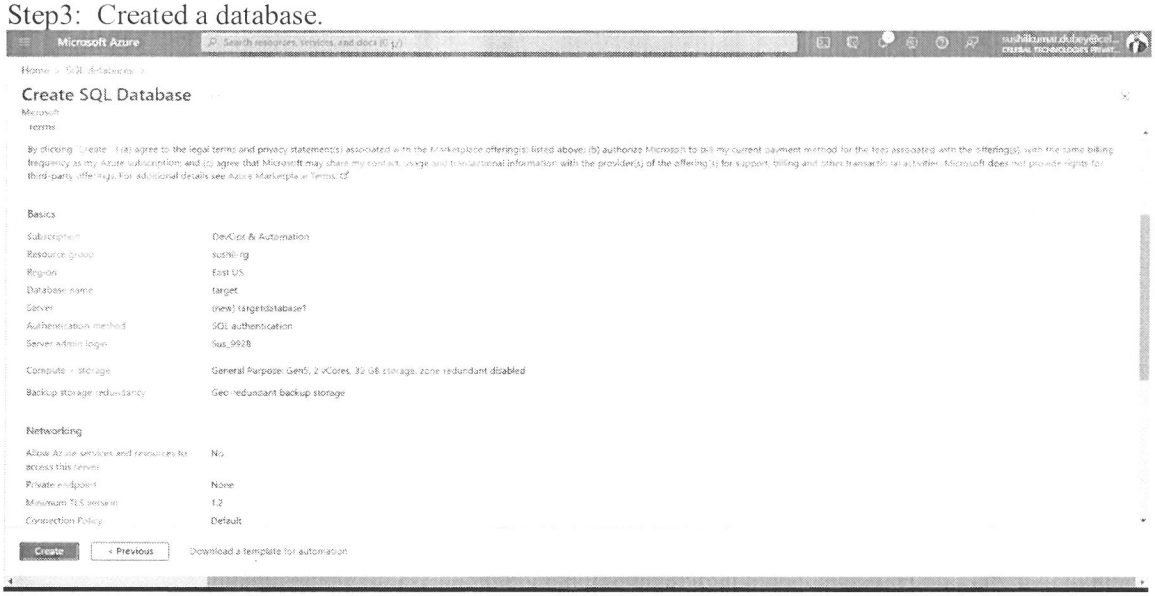
Step1: Make a SQL VM with Static IP.



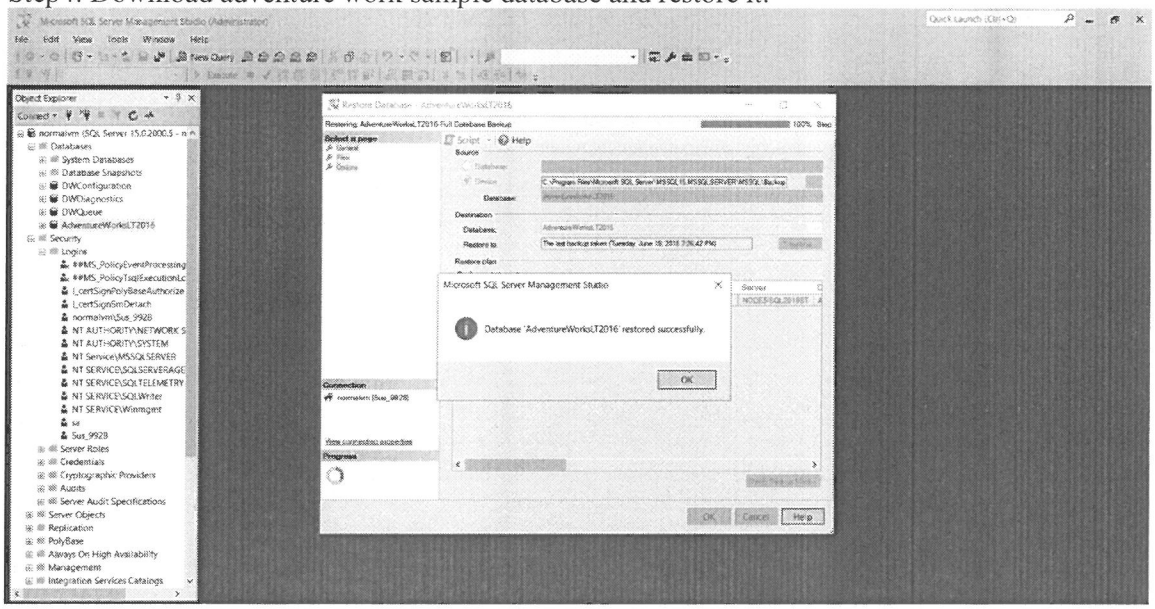
Step2: Create a SQL Database and then create a project inside.



Step3: Created a database.



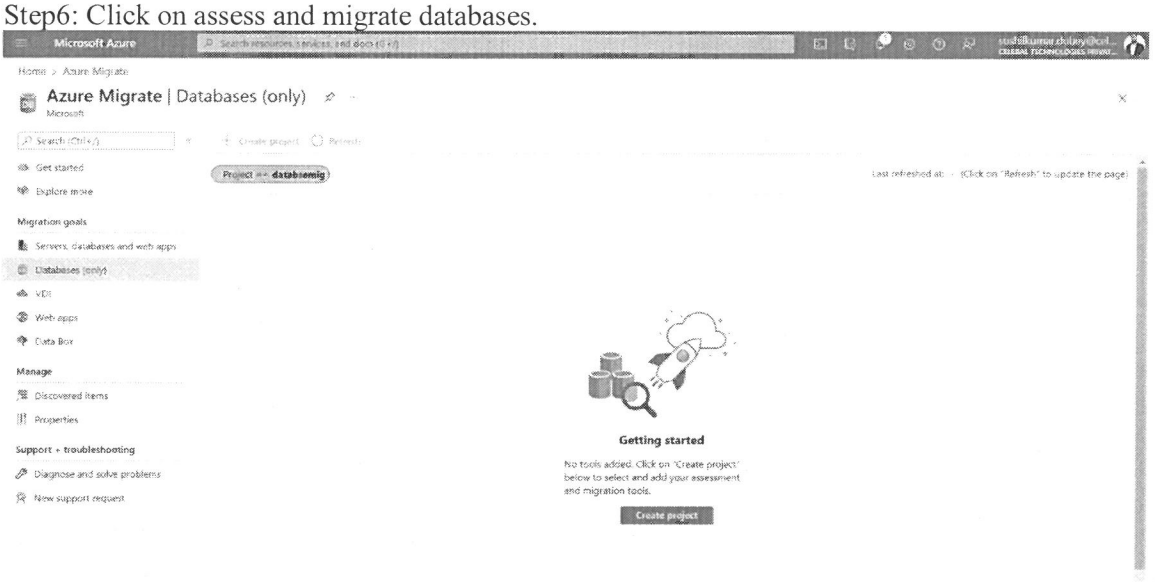
Step4: Download adventure work sample database and restore it.



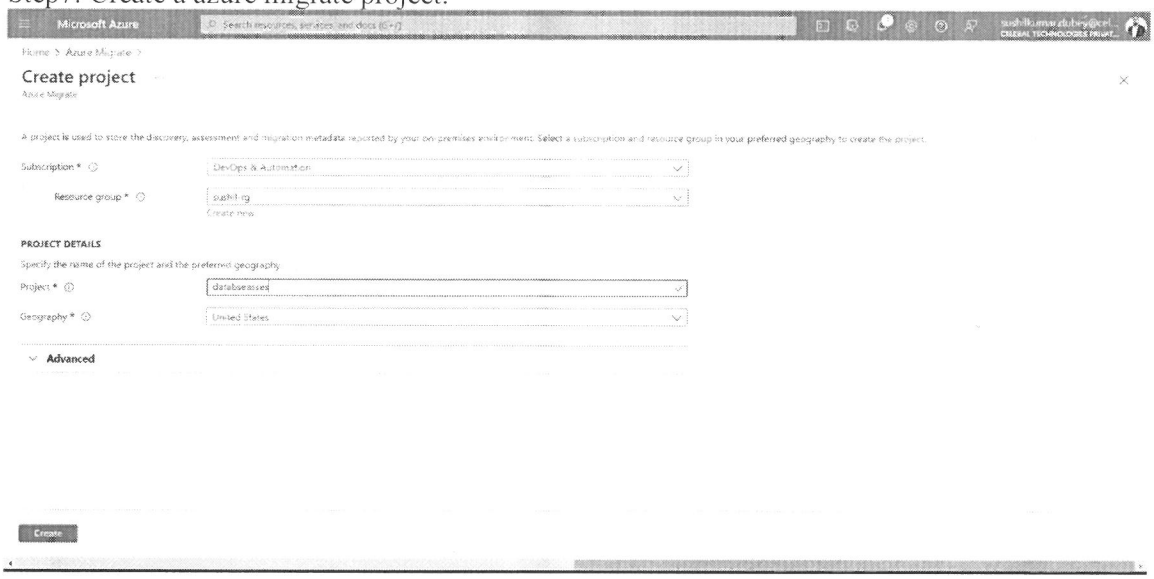
Step5: Go to portal and then Search for azure migrate.



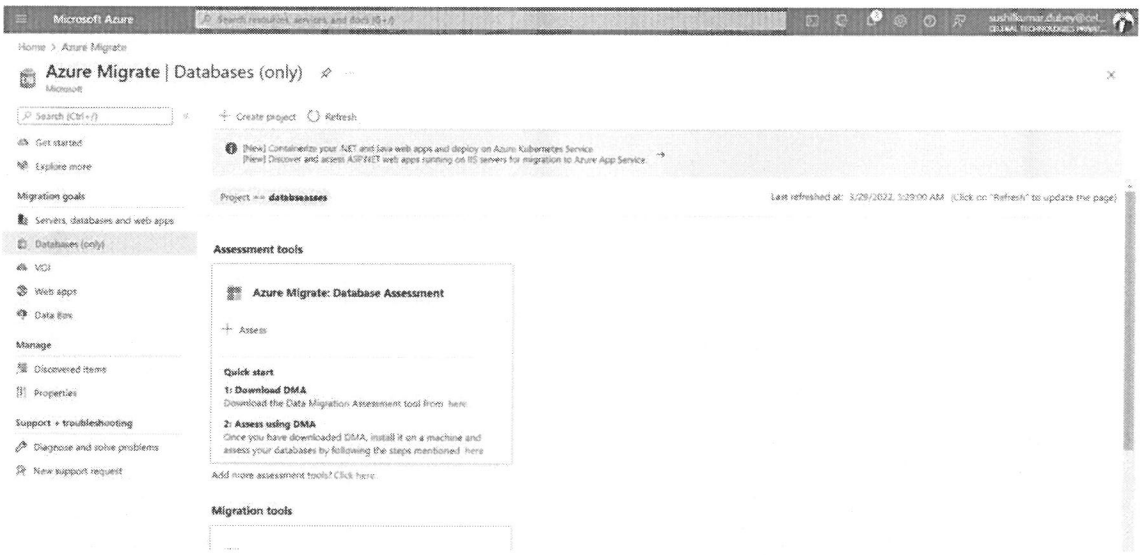
Step6: Click on assess and migrate databases.



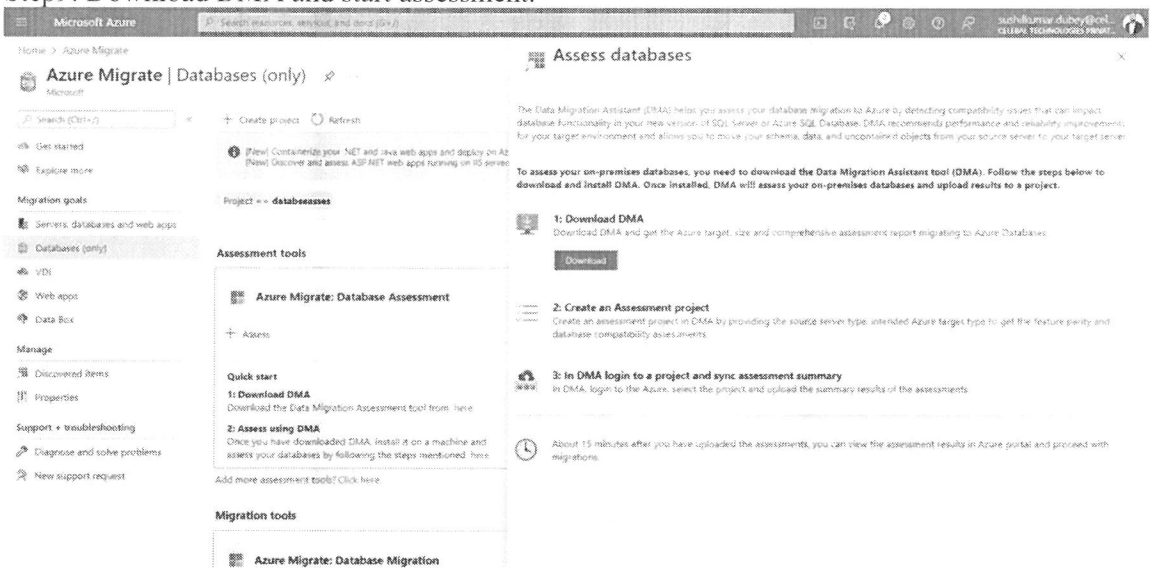
Step7: Create a azure migrate project.



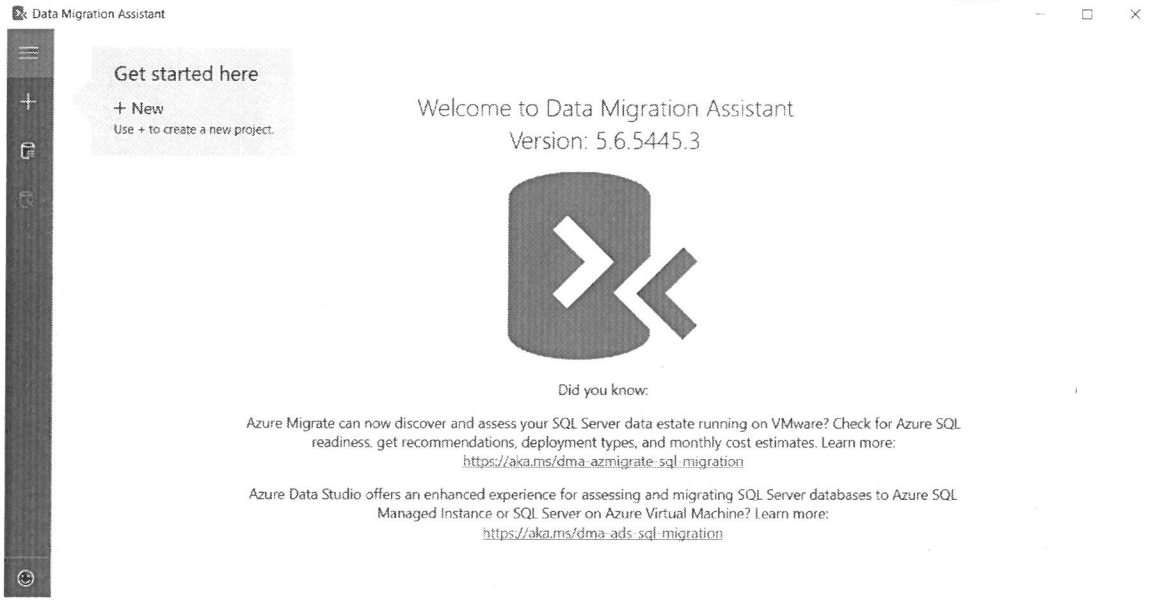
Step8: Now Start assess the database.



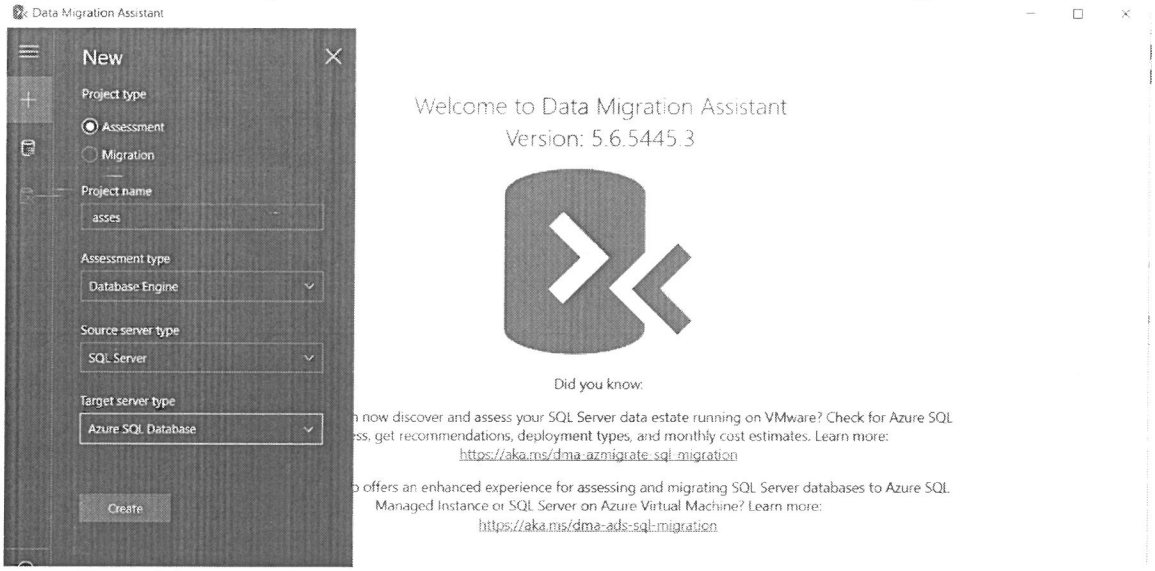
Step9: Download DMA and start assessment.



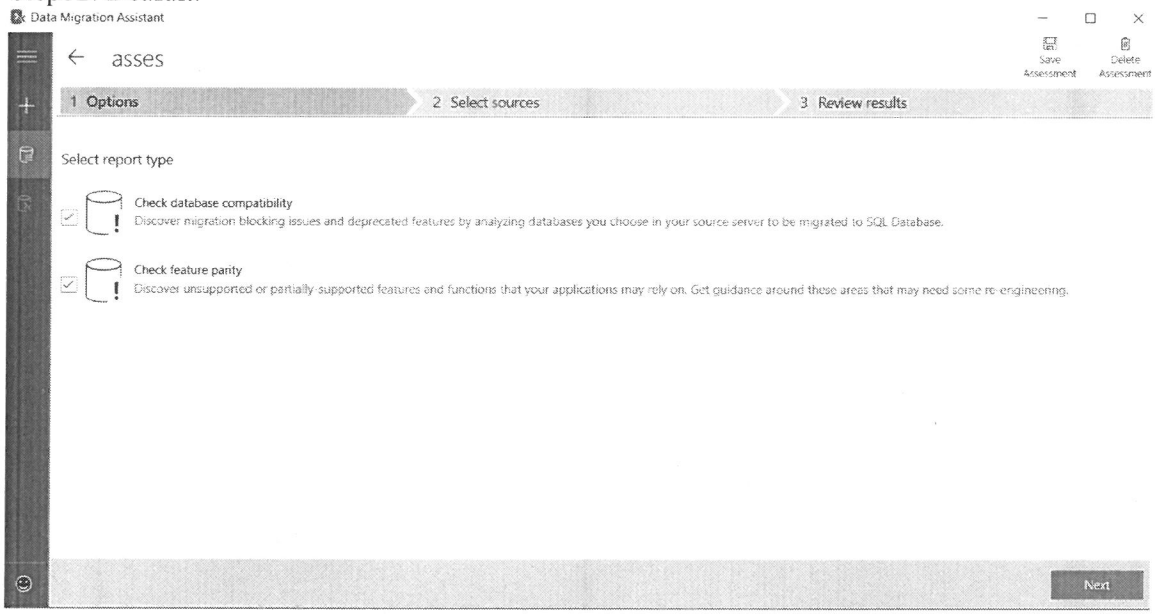
Step10: Select assessment.



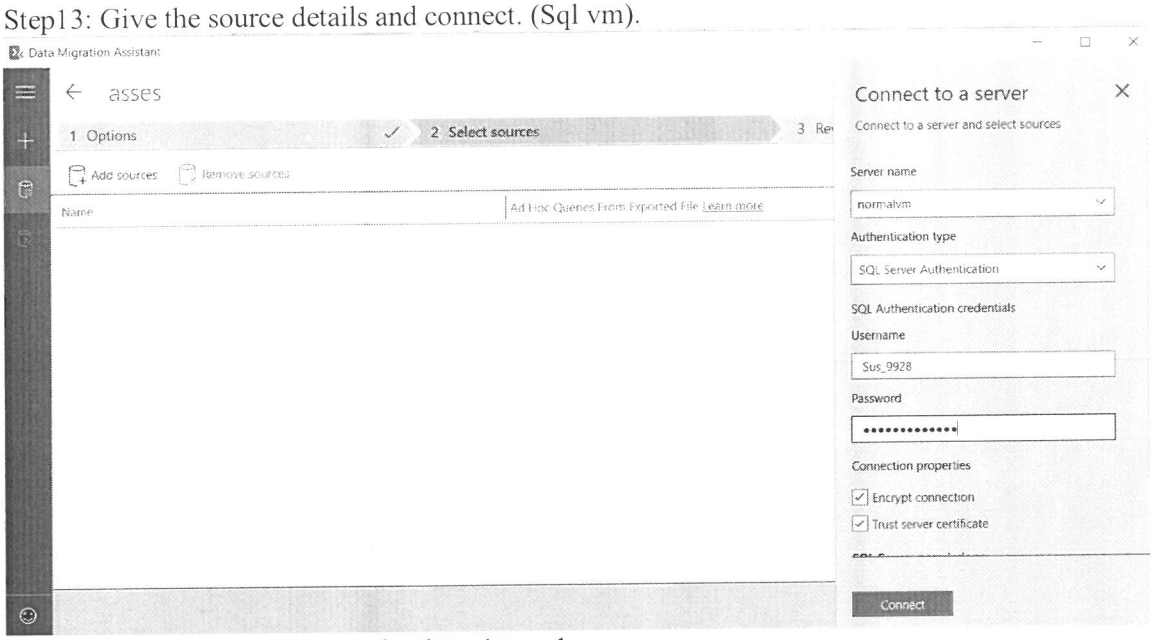
Step11: After selecting assessment, fill the essentials details as source and target.



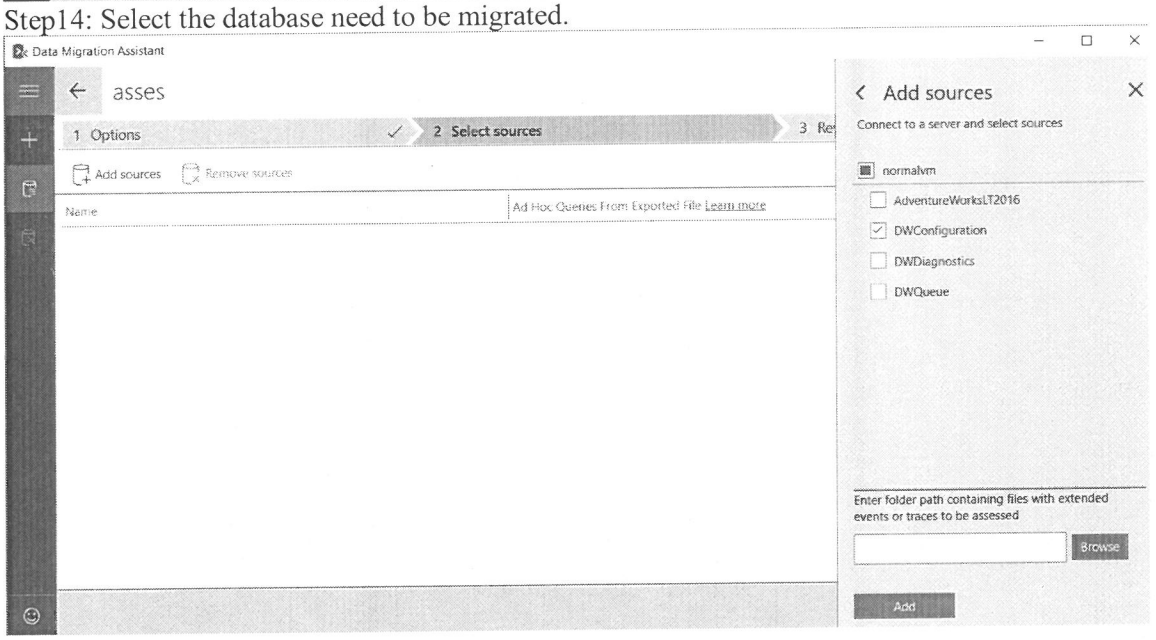
Step12: Deafult.



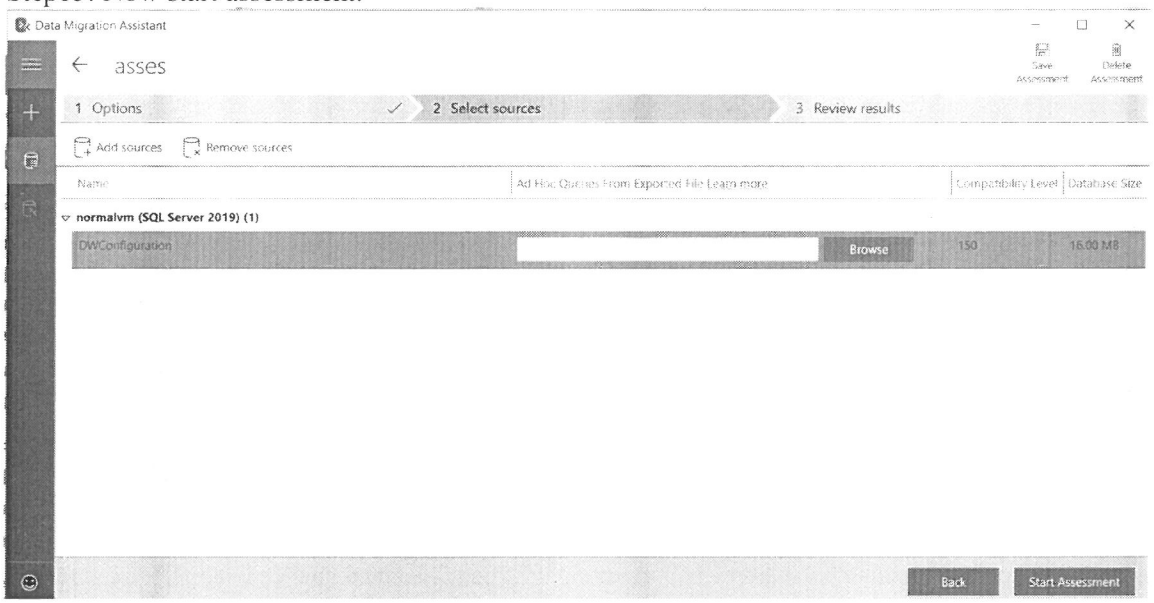
Step13: Give the source details and connect. (Sql vm).



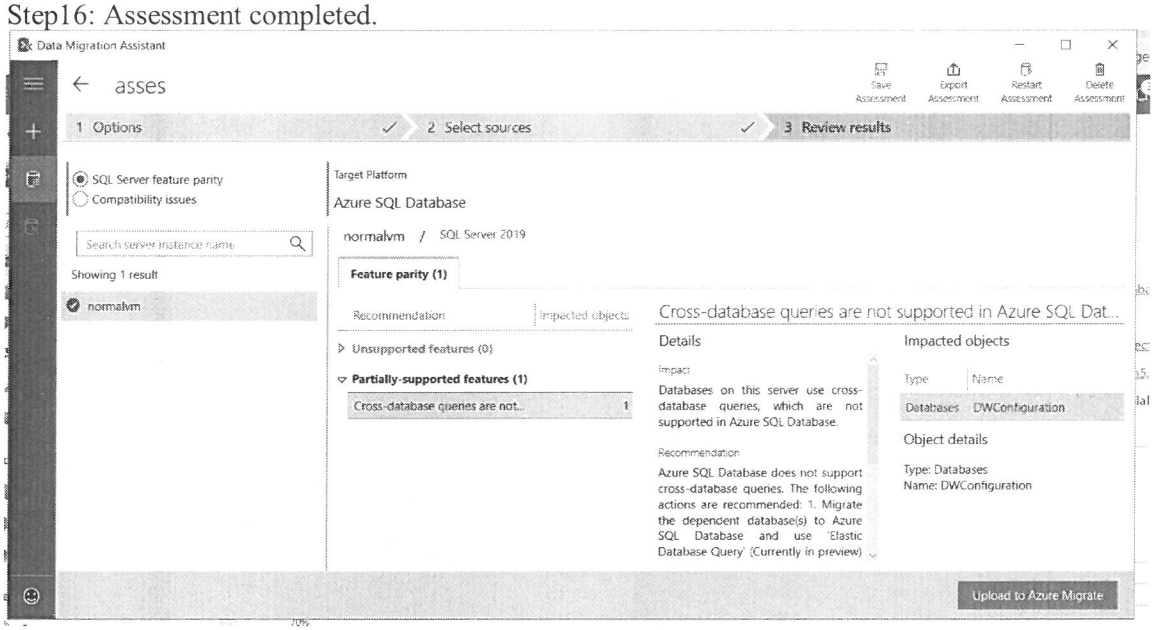
Step14: Select the database need to be migrated.



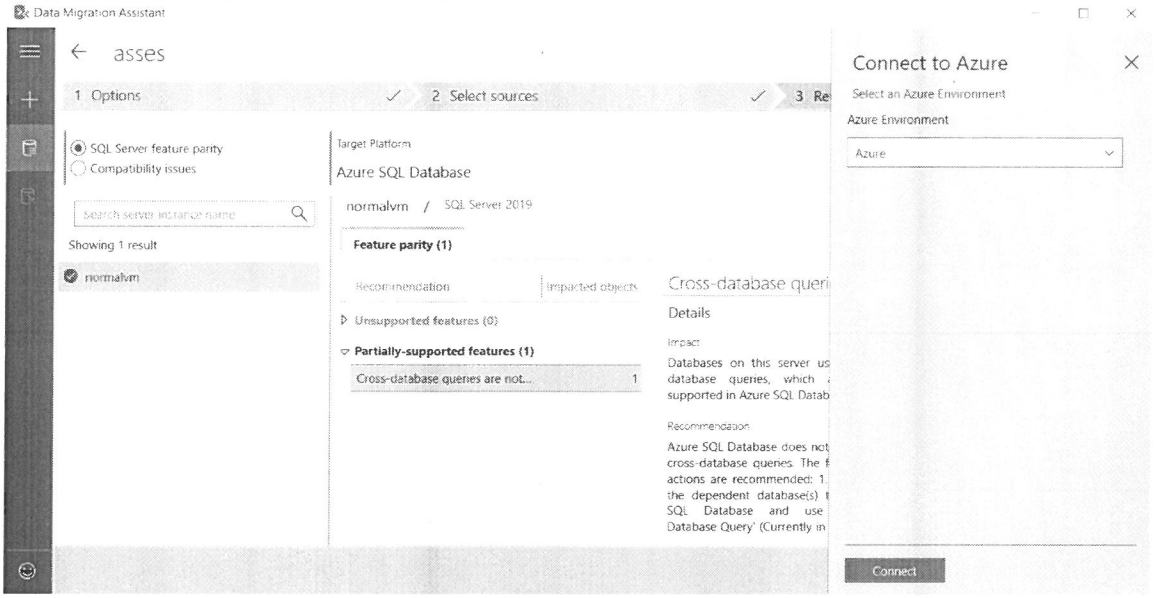
Step15: Now start assessment.



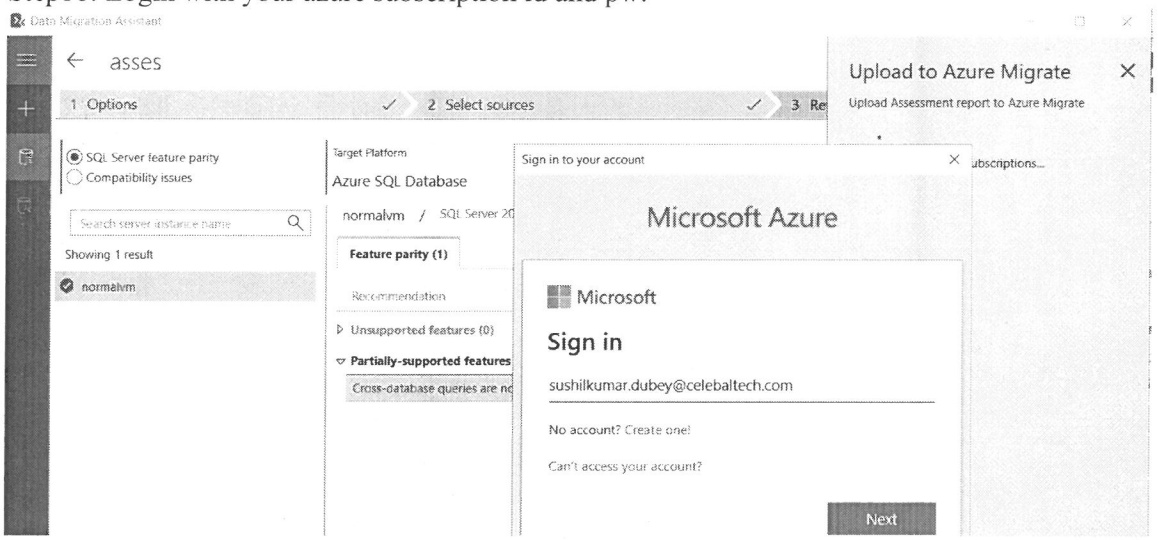
Step16: Assessment completed.



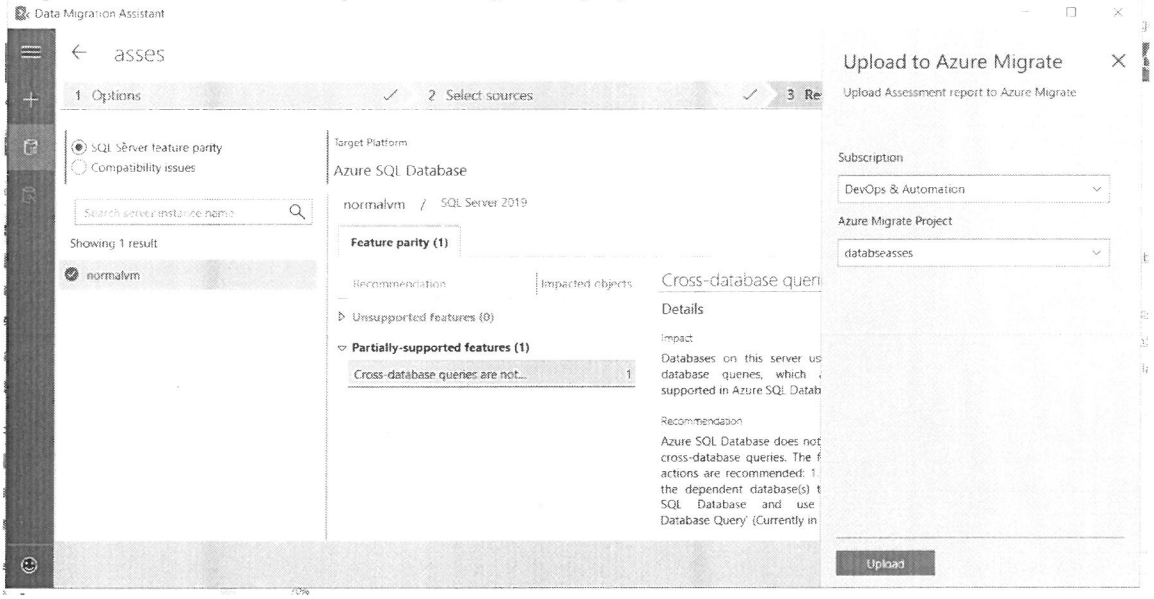
Step17: Click on upload on azure migrate and then choose azure.



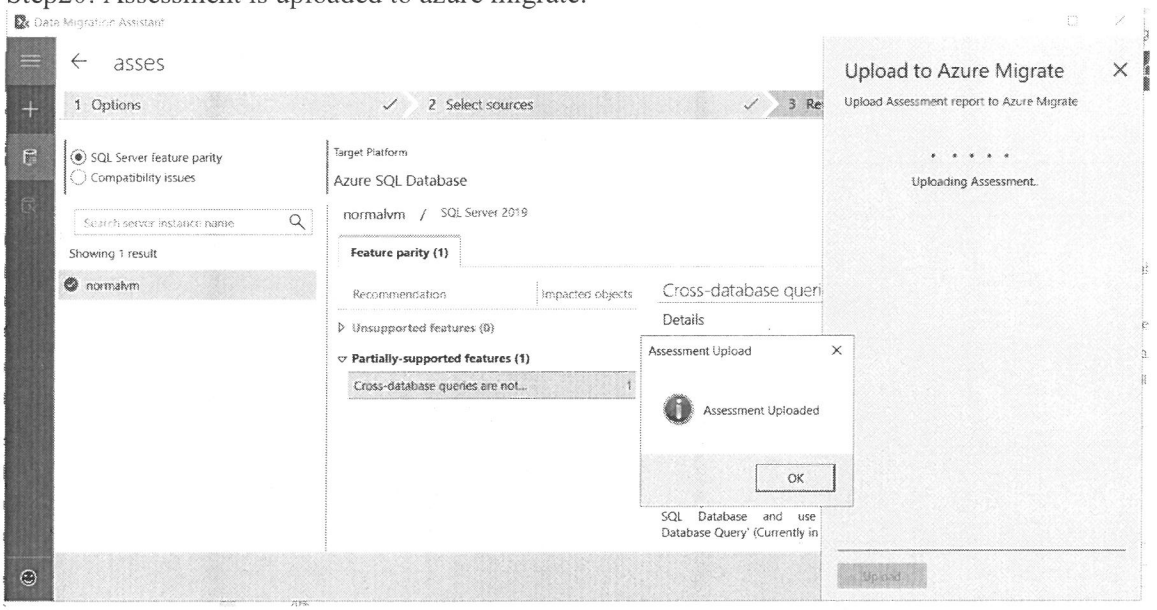
Step18: Login with your azure subscription id and pw.



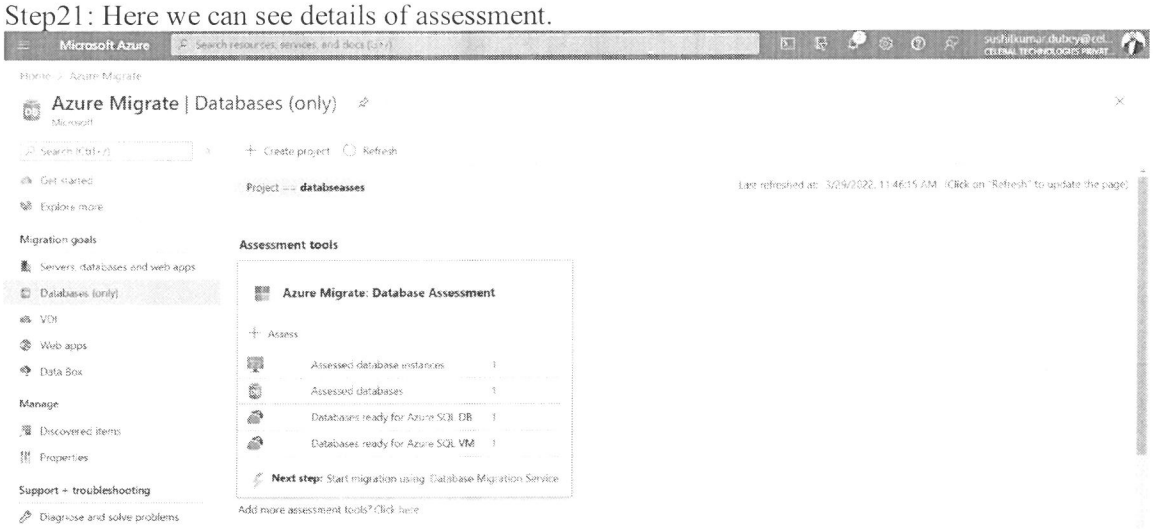
Step19: Then choose subscription and migration project.



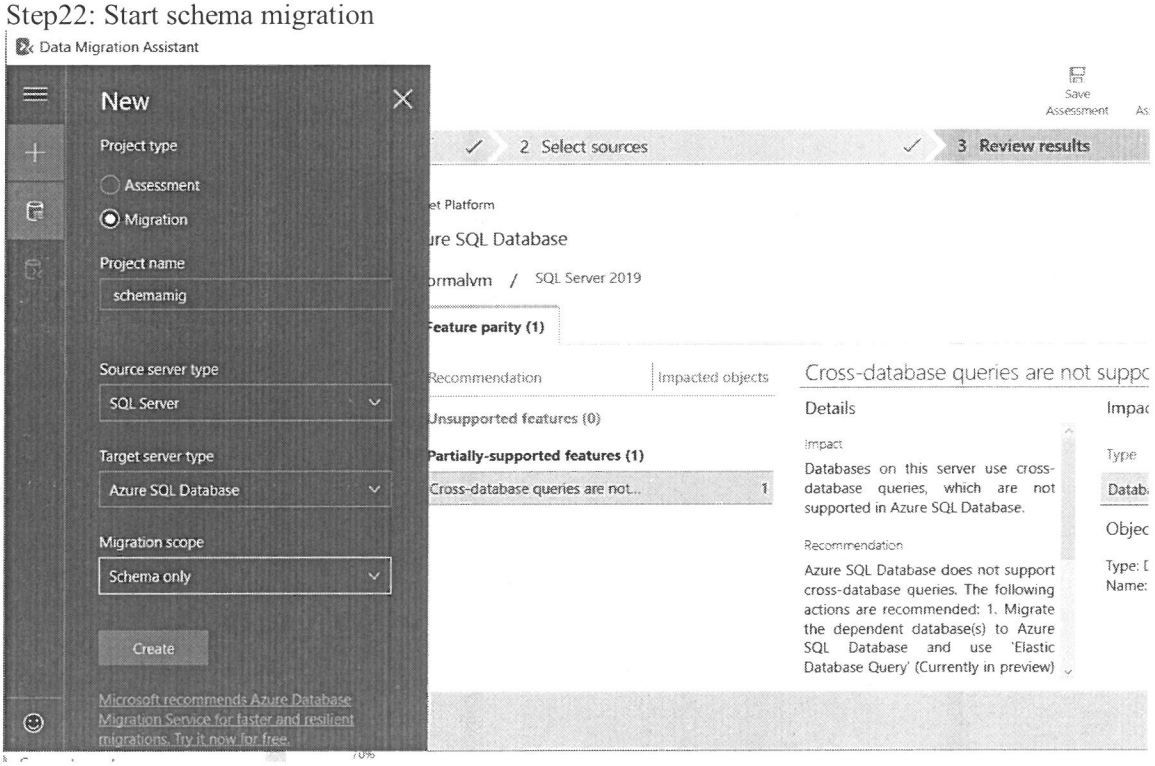
Step20: Assessment is uploaded to azure migrate.



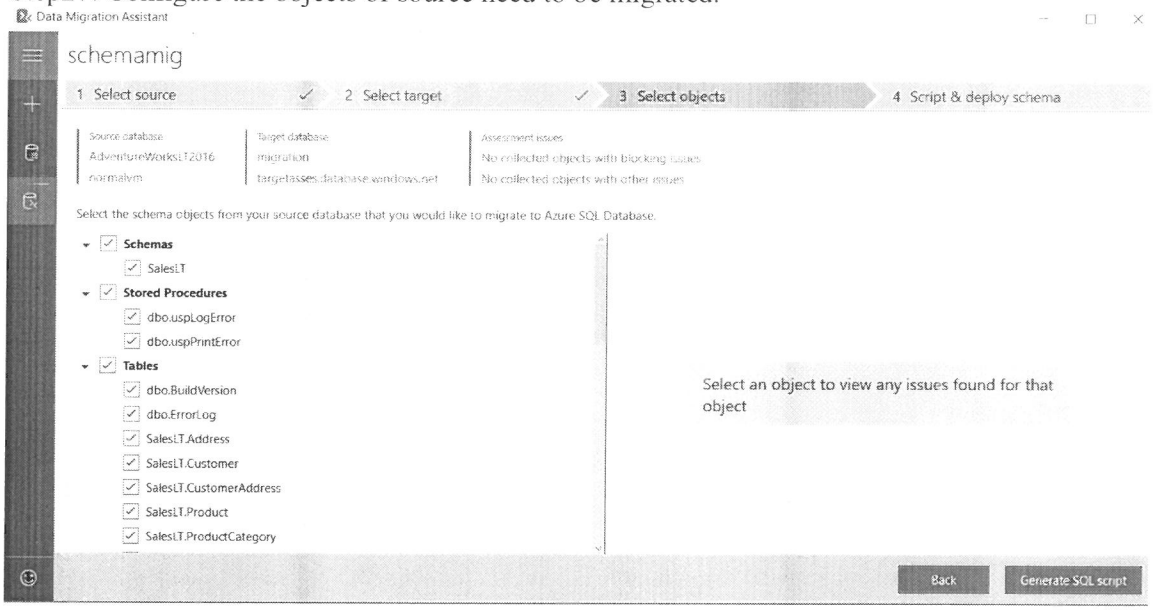
Step21: Here we can see details of assessment.



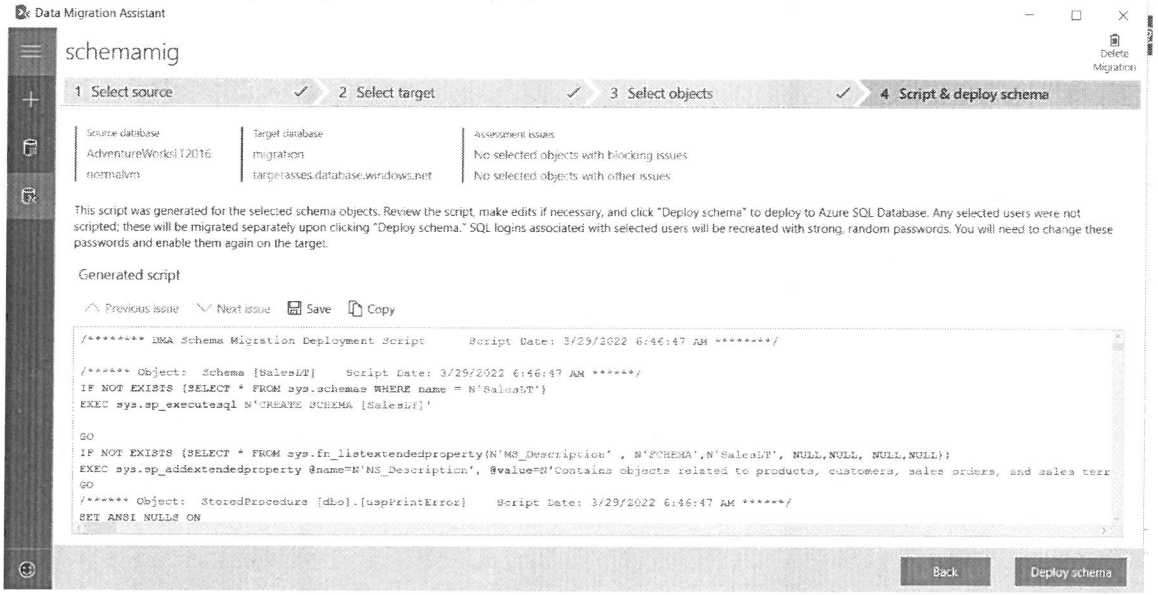
Step22: Start schema migration



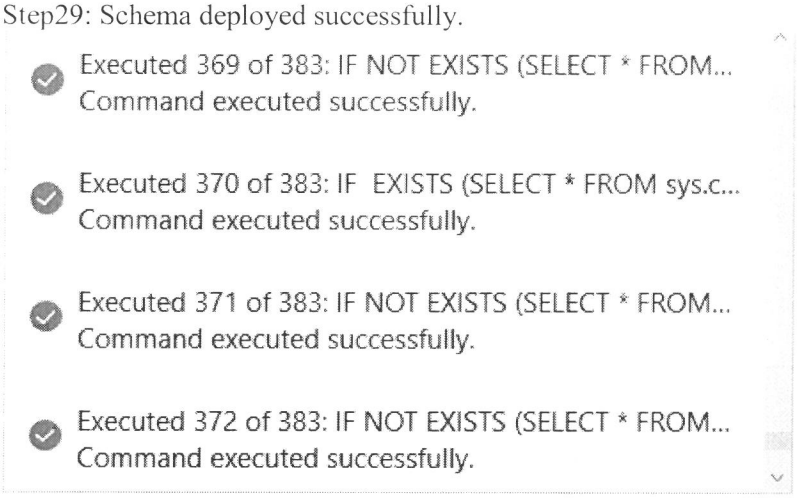
Step27: Configure the objects of source need to be migrated.



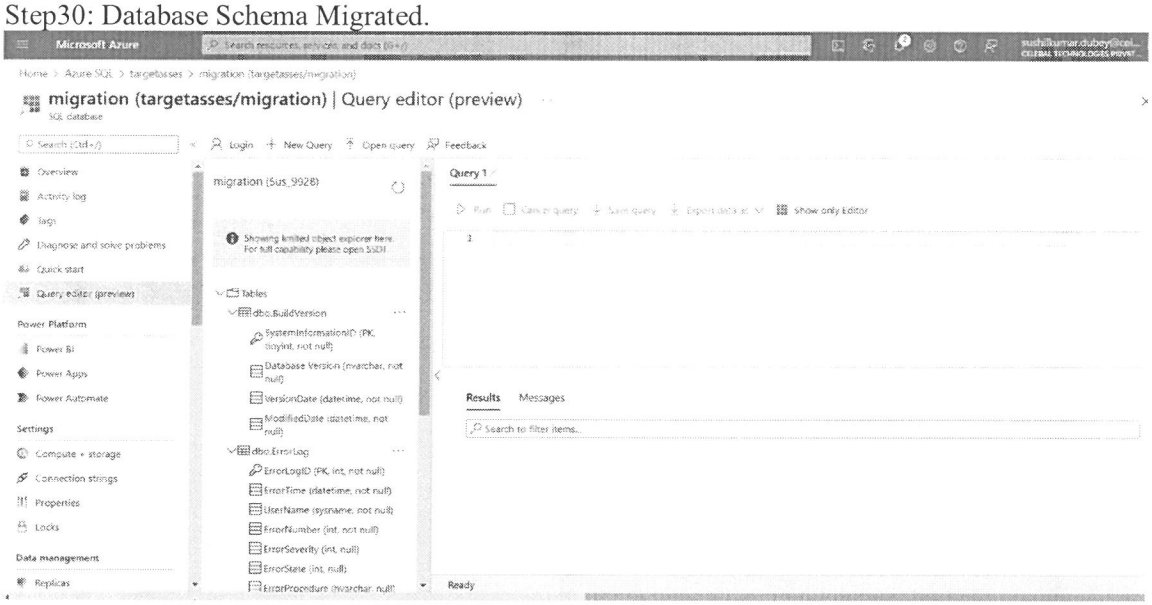
Step28: Generate SQL script and then deploy schema.



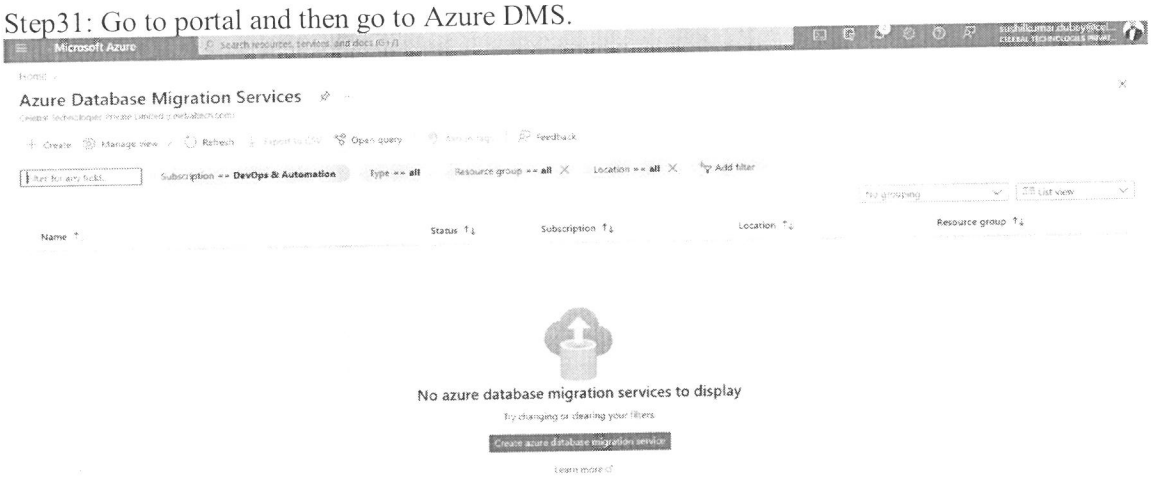
Step29: Schema deployed successfully.



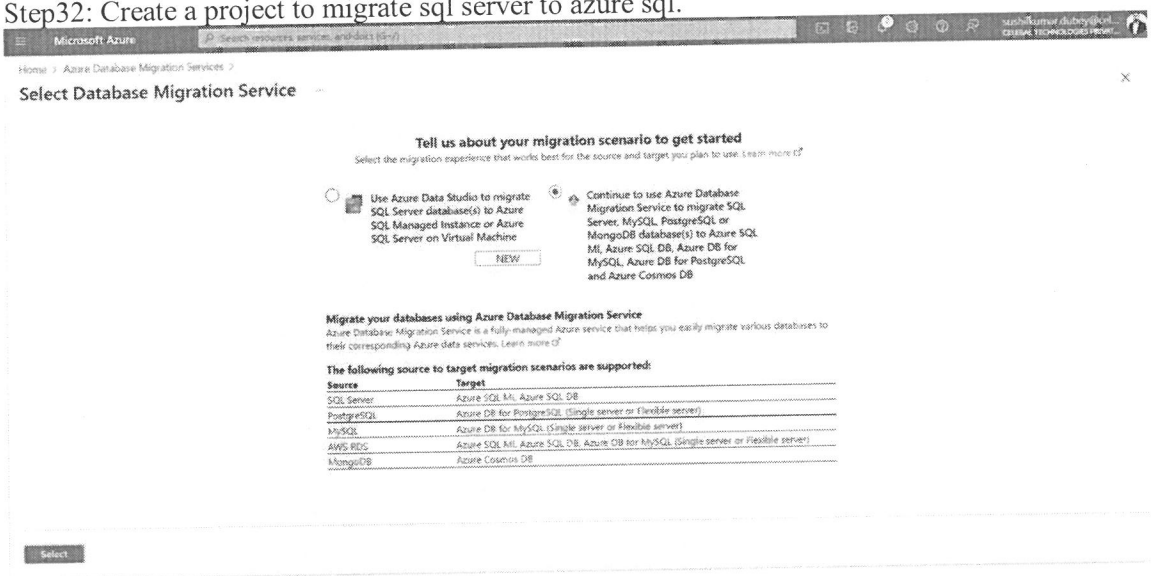
Step30: Database Schema Migrated.



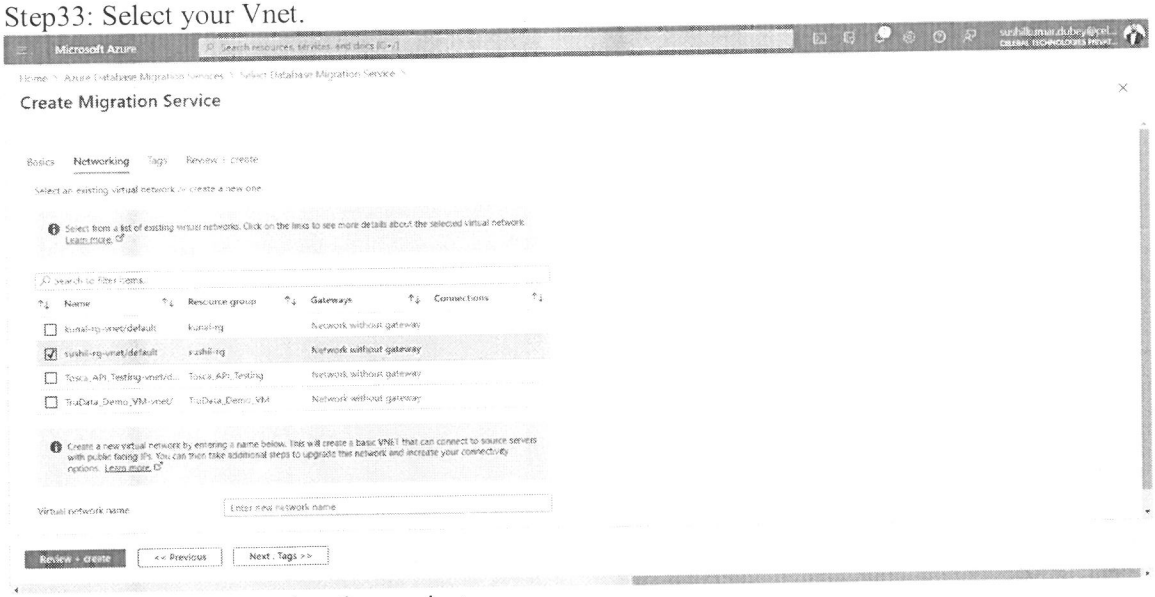
Step31: Go to portal and then go to Azure DMS.



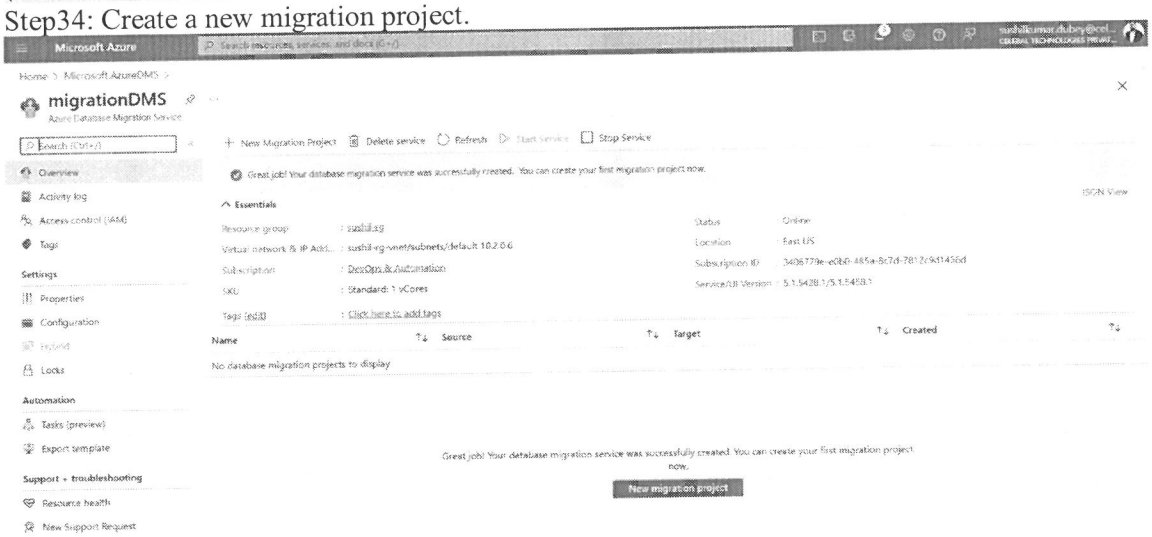
Step32: Create a project to migrate sql server to azure sql.



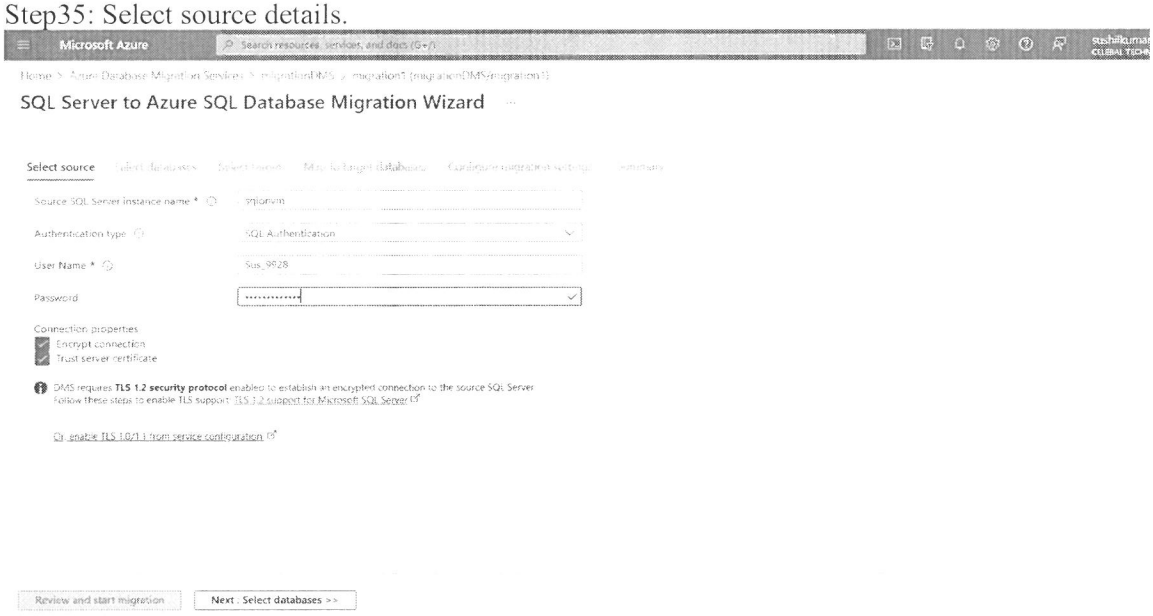
Step33: Select your Vnet.



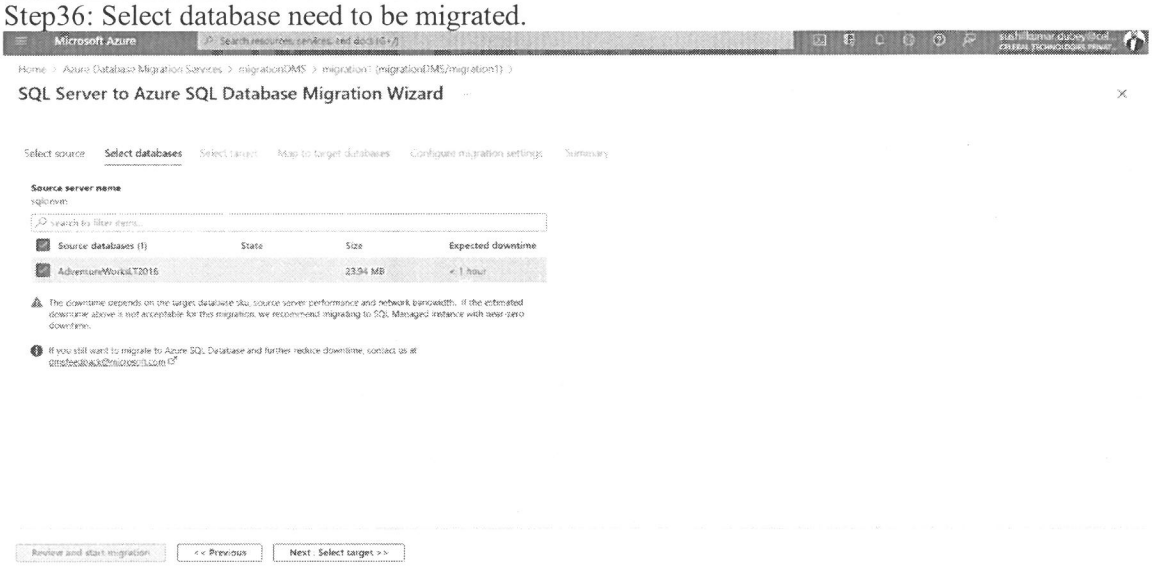
Step34: Create a new migration project.



Step35: Select source details.



Step36: Select database need to be migrated.



Results object1: Steps Continued from Setup.

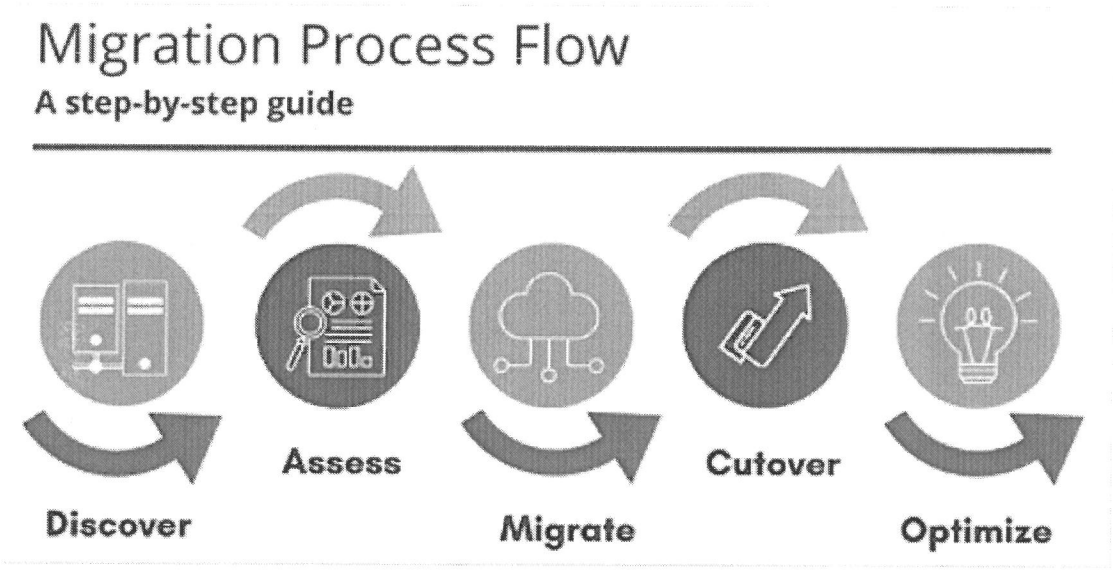
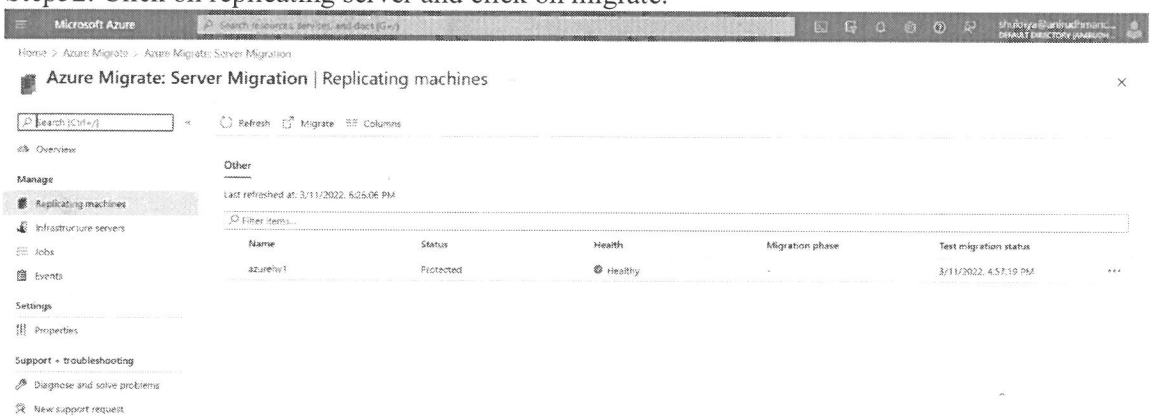
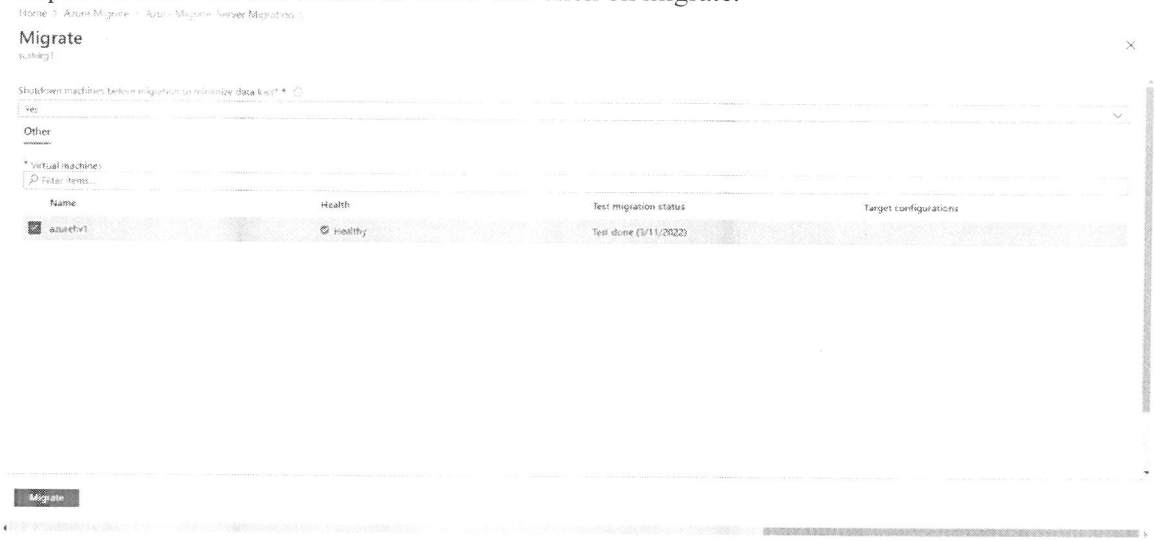


Fig6.

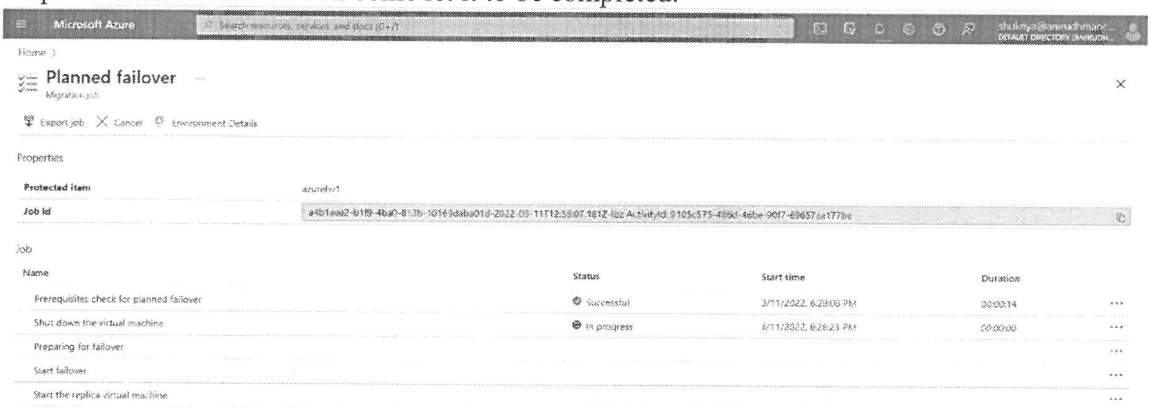
Step52: Click on replicating server and click on migrate.



Step53: Select VM and details as below and click on migrate.



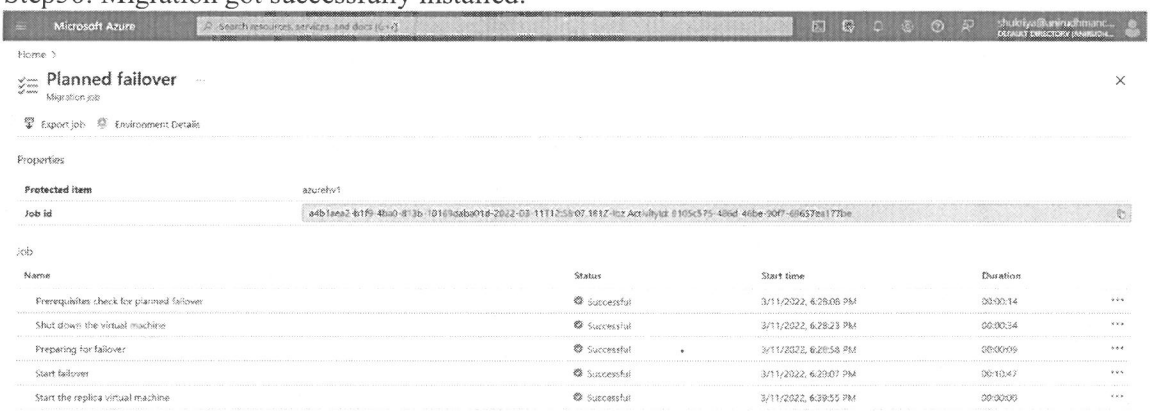
Step54: Planned failover will come let it to be completed.



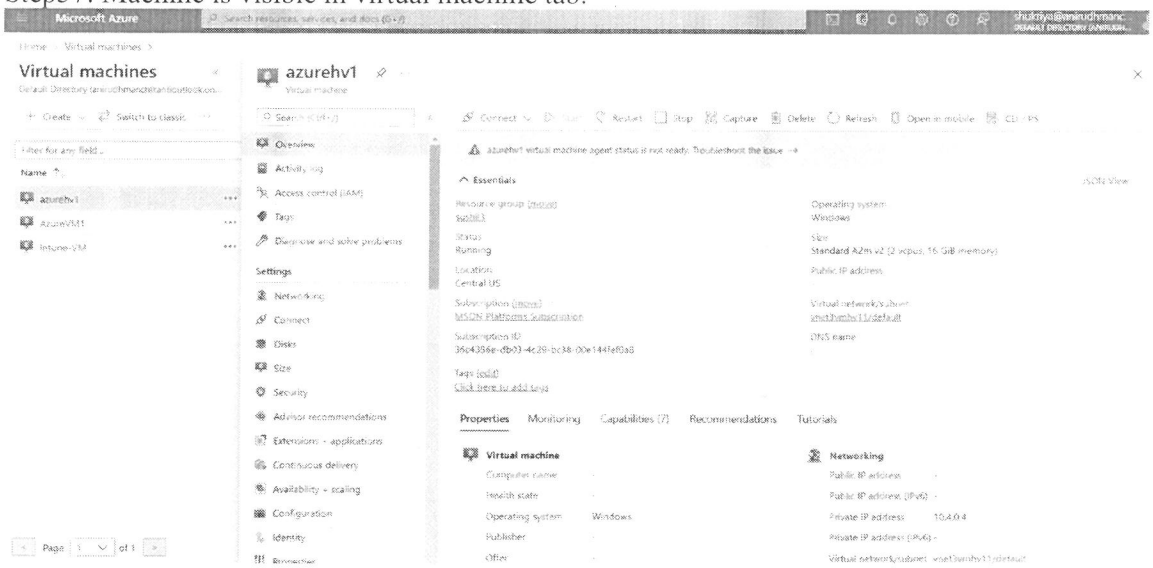
Step55: It is in progress.



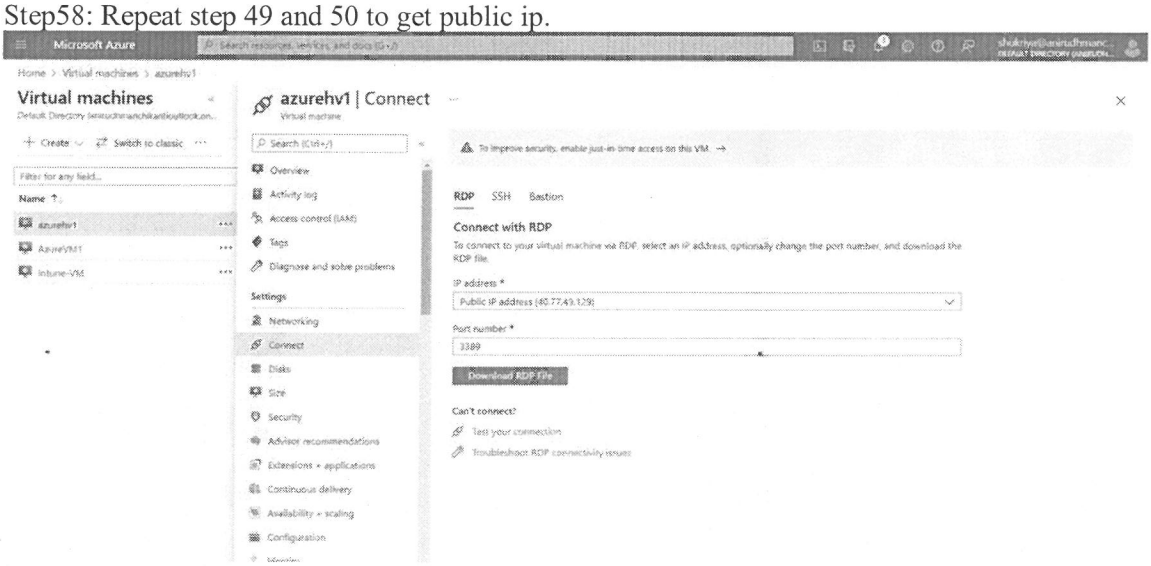
Step56: Migration got successfully installed.



Step57: Machine is visible in virtual machine tab.



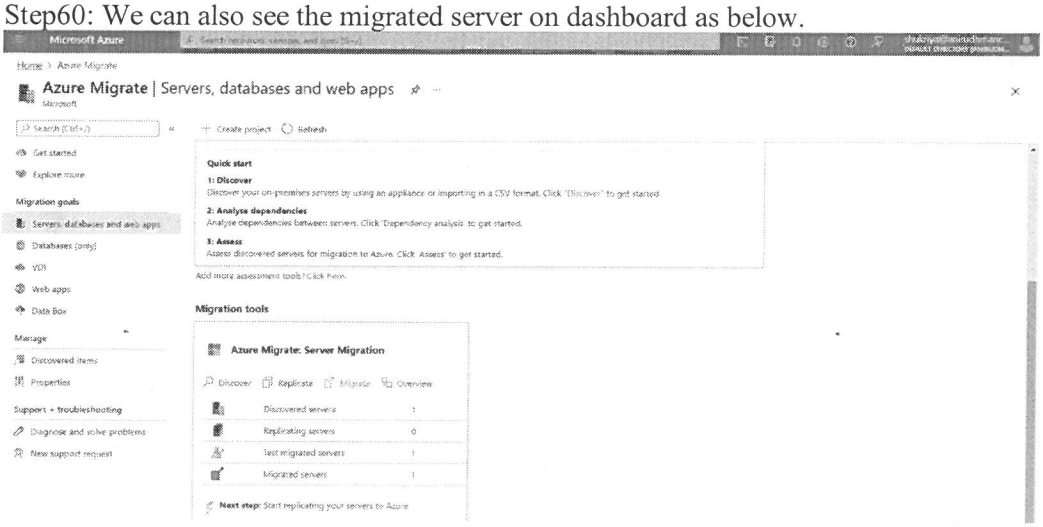
Step58: Repeat step 49 and 50 to get public ip.



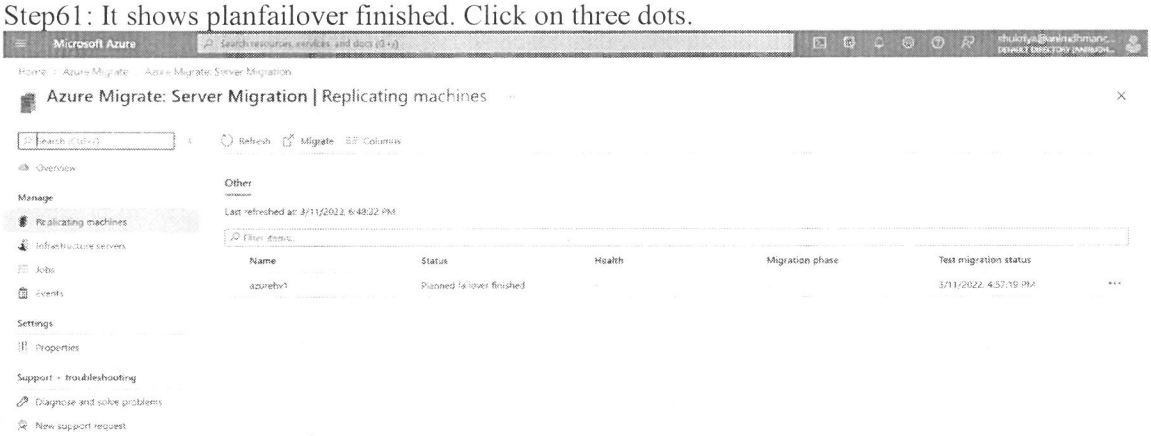
Step59: RDP of migrated VM.



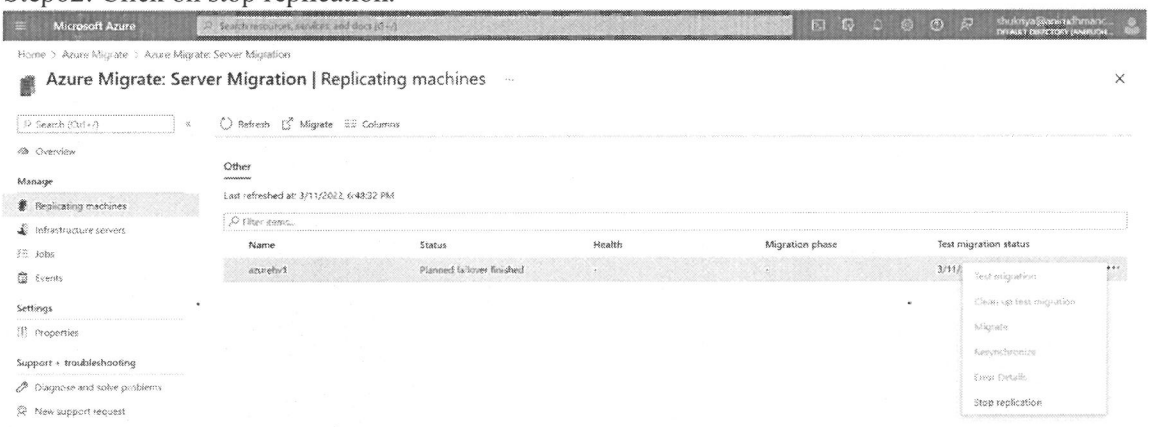
Step60: We can also see the migrated server on dashboard as below.



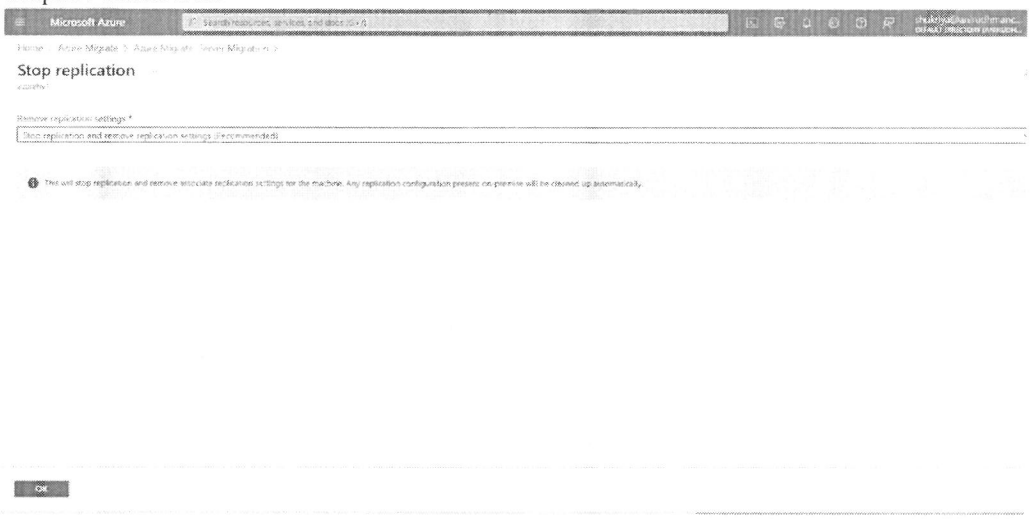
Step61: It shows planfailover finished. Click on three dots.



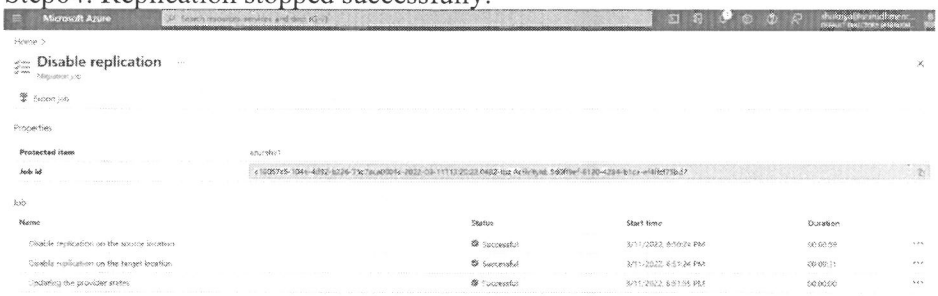
Step62: Click on stop replication.



Step63: Click OK.

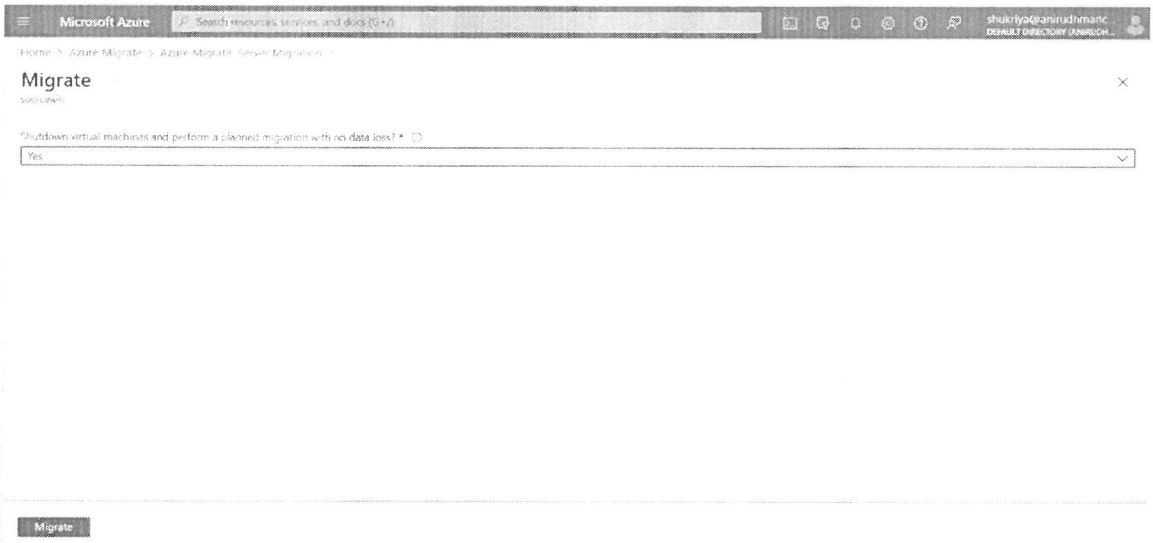


Step64: Replication stopped successfully.

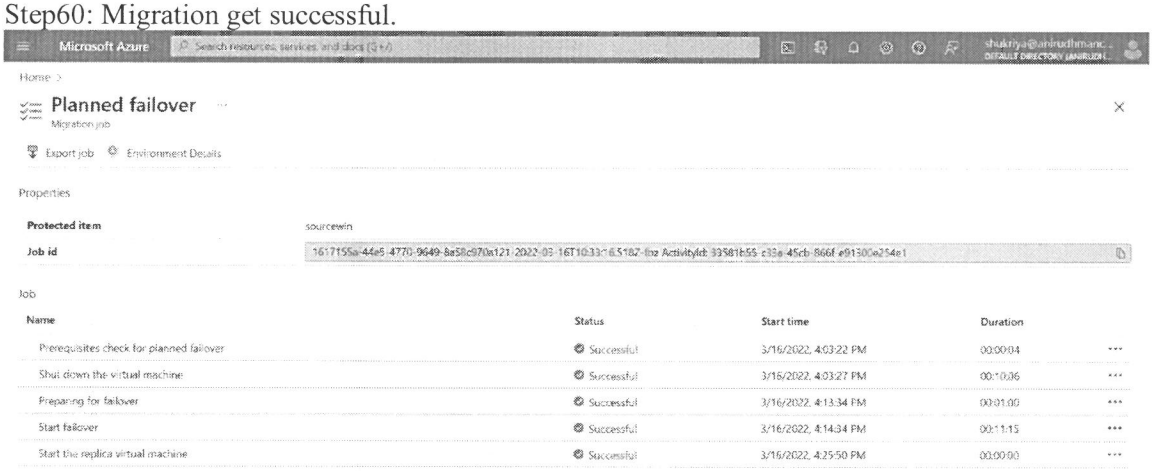


Results objective 2:

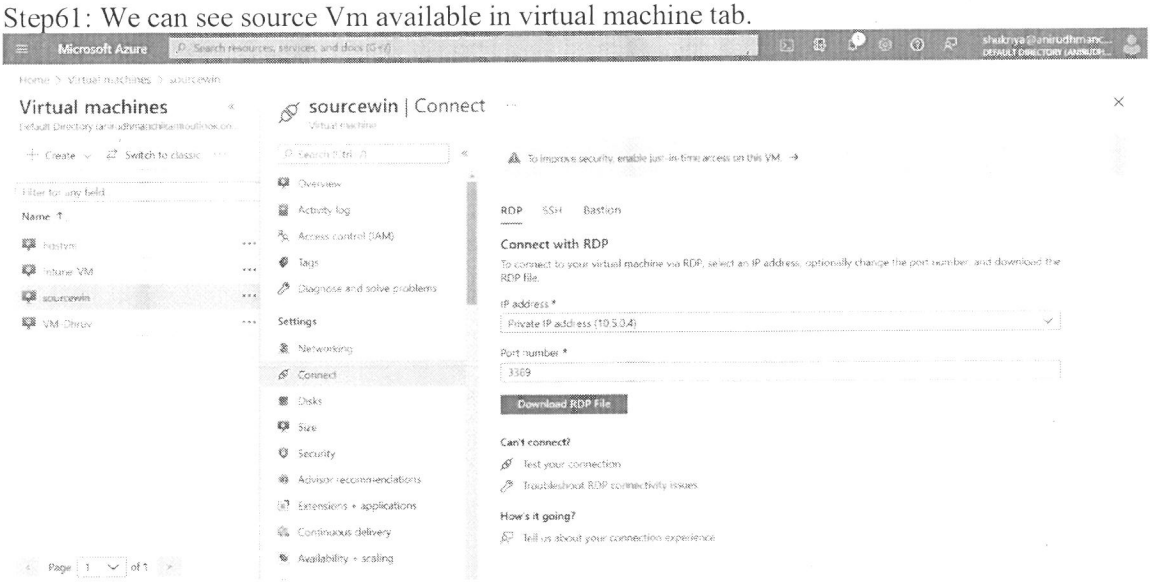
Step59: Azure Migrate: Migration Tool: Migrate. Choose yes for np data loss.



Step60: Migration get successful.



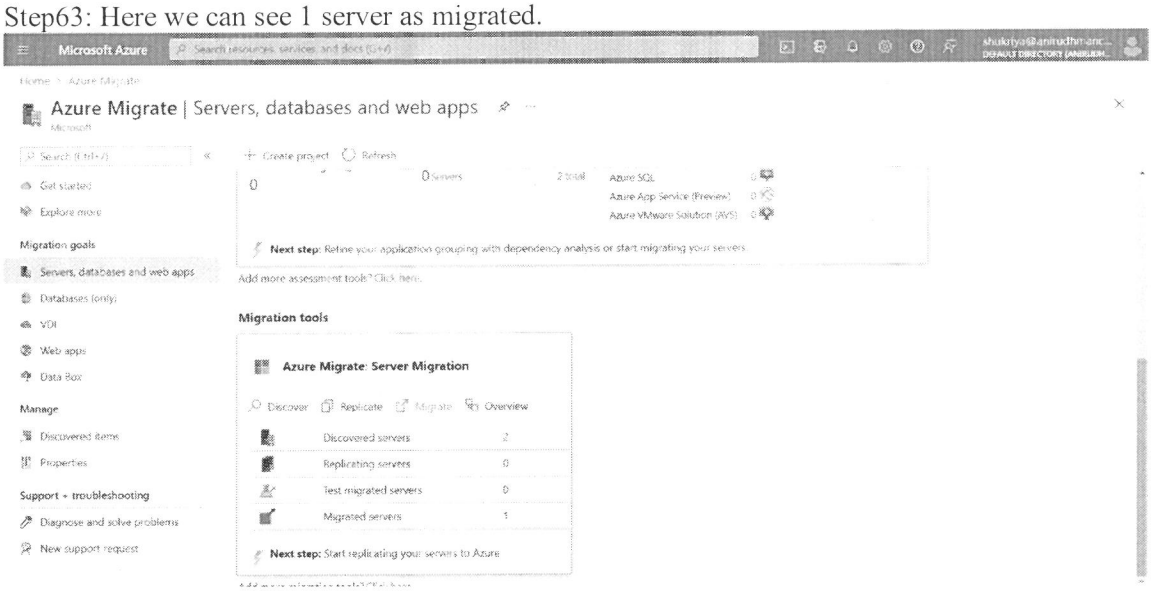
Step61: We can see source Vm available in virtual machine tab.



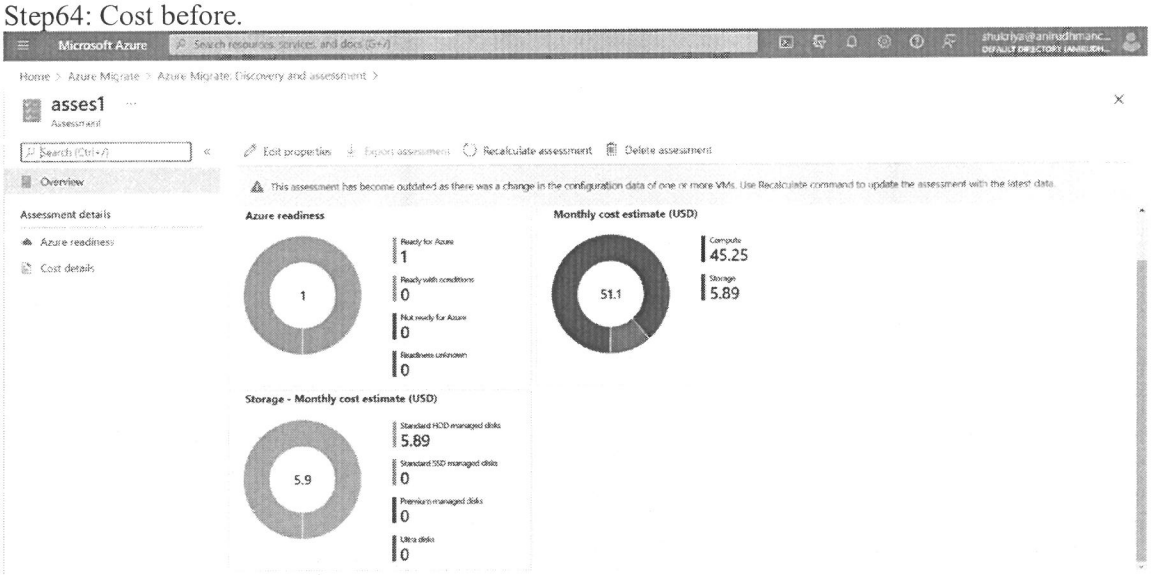
Step62: (as above we did for test vm). Create NSG and Associate Public IP with this.



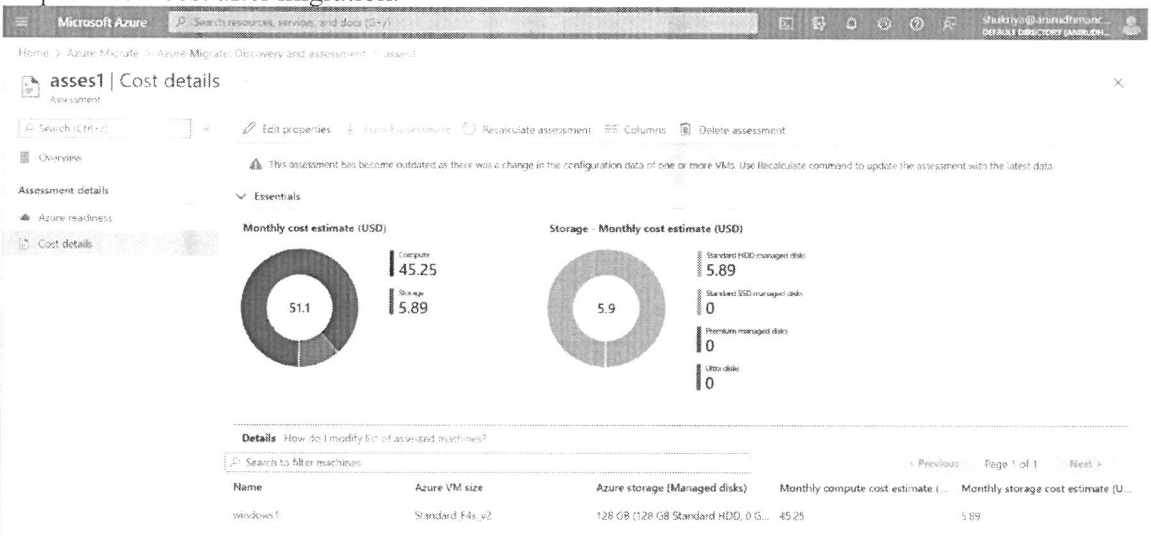
Step63: Here we can see 1 server as migrated.



Step64: Cost before.

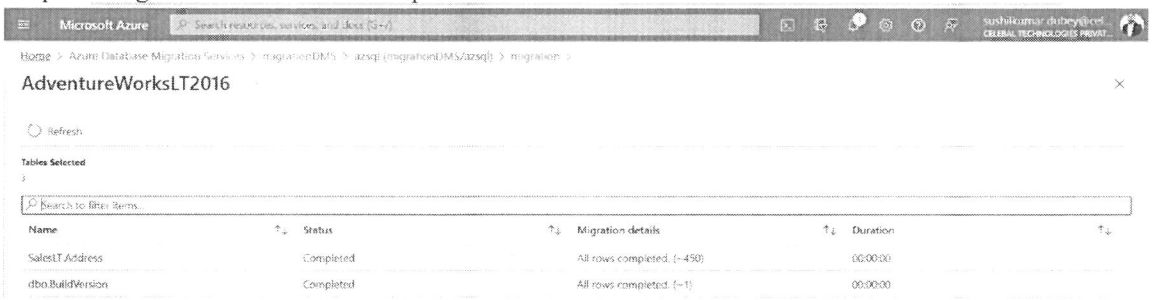


Step65: New cost after migration.

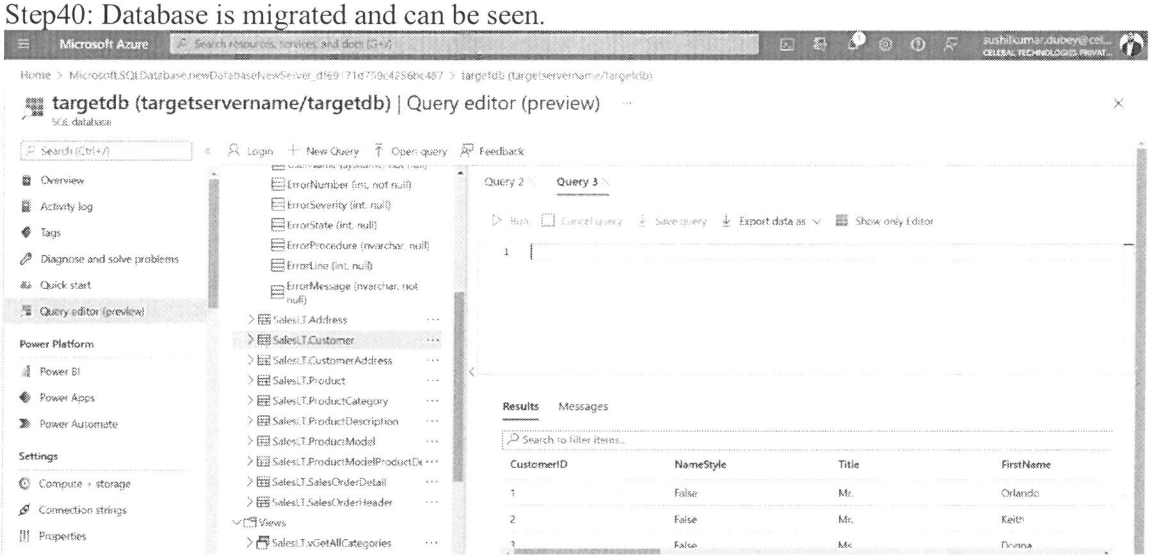


Result objective 3:

Step39: Migration started and completed.



Step40: Database is migrated and can be seen.



CHAPTER 7 : SUMMARY & FUTURE SCOPE OF WORK

7.1 Summary

Hence, we have done the database and datacentre migration of project IDFC-DB/DC Migration. In this project I have learned many things including basics of migration to configuration and successfully achieved the goal according to their need. All database and datacentre are assessed and migrated without any loss. We have asses and migrate as mentioned as below.

- **Servers, databases, and web apps**: Assess on-premises servers including web apps and SQL Server instances and migrate them to Azure virtual machines or Azure VMware Solution (AVS) (Preview).
- **Databases**: Assess on-premises databases and migrate them to Azure SQL Database or to SQL Managed Instance.
- **Web applications**: Assess on-premises web applications and migrate them to Azure App Service.
- **Virtual desktops**: Assess your on-premises virtual desktop infrastructure (VDI) and migrate it to Azure Virtual Desktop.
- **Data**: Migrate large amounts of data to Azure quickly and cost-effectively using Azure Data Box products.

7.2 Conclusion

- As we know there are significant savings in resource, maintenance, and real estate costs, in addition to the ability to optimise workloads so that they cost less to run while opting to cloud. Organizations pay only for the cloud resources that they use, meaning that they don't need to pay for and maintain IT assets that they may only use occasionally. Many public clouds have built-in security features and specialised cloud security tools to help ensure that an organisation's resources are protected. Security patching is done automatically by the cloud provider in many cases. So these are main areas which client focused and get decided to migrate all the data to cloud without loss of any data.

7.3 Future Scope

The future of Cloud computing as a combination of cloud-based software products and on-premises compute which will help to create hybrid IT solutions. The modified cloud is scalable and flexible, which will provide security and control over data centre. Gartner forecasts end-user spending on public cloud services to reach $396 billion in 2021 and grow 21.7% to reach $482 billion in 2022. Additionally, by 2026, Gartner predicts public cloud spending will exceed 45% of all enterprise IT spending, up from less than 17% in 2021. Migrating to the cloud involves all kinds of security risks, from compliance violations and contractual breaches to insecure APIs, accidental

errors, malware, external attacks, and more. It is essential that, when moving to the cloud, you be aware of these risks and equip yourself to handle them. **Cloud technology allows businesses to scale and adapt quickly, accelerating innovation, driving business agility, streamlining operations, and lowering costs**. This will not only help companies get through the current crisis, but it could also contribute to improved, long-term growth. **The future is set to be highly competitive, and agility is the need of the hour**. With cloud computing, organizations can save money on storage, servers, and management services, as these services can be moved to the cloud with minimum cost, making your operations more efficient.

REFERENCES

1. Jamshidi, Pooyan & Ahmad, Aakash & Pahl, Claus. (2014). Cloud Migration Research: A Systematic Review. IEEE Transactions on Cloud Computing. 1. 142 - 157. 10.1109/TCC.2013.10.

2. Wang, Zhixiao & Yan, Wenyao & Wang, Wendong. (2020). Revisiting Cloud Migration: Strategies and Methods. Journal of Physics: Conference Series. 1575. 012232. 10.1088/1742-6596/1575/1/012232.

3. Arif Iqbal, Ricardo Colomo-Palacios (2019), Key Opportunities and Challenges of Data Migration in Cloud: Results from a Multivocal Literature Review

4. Gurdeep Singh, Dr.Vijay Laxmi (2017), A REVIEW ON DATA MIGRATION IN PUBLIC CLOUD

5. Cloud Strategy: A Decision-based Approach to Successful Cloud Migration

6. https://docs.microsoft.com/en-us/azure/migrate/migrate-appliance

7. https://docs.microsoft.com/en-us/azure/migrate/tutorial-discover-hyper-v

8. https://docs.microsoft.com/en-us/azure/migrate/tutorial-discover-physical

9. https://docs.microsoft.com/en-us/azure/migrate/tutorial-assess-hyper-v

10. https://docs.microsoft.com/en-us/azure/migrate/tutorial-assess-physical

11. https://docs.microsoft.com/en-us/azure/migrate/tutorial-migrate-hyper-v?tabs=UI

12. https://docs.microsoft.com/en-us/azure/migrate/tutorial-migrate-physical-virtual-machines

13. https://docs.microsoft.com/en-us/sql/dma/dma-overview?view=sql-server-ver16

14. https://docs.microsoft.com/en-us/azure/dms/tutorial-sql-server-to-azure-sql

CELEBAL TECHNOLOGIES

hr@celebaltech.com
enterprisesales@celebaltech.com
www.celebaltech.com
0141-4700659
India: A-2 7th floor, UDB Corporate Tower, J.L.N. Marg, Jaipur

STRICTLY CONFIDENTIAL

Dated: 26th May, 2022

Ongoing Internship Certificate

To Whomsoever It May Concern

This is to certify that **Sushil Kumar Dubey** had undertaken Internship with Celebal Technologies, Jaipur, starting from 17th January 2022 in **Cloud Infra & Security** Department.

During his 4 months of Internship, he was working under the mentorship of **Mr. Anirudh Manchikanti.**

Best Regards

Tejal

Tejal Mangal
Sr. Executive
Human Resources
Celebal Technologies