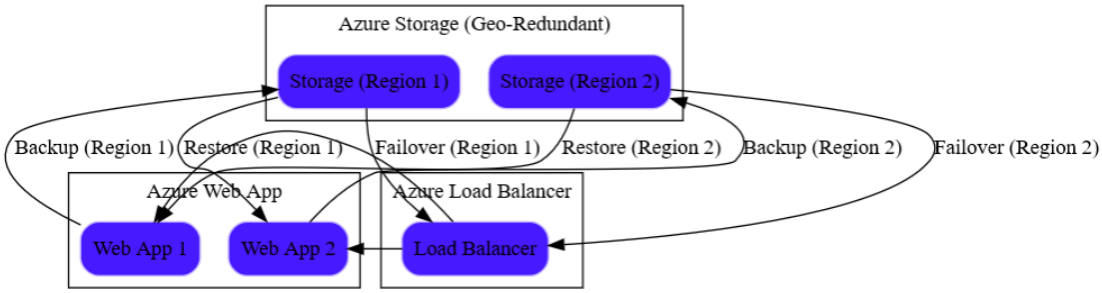
Ali Salih

Table Of Contents:

I. **Introduction:** In today's fast-paced digital world, making sure that your website stays up and running smoothly is crucial. We all know that unexpected things can happen, like a server hiccup or even a whole region experiencing technical difficulties. These kinds of issues can seriously disrupt our online presence and affect how users interact with our website. That's why businesses go the extra mile to put in place advanced plans—Business Continuity measures—to keep their web servers humming along, no matter what surprises come their way. In the world of cloud computing, Azure by Microsoft offers a bunch of tools and services to help companies build a solid and dependable online infrastructure. This guide is here to walk you through the nitty-gritty of getting your web server set up on Azure, adding in some safety nets like backup solutions, and building a strong shield against disruptions, whether they're small hiccups or larger regional challenges. With Azure's toolkit, you're not just making sure your website runs smoothly; you're also giving users an experience they can rely on, even when the unexpected comes knocking.

II. **Motivation:** The motivation behind the deployment of the web server on Azure with enhanced backup and business continuity measures comes from my unwavering commitment to providing users with a seamless and uninterrupted digital experience. In today's dynamic digital landscape, where reliability and performance are a must, my decision reflects a strategic move towards making sure the resilience of our web applications. By taking advantage of Azure's robust infrastructure and advanced backup strategies, that proactively safeguards critical data and mitigates risks associated with unforeseen events. My focus on business continuity and disaster recovery underscores our dedication to maintaining operations under any circumstance. Furthermore, the implementation of load balancing mechanisms and scalability features aligns with my vision for not just meeting but exceeding user expectations. Ensuring that our web applications remain cutting-edge and ready for future growth. Ultimately, my motivation revolves around creating a digital environment that is reliable, secure, and poised for sustained success in the evolving digital landscape.

III. **Architectural drawing.**



Here we can see how the webserver is made and how it's going through a load balancer that is going two storages in separate region who are all geo-redundant for perfect protection against regional failures.

IV. Creating a webserver with a modified index page:

I. **Creating a resource group.**

II. **Creating a virtual network.**

III. **Creating a virtual machine with 2016 datacenter.**

III.I **Make an Availability set.**

III.II **Making a Load balancer.**

IV. **Connecting to the Virtual Machine Via RDP.**

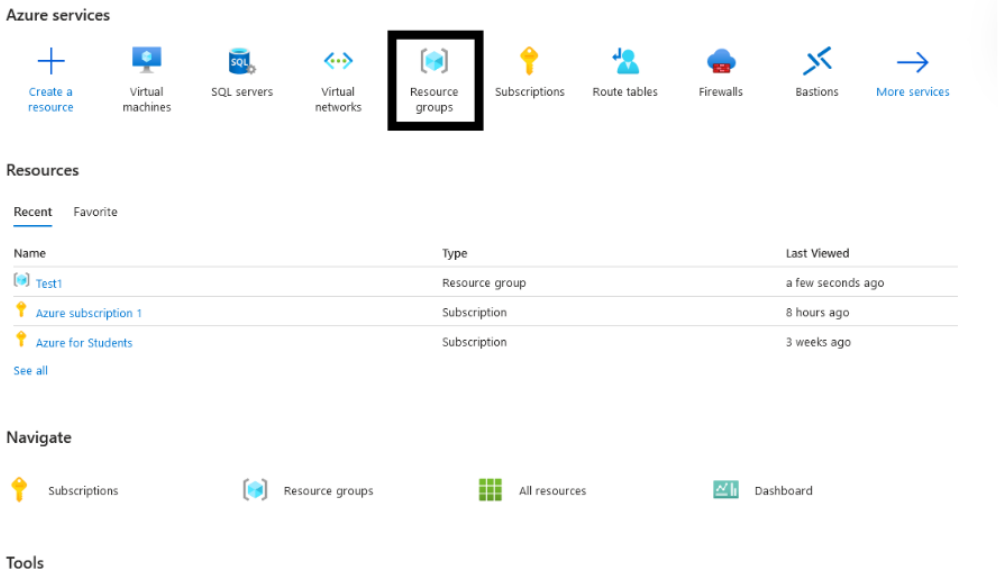
V. **Installing and modifying the IIS.**

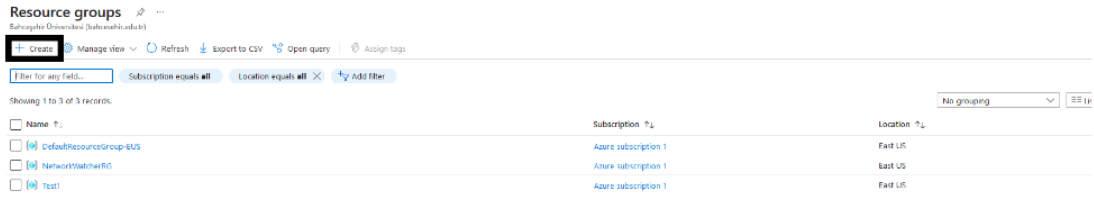
VI. **Modifying index page.**

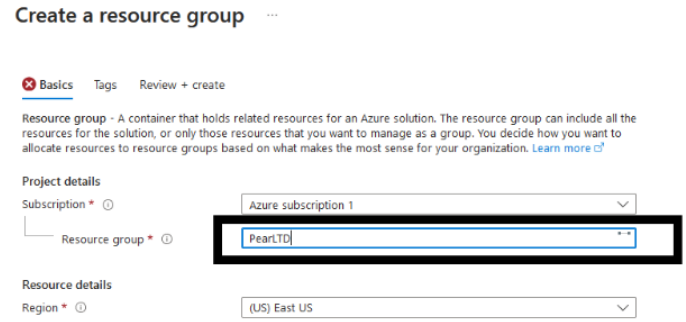
I. Creating a resource group

We start with creating a **resource group** to source all our resources in one space so it can be easily accessible and so that it won't intervene with current or future projects.

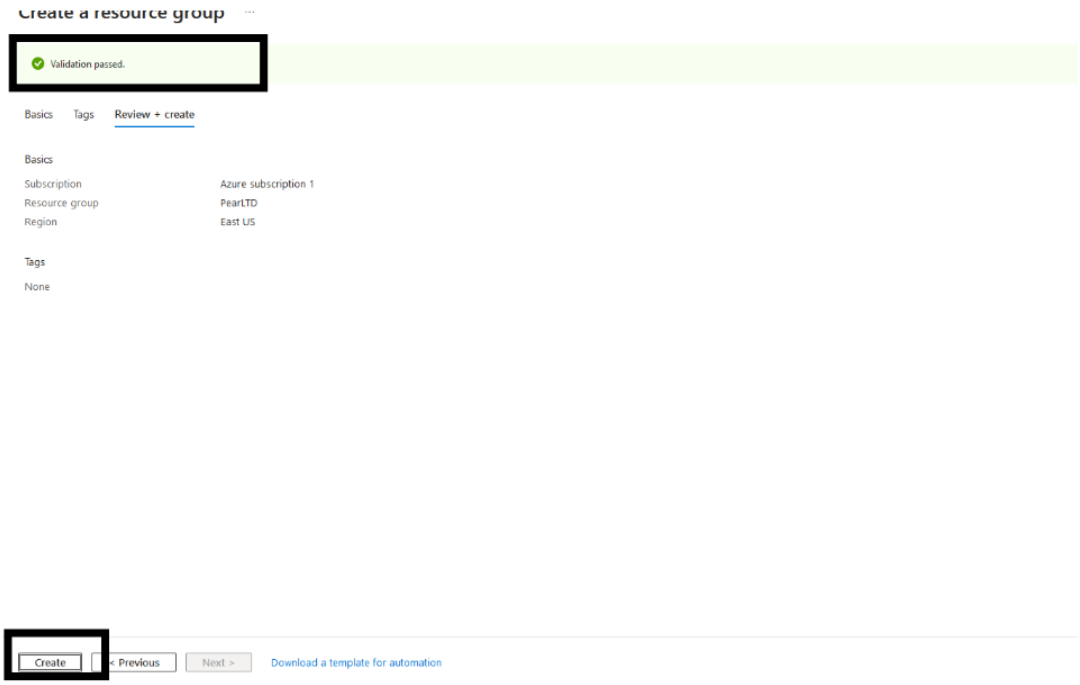
We start by clicking on resource group then clicking on create and then for this project we will call it PearLTD then we will press on **review + create**. Then waiting for the **validation check** then we will click **create**.




Resource groups
Create
Manage view
Refresh
Export to CSV
Open query
Assign tags
Filter for any field...
Subscription equals all
Location equals all
Add filter
Showing 1 to 3 of 3 records.
No grouping
Name
Subscription
Location
DefaultResourceGroup-EUS
Azure subscription 1
East US
NetworkWatcherRG
Azure subscription 1
East US
Test1
Azure subscription 1
East US


Create a resource group
Basics
Tags
Review + create
Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. Learn more
Project details
Subscription *
Azure subscription 1
Resource group *
PearLTD
Resource details
Region *
(US) East US


Review + create
< Previous
Next : Tags >

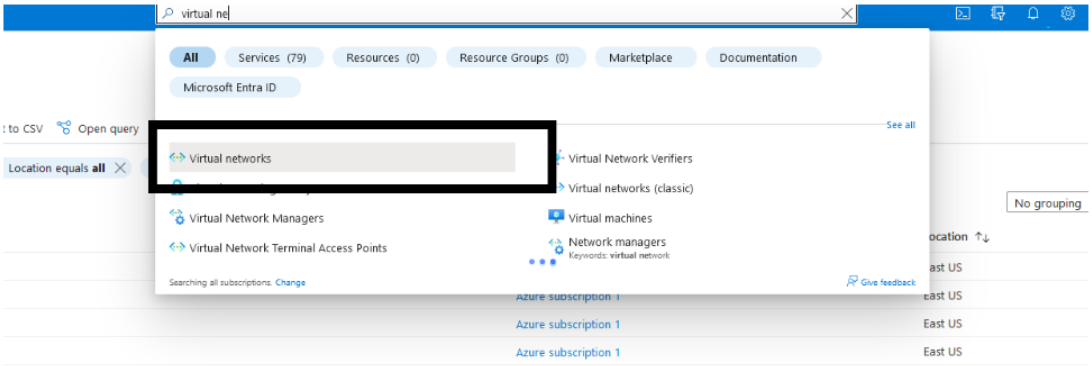


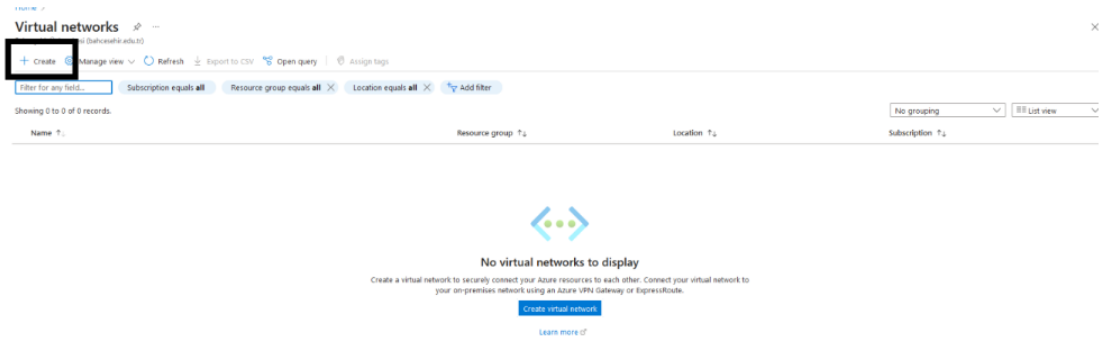
II. Creating a virtual network.

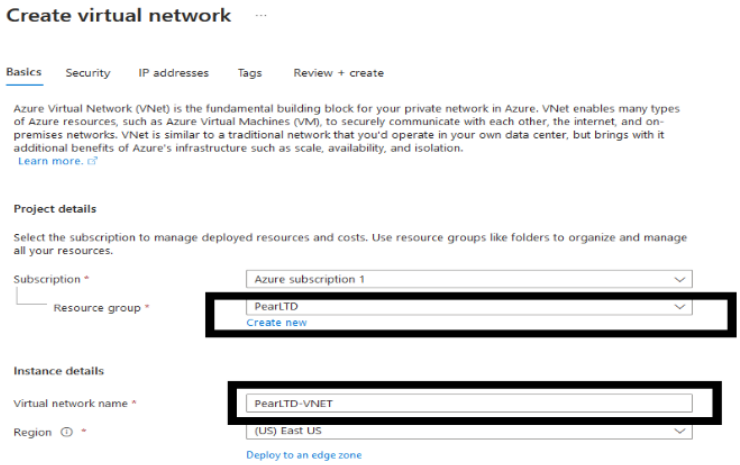
Now that we have insured the creating of our **resource group,** we will start with making a **virtual network** so that we can have a safe tunnel for our information to flow through that wont interfere with public networks and so that we can manage our traffic in a healthy and easy way.

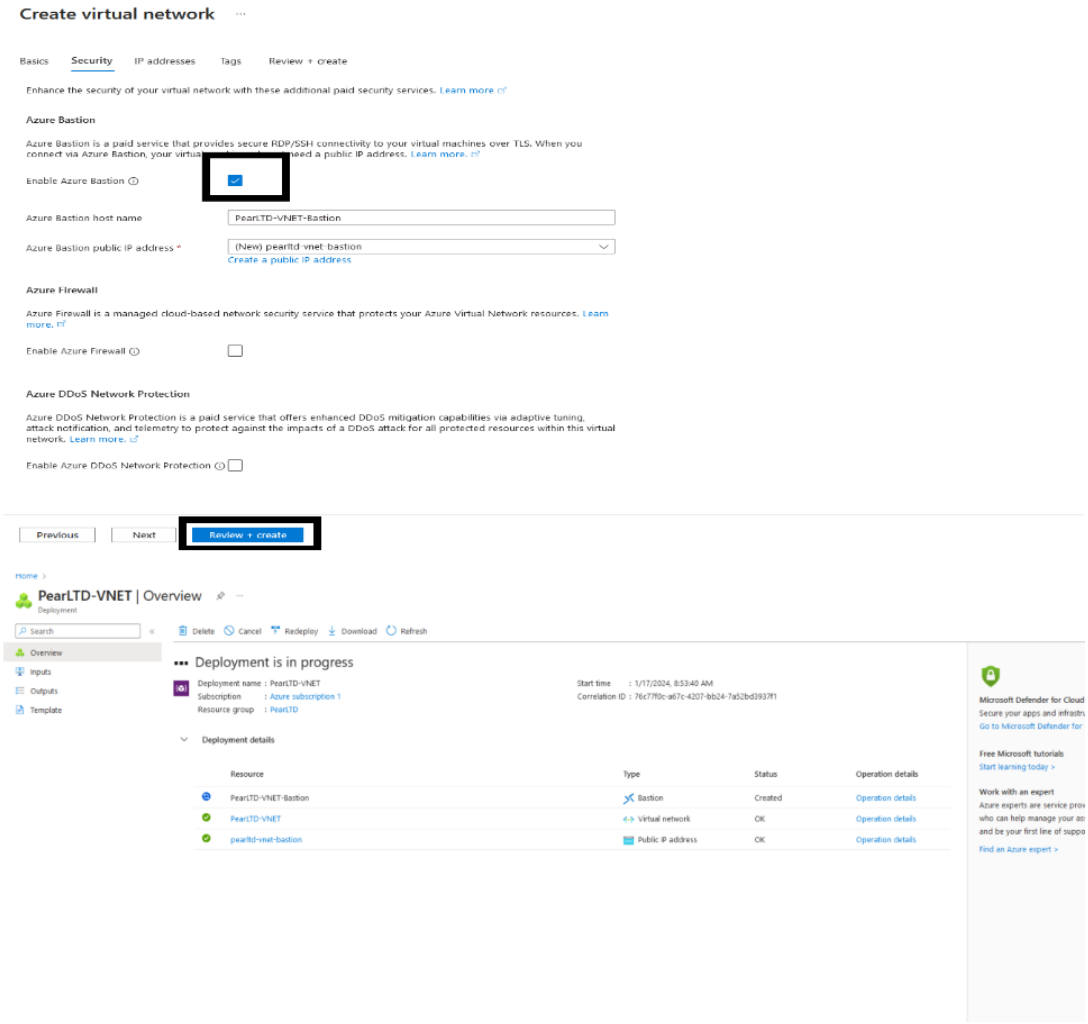
First we start with searching for **Virtual networks on** azures search tab, then proceedings with create so that we can create a new one then on the resource group tab we will click on our **PearLTD resource group** that we created then we will proceed with naming our **virtual network** we went with **PearLTD-VNET.**

Second when we press next and head to security we will **enable azure bastion** for easier future access, in this project we won't use the **bastion** we will utilize the old technique of connecting via **RDP** to further enhance the project so that we can connect to it anywhere and with any machine. And once after we do that we click on **Review + Create** and wait for the validation and **create**.


virtual ne
All
Services (79)
Resources (0)
Resource Groups (0)
Marketplace
Documentation
Microsoft Entra ID
See all
Virtual networks
Virtual Network Verifiers
Virtual networks (classic)
Virtual Network Managers
Virtual machines
Virtual Network Terminal Access Points
Network managers
Keywords: virtual network
Searching all subscriptions. Change
Give feedback
to CSV
Open query
Location equals all
No grouping
Azure subscription 1
East US


Virtual networks
Create
Manage view
Refresh
Export to CSV
Open query
Assign tags
Filter for any field...
Subscription equals all
Resource group equals all
Location equals all
Add filter
Showing 0 to 0 of 0 records.
No grouping
List view
Name
Resource group
Location
Subscription
No virtual networks to display
Create virtual network
Learn more


Create virtual network
Basics
Security
IP addresses
Tags
Review + create
Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of Azure resources, such as Azure Virtual Machines (VM), to securely communicate with each other, the internet, and on-premises networks. VNet is similar to a traditional network that you'd operate in your own data center, but brings with it additional benefits of Azure's infrastructure such as scale, availability, and isolation.
Learn more.
Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription *
Azure subscription 1
Resource group *
PearLTD
Create new
Instance details
Virtual network name *
PearLTD-VNET
Region *
(US) East US
Deploy to an edge zone



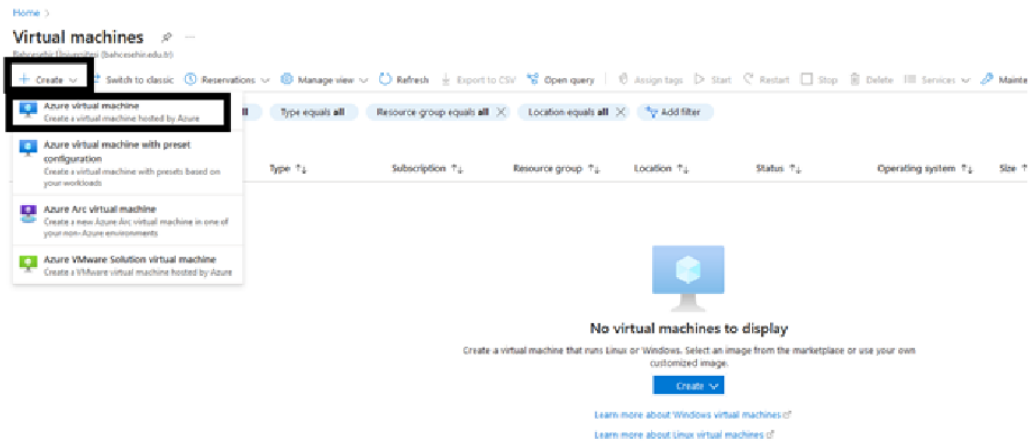
The **deployment** might take a while, so we patiently wait for the **virtual network** to be **deployed.**

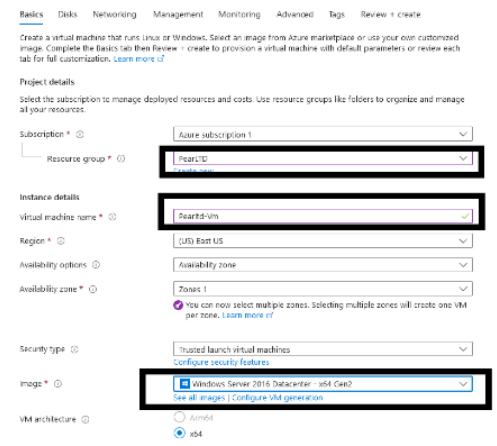
Once deployed we will move to our next step.

III. Creating a Windows 2016 Datacenter Virtual Machine.

Here we created a **datacenter** to host all of **PearLTDS** data in a very good an accessible way, through a **virtual machine**, we did that so it can easily accessible and so that It can be on the cloud in safe and secure environments so we can avoid all the problems that can come with hosting data locally from power outrages to babysitting we avoid all that by migrating to the cloud.

First we start with Searching or finding the virtual machine tab and clicking on it and proceeding with clicking on create so create a new Virtual machine, we pick our resource group **PearLTD** then we will pick our name and region same as our virtual network and resource group and make sure we select the **2016 data center** for our image.

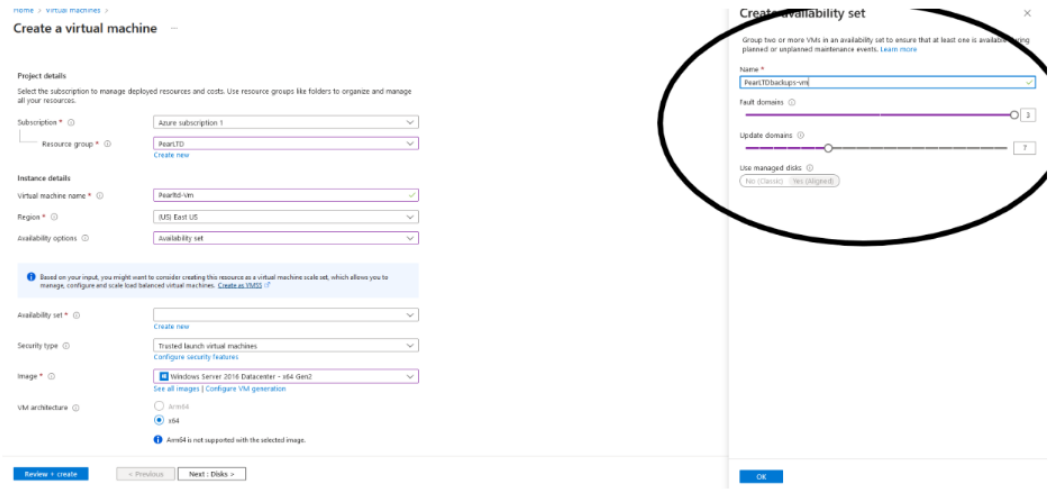




III.I Make an Availability set.

We will make an **availability set** so that our machine can be **geo redundant** so that it can withstand all sorts of regional failures.

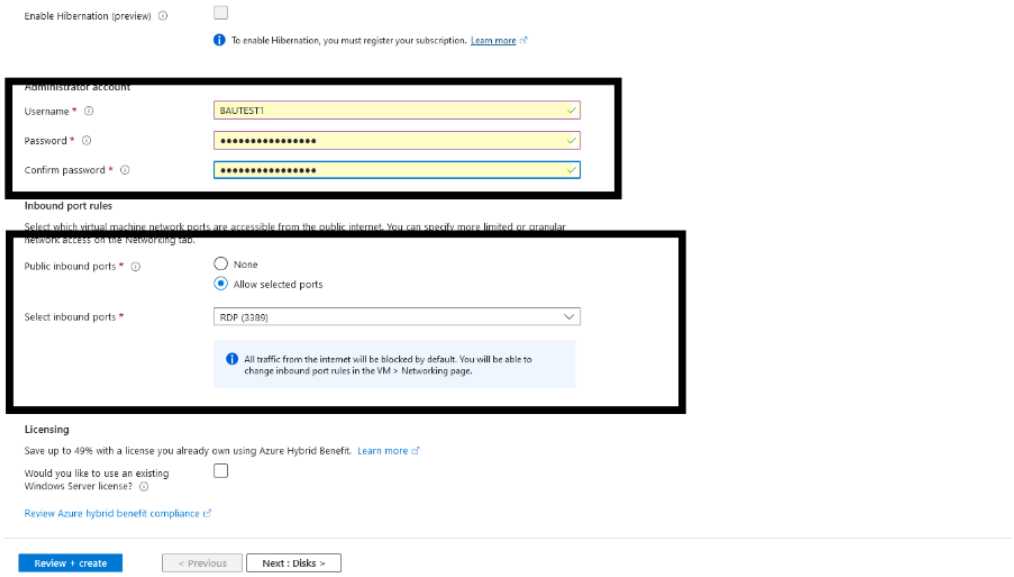
We start by selecting **availability set** in **availability zone** so that it is **Geo Redundant.** And so that we can be sure that our **virtual machine** is always up and running and then we create our availability we start with **create new** and then we will put **3 fault domains and 9 update domains** so that for each vault domain will have 3 update domains so we can achieve perfect redundancy, and we will call it **PearLTDbackups-vm**. And then click on **ok.**



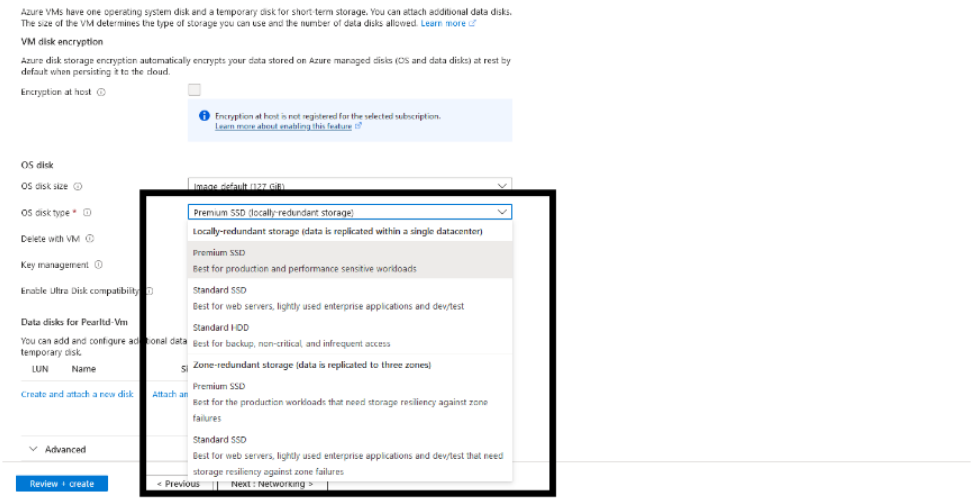
III. CONTINUES

And then we will setup a username and a password for extra protection and so that later we can access it via **RDP** or **Bastion**

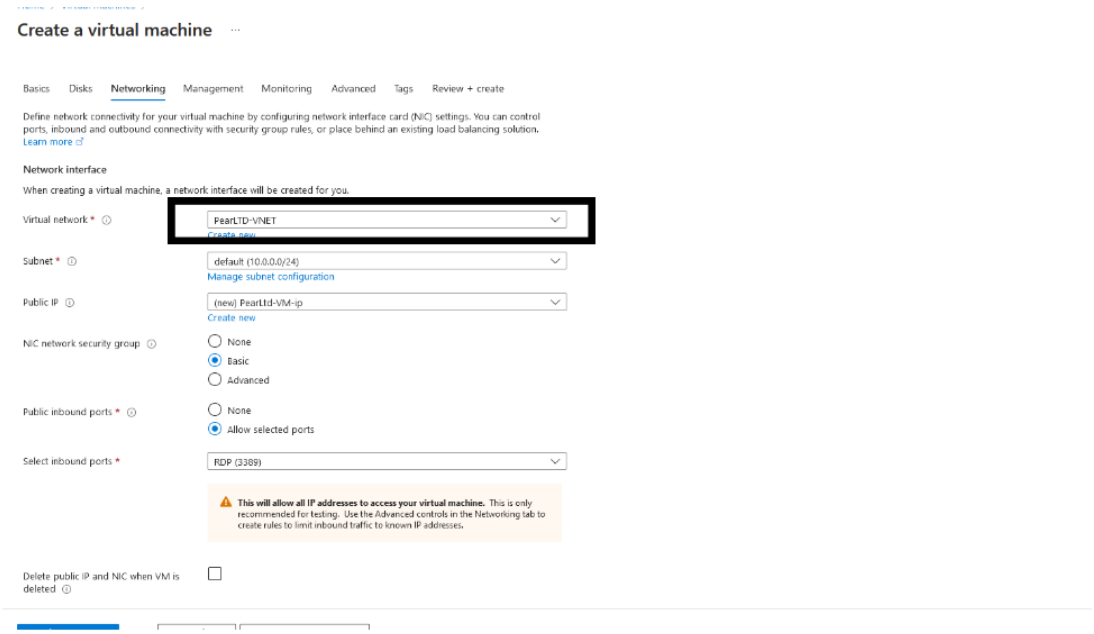
Also we have to make sure to press on **allow <u>public inbound ports</u>** and make sure it is on **port 3389** or we wont be able to access it later via **RDP**.



Then we will press next and go to **disks** we will select **zone redundant storage** so that we can have **zone redundancy** and then we will opt for **standard SSD** because we don't need it to be fast, just zone redundant.



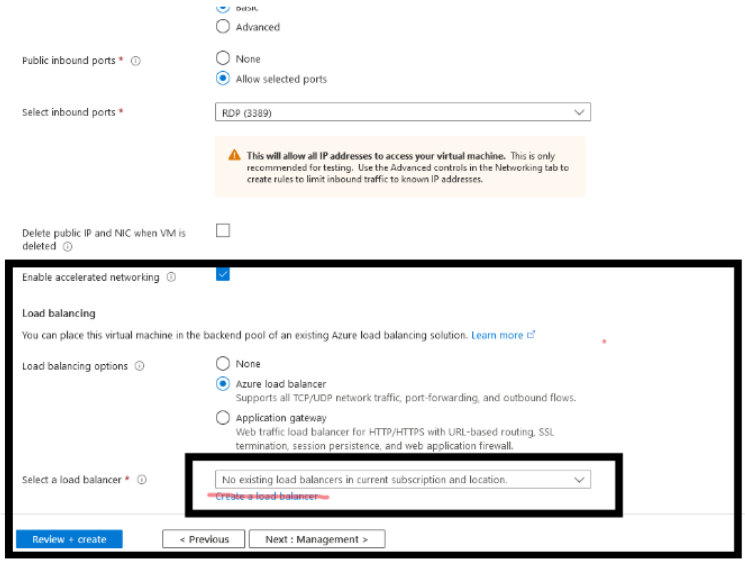
Then press next go t**o networking** and click our **vnet** and **subnet** of our **vnet** Also we have to make sure to press on **allow public inbound ports** and make sure it is on **port 3389** or we won't be able to access it later via **RDP**.

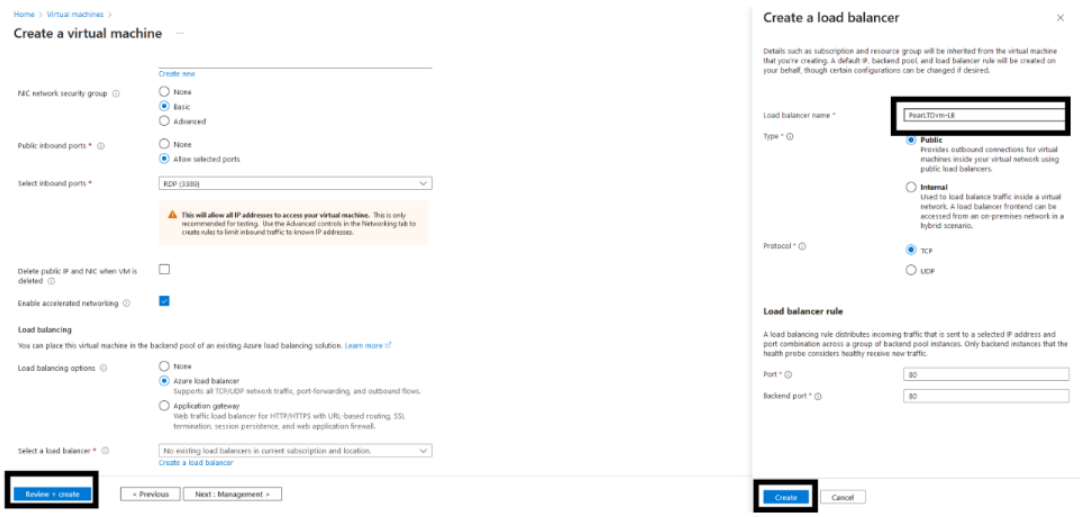


III.II Making a load balancer.

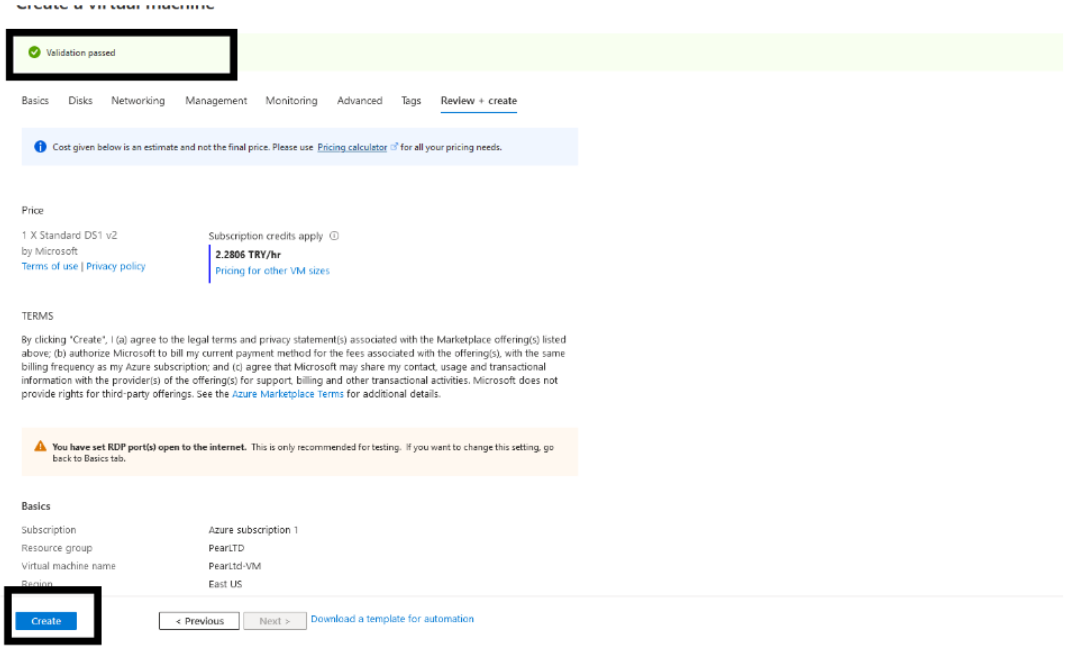
We are creating a load balancer so that we can assure that the traffic flow is equally processed so that there wont be any over loading of traffic so that the machines won't run a risk of shutting down due to bad traffic.

We scroll down and then go on **azure load balancer** and then **create** a **load balancer** and we will make a basic load balancer that is **public** so its more resilient and then use **TCP protocol** and use the basic **port 80** and then we will name it **PearLTDvm-LB** so that we can later easily access it in the **resource group** then we will click create.

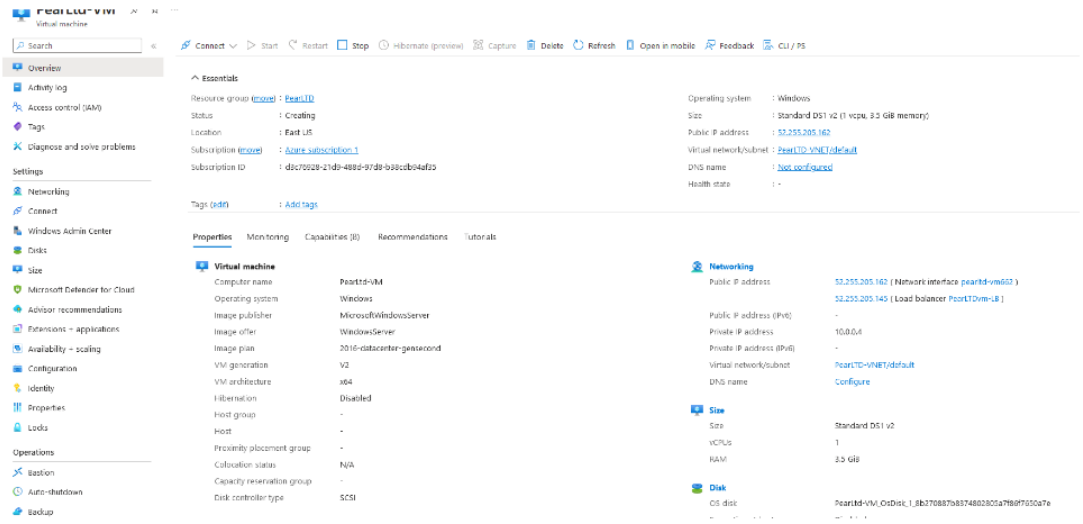




And once we are done with the we will click on **Review + create** then wait for the **validation** and press **create** and with that we are done with creating our **virtual machine**.



And once we see that the machine is up and running we will proceed to our next step.



IV. Connecting to the Virtual Machine Via RDP.

Why are we connecting via **RDP** and not **Bastion**?

RDP has been the standard for years, and it emerges as a superior choice compared to **Bastion** for server access and management. **RDP** stands out by offering a direct connection to the server's desktop environment, ensuring a smooth and immersive user experience. In contrast to Bastion, which acts as an intermediary gateway, **RDP** eliminates an additional layer, minimizing latency and potential points of failure. This direct link enables users to interact with server applications and files seamlessly, closely resembling an on-premises setting. **RDP**'s versatility is evident in its support for various functionalities such as clipboard sharing and printer redirection, contributing to a more integrated and flexible remote working environment. While **Bastion** plays a crucial role in enhancing security as a secure gateway, **RDP** excels in providing an efficient, feature-rich interface for streamlined server administration.

So we start with going on our **windows computer** and opening run and running **mstsc**

Then we will copy the **public IP address** of our machine and paste it on our **RDP portal**

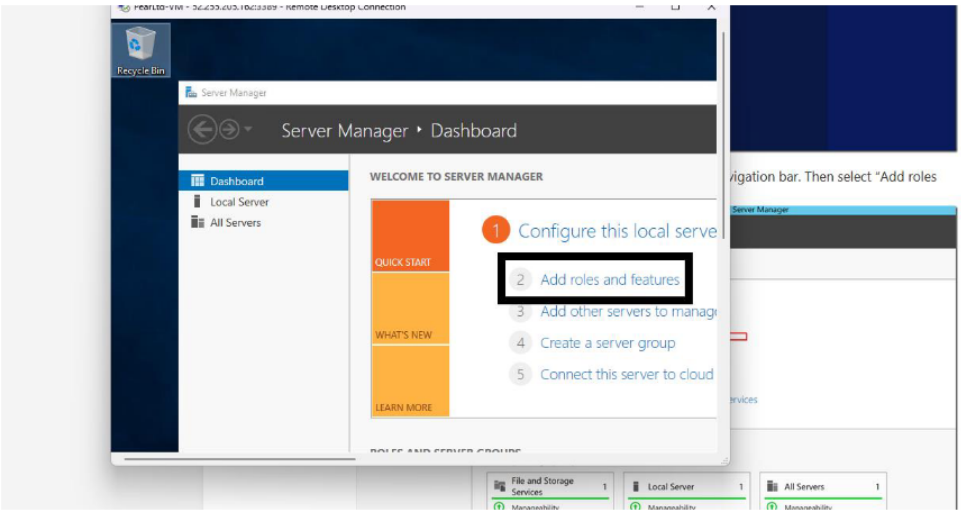
Then proceed with entering the **username and password** we bestowed to our machine and then click **yes** on the security permission and viola we connected to the machine.

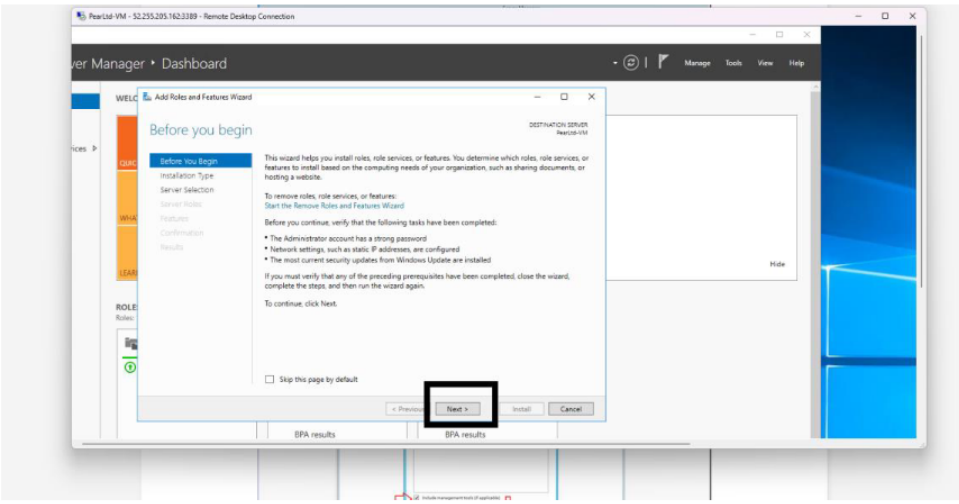
V. Installing and modifying the IIS.

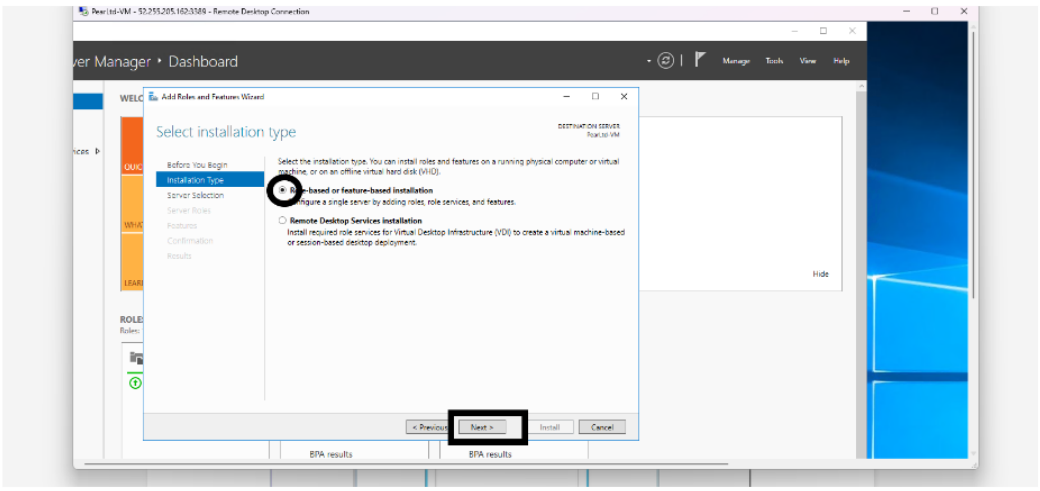
What is IIS?

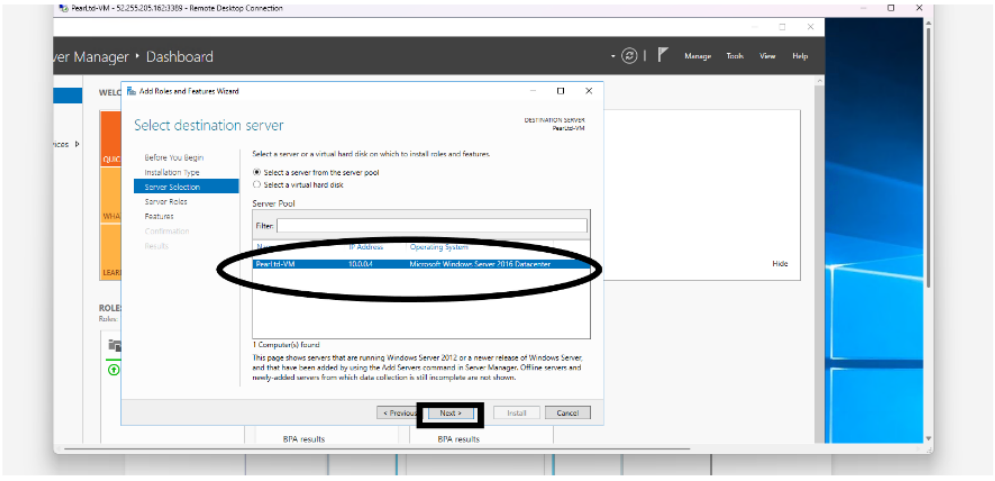
IIS, or Internet Information Services, is a web server developed by Microsoft. It acts as a platform for hosting websites and web applications on Windows servers. Offering support for a variety of web technologies. With management tools like the IIS Manager, administrators can easily configure and oversee server settings, making IIS a vital component for hosting and managing web content in a Windows environment.

We start with going on the windows menu and searching for server manager and once we are in **server manager,** we want to click on **Add roles and features** then click **next** and make our **installation type role based.** and then click next and make sure our server is there in the server selection and click next.

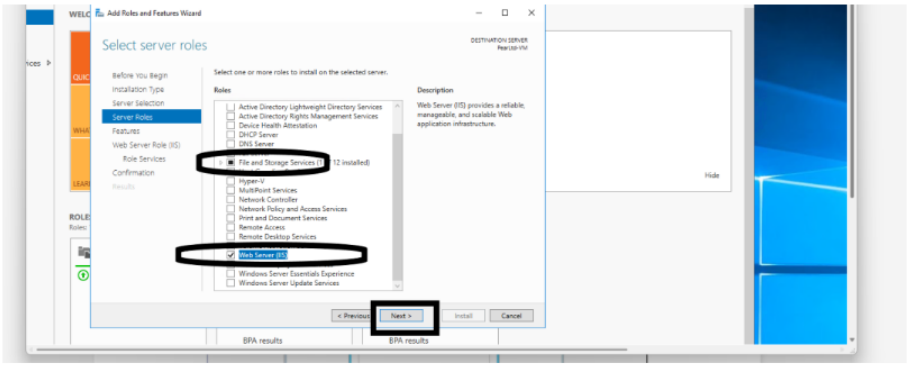


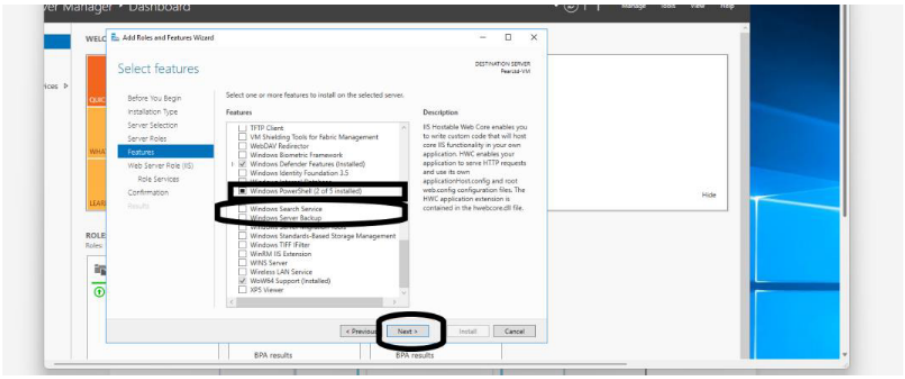

Server Manager • Dashboard
Add Roles and Features Wizard
Before you begin
Before You Begin
Installation Type
Server Selection
Server Roles
Features
Confirmation
Results
This wizard helps you install roles, role services, or features. You determine which roles, role services, or features to install based on the computing needs of your organization, such as sharing documents, or hosting a website.
To remove roles, role services, or features:
Start the Remove Roles and Features Wizard
Before you continue, verify that the following tasks have been completed:
* The Administrator account has a strong password
* Network settings, such as static IP addresses, are configured
* The most current security updates from Windows Update are installed
If you must verify that any of the preceding prerequisites have been completed, close the wizard, complete the steps, and then run the wizard again.
To continue, click Next.
Skip this page by default
< Previous
Next >
Install
Cancel
BPA results

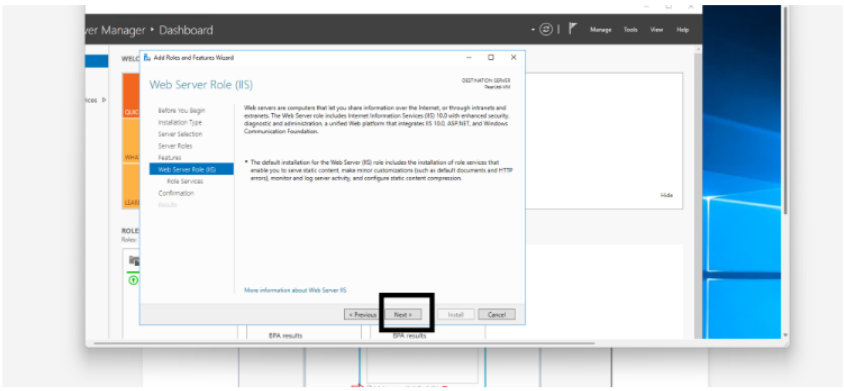

Server Manager • Dashboard
Add Roles and Features Wizard
Select installation type
Before You Begin
Installation Type
Server Selection
Server Roles
Features
Confirmation
Results
Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).
Role-based or feature-based installation
Configure a single server by adding roles, role services, and features.
Remote Desktop Services installation
Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based or session-based desktop deployment.
< Previous
Next >
Install
Cancel
BPA results

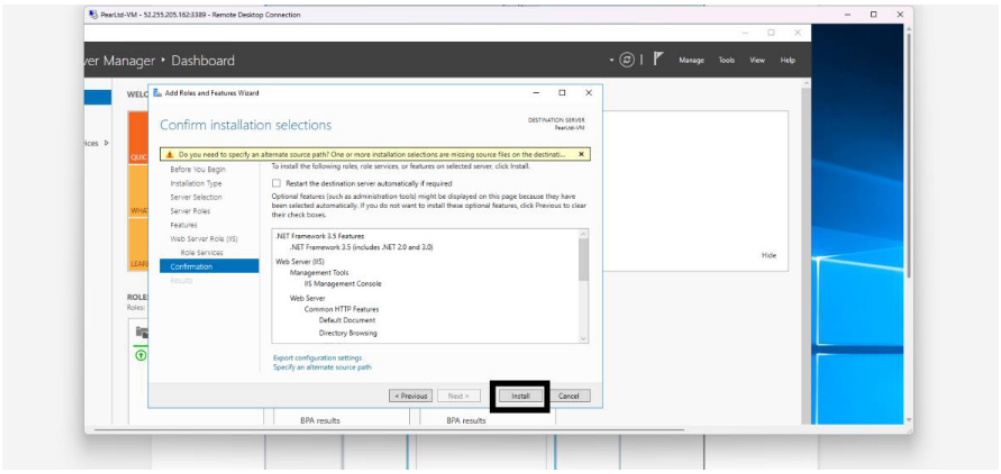

Server Manager • Dashboard
Add Roles and Features Wizard
Select destination server
Before You Begin
Installation Type
Server Selection
Server Roles
Features
Confirmation
Results
Select a server or a virtual hard disk on which to install roles and features.
Select a server from the server pool
Select a virtual hard disk
Server Pool
Filter:
Name
IP Address
Operating System
1 Computer(s) found
This page shows servers that are running Windows Server 2012 or a newer release of Windows Server, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.
< Previous
Next >
Install
Cancel
BPA results

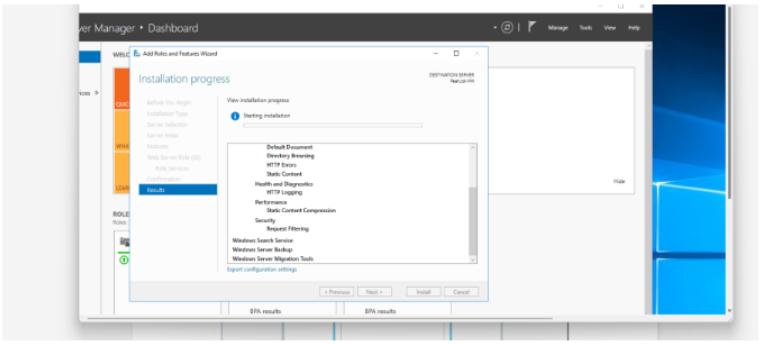
Now we are at **server roles** and we want to make sure to tik **IIS** click **next** and on **features** make sure to **windows search service**, **windows server back** up and then on role services click all of the **NET option**s and other options Microsoft offers, the reason we need to install these modules is so that we can have full scalability in the future in case we want to expand our server then click on **install** and wait for the **installation**.

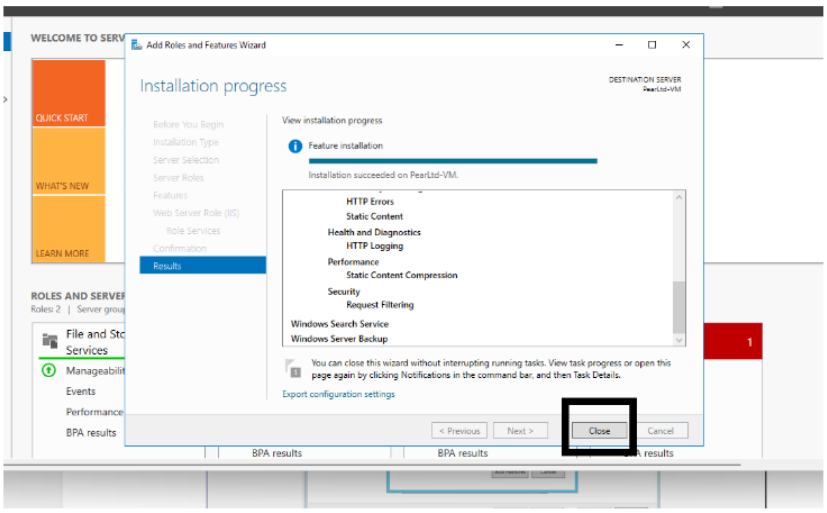










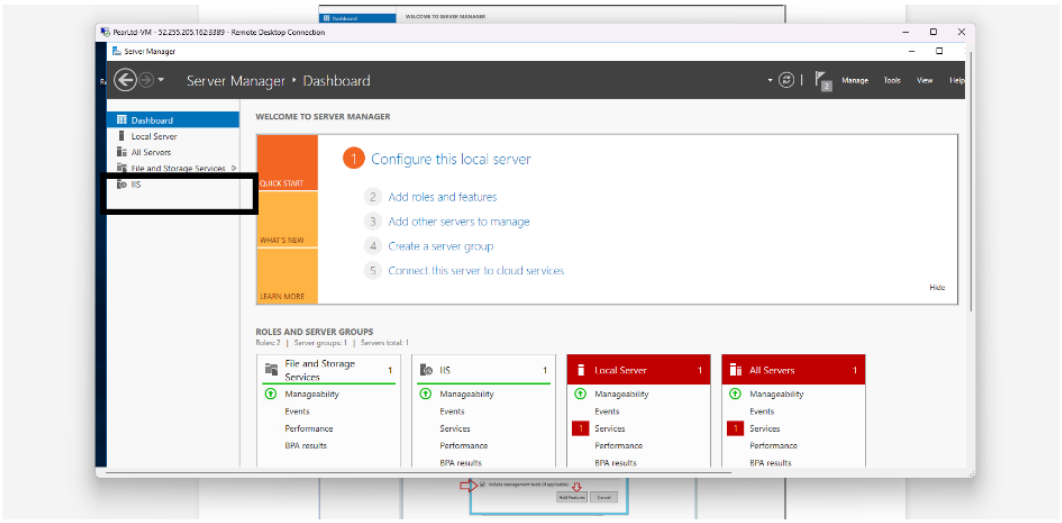


And once we are greeted with this screen we have successfully **installed IIS** and ready to move to the next step.

VI. Modifying index page.

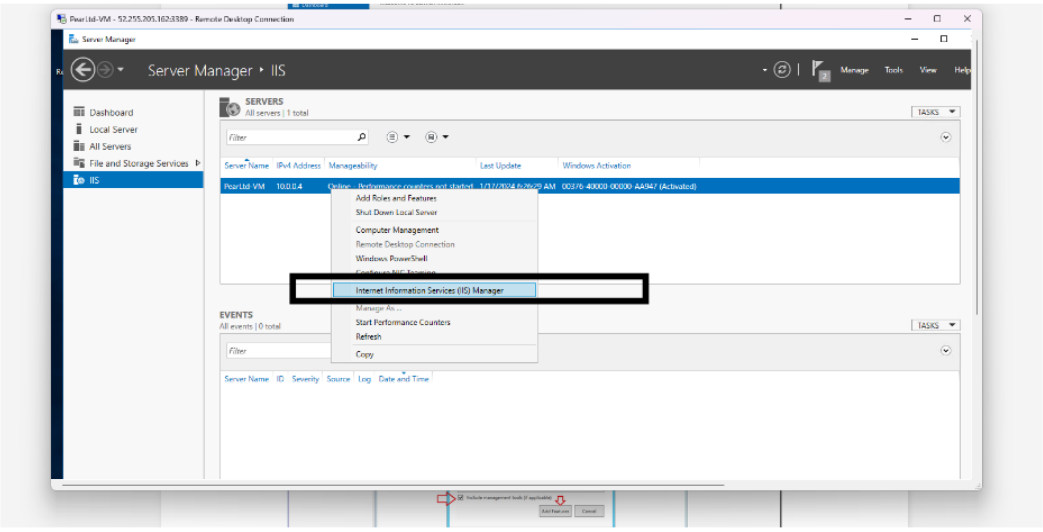
Now that we have a website up and running, we want to modify it and in doing that we want to add our name and student number to it so we want to start with writing a little code so that the website can read and present

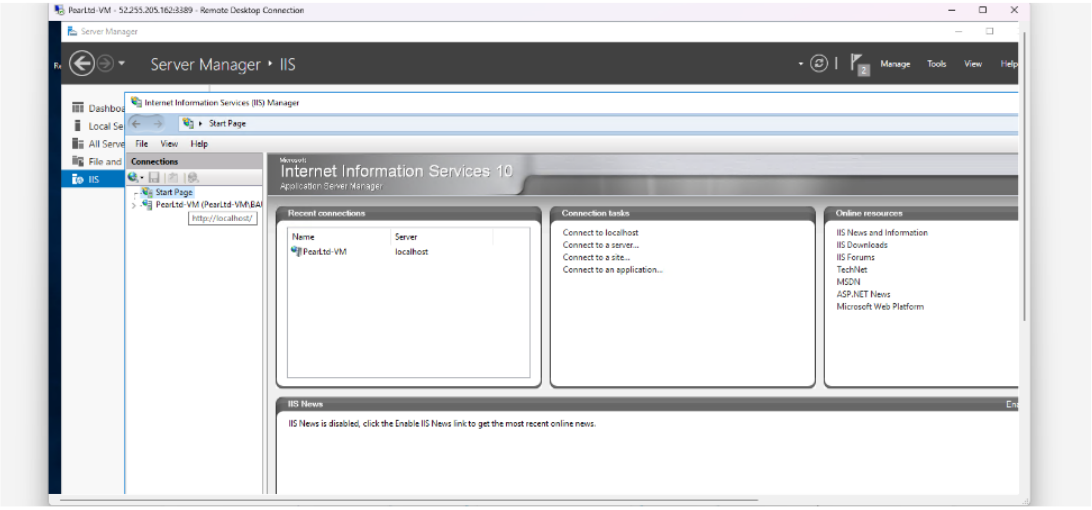
We want to make sure to **save this as an html** so that it wont cause any problems in the future and now we want to implement this code on the **index page** we start by finding the **directory** which sends us back to server manager, we will press the right blade this time and click on **IIS.**

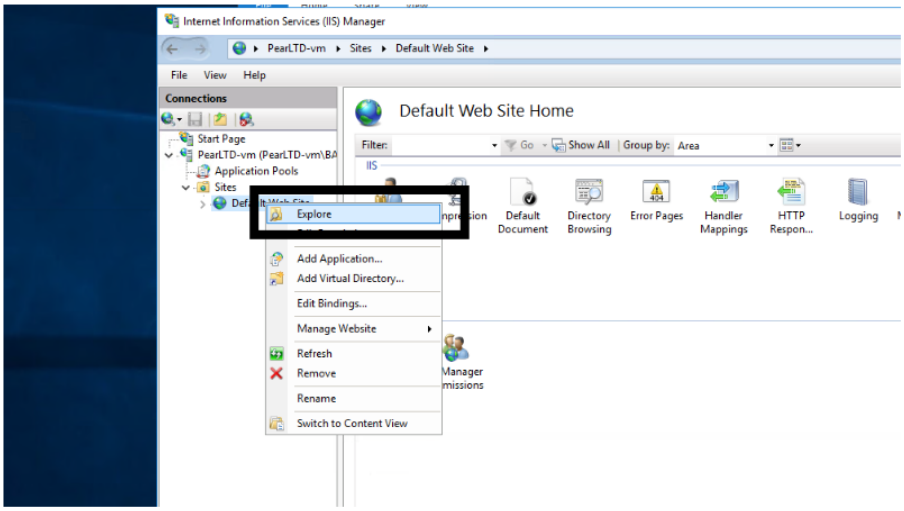


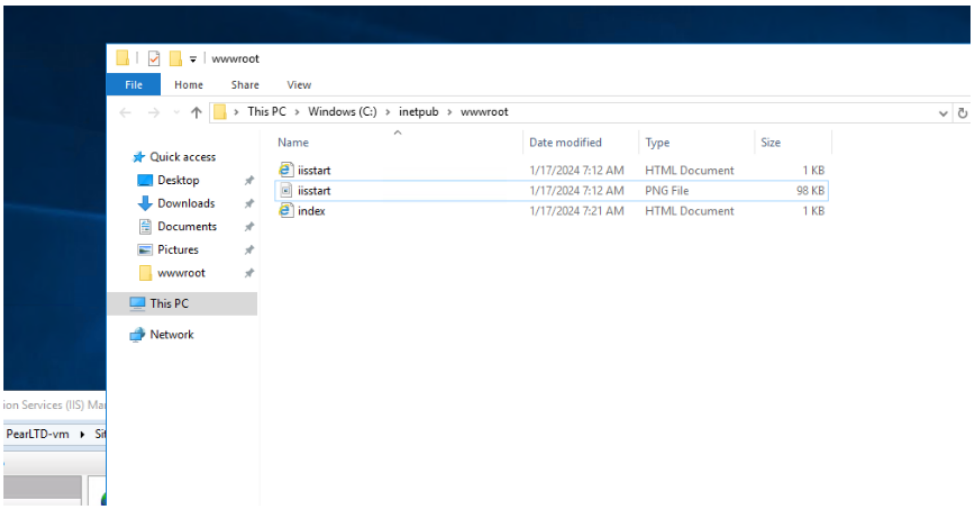
Then again **click** on the **right blade** and right click and press **internet Information services manager** then Then again click on the right blade then on

on **our vm** a dropdown menu would appear and then we will see the **default website** we will click on that and then press **explore** to find the **directory,** and then we will **paste** our next index to it so it changes.





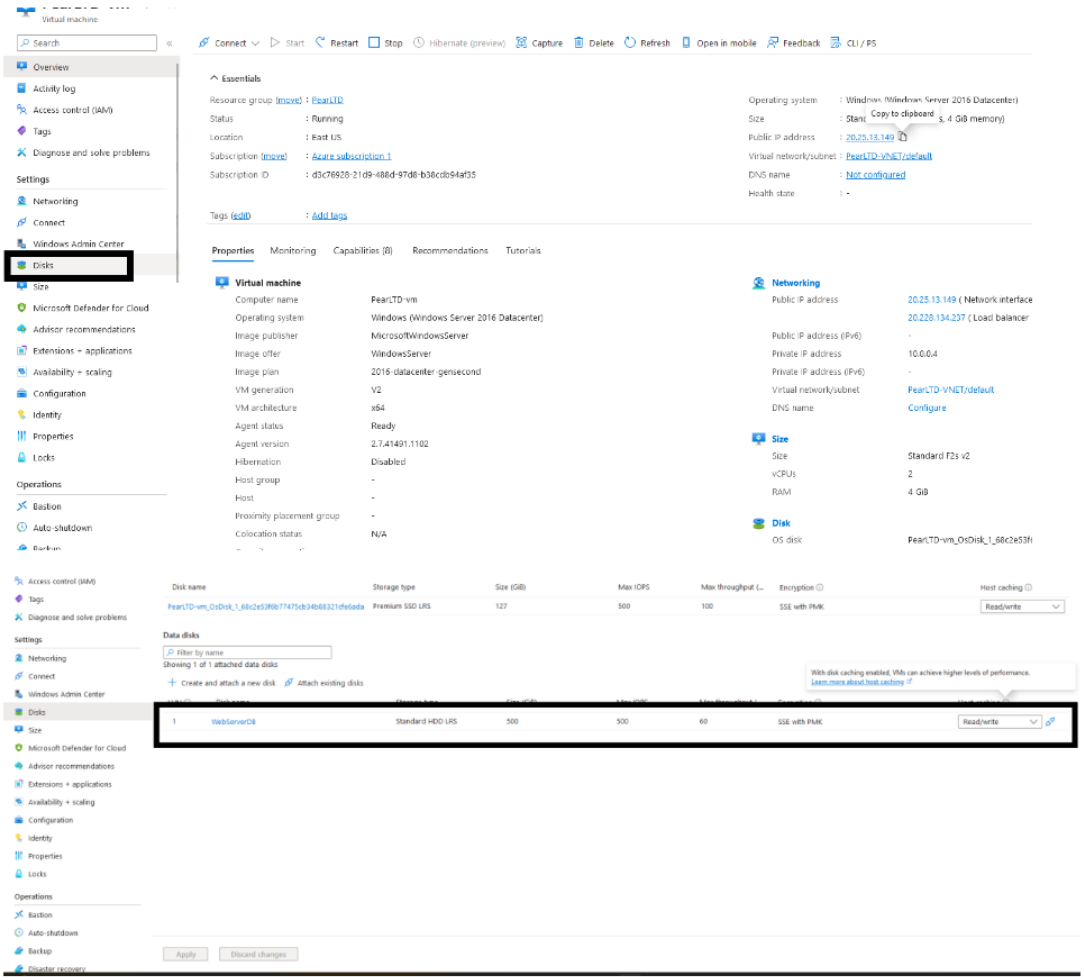




And now we will refresh the website to see if the change has been made and once, we see that the change has been made we are ready to move to our next step.

V. Adding an additional hard disc to the webserver.

We go on our **virtual machine** main page, then go on the right blade and we can see disks then we will press on that and add a new **HDD disk with 500 gbs** so the **IOPS** can be higher then click create and make sure the option of read and write is on so that the **disk** and be **backed up and restored** to our liking.



VI. Enabling automated backup for the hard disc.

I. Creating recovery vault.

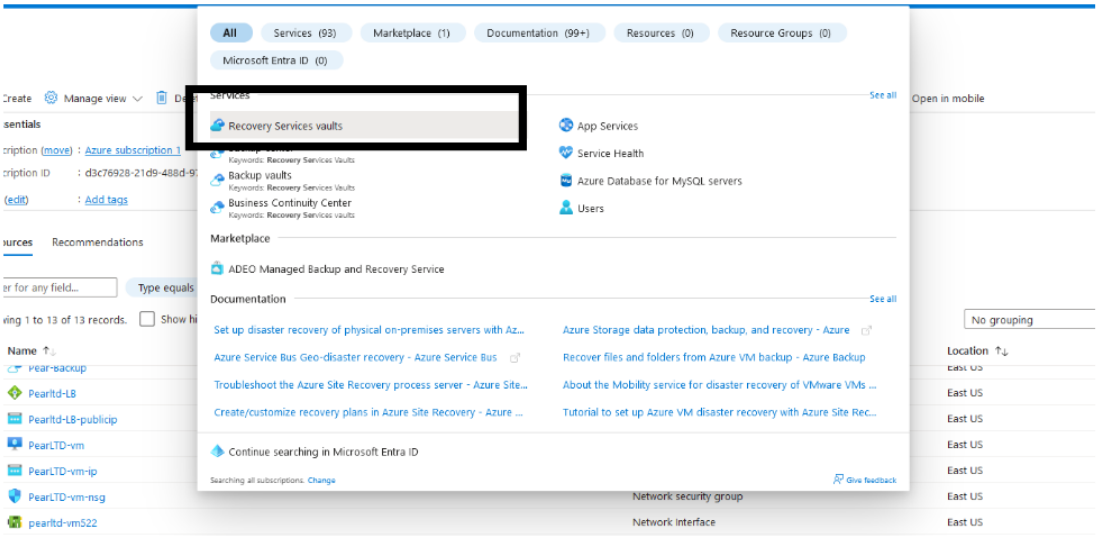
II. Creating backup Protocol.

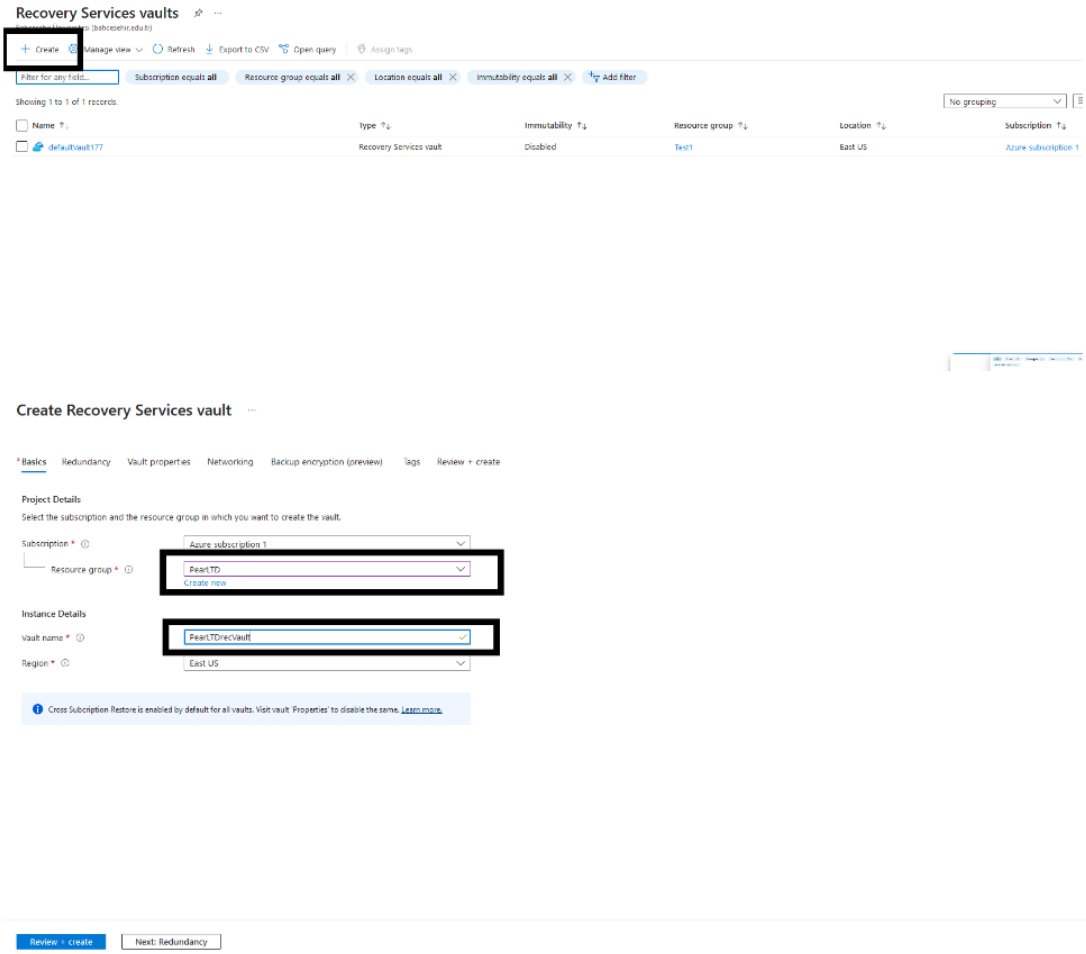
I. Creating recovery vault

Why do we need a recovery vault?

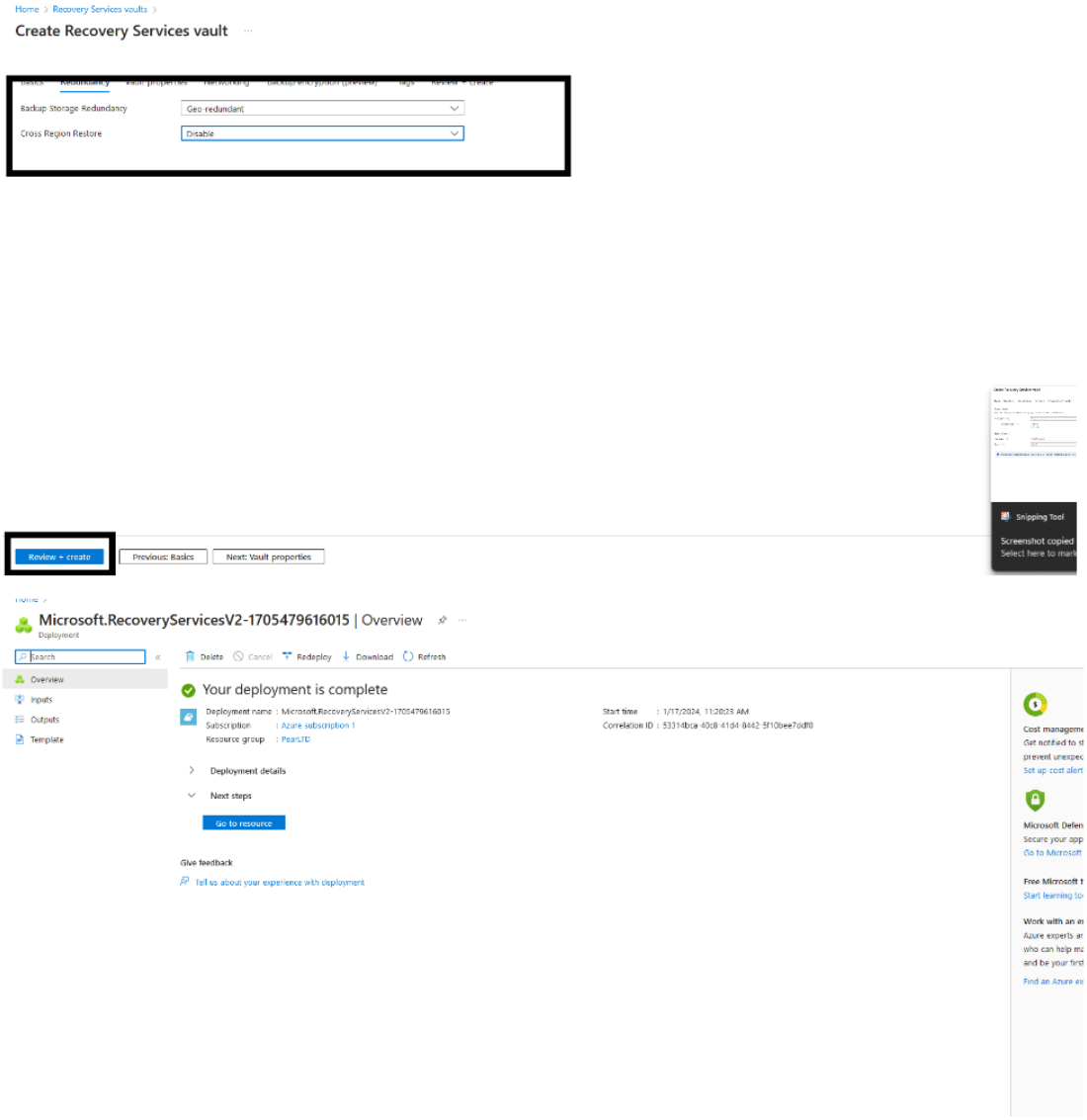
Having a **recovery vault** is like having a digital safety net for your important stuff. It's a special place, often part of services like **Azure Recovery Services**, where we keep backups of crucial data and system settings. Think of it as a **backup plan** for when things go wrong **accidental deletions**, **data glitches**, or even **major disasters**. This vault ensures that if something breaks, we can easily **restore** everything to how it was before, like a **snapshot** in time that saves us from headaches and keeps our digital world safe and sound.

We start by searching for **recovery services vault** and then clicking on It and again clicking **create** to start the procedure of making the vault we select our resource group (pearltd) and name for this we will name it **PearLTDRecvault**. And then we click next.





We click **next** and go to **redundancy** and make sure it is **geo redundant** so that it can be safe from **region failures,** and we want to **enable** cross region restore so that across all regions our machines can be restored safely then we want to click on **review + create** and wait for the deployment and once don't move to the next step.

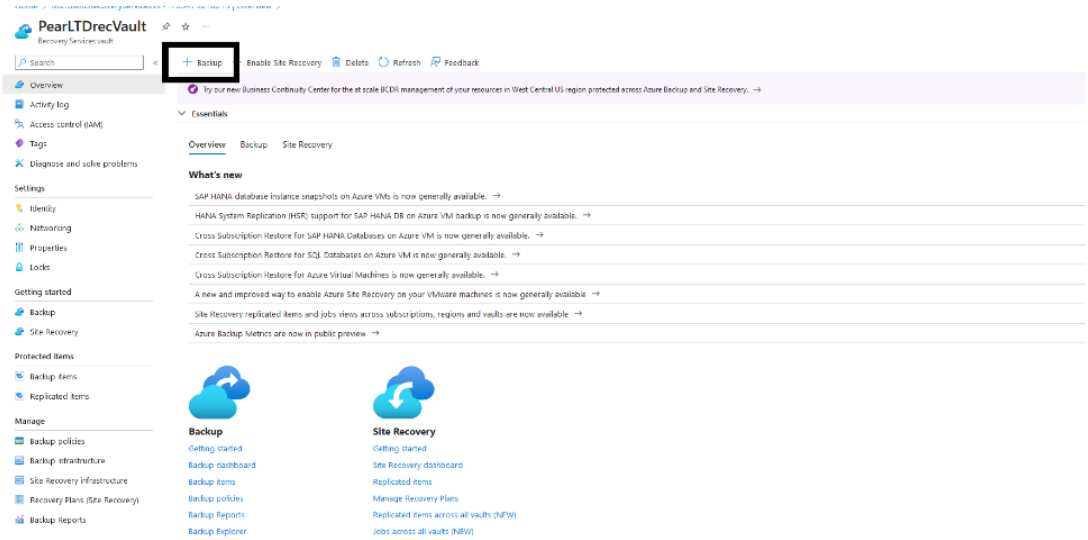

Home > Recovery Services vaults >
Create Recovery Services vault
Backup Storage Redundancy
Geo-redundant
Cross Region Restore
Disable
Review + create
Previous: Basics
Next: Vault properties
Snipping Tool
Screenshot copied
Microsoft.RecoveryServicesV2-1705479616015 | Overview
Deployment
Search
Overview
Inputs
Outputs
Template
Delete
Cancel
Redeploy
Download
Refresh
Your deployment is complete
Deployment name : Microsoft.RecoveryServicesV2-1705479616015
Subscription : Azure subscription 1
Resource group : PearlLTD
Start time : 1/17/2024, 11:20:28 AM
Correlation ID : 53314bca-40c8-41d4-8442-5f10bee7ddf0
Deployment details
Next steps
Go to resource
Give feedback
Tell us about your experience with deployment

IV.II Creating backup Protocol.

Why do we need a backup protocol?

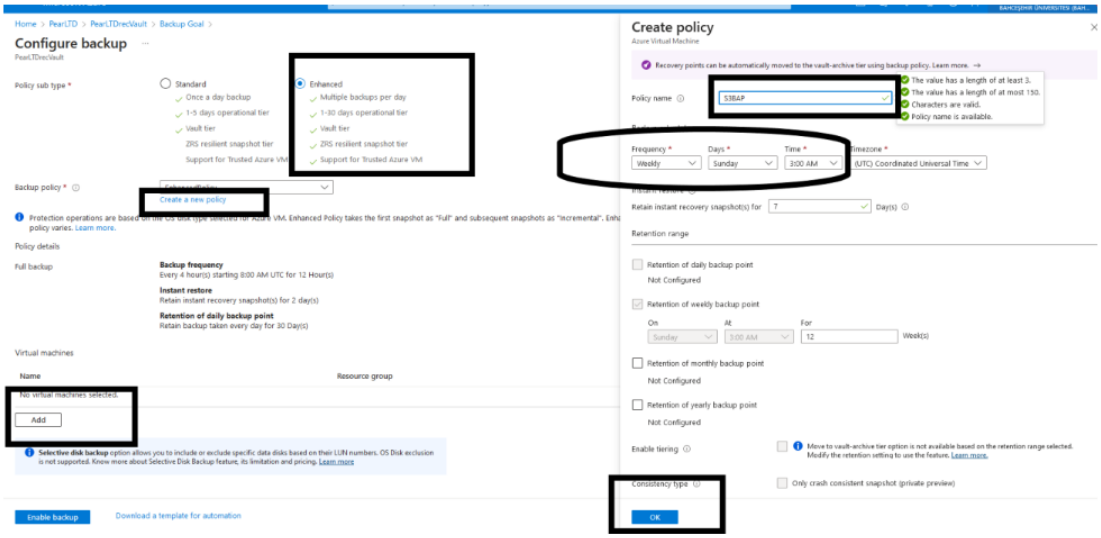
Implementing a robust **backup protocol** is a critical element of prudent **data management** and **system administration**. Unforeseen events, ranging from accidental deletions to hardware failures or catastrophic system crashes, can compromise valuable data and disrupt business operations. A well-structured backup protocol serves as a safeguard against such contingencies, ensuring the preservation and recovery of crucial information. By systematically creating and maintaining backup copies of data, applications, and system configurations, organizations establish a resilient framework that minimizes downtime, accelerates recovery processes, and ultimately enhances the overall integrity and continuity of their digital assets. In the dynamic landscape of information technology, a proactive backup strategy is an indispensable measure for mitigating risks and fortifying data security.

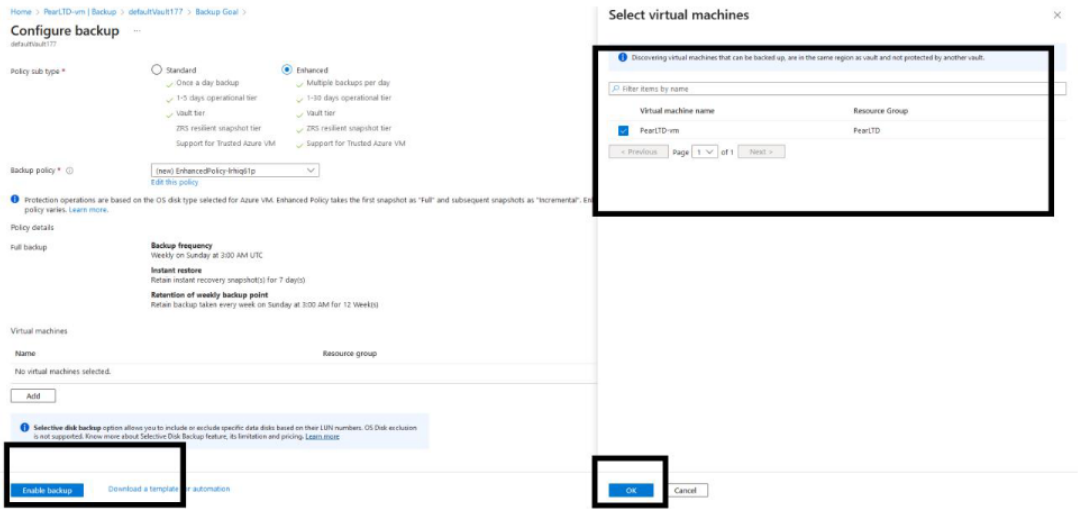
We start with going up our **recovery vault** that we created and we want to click on **back up** and then select **Azure** for **workload** and then click **virtual machine** for **what do you want to back up** and then clicking backup.



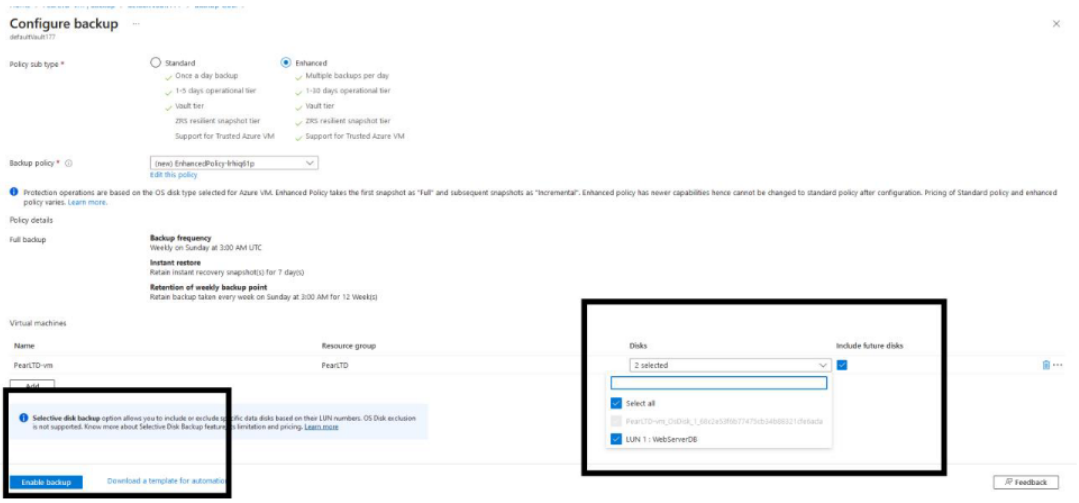
Then once we are on **configuring the backup** we want an **enhanced back up** for our machine and then for our **policy** we will **create a new policy** and make it **weekly**, on **Sundays** at **0030 Sharp** and we will call it **S3RAP** then click **ok** to make the policy then we will **add** our **virtual machine**

And select our **virtual machine PearLTD-vm**





And then after that we will make sure that our disk **WebserverDB** is selected and then press ok and **Enable Backup.**

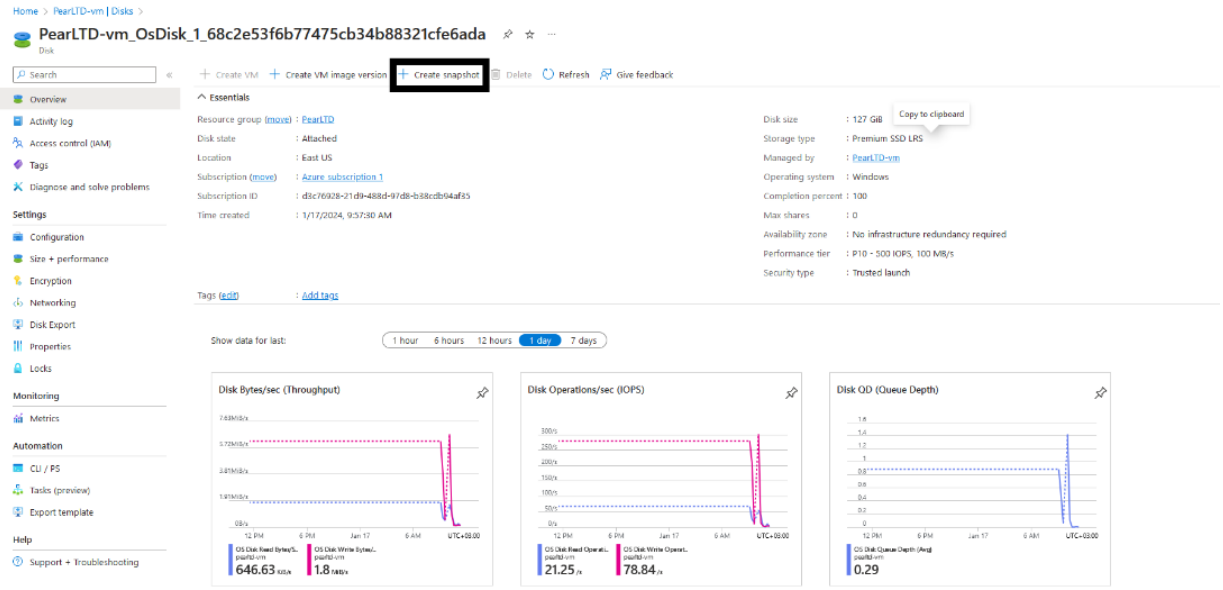


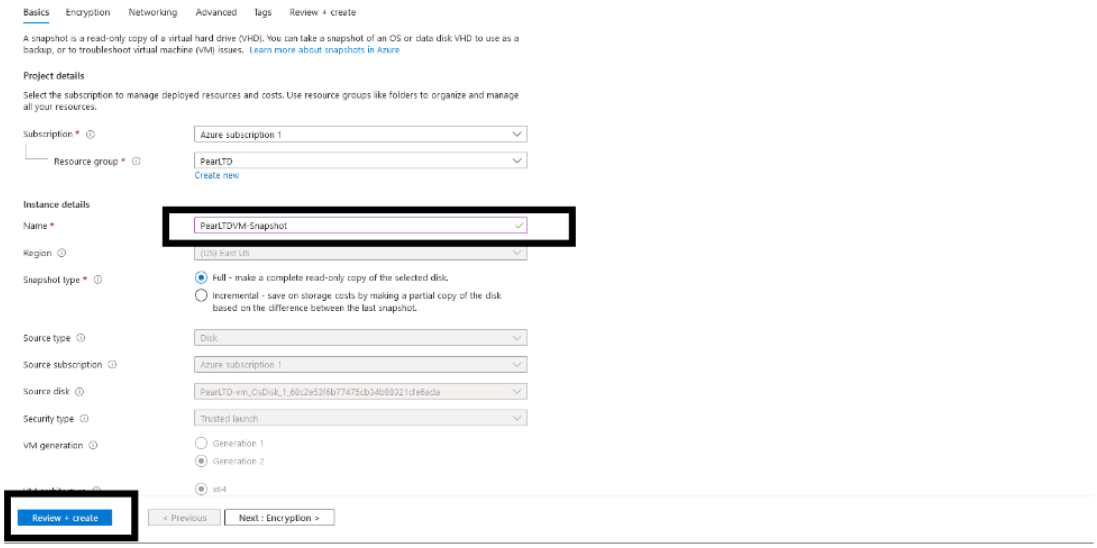
VII. Backing up snapshot.

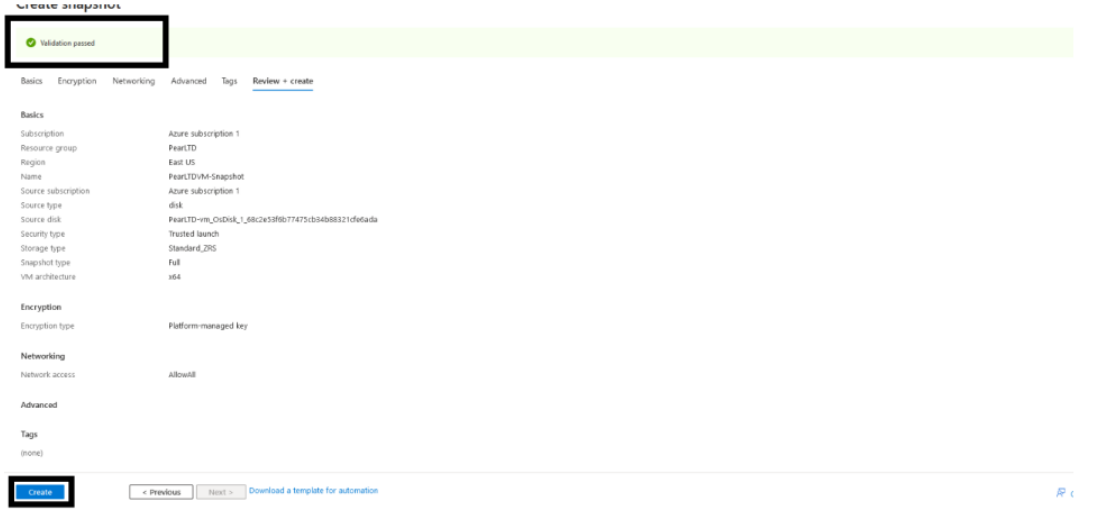
What is snapshot, and why do we need to back it up?

A **snapshot** is a point-in-time copy of a system or data set, capturing its specific state without altering the original. In **data storage** and **virtualization**, **snapshots** are read-only representations used for recovery, backup, or analysis, preserving the data's state at a given moment. However, while **snapshots** are valuable for quick captures, they aren't a complete replacement for traditional backups. Backing up snapshots involves creating an independent copy of the snapshot data, providing an additional layer of protection. This ensures that if the primary storage or infrastructure encounters issues, the backed-up **snapshots** can be used for **recovery**, contributing to a comprehensive and secure **backup** strategy.

Firstly we will go to our disk then lick on **WebserverDB** and on top we can see the option of **create snapshot** and we will press that and we will name it **PearLTD-snapshot** so that we can access it easily in the future and then we will press on **review + create** then create and we are done.




Basics Encryption Networking Advanced Tags Review + create
A snapshot is a read-only copy of a virtual hard drive (VHD). You can take a snapshot of an OS or data disk VHD to use as a backup, or to troubleshoot virtual machine (VM) issues. Learn more about snapshots in Azure
Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription * Azure subscription 1
Resource group * PearLTD
Create new
Instance details
Name * PearLTDVM-Snapshot
Region (US) East US
Snapshot type * Full - make a complete read-only copy of the selected disk.
Incremental - save on storage costs by making a partial copy of the disk based on the difference between the last snapshot.
Source type Disk
Source subscription Azure subscription 1
Source disk PearLTD-vm_OsDisk_1_68c2e53f6b77475cb34b88321cfe6ada
Security type Trusted launch
VM generation Generation 1
Generation 2
x64
Review + create
< Previous
Next : Encryption >

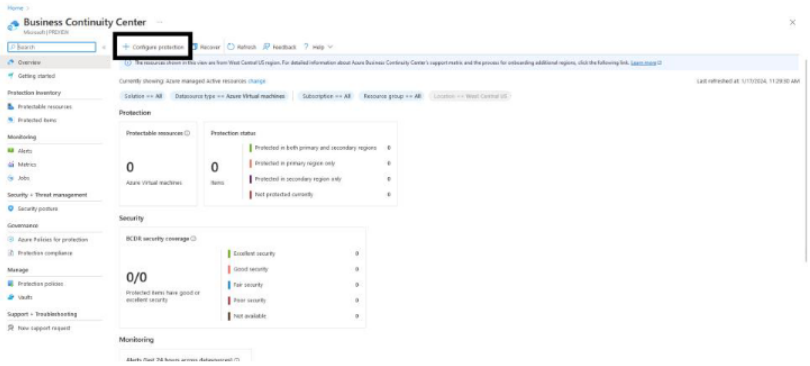

Validation passed
Basics Encryption Networking Advanced Tags Review + create
Basics
Subscription Azure subscription 1
Resource group PearLTD
Region East US
Name PearLTDVM-Snapshot
Source subscription Azure subscription 1
Source type disk
Source disk PearLTD-vm_OsDisk_1_68c2e53f6b77475cb34b88321cfe6ada
Security type Trusted launch
Storage type Standard_ZRS
Snapshot type Full
VM architecture x64
Encryption
Encryption type Platform-managed key
Networking
Network access Allowall
Advanced
Tags
(none)
Create
< Previous
Next >
Download a template for automation

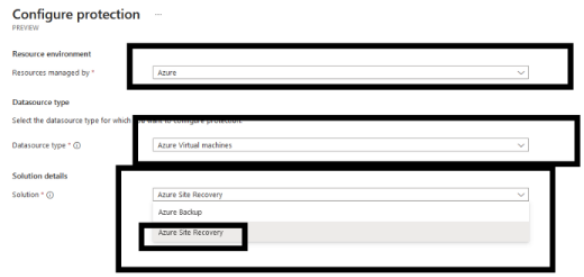
VIII. Business continuity measures taken.

What is business continuity?

Business continuity is about ensuring a company can keep running smoothly even during unexpected events. It involves having plans in place to quickly recover from disruptions and minimize downtime, ensuring essential operations continue seamlessly.

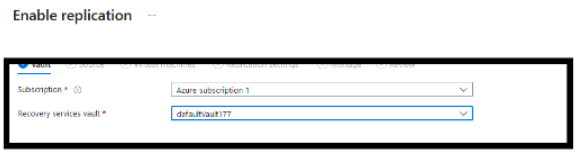
We start with going to the search bar and searching for **business continuity center** and then going on and clicking **configure protection.** Then on the next tab for **resources managed by** we will choose **azure,** for **datasource type** we will choose **virtual machine** and for **solution azure site recovery.**

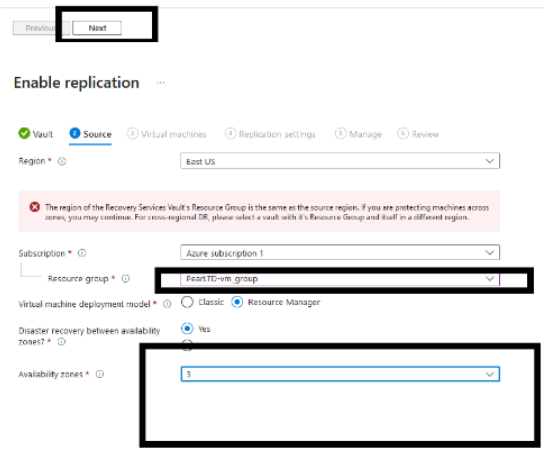


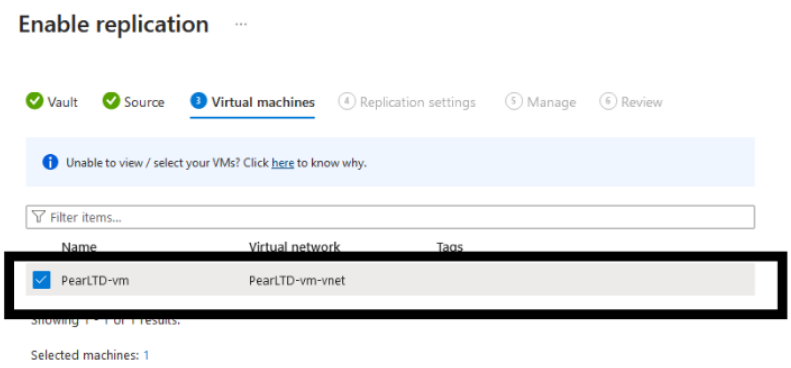


Then we will pick our **vault** which was **PearLtdRec-vault** click **next** and go to source and we will select our **resource group PearLTD** and **enable disaster recovery between availability zones** so that we can have it up and running at all times and **set the zones to 3** and click **next.**

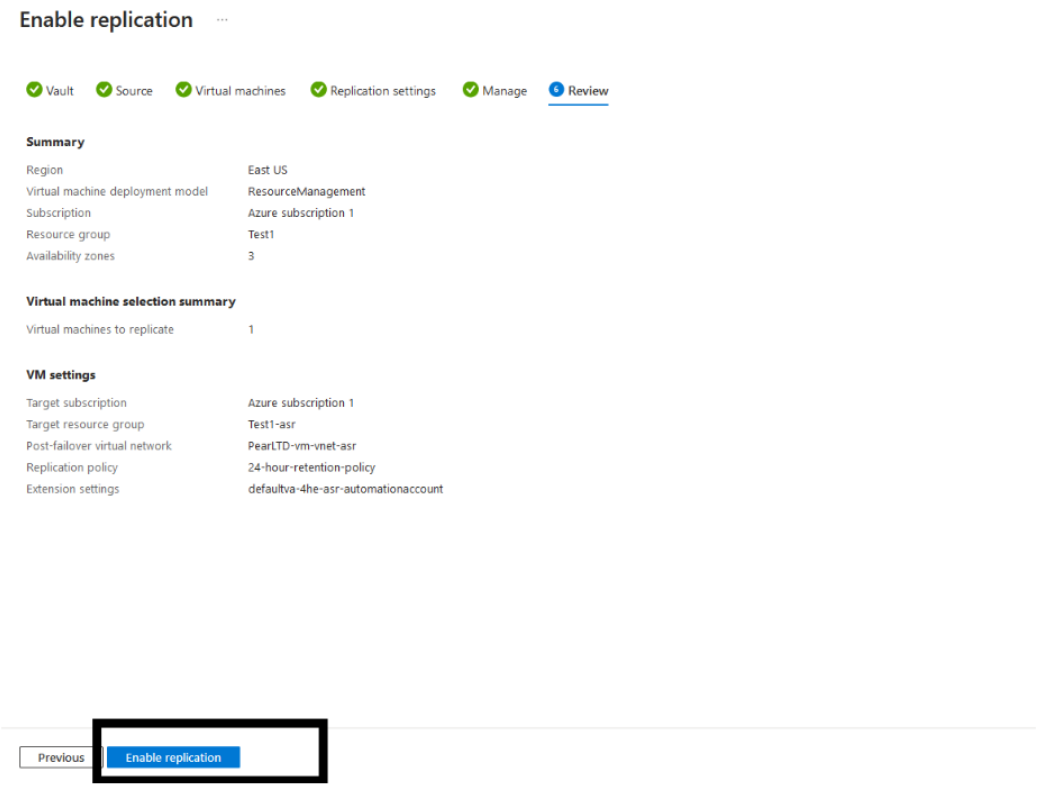
And on virtual machines click on our **Virtual machine PearLTD-vm** and click **review + create**.







And once it is all good and checked weill Enable Replication and we are done.



IX. Conclusion.

In conclusion, this project represents a dedicated effort to establish a resilient and efficient web server deployment on Azure. By leveraging the capabilities of Internet Information Services (IIS) and integrating advanced features such as a recovery vault, geo-redundant storage, and load balancing, we have fortified our infrastructure against potential disruptions. The incorporation of Azure Backup and a robust business continuity plan ensures the safeguarding of critical data and the swift recovery of operations in the face of unforeseen events. This strategic alignment with Azure technologies not only enhances security but also positions our web applications for scalability and future growth. Through this project, we have not only met the immediate objectives of a reliable and performant web server but have laid the groundwork for sustained success in the dynamic digital landscape.