CONTOSO

Report: Moving to Azure

STEP 0: Problem Background

Contoso is an online cloth merchandise company specializing in selling activewear. They have a rented space in a local data center. They have one system administrator who makes sure all servers are working properly 24x7. Their hardware is getting old and they must decide on whether they need to spend $22,000 for new hardware or move their business to the Azure cloud services. The following list represents their current on-premises infrastructure:

Server 1:	**Purpose:** WordPress web server **CPU:** 8 Cores and 60% average utilization **RAM:** 16 GB and 87% average utilization **HDD OS:** 500 GB capacity with 57 GB used **Web URL:** Contoso.com **IP # Public:** 200.200.100.50 **IP #:** 10.10.1.11 **Firewall:** Inbound TCP 2222-2224, 80, 443 **Usage:** This is Contoso's only web server. It runs WordPress and eCommerce services. Their on-line store is always open, and they receive orders 24x7 This server uses ports 80 and 443 for HTTP and HTTPS traffic

Server 2 & 3:	**Purpose:** Microsoft SQL 2019 **CPU:** 8 Cores and 30% average utilization x2 **RAM:** 16 GB and 87% average utilization x2 **HDD OS:** 500 GB capacity with 240 GB used x2 **HDD Data:** 2 TB SAN (Storage Area Network drive) **IP #:** 10.10.1.12 and 10.10.1.13 **SQL Cluster:** SQLCluster.Contoso.Com **IP #:** 10.10.1.14 **Firewall:** Inbound TCP 2222-2224, 1433 **Usage:** These two servers are running Microsoft SQL cluster services. SQL Always-On service is fully configured as Active-Passive nodes. The 2 servers use an external attached SAN drive for all data storage such as product descriptions, transaction logs, and clients lists. Annual data growth is negligible. These servers use the standard SQL inbound TCP port 1433
Server 4:	**Purpose:** ABC Backup and Restore server **CPU:** 8 Cores and 30% average utilization **RAM:** 16 GB and 87% average utilization **HDD OS:** 500 GB capacity with 164 GB used **HDD Backup:** 40 TB **IP #:** 10.10.1.15 **Firewall:** Inbound TCP 2222 **Usage:** The ABS backup software runs daily at 8pm. It stores the last 18 months of all the SQL data drive contents onto a local D: drive (HDD Backup) with 40 TB capacity.

Server 5:	**Purpose:** XYZ Antivirus server **CPU:** 8 Cores and 30% average utilization **RAM:** 16 GB and 87% average utilization **HDD:** 500 GB capacity with 43 GB used **IP #:** 10.10.1.16 **Firewall:** Inbound TCP 2222-2224 This server uses ports TCP 2222-2224 for the antivirus client **Usage:** The XYZ anti-virus services are essential for the security of Contoso's operations security. The server is always on and constantly running. It monitors all Contoso's servers and mitigates against viruses and hack attacks. Data grown is negligible.

STEP 1: Assessing the On-Premises Environment

Purpose: To identify the Azure services needed to ensure Contoso's business continuity in the cloud.

Current Environment
 	
Make a list of all current on-premises servers and services.
	1. 1x Web server
	   • eCommerce
	2. 2x Microsoft SQL server
	   • Microsoft SQL 2019
	3. 1x ABC Backup and Restore server
	   • Backup & Restore service
	4. 1x XYZ Antivirus server
	   • XYZ anti-virus for all servers

Matching Azure Services Match the list of on-premises servers and services to the corresponding Azure ones.	Make a list of all servers and services you would create on Azure, and why you chose each. As a hint, one of the servers is likely no longer needed. * There are some services that can be replaced with other azure services but in this case, we will just use VMs to migrate our services easily by bring everything in current on-premises to azure. - Web server ⇔ 1 VM with DNS, public IP, HDD - Microsoft SQL Server ⇔ 2 VM running SQL Server (or Azure SQL Database with a replication) - ABC Backup and Restore server ⇔ no need VM, use Azure Backup service instead with almost the same features - XYZ Antivirus server ⇔ a VM running XYZ antivirus (or can be replaced with Microsoft Antimalware for Azure)
Discussion Question #1 A - How can you verify the running programs and services on each of your on-premises servers? List the steps taken to identify the services running for each server. B - List your migration plans.	A & B – Using Azure Migrate, we can verify the services running in the on-premises and then migrate to Azure - Prepare to use Azure with Migration and modernization. - Check requirements for machines you want to migrate and prepare a machine for the Azure Migrate replication appliance that's used to discover and migrate machines to Azure. - Add the Migration and modernization tool in the Azure Migrate hub. - Set up the replication appliance. - Install the Mobility service on machines you want to migrate. - Enable replication. - Run a test migration to make sure everything's working as expected. - Run a full migration to Azure. Ref: https://learn.microsoft.com/en-us/azure/migrate/tutorial-migrate-physical-virtual-machines
Discussion Question #2 On your on-premises servers: A - How can you find the listing of all windows firewall port exceptions? B - Do these firewall port exceptions have to match the NSG firewall exceptions? Please explain.	A – List ports - Control Panel > System and Security > Windows Defender > Firewall > Allow an app or feature through Windows Defender Firewall. - Or command (admin): netsh firewall show state/ Netstat -ab B – 2 cases - Yes, if the port is used by any service (sql server, wordpress, …) - No if the port is not used by any service

Optional Discussion Looking at the new Azure server farm, what will you change and why?	- The database server should use SSD with high IOPS - Web server and database should have the auto scale configurated - Should have monitoring service - The ABC backup can be replaced with Azure Backup service - The XYZ Antivirus can be replaced with Microsoft Antimalware for Azure

STEP 2: Cost Estimates

Purpose: To provide the CIO with a monthly cost estimate after the migration to Azure.

Use Azure Pricing Calculator to provide the CIO with a monthly cost estimate, including:

- The number of VMs needed
- The RAM and CPU needed for each VM
- The amount of storage needed
- Any Azure services such as anti-virus, back-up, database, etc.
- Build a list/table that includes VM type (you may use the template below or create your own)

Build / fill out the table providing your current server farm and its corresponding Azure farm. List the potential Azure replacement for each of the on-premises servers, the VM type and monthly cost. Assume your company has Hybrid benefits and are willing to commit to 3-year agreements. Use the East US Azure zone. Show the cost of all servers with a three year commitment after applying Azure Reservations cost reduction. Compare the VMs prices with and without Azure Reservations.

* Assumed all licenses are already available and using Azure Hybrid Benefit

Server Name	CPU Cores	RAM/HD	VM Type	Monthly Cost
Web server	8	16GB/512GB	1 F8s v2 (8 vCPUs, 16 GB RAM) (3 year reserved), Windows (AHB), OS Only; 1 managed disk – S20; Inter Region transfer type, 5 GB outbound data transfer from East US to East Asia	$112.29 ($246.74 pay as you go)
DB Server 1, 2	8	16GB/512GB	2 E8bs v5 (8 vCPUs, 64 GB RAM) (3 year reserved), Windows (AHB), OS Only; 0 managed disks – S4; Inter Region transfer type, 5 GB	$304.56 ($870.16 pay as you go)

			outbound data transfer from East US to East Asia	
Storage for DB		2TB	Block Blob Storage, General Purpose V2, Flat Namespace, LRS Redundancy, Hot Access Tier, 2 TB Capacity - Pay as you go, 10 x 10,000 Write operations, 10 x 10,000 List and Create Container Operations, 10 x 10,000 Read operations, 1 x 10,000 Other operations. 1,000 GB Data Retrieval, 1,000 GB Data Write	$28.12 ($42.60 pay as you go)
Azure Backup service			SQL Server on Azure VMs, 2 Instance(s) x 240 GB, GRS Redundancy, High Average Daily Churn, 21,000 GB Average monthly backup data	$990,80
XYZ Antivirus	8	16GB/512GB	1 F8s v2 (8 vCPUs, 16 GB RAM) (3 year reserved), Windows (AHB), OS Only; 1 managed disk – S20; Inter Region transfer type, 5 GB outbound data transfer from East US to East Asia	$112.29 ($246.74 pay as you go)

Discussion Question #1 Will these 4 Azure servers provide HA/DR for Contoso? Will their site be available 24x7, 365 days?	1. The Azure VM's availability (with HDD OS disk) for single VM is 95% and for 2 (or more) VMs in the same AZ is 99.95%, then cannot say that the Contoso site will be available 24x7, 365 days. - The web server and antivirus server will have >= 95% uptime. - The database will have >= 99.95% uptime. - Azure guarantee at least 99.9% availability of the backup and restore functionality of the Azure Backup service. 2. We don't have any DR for the web server. If there's any disaster happen to the AZ, all data of the web server will be lost. We enabled the GRS (geo-redundant storage) for the backup server (only applied backup for database), so if there's any disaster happen, we still have daily backup data for the database. * To increase the HA/DR of the web service, we can add another web server (in another region or AZ) for wordpress and add a cross-region load balancer to manage the requests to the web servers. More about Azure SLA: Service Level Agreements - Home | Microsoft Azure

Discussion Question #2

Can you change the VM type (upgrade or downgrade the configurations based on needs)? Try to downgrade one of the Azure VMs. Also, please provide a screenshot of the VM Overview settings, including VM name and size.

Created VM:

Essentials

Resource group (move)	: project-1	Operating system	: Linux (ubuntu 20.04)
Status	: Running	Size	: Standard D2s v3 (2 vcpus, 8 GiB memory)
Location	: East US	Public IP address	: 20.124.189.18
Subscription (move)	: Azure subscription 1	Virtual network/subnet	: project-1-vnet/default
Subscription ID	: fbee7822-315e-432f-9e8c-87b338c1b863	DNS name	: Not configured
Tags (edit)	: Click here to add tags		

Properties | Monitoring | Capabilities (7) | Recommendations | Tutorials

Virtual machine

Computer name	project-1-vm-1
Health state	-
Operating system	Linux (ubuntu 20.04)
Publisher	canonical
Offer	0001-com-ubuntu-server-focal
Plan	20_04-lts-gen2
VM generation	V2
VM architecture	x64
Agent status	Ready
Agent version	2.9.0.4
Host group	None

Networking

Public IP address	20.124.189.18
Public IP address (IPv6)	-
Private IP address	10.0.0.4
Private IP address (IPv6)	-
Virtual network/subnet	project-1-vnet/default
DNS name	Configure

Size

Size	Standard D2s v3
vCPUs	2
RAM	8 GiB

Try to downgrade VM

If the virtual machine is currently running, changing its size will cause it to be restarted. Stopping the virtual machine may reveal additional sizes. →

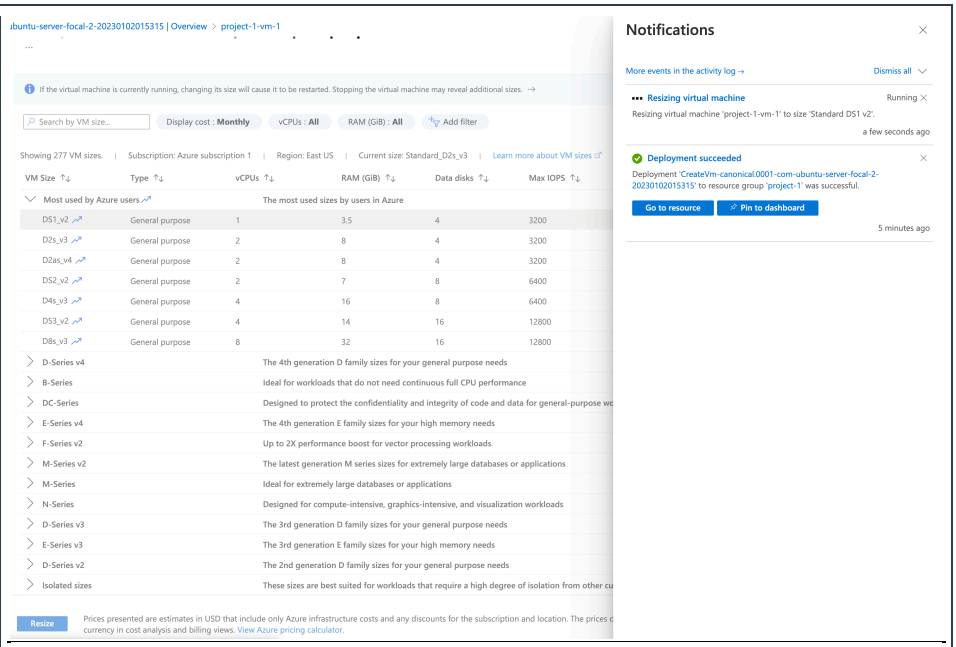
Search by VM size... | Display cost : Monthly | vCPUs : All | RAM (GiB) : All | Add filter

Showing 277 VM sizes. | Subscription: Azure subscription 1 | Region: East US | Current size: Standard_D2s_v3 | Learn more about VM sizes | Group by series

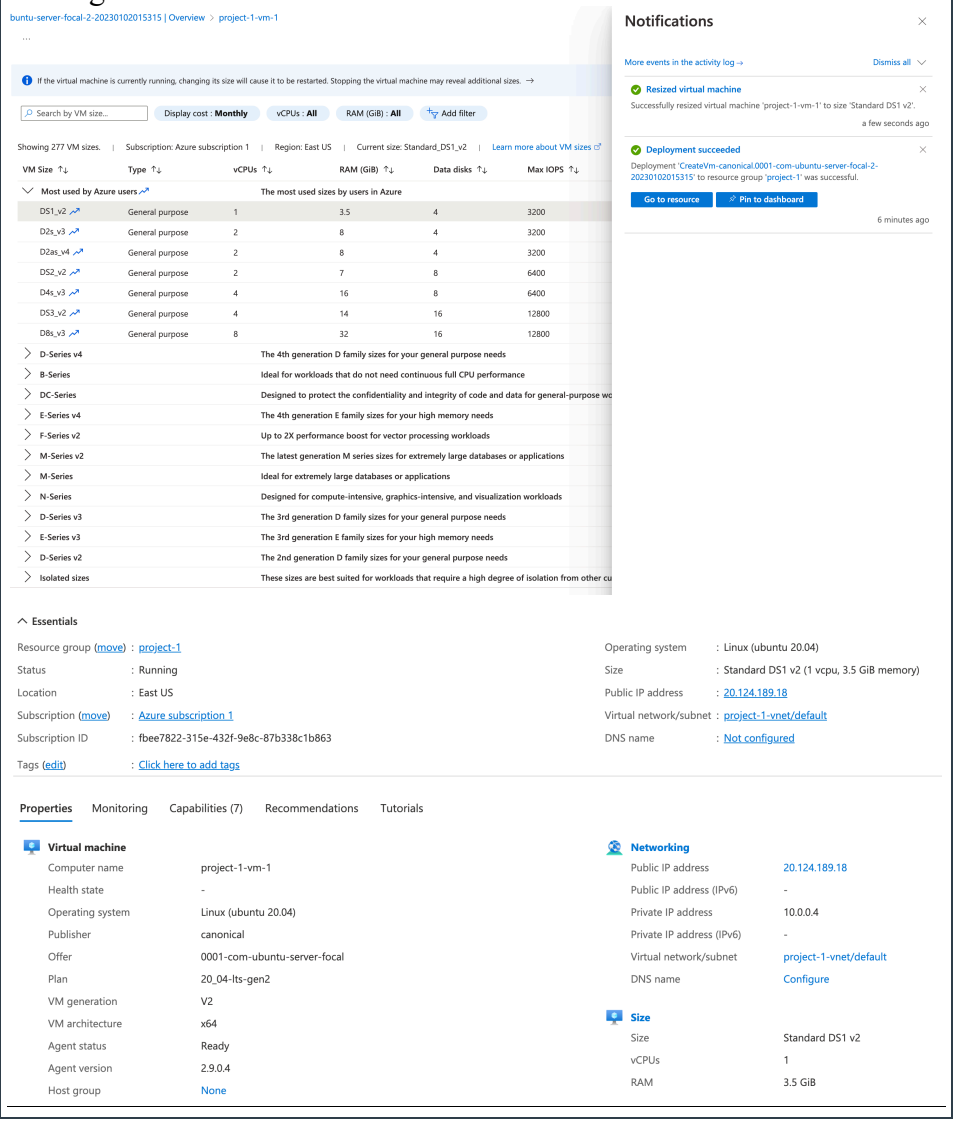
VM Size	Type	vCPUs	RAM (GiB)	Data disks	Max IOPS	Temp storage (GiB)	Premium disk	Cost/month
Most used by Azure users	The most used sizes by users in Azure							
DS1_v2	General purpose	1	3.5	4	3200	7	Supported	US$53.29
D2s_v3	General purpose	2	8	4	3200	16	Supported	US$70.08
D2as_v4	General purpose	2	8	4	3200	16	Supported	US$70.08
DS2_v2	General purpose	2	7	8	6400	14	Supported	US$106.58
D4s_v3	General purpose	4	16	8	6400	32	Supported	US$140.16
DS3_v2	General purpose	4	14	16	12800	28	Supported	US$213.89
D8s_v3	General purpose	8	32	16	12800	64	Supported	US$280.32
D-Series v4	The 4th generation D family sizes for your general purpose needs							
B-Series	Ideal for workloads that do not need continuous full CPU performance							
DC-Series	Designed to protect the confidentiality and integrity of code and data for general-purpose workloads							
E-Series v4	The 4th generation E family sizes for your high memory needs							
F-Series v2	Up to 2X performance boost for vector processing workloads							
M-Series v2	The latest generation M series sizes for extremely large databases or applications							
M-Series	Ideal for extremely large databases or applications							
N-Series	Designed for compute-intensive, graphics-intensive, and visualization workloads							
D-Series v3	The 3rd generation D family sizes for your general purpose needs							
E-Series v3	The 3rd generation E family sizes for your high memory needs							
D-Series v2	The 2nd generation D family sizes for your general purpose needs							
Isolated sizes	These sizes are best suited for workloads that require a high degree of isolation from other customers' workloads. Isolated VM sizes have a hardware-limited lifespan.							

Resize

Prices presented are estimates in USD that include only Azure infrastructure costs and any discounts for the subscription and location. The prices don't include any applicable software costs. Final charges will appear in your local currency in cost analysis and billing views. View Azure pricing calculator.



Downgraded



Essentials

Resource group (move)	: project-1	Operating system	: Linux (ubuntu 20.04)
Status	: Running	Size	: Standard DS1 v2 (1 vcpu, 3.5 GiB memory)
Location	: East US	Public IP address	: 20.124.189.18
Subscription (move)	: Azure subscription 1	Virtual network/subnet	: project-1-vnet/default
Subscription ID	: fbee7822-315e-432f-9e8c-87b338c1b863	DNS name	: Not configured
Tags (edit)	: Click here to add tags		

Properties | Monitoring | Capabilities (7) | Recommendations | Tutorials

Virtual machine

Computer name	project-1-vm-1
Health state	-
Operating system	Linux (ubuntu 20.04)
Publisher	canonical
Offer	0001-com-ubuntu-server-focal
Plan	20_04-lts-gen2
VM generation	V2
VM architecture	x64
Agent status	Ready
Agent version	2.9.0.4
Host group	None

Networking

Public IP address	20.124.189.18
Public IP address (IPv6)	-
Private IP address	10.0.0.4
Private IP address (IPv6)	-
Virtual network/subnet	project-1-vnet/default
DNS name	Configure

Size

Size	Standard DS1 v2
vCPUs	1
RAM	3.5 GiB

	The screenshots above show that we can change the VM type (as long as it's not a reserved resource).
Optional Discussion Is Contoso better off with a SQL Managed Instance? Check Azure Pricing.	SQL Managed Instance: Managed Instance, LRS, General Purpose, Single Instance, 8 vCore, Primary Instance, 2 instance(s), 3 year reserved, 512 GB Storage, 1 GB Point-In-Time Restore, 5 GB Long Term Retention. The 2x Managed Instance cost **$799.96** per month (compare to **$304.56** of current solution). Therefore, the current solution is good for saving cost.

Note: *If you are using Udacity Cloud Labs, you will be allowed to create a few VM sizes only. Visit this link to see all the possible VM sizes and go through the classroom instructions for more details.*

STEP 3 (OPTIONAL): Creating a VPN

Purpose: Build and set up a point-to-point (site to site) VPN connection between Contoso's on-premises and Contoso's Azure environments.

Note: *This step is entirely optional, and may take a considerable amount of time to implement. Therefore, it is suggested that you only attempt this step on your own after having satisfactorily completed all other project steps. You may find this site helpful in completing this optional step.*

STEP 4: An Additional Server

Purpose: Use Azure Resource Manager (ARM) to deploy one additional WordPress web server. This additional web server should provide web services redundancy and improve the web site's response time.

Create a replica of the WordPress server configuration.

The process is summarized as:

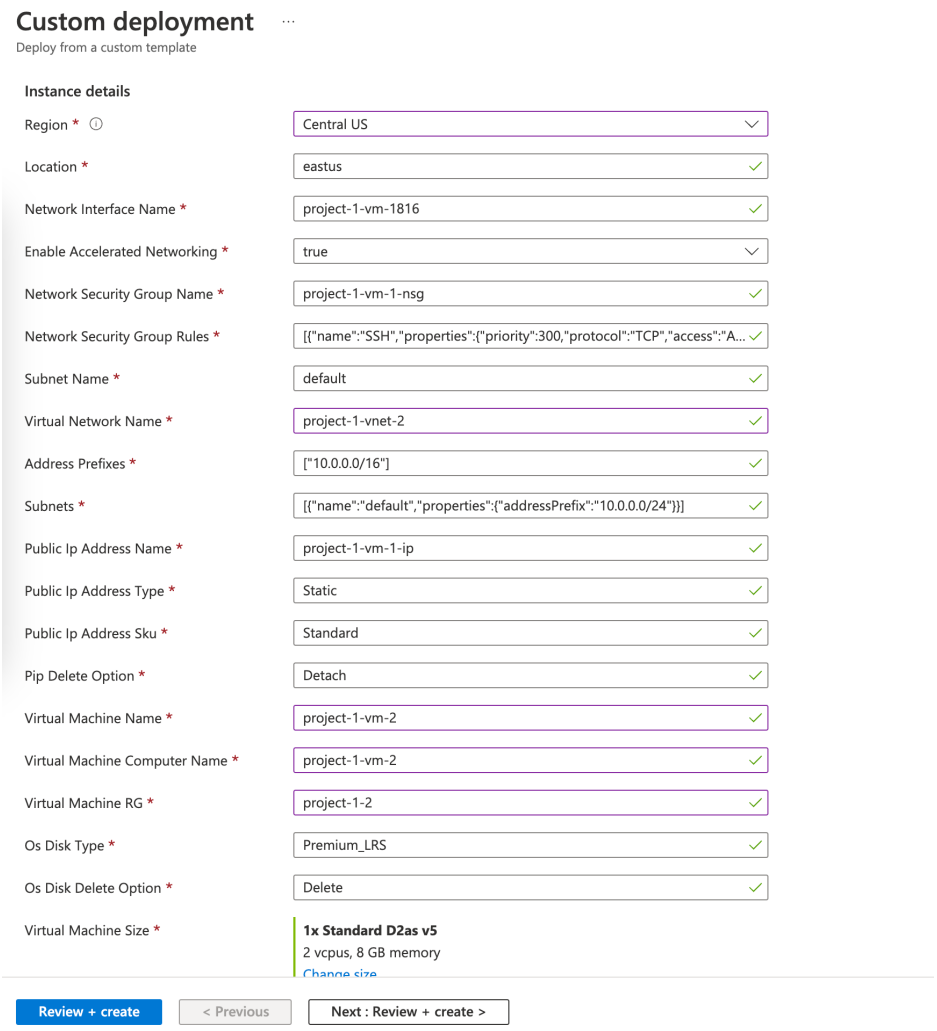
- The current WP server settings were saved as a template during the creation process. If not, you will need to add it to your Template store.
- Deploy a new VM from a template. In the Azure portal search for TEMPLATES and run that service.
- The WP server template should be listed there. Select it.
- Make sure you load and edit the parameters file and change the values for the new VM as needed. Values such as Name, Password, etc. should be unique. Use the Azure Template Services.

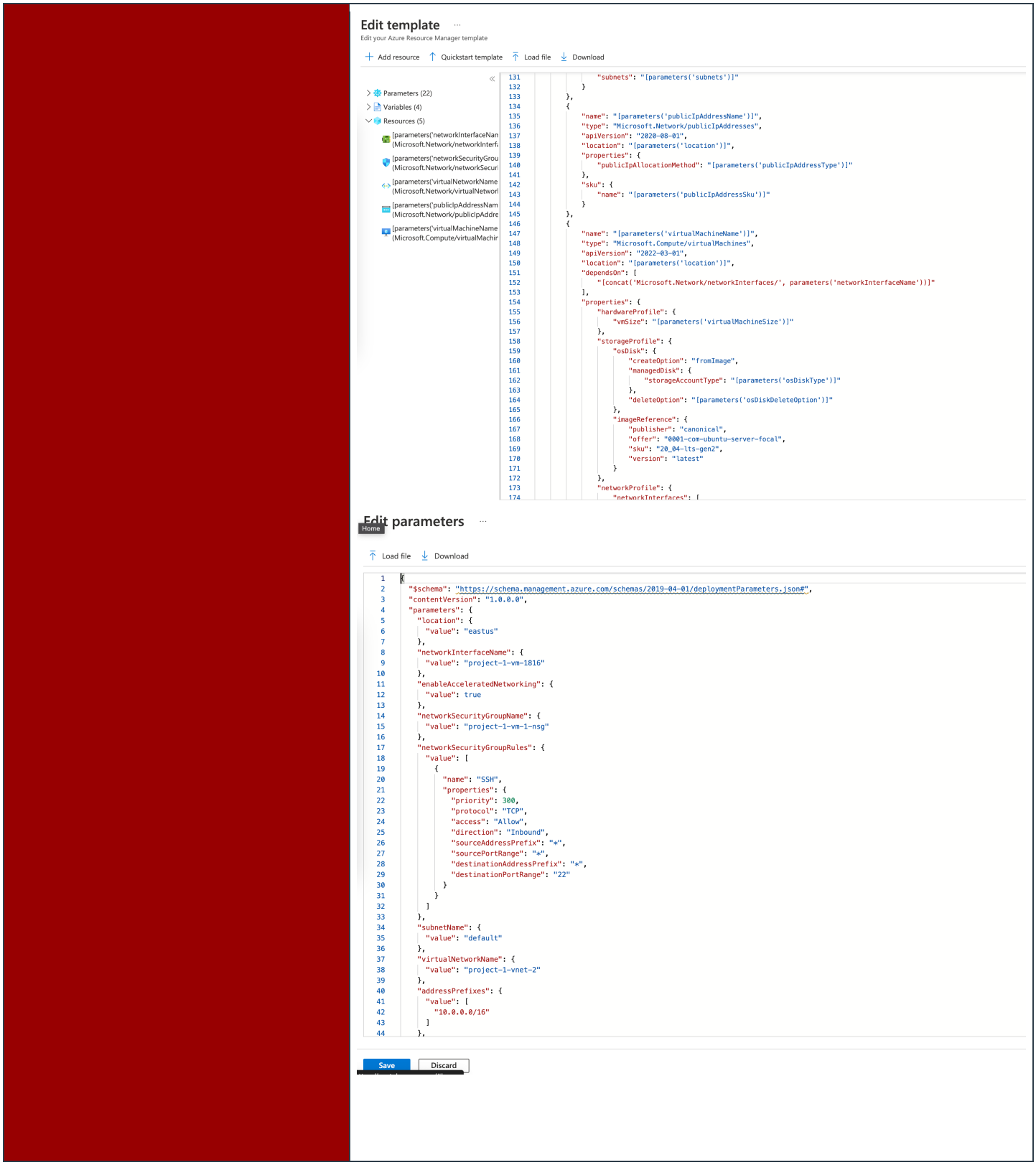
Make sure you already have a resource group to place the VM in. You may need to create a Servers-RG resource group if one does not exist.

Configuration Process

Provide a screenshot of the template configuration process.

Deploy in Central US region (different from the first VM in East US for HA and DR)




Edit template
Edit your Azure Resource Manager template
Add resource
Quickstart template
Load file
Download
Parameters (22)
Variables (4)
Resources (5)
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(Microsoft.Network/networkInterf
[parameters('networkSecurityGrou
(Microsoft.Network/networkSecuri
[parameters('virtualNetworkName
(Microsoft.Network/virtualNetworl
[parameters('publicIpAddressNam
(Microsoft.Network/publicIpAddre
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(Microsoft.Compute/virtualMachir
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"offer": "0001-com-ubuntu-server-focal",
"sku": "20_04-lts-gen2",
"version": "latest"
}
},
"networkProfile": {
"networkInterfaces": [
Edit parameters
Home
Load file
Download
{
"$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentParameters.json#",
"contentVersion": "1.0.0.0",
"parameters": {
"location": {
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"networkSecurityGroupRules": {
"value": [
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"name": "SSH",
"properties": {
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"direction": "Inbound",
"sourceAddressPrefix": "*",
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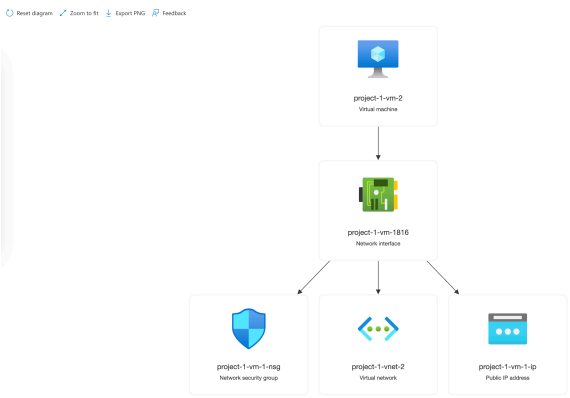
"destinationAddressPrefix": "*",
"destinationPortRange": "22"
}
}
]
},
"subnetName": {
"value": "default"
},
"virtualNetworkName": {
"value": "project-1-vnet-2"
},
"addressPrefixes": {
"value": [
"10.0.0.0/16"
]
},
Save
Discard

Resource visualizer



Custom deployment

Deploy from a custom template

Validation Passed

Neither subscription credits nor monetary commitment funds may be used to purchase non-Microsoft offerings. These purchases are billed separately.

If any Microsoft products are included in a Marketplace offering (e.g. Windows Server or SQL Server), such products are licensed by Microsoft and not by any third party.

Basics

Subscription	Azure subscription 1
Resource group	project-1-rg-2
Region	Central US
Location	eastus
Network Interface Name	project-1-vm-1816
Enable Accelerated Networking	true
Network Security Group Name	project-1-vm-1-nsg
Network Security Group Rules	[{"name":"SSH","properties":{"priority":300,"protocol":"TCP","access":"Allow","...
Subnet Name	default
Virtual Network Name	project-1-vnet-2
Address Prefixes	["10.0.0.0/16"]
Subnets	[{"name":"default","properties":{"addressPrefix":"10.0.0.0/24"}}]
Public Ip Address Name	project-1-vm-1-ip
Public Ip Address Type	Static
Public Ip Address Sku	Standard
Pip Delete Option	Detach
Virtual Machine Name	project-1-vm-2
Virtual Machine Computer Name	project-1-vm-2
Virtual Machine RG	project-1-2
Os Disk Type	Premium_LRS
Os Disk Delete Option	Delete
Virtual Machine Size	Standard_D2as_v5
Nic Delete Option	Detach
Admin Username	longpv
Admin Password	**********

Create | < Previous | Next

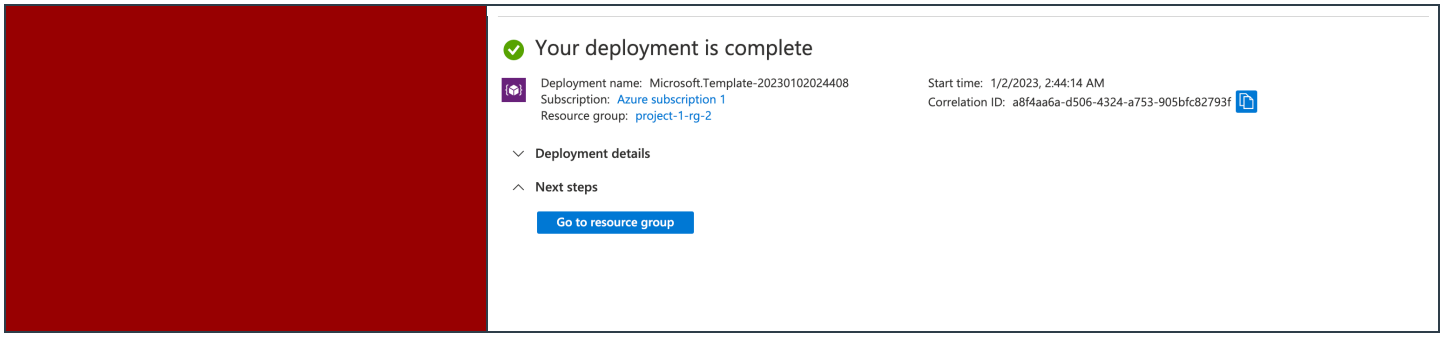
Notifications

More events in the activity log → | Dismiss all

Deployment in progress... Running

Deployment to resource group 'project-1-rg-2' is in progress.

a few seconds ago


Your deployment is complete
Deployment name: Microsoft.Template-20230102024408
Subscription: Azure subscription 1
Resource group: project-1-rg-2
Start time: 1/2/2023, 2:44:14 AM
Correlation ID: a8f4aa6a-d506-4324-a753-905bfc82793f
Deployment details
Next steps
Go to resource group

Discussion Question #1

List the benefits (at least three) of using ARM templates. Think of when, why and how you can benefit from this Azure service.

CI/CD integration: You can integrate templates into your continuous integration and continuous deployment (CI/CD) tools, which can automate your release pipelines for fast and reliable application and infrastructure updates. By using Azure DevOps and Resource Manager template task, you can use Azure Pipelines to continuously build and deploy ARM template projects.

Exportable code: You can get a template for an existing resource group by either exporting the current state of the resource group, or viewing the template used for a particular deployment. Viewing the exported template is a helpful way to learn about the template syntax.

Built-in validation: Your template is deployed only after passing validation. Resource Manager checks the template before starting the deployment to make sure the deployment will succeed. Your deployment is less likely to stop in a half-finished state.

Discussion Question #2

What is the difference between an ARM template and a server image? When will you use each and for what purpose? Make sure you consider each of the two.

ARM Template	Server Image
A JavaScript Object Notation (JSON) file that defines one or more resources to deploy to a resource group, subscription, management group, or tenant. The template can be used to deploy the resources consistently and repeatedly	An executable image file of a virtual machine that is stored in a specific format. By uploading the image file to the hardware, we can create a new virtual machine.
The ARM template is just a JSON file, so its size is negligible as compared to a Server Image file (template size limit is 4 MB)	The size of the executable image file is large
Infrastructure as a Code	Infrastructure as a Service

Server Image is used for general purposes, it supports up to 20 simultaneous deployment.
ARM template is used to deploy a specific service or a set of services and image is not available for such case, the required services can be installed via ARM template and it supports up to 800 Resource Group creations, it is used for large and/or automating the deployment process for specific Infrastructure.

Optional Discussion	
Visit GitHub (https://github.com/azure/azure-quickstart-templates) and look at all available templates. Can you find a template that deploys 2 web servers, a load balancer, and a Resource Group? Send the link to the template or a screenshot clearly highlighting the one you will select.	

STEP 5: Backup and Recovery

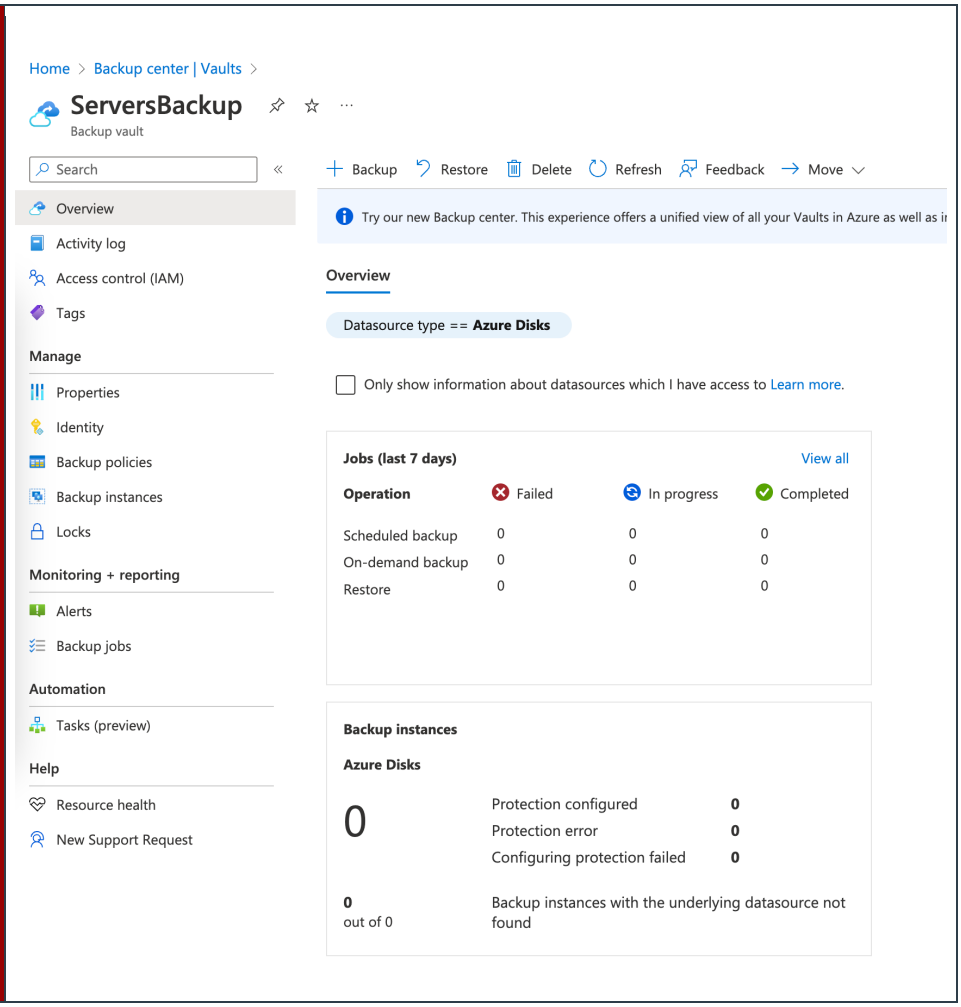
Purpose: Use the Azure backup services to setup recurring full daily backup jobs of your products and client's data. Test the backup process. No back is fully verified until you perform a successful restore.

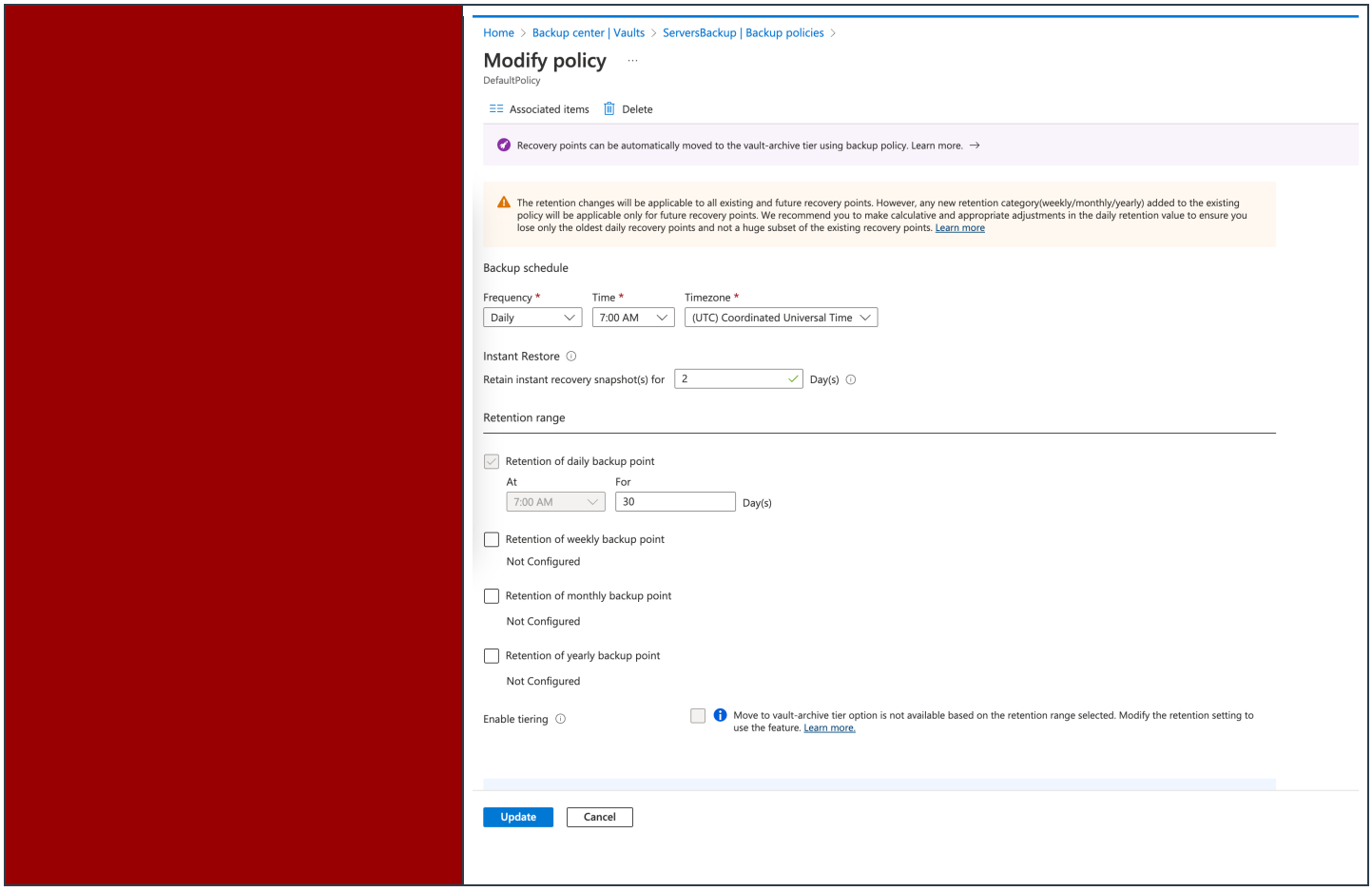
You want to ensure your VMs are all backed up. You want to ensure a working replica of each of them is saved somewhere safe. The steps are:

1. Create a backup vault. Call it "ServersBackup".
2. Install Azure Backup Extension on the target VM.
3. Create a backup policy in the vault. Set retention policy and daily backup points.
4. Now it is time to link the target VM to the backup policy. Click on the target VM, select Backup from the Operations tab. Then select the newly created backup policy.
5. Alternatively, you can select Recovery Services Vault from the left navigation bar. Select all the VMs you want to add to the backup.

Backups

Provide screenshots of 1) the backup vault and 2) the backup policy.




Home > Backup center | Vaults > ServersBackup | Backup policies >
Modify policy
DefaultPolicy
Associated items
Delete
Recovery points can be automatically moved to the vault-archive tier using backup policy. Learn more. →
The retention changes will be applicable to all existing and future recovery points. However, any new retention category(weekly/monthly/yearly) added to the existing policy will be applicable only for future recovery points. We recommend you to make calculative and appropriate adjustments in the daily retention value to ensure you lose only the oldest daily recovery points and not a huge subset of the existing recovery points. Learn more
Backup schedule
Frequency *
Daily
Time *
7:00 AM
Timezone *
(UTC) Coordinated Universal Time
Instant Restore
Retain instant recovery snapshot(s) for
2
Day(s)
Retention range
Retention of daily backup point
At
7:00 AM
For
30
Day(s)
Retention of weekly backup point
Not Configured
Retention of monthly backup point
Not Configured
Retention of yearly backup point
Not Configured
Enable tiering
Move to vault-archive tier option is not available based on the retention range selected. Modify the retention setting to use the feature. Learn more.
Update
Cancel

Discussion Question #1 What is the difference between Azure backup and site recovery? When would you use each service and for what reason?	Backup Vault provides backup storage for newer workloads that Azure Backup supports such as Azure managed disks, Azure blob storage and Azure Database for PostgreSQL Servers. It is not a replacement for the Recovery Services Vault but complimentary to it. In the Recovery Services Vault, no data is transferred to a "vault" storage for long term retention, but instead it provides an operational backup facility. You are charged only for the cost of the delta changes in the snapshot storage, so no backup service fee is charged.
Discussion Question #2 Restore Time Objective (RTO) and Restore Point Objective (RPO) have similarities and differences. A - How are they different? Make sure you consider each of the two. B - Which backup strategy consumes more disc space?	A – - RTO is the goal for the maximum length of time it should take to restore normal operations following an outage or data loss. It is the amount of downtime of a service that a company can endure. RTO is used to decide how long can services be down. - RPO is your goal for the maximum amount of data the organization can tolerate losing. It indicates how recent the data will be when it is recovered. In practice, the RPO refers to the amount of data (updated or created) that will be lost or reentered following an outage. It is the metric for the amount of acceptable data loss if a recovery needs to be done. B – RPO consumes more disk space as it saves all backups from before (usually by time interval) and decides by the policy which backup is to be used for the recovery.
Optional Discussion Create more that one backup policy for each type of data. For example, you may want to create a policy that backs up certain files and folders and not the entire VM's hard drive. Try a policy that has folder exclusion and inclusion.	

STEP 6: Antivirus Communication

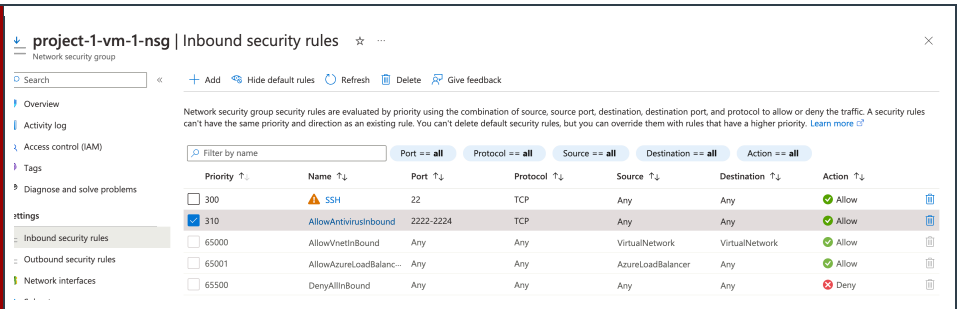
Purpose: Enable the antivirus server to communicate with client VMs.

The XYZ antivirus server requires TCP ports 2222-2224 to communicate with the target client VMs. A firewall exception on the target VM is necessary to allow the XYZ server to scan and update the clients. Assuming Contoso will want to continue using their XYZ antivirus server, how will you alter the NSG (network security group) to allow all Contoso's Azure servers port: TCP 2222-2224 in from the

antivirus server?

Each of the Azure servers you created have a unique internal (not public) IP address. Each one of these VMs has its own Network Security Group (nsg) associated with it as well. **Your task is to adjust the nsg of each server to allow for traffic coming from the antivirus server**. The steps are:

1. Make a list of each server and it's internal IP.
2. For each server's nsg, modify the settings to allow for TCP 2222-2224 from the antivirus server's IP number.
3. Test your work by trying to deploy the antivirus agent on one of the target servers.

Inbound Rules Provide a screenshot of the modified nsg firewall inbound rules.	
Discussion Question #1 Will you need to create an inbound port exception on your Windows OS?	Yes, the NSG is an external firewall (outside of the Virtual Machine) since Windows is an internal firewall, ports on both should be open for communication to take place.

Note: Once you have completed your report, feel free to shut down your Azure resources to avoid charges!