



# Instituto Politécnico Nacional

Escuela Superior de Cómputo

Sistemas Distribuidos

Pineda Guerrero Carlos

Tarea 8

4CV13

Humberto Alejandro Ortega Alcocer (2016630495)

29 de Mayo del 2023

# Índice

<b>Índice</b>	<b>1</b>
<b>Desarrollo</b>	<b>3</b>
Creación de Máquina Virtual	3
Prueba de Conectividad	10
Habilitar respaldo en la máquina virtual	11
Iniciar un respaldo completo	15
Restaurar la máquina virtual	19
Crear cuenta de almacenamiento	21
Continuando proceso con la cuenta de almacenamiento	28
Prueba de conectividad con la máquina restaurada	31
Eliminar el proceso de respaldo	33
<b>Conclusión</b>	<b>37</b>

# Desarrollo

Siguiendo el planteamiento de la tarea, los pasos a realizar son:

1. Crear la máquina virtual a partir de la imagen de la tarea 6.
2. Habilitar el respaldo en la máquina virtual.
3. Iniciar un respaldo completo.
4. Restaurar la máquina virtual.
5. Eliminar el proceso de respaldo.

Se realizarán cada uno de los pasos y se incluirán las capturas de pantalla relevantes a cada uno.

## Creación de Máquina Virtual

La creación de la máquina virtual será siguiendo el proceso habitual, lo primero será ir a nuestra página de inicio de Azure:

The screenshot shows the Microsoft Azure portal interface. At the top, there's a header bar with tabs for 'TT-ESCOM', 'SISDIS-4CV13: Tarea 8. Resp... X', 'Home - Microsoft Azure X', 'https://chat.openai.com X', and 'SISDIS - Reporte Tarea 8 - Doc... X'. Below the header is a search bar and a user profile icon. The main content area is divided into several sections:

- Azure services:** A row of icons for creating a resource, virtual machines, public IP addresses, SSH keys, cost management, Azure Virtual Desktop, Quickstart Center, App Services, storage accounts, and more services.
- Resources:** A table showing recent resources. The first row is 'SistemasDistribuidosResourceGroup' (Resource group, last viewed 5 minutes ago). The second row is 'T6-2016630495-image-20230508195913' (Image, last viewed 3 days ago). There's also a 'See all' link.
- Navigate:** Links to Subscriptions, Resource groups, All resources, and Dashboard.
- Tools:** Links to Microsoft Learn (Learn Azure with free online training from Microsoft), Azure Monitor (Monitor your apps and infrastructure), Microsoft Defender for Cloud (Secure your apps and infrastructure), and Cost Management (Analyze and optimize your cloud spend for free).

Iremos a la sección *Virtual Machines*:

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Respuestas, Virtual machines - Microsoft Azure, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Docx. The main title is "Virtual machines". A search bar at the top right says "Search resources, services, and docs (G+/-)". Below the title, there are several filter options: "Subscription equals all", "Type equals all", "Resource group equals all", "Location equals all", and "Add filter". A "No grouping" dropdown and a "List view" button are also present. The main content area displays a large icon of a computer monitor with a cube on it, followed by the text "No virtual machines to display". It encourages users to "Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image." A prominent blue "Create" button is centered. Below the button, two links are visible: "Learn more about Windows virtual machines" and "Learn more about Linux virtual machines". At the bottom right of the page, there is a "Give feedback" link.

Haremos click en *Create* y llenaremos el formulario con la siguiente información:

The screenshot shows the "Create a virtual machine" wizard in the Microsoft Azure portal. The top navigation bar is identical to the previous screenshot. The main title is "Create a virtual machine". Below it, the sub-navigation shows "Home > Virtual machines > Create a virtual machine". The "Basics" tab is selected. The page provides instructions: "Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization." A note below states: "This subscription may not be eligible to deploy VMs of certain sizes in certain regions." The "Project details" section allows selecting a subscription ("Azure for Students") and a resource group ("SistemasDistribuidosResourceGroup"). The "Instance details" section includes fields for "Virtual machine name" (T6-2016630495-BAK), "Region" ((US) East US), "Availability options" (No infrastructure redundancy required), "Security type" (Standard), and "Image" (T6-2016630495-image-20230508195913 - x64 Gen2). At the bottom, there are "Review + create" and "Next : Disks >" buttons, along with a "Give feedback" link.

Seleccionaremos la imagen de la tarea 6, una instancia con 2vCPUs y 4GiB de RAM, así como el usuario y clave que hemos usado desde la tarea 1:

Image \*  T6-2016630495-image-20230508195913 - x64 Gen2  
[See all images](#) | Configure VM generation

VM architecture  x64  
 Arm64  
⚠️ Arm64 is not supported with the selected image.

Run with Azure Spot discount

Size \*  Standard\_B2s - 2 vcpus, 4 GiB memory (\$30.37/month)  
[See all sizes](#)

Administrator account

Authentication type  SSH public key  
 Password

⚠️ Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.

Username \*  humbertowoody

SSH public key source  Use existing key stored in Azure

Stored Keys  humbertowoody-azure

Inbound port rules

[Review + create](#) [< Previous](#) [Next : Disks >](#) [Give feedback](#)

Posteriormente, habilitaremos el puerto 22 (SSH) para poder comunicarnos con la máquina remotamente:

Authentication type  SSH public key  
 Password

⚠️ Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.

Username \*  humbertowoody

SSH public key source  Use existing key stored in Azure

Stored Keys  humbertowoody-azure

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \*  None  
 Allow selected ports

Select inbound ports \*  SSH (22)

⚠️ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

[Review + create](#) [< Previous](#) [Next : Disks >](#) [Give feedback](#)

En cuanto a discos, usare un SSD en esta tarea puesto que las tareas de respaldo dependen de muchos factores, pero el disco puede ser un cuello de botella que quisiera prevenir, además, las máquinas sólamente existirán un par de horas por lo que los costos son admisibles:

The screenshot shows the 'Create a virtual machine' wizard on the 'Disks' tab. It includes fields for OS disk type (Premium SSD), key management (Platform-managed key), and data disks (T8-2016630495-BAK). A note indicates that encryption at host is not registered.

En cuanto a red, usaremos una red virtual nueva, una subred nueva y una dirección IP pública para poder tener acceso remoto, también dejaremos de nuevo la configuración del puerto 22 (SSH):

The screenshot shows the 'Create a virtual machine' wizard on the 'Networking' tab. It includes fields for Virtual network (new T8-2016630495-BAK-vnet), Subnet (new default (10.0.0.0/24)), Public IP (new T8-2016630495-BAK-ip), and NIC network security group (Basic selected). A warning message states that selecting 'Allow selected ports' will allow all IP addresses to access the virtual machine.

Finalmente, en *Review* veremos un resumen de la configuración final para nuestra máquina virtual:

The screenshot shows the 'Review + create' tab of the Azure VM creation wizard. A green validation bar at the top indicates 'Validation passed'. Below it, a warning message states: '⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.' The 'Image' section shows 'T6-2016630495-image-20230508195913' selected, which is 'Standard B2s' with '2 vcpus, 4 GiB memory'. The 'Basics' section lists configuration details: Subscription (Azure for Students), Resource group (SistemasDistribuidosResourceGroup), Virtual machine name (T8-2016630495-BAK), Region (East US), Availability options (No infrastructure redundancy required), Security type (Standard), Image (T6-2016630495-image-20230508195913 - Gen2), VM architecture (x64), Size (Standard B2s (2 vcpus, 4 GiB memory)), Authentication type (SSH public key), Username (humbertowoody), Key pair name (humbertowoody-azure), and Public inbound ports (SSH). At the bottom are 'Create', '< Previous', 'Next >', and 'Download a template for automation' buttons.

This screenshot shows the 'Review + create' step of the Azure VM creation wizard, identical to the one above but with different configuration values. The 'Basics' section now includes 'Key pair name (humbertowoody-azure)', 'Public inbound ports (SSH)', and 'Azure Spot (No)'. The 'Disks' section shows 'OS disk type (Premium SSD LRS)'. The 'Networking' section includes 'Virtual network ((new) T8-2016630495-BAK-vnet)', 'Subnet ((new) default (10.0.0.0/24))', 'Public IP ((new) T8-2016630495-BAK-ip)', 'Accelerated networking (Off)', 'Place this virtual machine behind an existing load balancing solution? (No)', and 'Delete public IP and NIC when VM is deleted (Disabled)'. The 'Management' section shows 'Microsoft Defender for Cloud (Basic (free))' and 'System assigned managed identity (Off)'. The bottom buttons are identical to the previous screenshot.

Validation passed

**Management**

Microsoft Defender for Cloud	Basic (free)
System assigned managed identity	Off
Login with Azure AD	Off
Auto-shutdown	Off
Enable hotpatch	Off
Patch orchestration options	Image Default

**Monitoring**

Alerts	Off
Boot diagnostics	On
Enable OS guest diagnostics	Off

**Advanced**

Extensions	None
VM applications	None
Cloud init	No
User data	No
Disk controller type	SCSI
Proximity placement group	None
Capacity reservation group	None

Create < Previous Next > Download a template for automation Give feedback

Finalmente haremos click en *Create* y esperaremos a que termine el despliegue de la infraestructura:

Deployment is in progress

Resource	Type	Status	Operation details
TB-2016630495-BAK	Microsoft.Compute/virtualMachines	Created	<a href="#">Operation details</a>
t8-2016630495-bak24	Microsoft.Network/networkInterfaces	Created	<a href="#">Operation details</a>
T8-2016630495-BAK-vnet	Microsoft.Network/virtualNetworks	OK	<a href="#">Operation details</a>
T8-2016630495-BAK-ip	Microsoft.Network/publicIPAddresses	OK	<a href="#">Operation details</a>
T8-2016630495-BAK-nsg	Microsoft.Network/networkSecurityGroups	OK	<a href="#">Operation details</a>

Give feedback Tell us about your experience with deployment

**Microsoft Defender for Cloud**  
Secure your apps and infrastructure  
[Go to Microsoft Defender for Cloud >](#)

**Free Microsoft tutorials**  
[Start learning today >](#)

**Work with an expert**  
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.  
[Find an Azure expert >](#)

Una vez finalizado el despliegue, veremos la siguiente pantalla:

The screenshot shows the Microsoft Azure portal with the URL <https://portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/~/overview>. The deployment name is **CreateVm-T6-2016630495-image-20230508195913-20230529142135**. The status message indicates **Deployment succeeded** with the message: "Deployment 'CreateVm-T6-2016630495-image-20230508195913-20230529142135' to resource group 'SistemasDistribuidosResourceGroup' was successful." Below this, the **Deployment details** table lists five resources: T8-2016630495-BAK, T8-2016630495-bak24, T8-2016630495-BAK-vnet, T8-2016630495-BAK-ip, and T8-2016630495-BAK-nsg, all in an **OK** status. To the right of the main content area, there are several promotional cards: **Cost Management**, **Microsoft Defender for Cloud**, **Free Microsoft tutorials**, and **Work with an expert**.

Haremos click en la máquina virtual y veremos su página principal:

The screenshot shows the Microsoft Azure portal with the URL <https://portal.azure.com/#resource/subscriptions/a5d9d675-3ae1-4e2b-95b5-02150d67b8d2/resourceGroups/SistemasDistribuidosResourceGroup/providers/Microsoft.Compute/virtualMachines/T8-2016630495-BAK>. The main page displays the virtual machine **T8-2016630495-BAK** (Virtual machine). The **Overview** section shows the following details: Resource group: [SistemasDistribuidosResourceGroup](#), Status: Running, Location: East US, Subscription: [Azure for Students](#), and Subscription ID: a5d9d675-3ae1-4e2b-95b5-02150d67b8d2. The **Essentials** section provides operating system information: Operating system: Linux (ubuntu 20.04), Size: Standard B2s (2 vcpus, 4 GiB memory), Public IP address: [172.173.188.159](#), Virtual network/subnet: [T8-2016630495-BAK-vnet/default](#), DNS name: [Not configured](#), and Health state: -. The **Networking** section shows the public IP address: 172.173.188.159, private IP address: 10.0.0.4, and virtual network/subnet: T8-2016630495-BAK-vnet/default. The **Size** section indicates the size: Standard B2s, vCPUs: 2, and RAM: 4 GiB.

## Prueba de Conectividad

Siempre que creamos una máquina virtual, es buena idea probar que podemos acceder a la misma, para esto, iniciare sesión SSH usando las claves requeridas, de la siguiente forma:

```
> pwd
/users/humbertowoodly/Proyectos/IPN/sistemas-distribuidos-escom/azure
> ls
humbertowoodly-azure.pem
> ssh -i humbertowoodly-azure.pem 172.173.188.159
The authenticity of host '172.173.188.159 (172.173.188.159)' can't be established.
ED25519 key fingerprint is SHA256:8Gk7+h/9lJ7iCvXRdCXFaIUfyUx9jXTat6iGrumH5IQ.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.173.188.159' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1037-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Mon May 29 20:35:26 UTC 2023

System load:  0.38          Processes:           121
Usage of /:   8.5% of 28.89GB  Users logged in:    0
Memory usage: 21%          IPv4 address for eth0: 10.0.0.4
Swap usage:   0%

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

3 updates can be applied immediately.
2 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Tue May  9 01:55:13 2023 from 148.204.56.241
humbertowoodly@T8-2016630495-BAK:~$ echo "wujuuuuu"
wujuuuuu
humbertowoodly@T8-2016630495-BAK:~$ █
```

## Habilitar respaldo en la máquina virtual

Para habilitar el respaldo en la máquina virtual, primero iremos a la página principal de la misma:

The screenshot shows the Azure portal interface for a virtual machine. The main navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Resp., T8-2016630495-BAK - Micros, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Doc. Below the bar, the URL is portal.azure.com/#@correo.ipn.mx/resource/subscriptions/a5d9d675-3ae1-... . The top navigation bar has links for Home, CreateVm-T6-2016630495-image-20230508195913-20230529142135 | Overview, and T8-2016630495-BAK | Virtual machine.

**Virtual machine Overview:**

- Resource group: SistemasDistribuidosResourceGroup
- Status: Running
- Location: East US
- Subscription: Azure for Students
- Subscription ID: a5d9d675-3ae1-4e2b-95b5-02150d67b8d2
- Tags: Click here to add tags
- Operating system: Linux (ubuntu 20.04)
- Size: Standard B2s (Copied from memory)
- Public IP address: 172.173.188.159
- Virtual network/subnet: T8-2016630495-BAK-vnet/default
- DNS name: Not configured
- Health state: -

**Properties:**

- Virtual machine:** Computer name: T8-2016630495-BAK; Operating system: Linux (ubuntu 20.04); Publisher: -; Offer: -; Plan: -; VM generation: V2; VM architecture: x64; Agent status: Ready; Agent version: 2.9.0.4; Host group: None; Host: -.
- Networking:** Public IP address: 172.173.188.159 (Network interface t8-2016630495-bak24); Public IP address (IPv6): -; Private IP address: 10.0.0.4; Private IP address (IPv6): -; Virtual network/subnet: T8-2016630495-BAK-vnet/default; DNS name: Configure.
- Size:** Size: Standard B2s; vCPUs: 2; RAM: 4 GiB.

Seleccionaremos la sección *Backup* del menú lateral y llenaremos el formulario como se muestra a continuación:

The screenshot shows the Azure portal interface for enabling backup for a virtual machine. The main navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Resp., T8-2016630495-BAK - Micros, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Doc. Below the bar, the URL is portal.azure.com/#@correo.ipn.mx/resource/subscriptions/a5d9d675-3ae1-... . The top navigation bar has links for Home, CreateVm-T6-2016630495-image-20230508195913-20230529142135 | Overview, and T8-2016630495-BAK | Backup.

**Welcome to Azure Backup for Azure VMs:**

Simple and reliable VM backup to the Azure. Learn more. Charges are based on the number and size of VMs being protected. Learn more about pricing.

Review the following information and click on 'Enable backup' to start protecting your VM.

**Backup vault:** Create new (selected) or Select existing. Value: SistemasDistribuidosVault.

**Resource group:** SistemasDistribuidosResourceGroup.

**Policy sub type:** Standard (selected). Options: Standard (Once a day backup, 1-5 days operational tier, Vault tier, ZRS resilient snapshot tier, Support for Trusted Azure VM) and Enhanced (Multiple backups per day, 1-30 days operational tier, Vault tier, ZRS resilient snapshot tier, Support for Trusted Azure VM).

**Choose backup policy:** (new) DailyPolicy-l9t8ym2.

**Buttons:** Enable backup (highlighted in blue) and Cancel.

Ahora visualizaremos la política de respaldo autogenerada por Azure:

The screenshot shows the 'Create policy' dialog for a VM named 'T8-2016630495-BAK'. The 'Policy sub type' is set to 'Backup'. The 'Frequency' is 'Daily' at '8:00 AM' UTC. The 'Retention range' is set to keep daily backup points for 7 days. The 'OK' button is visible at the bottom right.

Finalmente observaremos el resumen que nos muestra Azure en la parte inferior de la pantalla:

The screenshot shows the summary page for the VM 'T8-2016630495-BAK'. It lists the backup policy: 'Once a day backup' with '1-5 days operational tier' and 'Vault tier'. The 'Enhanced' tier is also listed. The 'Policy Details' section shows 'Full backup' with 'Backup frequency' set to 'Daily at 8:00 AM UTC'. The 'Instant restore' and 'Retention of daily backup point' options are also shown. The 'OK' button is visible at the bottom right.

Daremos click en *Enable Backup* y esperaremos a que termine el despliegue de la política de respaldo:

ConfigureProtection-1685392871560 | Overview

Deployment

Deployment is in progress

Deployment name : ConfigureProtection-1685392871560  
Subscription : Azure for Students  
Resource group : SistemasDistribuidosResourceGroup

Start time : 5/29/2023, 2:41:25 PM  
Correlation ID : 115c64c8-f122-4670-b549-8cd74f0f3d8b

Deployment details

Resource	Type	Status	Operation details
There are no resources to display.			

Microsoft Defender for Cloud  
Secure your apps and infrastructure  
[Go to Microsoft Defender for Cloud >](#)

Free Microsoft tutorials  
[Start learning today >](#)

Work with an expert  
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.  
[Find an Azure expert >](#)

Una vez finalizado, se mostrará la siguiente pantalla:

ConfigureProtection-1685392871560 | Overview

Your deployment is complete

Deployment name : ConfigureProtection-1685392871560  
Subscription : Azure for Students  
Resource group : SistemasDistribuidosResourceGroup

Start time : 5/29/2023, 2:41:25 PM  
Correlation ID : 115c64c8-f122-4670-b549-8cd74f0f3d8b

Deployment details

Resource	Type	Status	Operation details
SistemasDistribuidosVault/Az	Backup Item	OK	<a href="#">Operation details</a>
SistemasDistribuidosVault/Dz	Microsoft.RecoveryServices/vaul	OK	<a href="#">Operation details</a>
SistemasDistribuidosVault	Recovery Services vault	Created	<a href="#">Operation details</a>

Cost management  
Get notified to stay within your budget and prevent unexpected charges on your bill.  
[Set up cost alerts >](#)

Microsoft Defender for Cloud  
Secure your apps and infrastructure  
[Go to Microsoft Defender for Cloud >](#)

Free Microsoft tutorials  
[Start learning today >](#)

Work with an expert  
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.  
[Find an Azure expert >](#)

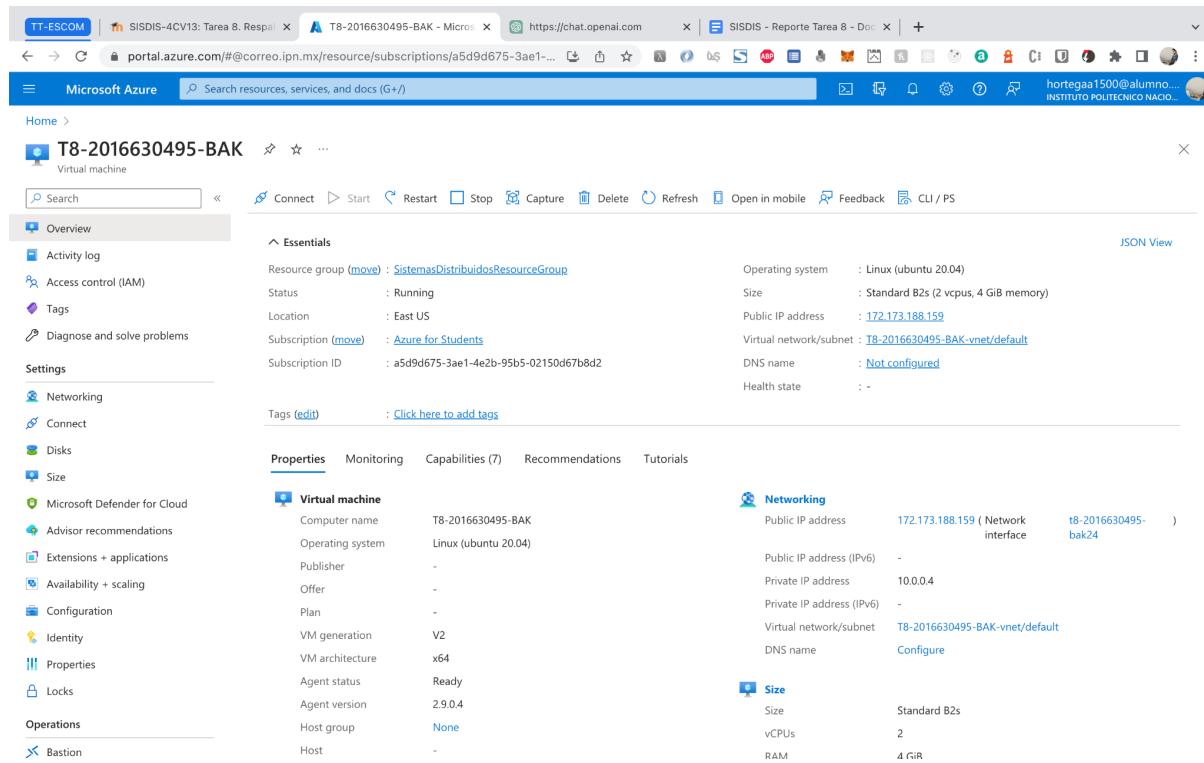
Ahora visitaremos nuestro *Vault* recién creado para validar que se activó el respaldo diario de la máquina virtual:

The screenshot shows the Azure portal interface for the 'SystechVault' Recovery Services vault. The left sidebar includes links for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (Identity, Networking, Properties, Locks), Getting started (Backup, Site Recovery), Protected items (Backup items, Replicated items), and Manage (Backup policies, Backup Infrastructure). The main content area displays the 'Overview' tab under the 'Essentials' section. It features a 'What's new' summary with several bullet points about Azure Site Recovery and Azure Backup. Below this are two large icons: 'Backup' (blue cloud with a circular arrow) and 'Site Recovery' (blue cloud with a downward arrow). A detailed 'Monitoring' section is visible at the bottom left, showing 'Backup Alerts (last 24 hours)' with 0 Critical and 0 Warning alerts, and 'Backup Jobs' with 0 In progress and 0 Failed jobs. To the right, a 'Backup Pre-Check Status (Azure VMs)' chart shows 0 Critical and 0 Warning status.

This screenshot is identical to the one above, showing the 'Overview' tab of the 'SystechVault' Recovery Services vault. The main difference is that the 'Monitoring' section is now explicitly highlighted. It contains the same data as the previous screenshot: 0 Critical and 0 Warning alerts over the last 24 hours, and 0 In progress and 0 Failed backup jobs. The 'Backup Pre-Check Status (Azure VMs)' chart also remains at 0 Critical and 0 Warning status.

## Iniciar un respaldo completo

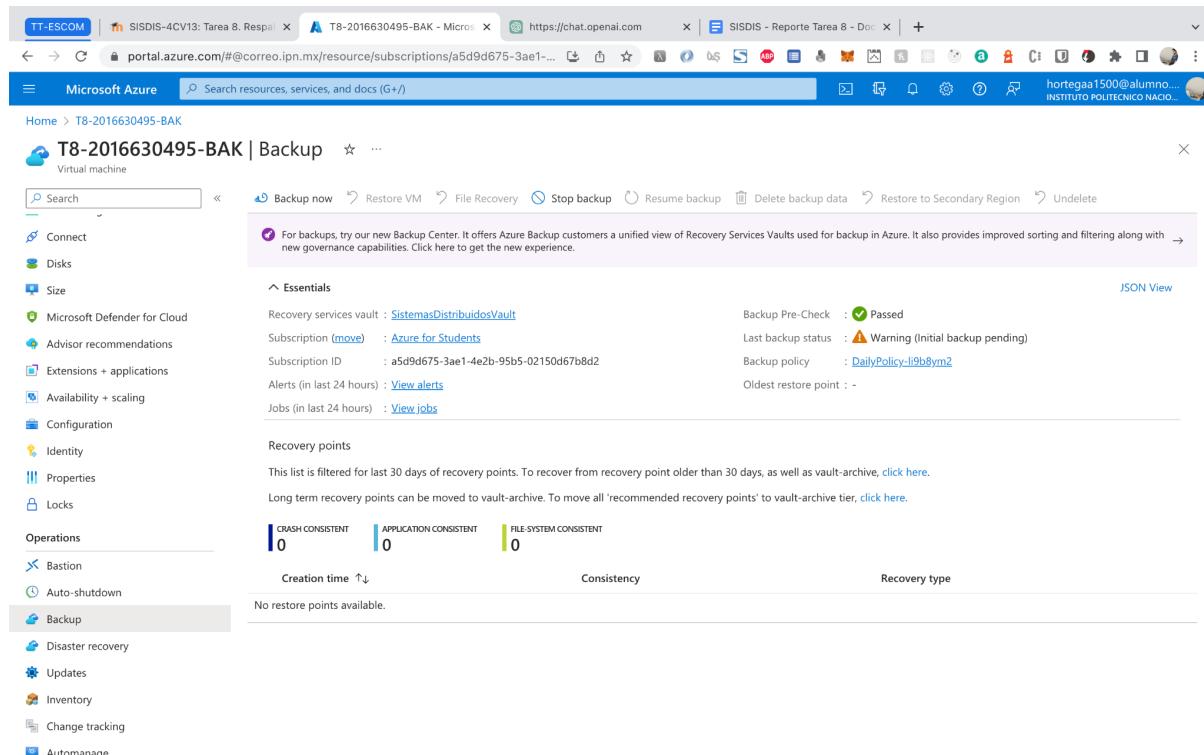
Para iniciar un respaldo completo de la máquina virtual, lo primero será ir a la página inicial de nuestra máquina virtual:



The screenshot shows the Microsoft Azure portal interface. The left sidebar lists various service categories such as Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Networking, Connect, Disks, Size, Microsoft Defender for Cloud, Advisor recommendations, Extensions + applications, Availability + scaling, Configuration, Identity, Properties, Locks, Operations, and Bastion. The main content area displays the 'Essentials' tab for a virtual machine named 'T8-2016630495-BAK'. Key details shown include:

- Resource group: SistemasDistribuidosResourceGroup
- Status: Running
- Location: East US
- Subscription: Azure for Students
- Subscription ID: a5d9d675-3ae1-4e2b-95b5-02150d67b8d2
- Tags: Click here to add tags
- Properties tab (selected):
  - Virtual machine: Computer name T8-2016630495-BAK, Operating system Linux (ubuntu 20.04)
  - Networking: Public IP address 172.173.188.159 (Network interface t8-2016630495-bak24), Private IP address -, Private IP address (IPv6) -, Virtual network/subnet T8-2016630495-BAK-vnet/default, DNS name Configure
  - Size: Size Standard B2s, vCPUs 2, RAM 4 GiB

Seleccionaremos la opción *Backup* desde el menú lateral:



The screenshot shows the Microsoft Azure portal interface, specifically the 'Backup' tab for the virtual machine 'T8-2016630495-BAK'. The left sidebar now highlights the 'Backup' section. The main content area displays the following information:

- Backup now, Restore VM, File Recovery, Stop backup, Resume backup, Delete backup data, Restore to Secondary Region, Undelete.
- A note: "For backups, try our new Backup Center. It offers Azure Backup customers a unified view of Recovery Services Vaults used for backup in Azure. It also provides improved sorting and filtering along with new governance capabilities. Click here to get the new experience."
- Essentials tab:
  - Recovery services vault: SistemasDistribuidosVault
  - Subscription: Azure for Students
  - Subscription ID: a5d9d675-3ae1-4e2b-95b5-02150d67b8d2
  - Alerts (in last 24 hours): View alerts
  - Jobs (in last 24 hours): View jobs
  - Backup Pre-Check: Passed
  - Last backup status: Warning (initial backup pending)
  - Backup policy: DailyPolicy-l9b8ym2
  - Oldest restore point: -
- Recovery points:

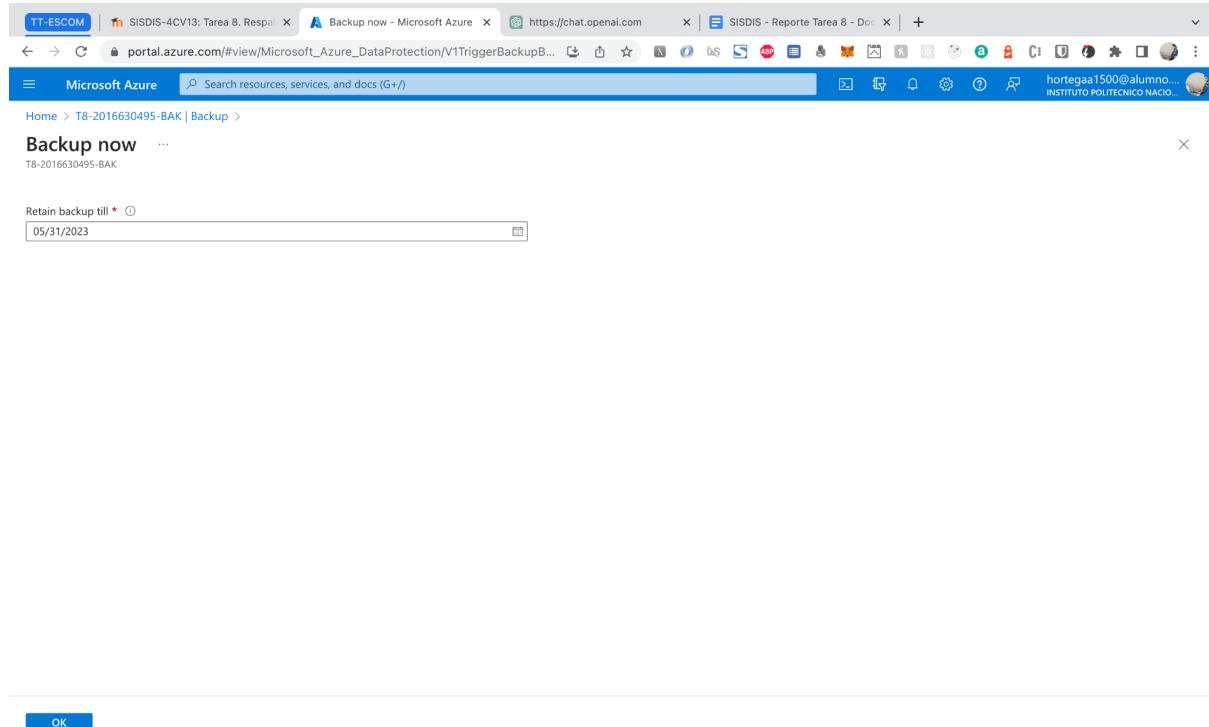
This list is filtered for last 30 days of recovery points. To recover from recovery point older than 30 days, as well as vault-archive, click here.

Long term recovery points can be moved to vault-archive. To move all 'recommended recovery points' to vault-archive tier, click here.

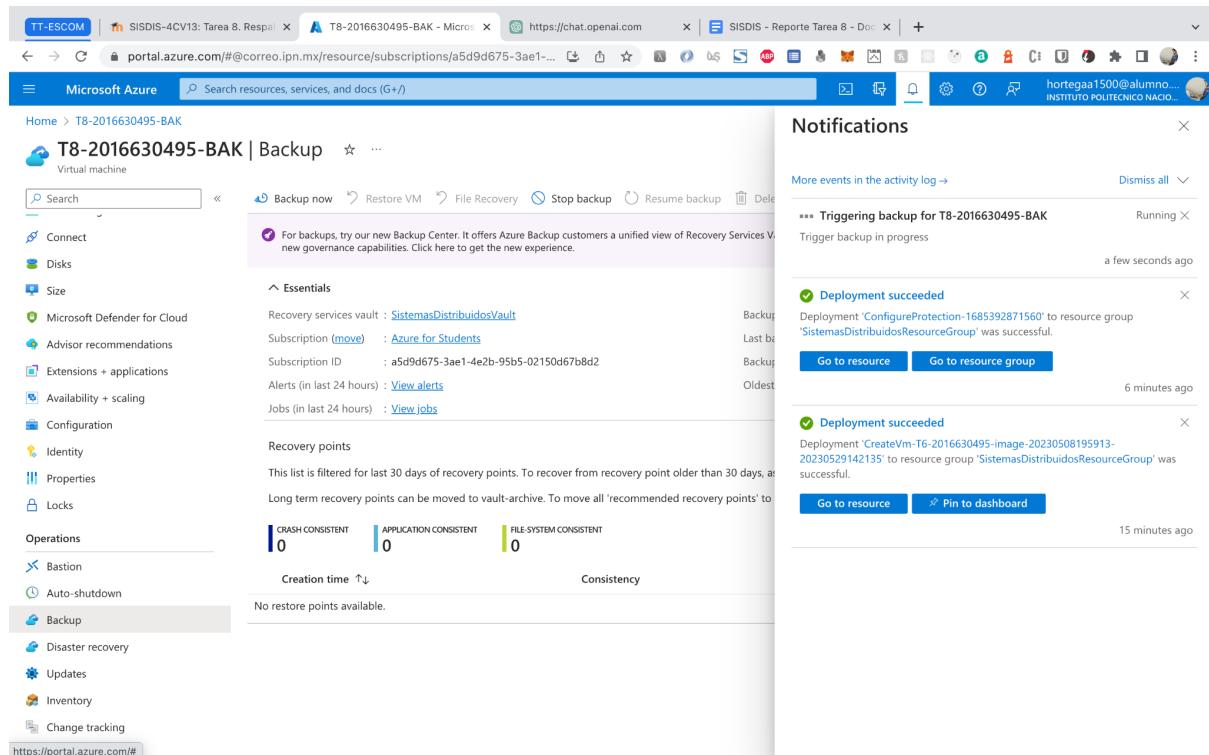
Creation time ↑↓	Consistency	Recovery type
0	CRASH CONSISTENT	APPLICATION CONSISTENT
0	APPLICATION CONSISTENT	FILE-SYSTEM CONSISTENT
0	FILE-SYSTEM CONSISTENT	-

No restore points available.

Haremos click en la opción de *Backup now*, con lo que iniciará el formulario para realizar el respaldo ahora mismo y elegiremos la fecha más cercana a la actual para no guardar el respaldo mucho tiempo (y ahorra un poco de créditos de la plataforma):



Ahora observaremos que se inició el proceso de respaldo en nuestras notificaciones:



Una vez que termine, haremos click en *View Details* y nos llevará a la página con el resumen de los procesos de respaldo:

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Respald, Backup Jobs - Microsoft Azure, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Doc. The main content area is titled "Backup Jobs". It displays a table of backup jobs with columns: Workload name, Operation, Status, Type, Start time, Total Duration, and Details. Two rows are present:

Workload name	Operation	Status	Type	Start time	Total Duration	Details
T8-2016630495-BAK	Backup	In progress	Azure Virtual Machine	5/29/2023, 2:48:31 PM	00:02:03	<a href="#">View details</a>
T8-2016630495-BAK	Configure backup	Completed	Azure Virtual Machine	5/29/2023, 2:41:28 PM	00:00:30	<a href="#">View details</a>

At the bottom of the table, there are navigation buttons: < Previous, Page 1 of 1, and Next >.

Ahí podremos visualizar el proceso y monitorear el mismo hasta que termine:

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Respald, Backup - Microsoft Azure, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Doc. The main content area is titled "Backup". It displays a "Job details" section with the following information:

VM Name	5/29/2023 2:48:31 PM
Recovery Point Expiry Time in UTC	5/31/2023 8:48:31 PM
Activity ID	4e597002-7170-4db7-bf05-af229fd0a040

Below this is a "Sub tasks" section with a table:

Name	Status	Duration
Take Snapshot	In progress	00:02:18
Transfer data to vault	Not started	00:00:00

Una vez finalizado, se visualizará de la siguiente manera:

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Respuestas, Backup - Microsoft Azure, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Doc. Below the navigation bar, the main title is "Backup" with a sub-path "Home > Backup Jobs > Backup". Under "Job details", it shows the VM Name as T8-2016630495-BAK, Recovery Point Expiry Time in UTC as 5/31/2023 8:48:31 PM, and Activity ID as 4e597002-7170-4db7-bf05-af229fd0a040. The "Sub tasks" section lists "Take Snapshot" as completed (Duration: 00:07:35) and "Transfer data to vault" as not started (Duration: 00:00:00).

De vuelta en la pestaña de *Backup* de la máquina virtual, se observará el respaldo disponible para su uso:

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for TT-ESCOM, SISDIS-4CV13: Tarea 8. Respuestas, T8-2016630495-BAK - Microsoft Azure, https://chat.openai.com, and SISDIS - Reporte Tarea 8 - Doc. Below the navigation bar, the main title is "T8-2016630495-BAK | Backup" with a sub-path "Home > T8-2016630495-BAK". The left sidebar shows navigation links for Advisor recommendations, Extensions + applications, Availability + scaling, Configuration, Identity, Properties, Locks, Operations (Bastion, Auto-shutdown), Backup (selected), Disaster recovery, Updates, Inventory, Change tracking, Automanage, Configuration management (Preview), Policies, and Run command. The main content area displays a summary of backup operations: Backup now, Restore VM, File Recovery, Stop backup, Resume backup, Delete backup data, Restore to Secondary Region, and Undelete. A note encourages users to try the new Backup Center. The "Essentials" section provides details about the Recovery services vault (SistemasDistribuidosVault), Subscription (Azure for Students), Subscription ID (a5d9d675-3ae1-4e2b-95b5-02150d67b8d2), Alerts (in last 24 hours), and Jobs (in last 24 hours). The "Recovery points" section shows a table with one entry: CRASH CONSISTENT (0), APPLICATION CONSISTENT (0), and FILE-SYSTEM CONSISTENT (1). The table includes columns for Creation time (5/29/2023, 2:48:35 PM), Consistency (File-system Consistent), Recovery type (Snapshot), and an ellipsis button.

## Restaurar la máquina virtual

Una vez finalizado el proceso de respaldo, iremos a la página principal de la máquina virtual:

The screenshot shows the Microsoft Azure portal interface for a virtual machine named "T8-2016630495-BAK". The "Overview" tab is active, providing a summary of the VM's configuration. Key details include:

- Resource group:** SistemasDistribuidosResourceGroup
- Status:** Running
- Location:** East US
- Subscription:** Azure for Students
- Subscription ID:** a5d9d675-3ae1-4e2b-95b5-02150d67b8d2
- Tags:** Click here to add tags

The "Properties" tab is also visible, showing more detailed configuration options like Computer name, Operating system, Publisher, Offer, Plan, VM generation, VM architecture, Agent status, Agent version, Host group, and Host.

Iremos a la sección de *Backup* en el menú lateral:

The screenshot shows the Microsoft Azure portal interface for the same virtual machine, now focusing on the "Backup" section. The "Backup" tab is active, displaying the following information:

- Recovery services vault:** SistemasDistribuidosVault
- Subscription:** Azure for Students
- Subscription ID:** a5d9d675-3ae1-4e2b-95b5-02150d67b8d2
- Alerts (in last 24 hours):** View alerts
- Jobs (in last 24 hours):** View jobs

The "Essentials" section also includes details about the backup pre-check, last backup status, backup policy, and oldest restore point.

Below this, the "Recovery points" section lists a single point: CRASH CONSISTENT (0), APPLICATION CONSISTENT (0), and FILE-SYSTEM CONSISTENT (1). The table below shows the creation time (5/29/2023, 2:48:35 PM), consistency (File-system Consistent), and recovery type (Snapshot).

Haremos click en *Restore VM* y seleccionaremos el punto de respaldo correspondiente que acabamos de crear:

The screenshot shows the Azure portal interface. A modal window titled "Select restore point" is open, displaying a single entry for a VM named "T8-2016630495-BAK". The entry shows the start date as 05/15/2023, the end date as 05/29/2023, and the recovery point consistency as "FILE-SYSTEM CONSISTENT". The "Time" column shows the creation time as 5/29/2023, 2:48:35 PM. The "Consistency" column shows "File-system Consistent". The "Recovery Type" column shows "Snapshot". Below the modal, there is a "Restore" button and "OK" and "Cancel" buttons.

Una vez seleccionado, haremos click en *OK* y llenaremos los datos correspondientes, usando el mismo grupo de recursos y subred:

The screenshot shows the "Restore Virtual Machine" configuration dialog. It includes fields for "Restore Type" (set to "Create new"), "Virtual machine name" (set to "T8-2016630495-RES"), "Resource group" (set to "SistemasDistribuidosResourceGroup"), "Virtual network" (set to "T8-2016630495-BAK-vnet (SistemasDistribuidosResourceGroup)"), "Subnet" (set to "default"), and "Staging Location" (set to "Select an option"). A note below the form states: "The identities listed here are based on the MSI configurations in the corresponding Recovery services vault." Under "Identities", the option "Disabled" is selected. At the bottom of the dialog is a "Restore" button.

Dado que no se cuenta con una cuenta de almacenamiento, deberemos crearla.

## Crear cuenta de almacenamiento

Para crear una cuenta de almacenamiento iremos a la página principal de Azure:

The screenshot shows the Microsoft Azure portal homepage. In the top navigation bar, there are several tabs: TT-ESCOM, SISDIS-4CV13: Tarea 8, Restore Virtual Machine, Restore VMs by using, Home - Microsoft Azure, https://chat.openai.com, SISDIS - Reporte Tarea, and a plus sign for creating new resources. The main content area is titled "Azure services" and includes links to Create a resource, Virtual machines, Public IP addresses, SSH keys, Cost Management, Azure Virtual Desktop, Quickstart Center, App Services, Storage accounts, and More services. Below this is the "Resources" section, which lists recent resources: TB-2016630495-BAK (Virtual machine), SistemasDistribuidosVault (Recovery Services vault), SistemasDistribuidosResourceGroup (Resource group), and T6-2016630495-image-20230508195913 (Image). It also has tabs for Recent and Favorite. Further down are sections for "Navigate" (Subscriptions, Resource groups, All resources, Dashboard) and "Tools" (Microsoft Learn, Azure Monitor, Microsoft Defender for Cloud, Cost Management).

Buscaremos el término *Storage Accounts* y visitaremos la página principal de ese recurso:

The screenshot shows the Microsoft Azure portal search results for the term "storage". The search bar at the top contains "storage". Below it, the "All" tab is selected, showing a list of services: Storage accounts, Storage Sync Services, Data Lake Storage Gen1, Azure Native Qumulo Scalable File Service, Publisher Artifact Stores, Storage account, Azure File Sync, Data Lake Storage Gen1, Backup and Site Recovery, Choose a data storage technology - Azure Architecture Center, Azure Storage Documentation Hub, Concepts - Storage in Azure Kubernetes Services (AKS) - Azure Ku..., Tutorial - Connect to a storage account using an Azure Private End..., Continue searching in Azure Active Directory, and Searching all subscriptions. To the right, there are sections for "Viewed" (Storage accounts, Data Lake Storage Gen1, Azure Native Qumulo Scalable File Service, Publisher Artifact Stores) and "See all" (links like Azure Blob Storage on IoT Edge, Azure Stack Edge, NetApp BlueXP, SFTPGo for Linux - SFTP, HTTP/S, FTP/S to Azure Blob Storage, Azure Blob Storage library - .NET, Azure Storage SDK for .NET - Azure for .NET Developers, Get storage account configuration information - Azure Storage, Upload and analyze a file with Azure Functions and Blob Storage). At the bottom, there are links to Microsoft Learn, Azure Monitor, Microsoft Defender for Cloud, and Cost Management.

La página principal se observa así:

The screenshot shows the Microsoft Azure Storage accounts page. The top navigation bar includes links for TT-ESCOM, SISDIS-4CV13: Tarea 8, Restore Virtual Machine, Restore VMs by using, Storage accounts - Micr..., https://chat.openai.com, and SISDIS - Reporte Tarea. The main title is "Storage accounts" with a subtitle "Instituto Politecnico Nacional (correo.ipn.mx)". Below the title are filter options: "Subscription equals all", "Resource group equals all", "Location equals all", and "Add filter". A search bar says "Search resources, services, and docs (G+/-)". The main content area displays a message: "No storage accounts to display. Create a storage account to store up to 500TB of data in the cloud. Use a general-purpose storage account to store object data, use a NoSQL data store, define and use queues for message processing, and set up file shares in the cloud. Use the Blob storage account and the hot or cool access tiers to optimize your costs based on how frequently your object data is accessed." It includes a "Create storage account" button and a "Learn more" link. At the bottom right is a "Give feedback" button.

Haremos click en *Create storage account* y comenzaremos a llenar los datos del formulario de la nueva cuenta de almacenamiento:

The screenshot shows the "Create a storage account" wizard on the "Basics" step. The top navigation bar is identical to the previous screenshot. The title is "Create a storage account" with a subtitle "Home > Storage accounts >". Below the title are tabs for Basics, Advanced, Networking, Data protection, Encryption, Tags, and Review. The "Basics" tab is selected. The form fields include "Subscription" (set to "Azure for Students") and "Resource group" (set to "SistemasDistribuidosResourceGroup"). Under "Instance details", there is a note about legacy storage account types. The "Storage account name" field contains "2016630495almacenamiento". The "Region" dropdown is set to "(US) East US". Under "Performance", the "Standard" radio button is selected with the note "Recommended for most scenarios (general-purpose v2 account)". Under "Redundancy", the "Geo-redundant storage (GRS)" dropdown is selected, and a checkbox "Make read access to data available in the event of regional unavailability" is checked. At the bottom are "Review" and "Next : Advanced >" buttons, and a "Give feedback" link.

Dejaremos la configuración avanzada con los valores por defecto:

Certain options have been disabled by default due to the combination of storage account performance, redundancy, and region.

### Security

Configure security settings that impact your storage account.

Require secure transfer for REST API operations

Allow enabling public access on individual containers

Enable storage account key access

Default to Azure Active Directory authorization in the Azure portal

Minimum TLS version

Permitted scope for copy operations (preview)

### Hierarchical Namespace

Review < Previous Next : Networking > Give feedback

Dejaremos la configuración de red con los valores por defecto:

You can connect to your storage account either publicly, via public IP addresses or service endpoints, or privately, using a private endpoint.

Network access \*  Enable public access from all networks  
 Enable public access from selected virtual networks and IP addresses  
 Disable public access and use private access

Enabling public access from all networks might make this resource available publicly. Unless public access is required, we recommend using a more restricted access type. [Learn more](#)

### Network routing

Determine how to route your traffic as it travels from the source to its Azure endpoint. Microsoft network routing is recommended for most customers.

Routing preference \*  Microsoft network routing  
 Internet routing

Review < Previous Next : Data protection > Give feedback

En protección de datos igualmente usaremos la configuración por defecto:

The screenshot shows the 'Create a storage account' wizard on the 'Data protection' step. Under the 'Recovery' section, several options are checked: 'Enable soft delete for blobs' (with a retention period of 7 days), 'Enable soft delete for containers' (with a retention period of 7 days), and 'Enable soft delete for file shares' (with a retention period of 7 days). The 'Enable point-in-time restore for containers' option is unchecked. The 'Tracking' section is collapsed. At the bottom, there are 'Review', '< Previous', 'Next : Encryption >', and 'Give feedback' buttons.

En términos de encriptación igualmente usaremos la configuración por defecto:

The screenshot shows the 'Create a storage account' wizard on the 'Encryption' step. Under the 'Encryption type' section, 'Microsoft-managed keys (MMK)' is selected. Under 'Enable support for customer-managed keys', 'Blobs and files only' is selected. A note states: '⚠️ This option cannot be changed after this storage account is created.' Under 'Enable infrastructure encryption', the checkbox is unchecked. The 'Review', '< Previous', 'Next : Tags >', and 'Give feedback' buttons are at the bottom.

Finalmente, se revisará el resumen de la cuenta de almacenamiento a crear:

The screenshot shows the Microsoft Azure portal interface for creating a new storage account. The browser tab is titled 'Create a storage account'. The main content area is the 'Review' tab of the configuration wizard. The configuration details are as follows:

Category	Setting	
<b>Basics</b>	Subscription	Azure for Students
	Resource Group	SistemasDistribuidosResourceGroup
	Location	eastus
	Storage account name	2016630495almacenamiento
	Deployment model	Resource manager
	Performance	Standard
<b>Advanced</b>	Replication	Read-access geo-redundant storage (RA-GRS)
	Enable hierarchical namespace	Disabled
	Enable network file system v3	Disabled
	Allow cross-tenant replication	Enabled
	Access tier	Hot
	Enable SFTP	Disabled
<b>Networking</b>	Large file shares	Disabled
	Network connectivity	Public endpoint (all networks)
<b>Security</b>	Default routing tier	Microsoft network routing
	Endpoint type	Standard
	Secure transfer	Enabled
	Allow storage account key access	Enabled
	Default to Azure Active Directory authorization in the Azure portal	Disabled
	Blob public access	Enabled
<b>Data protection</b>	Minimum TLS version	Version 1.2
	Permitted scope for copy operations (preview)	From any storage account
	Point-in-time restore	Disabled
Risk info details	Enabled	

At the bottom of the screen, there are navigation buttons: 'Create' (in blue), '< Previous' (disabled), 'Next >', 'Download a template for automation', and 'Give feedback'.

**Data protection**

Point-in-time restore	Disabled
Blob soft delete	Enabled
Blob retention period in days	7
Container soft delete	Enabled
Container retention period in days	7
File share soft delete	Enabled
File share retention period in days	7
Versioning	Disabled
Blob change feed	Disabled
Version-level immutability support	Disabled

**Encryption**

Encryption type	Microsoft-managed keys (MMK)
Enable support for customer-managed keys	Blobs and files only
Enable infrastructure encryption	Disabled

**Buttons:** Create, < Previous, Next >, Download a template for automation, Give feedback.

Haremos click en *Create* y comenzará el despliegue de la nueva cuenta de administración:

**Deployment**

**Deployment is in progress**

Deployment name: 2016630495almacenamiento\_1685395514938 Start time: 5/29/2023, 3:25:17 PM  
Subscription: Azure for Students Resource group: SistemasDistribuidosResourceGroup Correlation ID: 55ad9e91-0562-44bf-8755-12a91120a6c1

**Deployment details**

Resource	Type	Status	Operation details
No results.			

**Give feedback**  
[Tell us about your experience with deployment](#)

**Microsoft Defender for Cloud**  
Secure your apps and infrastructure  
[Go to Microsoft Defender for Cloud >](#)

**Free Microsoft tutorials**  
[Start learning today >](#)

**Work with an expert**  
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.  
[Find an Azure expert >](#)

Una vez finalizado el despliegue y creación de la cuenta de almacenamiento se observará la siguiente pantalla:

Finalmente, iremos a la página principal del recurso creado, se observa de la siguiente forma:

## Continuando proceso con la cuenta de almacenamiento

Una vez creada la cuenta de almacenamiento, regresaremos a la página de creación de respaldo y seleccionaremos las opciones previamente usadas pero añadiendo la cuenta de almacenamiento en cuestión:

Restore point \* 5/29/2023, 2:48:35 PM  
Select  
Data Store Snapshot  
Restore configuration  
 Create new  
 Replace existing  
To create an alternate configuration when restoring your VM (from the following menus), use PowerShell cmdlets.  
Restore Type \* Create new virtual machine  
Virtual machine name \* T8-2016630495-RES  
Resource group \* SistemasDistribuidosResourceGroup  
Virtual network \* T8-2016630495-BAK-vnet (SistemasDistribuidosResourceGroup)  
Subnet \* default  
Staging Location \* 2016630495almacenamiento (StandardRAGRS) Can't find your storage account?  
The identities listed here are based on the MSI configurations in the corresponding Recovery services vault. [Learn more.](#)  
Restore

Haremos click en *Restore* y comenzará el procedimiento en cuestión:

T8-2016630495-BAK | Backup ☆ ...  
Virtual machine  
Search  
Advisor recommendations  
Extensions + applications  
Availability + scaling  
Configuration  
Identity  
Properties  
Locks  
Operations  
Bastion  
Auto-shutdown  
Backup  
Disaster recovery  
Updates  
Inventory  
Change tracking  
Automanage  
Configuration management (Preview)  
Policies  
Run command  
https://portal.azure.com/#blade/Microsoft\_Azure\_ActivityLog/ActivityLogBlade/queryInputs/%7B"user%3A%40me%7D

Notifications

More events in the activity log → Dismiss all ▾

Triggering restore for T8-2016630495-BAK Running ×  
Trigger restore in progress.  
a few seconds ago

Triggering backup for T8-2016630495-BAK ×  
Backup triggered successfully. Please monitor progress in backup jobs page.  
41 minutes ago

Deployment succeeded ×  
Deployment 'ConfigureProtection-1685392871560' to resource group 'SistemasDistribuidosResourceGroup' was successful.  
48 minutes ago

Deployment succeeded ×  
Deployment 'CreateVm-T6-2016630495-image-20230508195913-20230529142135' to resource group 'SistemasDistribuidosResourceGroup' was successful.  
57 minutes ago

Go to resource Pin to dashboard

Una vez finalizado, haremos click en la notificación y nos llevará a la página de resumen de trabajos dónde podremos ver cuando finalice\*:

The screenshot shows the Microsoft Azure Backup Jobs page. It displays three backup jobs for the same virtual machine (T8-2016630495-BAK). The first job is a restore operation, the second is a backup operation, and the third is a configuration backup that has completed. All operations are currently in progress.

Workload name	Operation	Status	Type	Start time	Total Duration	Details
T8-2016630495-BAK	Restore	In progress	Azure Virtual Machine	5/29/2023, 3:30:18 PM	00:01:18	<a href="#">View details</a>
T8-2016630495-BAK	Backup	In progress	Azure Virtual Machine	5/29/2023, 2:48:31 PM	00:43:05	<a href="#">View details</a>
T8-2016630495-BAK	Configure backup	Completed	Azure Virtual Machine	5/29/2023, 2:41:28 PM	00:00:30	<a href="#">View details</a>

\*Nota: por algún motivo aquí sigue mostrando tanto el proceso de respaldo como de restauración como “En Proceso”, sin embargo al momento de tomar la captura ya había finalizado.

Haremos click en *View details* y observaremos el resumen de la restauración realizada:

The screenshot shows the Microsoft Azure Job Details page for the restore operation (T8-2016630495-BAK). The job status is listed as "100% completed". Below the status, there is a table of job details and a section for sub-tasks.

Job Type	Recover VM to an alternate location
Original VM Name	T8-2016630495-BAK
Target VM Name	T8-2016630495-RES
Target VNet Name	Group SistemasDistribuidosResourceGroup T8-2016630495-BAK-vnet
Target Storage Account Name	2016630495almacenamiento
Recovery point time	5/29/2023 8:48:35 PM
Target resource group	SistemasDistribuidosResourceGroup
Activity ID	4e597002-7170-4db7-bf05-af229fd0a081

**Job status**  
100% completed

**Sub tasks**

Name	Status	Details
Transfer data from vault	Completed	30 GBs / 30 GBs Transferred
Create the restored virtual machine	Completed	

Ahora nos dirigiremos a nuestra sección de máquinas virtuales en Azure y podremos observar la máquina virtual de restauración creada:

Virtual machines

Name	Type	Subscription	Resource group	Location	Status	Operating system	Size	Public IP address
T8-2016630495-BAK	Virtual machine	Azure for Students	SistemasDistribuidos...	East US	Running	Linux	Standard_B2s	172.173.188.159
T8-2016630495-RES	Virtual machine	Azure for Students	SistemasDistribuidos...	East US	Running	Linux	Standard_B2s	172.171.213.147

Iremos a la máquina virtual en cuestión para ver la información general:

T8-2016630495-RES

Virtual machine

Essentials

Resource group (move)	Operating system
SistemasDistribuidosResourceGroup	Ubuntu 20.04
Status	Size
Running	Standard B2s (2 vcpus, 4 GiB memory)
Location	Public IP address
East US	172.171.213.147
Subscription (move)	Virtual network/subnet
Azure for Students	T8-2016630495-BAK-vnet/default
Subscription ID	DNS name
a5d9d675-3ae1-4e2b-95b5-02150d67b8d2	Not configured

Properties

Computer name	Operating system
T8-2016630495-BAK	Ubuntu 20.04
Publisher	Offer
-	-
Plan	VM generation
-	V2
VM architecture	VM architecture
x64	x64

## Prueba de conectividad con la máquina restaurada

Para validar que la restauración realizada a partir del respaldo es exitosa, accederemos a la máquina virtual recién creada mediante SSH (puerto 22):

```
> pwd
/Users/humbertowoody/Proyectos/IPN/sistemas-distribuidos-escom/azure
> ls -lha
Permissions Size User          Date Modified Name
.rw-----@ 2.5k humbertowoody 24 Mar 15:19  humbertowoody-azure.pem
> ssh -i humbertowoody-azure.pem 172.171.213.147
The authenticity of host '172.171.213.147 (172.171.213.147)' can't be established.
ED25519 key fingerprint is SHA256:HJBvbjhcanK2b9LYTZW0Sa4GMHDxLIVPHWNFxK5HJng.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.171.213.147' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1037-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Mon May 29 21:40:14 UTC 2023

System load:  0.0              Processes:           112
Usage of /:   9.0% of 28.89GB  Users logged in:    0
Memory usage: 22%              IPv4 address for eth0: 10.0.0.5
Swap usage:   0%

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Mon May 29 20:35:28 2023 from 148.204.56.241
humbertowoody@T8-2016630495-BAK:~$
```

Para comparar que sean iguales, se listarán los contenidos de los directorios en ambas máquinas y se mostrará que no existe discrepancia entre las mismas:

```
humberto@T8-2016630495-BAK:~$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 60:45:bd:d7:58:e5 brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.5/24 brd 10.0.0.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::6245:bdff:fed7:58e5/64 scope link
        valid_lft forever preferred_lft forever
humberto@T8-2016630495-BAK:~$ ls
META-INF          compila_url.sh
Servicio.war      jaxrs-ri
Servicio.zip      jaxrs-ri-2.24.zip
WEB-INF           mysql-connector-j-8.0.33
apache-tomcat-8.5.88  mysql-connector-j-8.0.33.zip
apache-tomcat-8.5.88.zip servicio_json
compila_json.sh   servicio_url
humberto@T8-2016630495-BAK:~$ date
Mon May 29 21:43:16 UTC 2023
humberto@T8-2016630495-BAK:~$ ls -lha compila_json.sh
-rw-rw-r-- 1 humberto@T8-2016630495-BAK 365 Apr 24 20:01 compila_json.sh
humberto@T8-2016630495-BAK:~$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:0d:3a:19:68:86 brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.4/24 brd 10.0.0.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::20d:3aff:fe19:6886/64 scope link
        valid_lft forever preferred_lft forever
humberto@T8-2016630495-BAK:~$ ls
META-INF          compila_url.sh
Servicio.war      jaxrs-ri
Servicio.zip      jaxrs-ri-2.24.zip
WEB-INF           mysql-connector-j-8.0.33
apache-tomcat-8.5.88  mysql-connector-j-8.0.33.zip
apache-tomcat-8.5.88.zip servicio_json
compila_json.sh   servicio_url
humberto@T8-2016630495-BAK:~$ date
Mon May 29 21:43:14 UTC 2023
humberto@T8-2016630495-BAK:~$ ls -lha compila_json.sh
-rw-rw-r-- 1 humberto@T8-2016630495-BAK 365 Apr 24 20:01 compila_json.sh
humberto@T8-2016630495-BAK:~$
```

## Eliminar el proceso de respaldo

Para eliminar el proceso de respaldo lo primero será ir a la visualización de nuestro grupo de recursos, esto será en la página principal:

The screenshot shows the Microsoft Azure portal homepage. At the top, there's a navigation bar with several tabs and links. Below it is the 'Azure services' section with various icons for creating resources and managing them. The 'Resources' section lists recent resources, including a virtual machine, a recovery services vault, a resource group, and an image, along with their types, last viewed times, and links. Below that is the 'Navigate' section with links to Subscriptions, Resource groups, All resources, and Dashboard. The 'Tools' section includes links to Microsoft Learn, Azure Monitor, Microsoft Defender for Cloud, and Cost Management.

Seleccionaremos el grupo de recursos con lo que nos mostrará la siguiente pantalla:

The screenshot shows the details of the 'SistemasDistribuidosResourceGroup' resource group in the Azure portal. The left sidebar shows navigation options like Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Deployments, Security, Policies, Properties, Locks, Cost management, Cost analysis, Cost alerts (preview), Budgets, and Advisor recommendations. The main area displays the 'Essentials' section with information about the subscription, deployment status (16 succeeded), location (East US), and tags. Below this is a 'Resources' section showing a list of 14 resources, including storage accounts, SSH keys, recovery services vaults, images, virtual machines, public IP addresses, network security groups, and virtual networks. Each resource has a preview icon, name, type, location, and three-dot ellipsis menu.

Seleccionaremos todos los recursos asociados a la tarea para poder eliminarlos, de la siguiente forma:

The screenshot shows the Microsoft Azure Resource Group Overview page for the 'SistemasDistribuidosResourceGroup'. The left sidebar contains navigation links for Home, Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Cost Management, Monitoring, Automation, and Workbooks. The main content area displays a table of resources with columns for Name, Type, and Location. The table lists 14 resources, all of which are selected (indicated by a checked checkbox). The resources include a Storage account, an SSH key, a Recovery Services vault, an Image, a Virtual machine, a Public IP address, a Network security group, a Virtual network, a Network interface, a Disk, a Network interface, a Public IP address, a Virtual machine, and a Disk. The location for all resources is East US.

Haremos click en el botón *Delete* y verificaremos en la ventana mostrada que los recursos a eliminar sean los correctos, así como seleccionar la opción para aplicar un borrado forzado para los recursos que tengan errores (que los habrá), escribiremos *delete* en el campo solicitado y seleccionaremos el botón *Delete*:

The screenshot shows the Microsoft Azure Resource Group Overview page for the 'SistemasDistribuidosResourceGroup'. The left sidebar contains navigation links for Home, Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Cost Management, Monitoring, Automation, and Workbooks. The main content area displays a table of resources with columns for Name, Resource type, and Remove. The table lists 12 resources, all of which are selected (indicated by a checked checkbox). The resources include a Storage account, a Recovery Services vault, a Virtual machine, a Public IP address, a Network security group, a Virtual network, a Network interface, a Disk, a Network interface, a Public IP address, a Virtual machine, and a Disk. The 'Remove' column for each resource has a 'Remove' link. A 'Delete Resources' dialog box is open on the right side of the screen. It contains a message stating: 'The selected resources along with their related resources and contents will be permanently deleted. If you are unsure of the selected resource dependencies, navigate to the individual resource page to perform the delete operation. More details of the resource dependencies are available in the manage experience.' Below this message is a section titled 'Resources to be deleted (12)'. At the bottom of the dialog box, there is a checkbox labeled 'Apply force delete for selected Virtual machines and Virtual machine scale sets' with a help icon. Below the checkbox is a text input field with the placeholder 'Enter "delete" to confirm deletion' containing the word 'delete'. At the bottom right of the dialog box are two buttons: a red 'Delete' button and a white 'Cancel' button.

Nos mostrará una confirmación y haremos click en *Delete* de nuevo:

The selected resources along with their related resources and contents will be permanently deleted. If you are unsure of the selected resource dependencies, navigate to the individual resource page to perform the delete operation. More details of the resource dependencies are available in the manage experience.

**Resources to be deleted (12)**

Name	Resource type	Action
2016630495almacenamiento	Storage account	Remove
SistemasDistribuidosVault	Recovery Services vault	Remove
T8-2016630495-BAK	Virtual machine	Remove
T8-2016630495-BAK-ip	Public IP address	Remove
T8-2016630495-BAK-msg	Network security group	Remove
T8-2016630495-BAK-net	Virtual network	Remove
T8-2016630495-bak24	Network interface	Remove
T8-2016630495-R		Remove
T8-2016630495-R-182016630495res		Remove
T8-2016630495-R-182016630495res-odisk-20230529-213107		Remove
T8-2016630495-BAK-disk1_5672432a791e45d588a50a7c97cd9734	Disk	Remove
T8-2016630495-R-nic-e7a35051504a413cb84b55bcf0017d2	Network interface	Remove
T8-2016630495-R-pip-0a9b1b2051ef4d3ba362e66cf73cf535	Public IP address	Remove
T8-2016630495-RES	Virtual machine	Remove
T8-2016630495-RES-182016630495res-odisk-20230529-213107	Disk	Remove

**Delete confirmation**

Deleting the selected resources and their internal data is a permanent action and cannot be undone.

Apply force delete for selected Virtual machines and Virtual machine scale sets

Enter "delete" to confirm deletion :

**Delete** **Cancel**

El proceso será mostrado en nuestra sección de notificaciones de la siguiente forma:

**Notifications**

More events in the activity log → Dismiss all ▾

- Executing delete command on 12 selected items Running X  
Succeeded: 0, Failed: 0, Canceled: 0.  
a few seconds ago
- Triggering restore for T8-2016630495-BAK  
Restore triggered successfully. Please monitor progress in backup jobs page.  
23 minutes ago
- Triggering backup for T8-2016630495-BAK  
Backup triggered successfully. Please monitor progress in backup jobs page.  
an hour ago
- Deployment succeeded Deployment 'ConfigureProtection-1685392871560' to resource group 'SistemasDistribuidosResourceGroup' was successful.  
**Go to resource** **Go to resource group**  
an hour ago
- Deployment succeeded Deployment 'CreateVm-T8-2016630495-Image-20230508195913-20230529142135' to resource group 'SistemasDistribuidosResourceGroup' was successful.  
**Go to resource** **Pin to dashboard**  
an hour ago

Se observará que hubo un error al borrar un recurso:

The screenshot shows the Azure portal interface for a resource group named 'SistemasDistribuidosResourceGroup'. The left sidebar lists various management categories like Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Cost Management, Monitoring, and Insights (preview). The main content area displays the 'Essentials' section with details such as Subscription (move) to 'Azure for Students', Subscription ID 'a5d9d675-3ae1-4e2b-95b5-02150d67b8d2', and Tags. Below this is the 'Resources' section, which lists three items: 'humbertowoody-azure', 'SistemasDistribuidosVault', and 'T6-2016630495-image-20230508195913'. On the right side, there is a 'Notifications' panel showing activity logs. One notable entry is a warning: 'Executed delete command on 12 selected items' (Succeeded: 11, Failed: 1, Canceled: 0), which corresponds to the vault deletion mentioned in the text. Other notifications include successful restores and backups.

Este error ocurre pues nuestro respaldo para la máquina virtual original (BAK) fue seleccionado para almacenarse durante 2 días, por lo que Azure realizó un soft-delete el cual no surtirá efecto hasta dentro de los mismos 2 días.

## Conclusión

Entender cómo realizar respaldos y restauraciones en la nube es fundamental pues estos forman parte de los beneficios intrínsecos del uso de la misma. Gracias a la realización de esta tarea pude ver cómo se realiza en Azure, así como comprobar que los datos se “congelaron” en un punto en el tiempo en cuestión y fueron restaurados tal cual se encontraban en ese momento.

– Humberto Alejandro Ortega Alcocer.