



Máster en Ingeniería MultiCloud, DevOps y Seguridad.

AZURE LAB #4

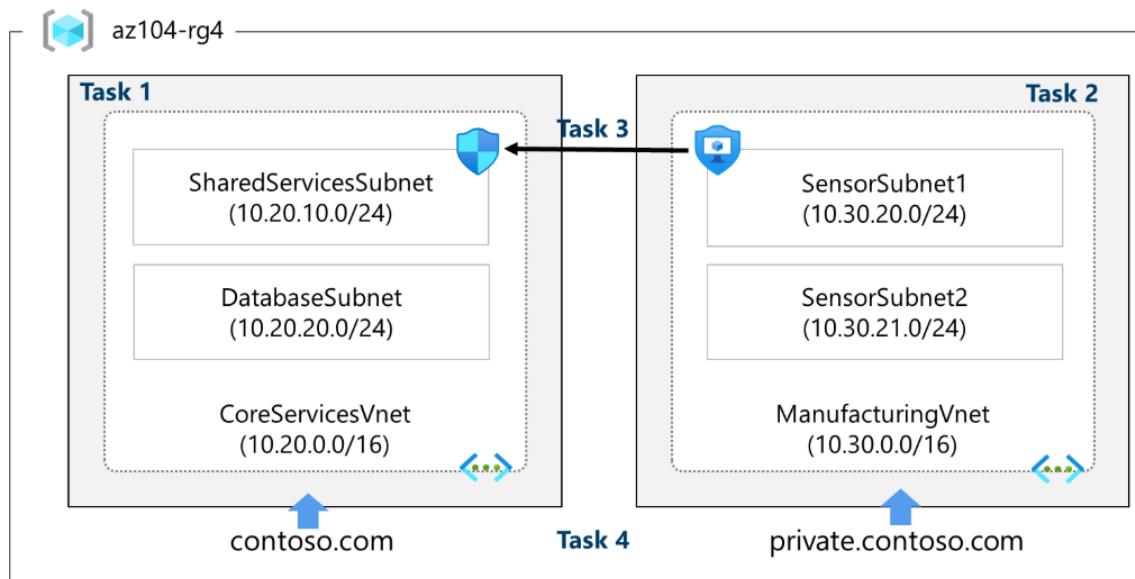
Implementación de redes virtuales



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Esquema del laboratorio





Creación de una red virtual con subredes mediante el portal

The screenshot shows the Microsoft Azure portal interface for creating a new virtual network. The top navigation bar includes the Microsoft Azure logo, a search bar, and a 'Search resources, services, and docs (G+ /)' field. Below the navigation, the breadcrumb trail shows 'Home > Network foundation | Virtual networks > Create virtual network'. The main content area has tabs for 'Basics', 'Security', 'IP addresses', 'Tags', and 'Review + create'. The 'Basics' tab is selected. A descriptive text explains that Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure, enabling communication between Azure VMs, the internet, and on-premises networks. It highlights benefits like scale, availability, and isolation. A 'Learn more' link is provided. The 'Project details' section asks to select a subscription and resource group. The 'Subscription' dropdown shows 'Azure for Students' and the 'Resource group' dropdown shows 'az104-rg4' with a 'Create new' option. The 'Instance details' section asks for the virtual network name ('CoreServicesVnet') and region ('(Europe) Spain Central'). A 'Deploy to an Azure Extended Zone' link is also present. At the bottom, there are 'Previous', 'Next', and 'Review + create' buttons. Two sections of the form—'Project details' and 'Instance details'—are highlighted with red boxes.

Accedemos a virtual networks y creamos una.

Previamente he creado un nuevo grupo de recursos az104-rg4 para que la red se cree dentro de este.



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Home > Network foundation | Virtual networks >

Create virtual network

Basics Security **IP addresses** Tags Review + create

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. [Learn more](#)

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. [Learn more](#)

Allocate using IP address pools. [Learn more](#)

+ Add a subnet

Subnets	IP address range	Size	NAT gateway
default	10.20.0.0 - 10.20.0.255	/24 (256 addresses)	-

Add IPv4 address space |

Defino el espacio de red para mi red virtual



Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

Subnet purpose Default

Name * SharedServicesSubnet

IPv4

Include an IPv4 address space

IPv4 address range **10.20.0.0/16**
10.20.0.0 - 10.20.255.255

Starting address **10.20.10.0**

Size **/24 (256 addresses)**
10.20.10.0 - 10.20.10.255

IPv6

Include an IPv6 address space This virtual network has no IPv6 address ranges.

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. [Learn more](#)

Enable private subnet (no default outbound access)

i After March 31, 2026, private subnet will be the default selection for new virtual networks. [Learn more](#)

Security

Defino el espacio de red de la subred para recursos.



Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more ↗](#)

Subnet purpose ⓘ

Default

Name * ⓘ

DatabaseSubnet

IPv4

Include an IPv4 address space



IPv4 address range ⓘ

10.20.0.0/16

10.20.0.0 - 10.20.255.255

Starting address * ⓘ

10.20.20.0

Size ⓘ

/24 (256 addresses)

Subnet address range ⓘ

10.20.20.0 - 10.20.20.255

IPv6

Include an IPv6 address space



This virtual network has no IPv6 address ranges.

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. [Learn more ↗](#)

Enable private subnet (no default outbound access)



After March 31, 2026, private subnet will be the default selection for new virtual networks. [Learn more ↗](#)

Security

Defino el espacio de red de la subred para la base de datos.



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✓ Your deployment is complete

	Deployment name : CoreServicesVnet-1764580627470	Start time : 1/12/2025, 10:17:10
	Subscription : Azure for Students	Correlation ID : 98b5cddf-74fe-4099-bd29-7c19145c4651
	Resource group : az104-rg4	

Deployment details

Resource	Type	Status	Operation details
CoreServicesVnet	Virtual network	OK	Operation details

Creamos la red virtual.



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Crear una red virtual mediante plantilla.

```
1 $schema: "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
2 contentVersion: "1.0.0.0",
3 parameters: {
4   "virtualNetworks_CoreServicesVnet_name": {
5     "defaultValue": "ManufacturingVnet",
6     "type": "String"
7   }
8 },
9 resources: [
10   {
11     "type": "Microsoft.Network/virtualNetworks",
12     "apiVersion": "2024-07-01",
13     "name": "[parameters('virtualNetworks_CoreServicesVnet_name')]",
14     "location": "spaincentral",
15     "properties": {
16       "addressSpace": {
17         "addressPrefixes": [
18           "10.20.0.0/16"
19         ]
20       },
21       "encryption": {
22         "enabled": false,
23         "enforcement": "AllowAllEncrypted"
24       },
25       "privateEndpointVnetPolicies": "Disabled",
26       "subnets": [
27         {
28           "name": "default",
29           "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_CoreServicesVnet_name'), 'default'))",
30           "properties": {
31             "addressPrefixes": [
32               "10.30.0.0/24"
33             ]
34           }
35         }
36       ]
37     }
38   }
39 }
```

Exportamos la plantilla y los parámetros y modificamos el nombre de la red, las subredes y las direcciones de la red y subredes.

```
1 $schema: "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
2 contentVersion: "1.0.0.0",
3 parameters: {
4   "virtualNetworks_ManufacturingVnet_name": {
5     "defaultValue": "ManufacturingVnet2",
6     "type": "String"
7   }
8 },
9 resources: [
10   {
11     "type": "Microsoft.Network/virtualNetworks",
12     "apiVersion": "2024-07-01",
13     "name": "[parameters('virtualNetworks_ManufacturingVnet_name')]",
14     "location": "spaincentral",
15     "properties": {
16       "addressSpace": {
17         "addressPrefixes": [
18           "10.30.0.0/16"
19         ]
20       },
21       "encryption": {
22         "enabled": false,
23         "enforcement": "AllowAllEncrypted"
24       },
25       "privateEndpointVnetPolicies": "Disabled",
26       "subnets": [
27         {
28           "name": "default",
29           "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'default'))",
30           "properties": {
31             "addressPrefixes": [
32               "10.30.0.0/24"
33             ]
34           }
35         }
36       ]
37     }
38   }
39 }
```

Subo la plantilla modificada a custom deployments.

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Home >

Edit parameters ...

Load file Download

```

1  {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentParameters.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "virtualNetworks_ManufacturingVnet_name": {
6       "value": null
7     }
8   }
9 }
```

Subo los parámetros modificamos para la creación de la nueva red virtual.

Home >

Custom deployment

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →

Select a template **Basics** Review + create

Template

Customized template ↗
4 resources

Edit template Edit parameters Visualize

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *	Azure for Students
Resource group *	az104-rg4
	Create new

Instance details

Region *	(Europe) Spain Central
Virtual Networks_ManufacturingVnet_name	ManufacturingVnet

Hacemos el despliegue de la red virtual.



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Your deployment is complete

[Deployment name : Microsoft.Template-20251201103632
Subscription : Azure for Students
Resource group : az104-rg4

Start time : 1/12/2025, 10:36:35
Correlation ID : 02dfec57-36e4-4788-8443-39d5625a6bc6

Deployment details

Resource	Type	Status	Operation details
ManufacturingVnet/SensorSubnet2	Microsoft.Network/virtualNetw	OK	Operation details
ManufacturingVnet/SensorSubnet1	Microsoft.Network/virtualNetw	OK	Operation details
ManufacturingVnet/default	Microsoft.Network/virtualNetw	OK	Operation details
ManufacturingVnet	Virtual network	OK	Operation details

Next steps

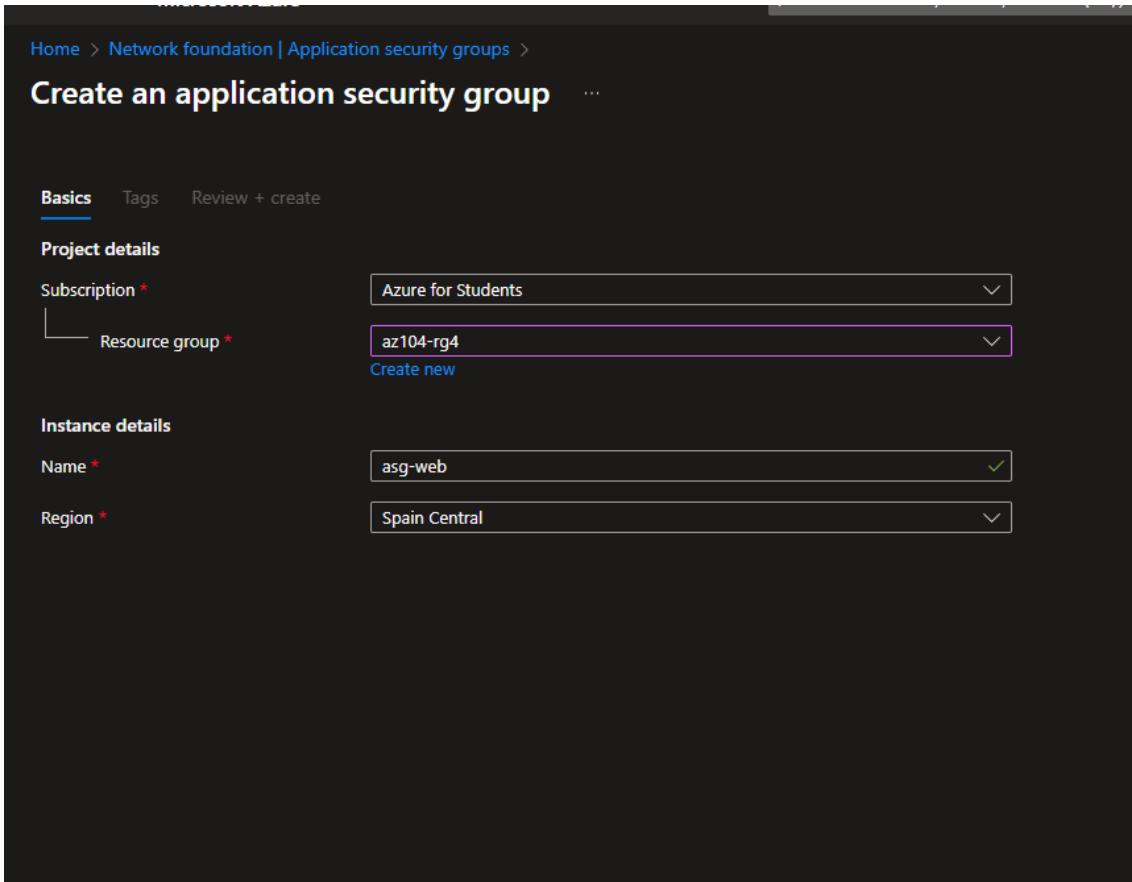
[Go to resource group](#)

Comprobamos que no ha habido errores.

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Creación y configuración de la comunicación entre un grupo de seguridad de aplicaciones y un grupo de seguridad de red.

En esta tarea, crearemos un grupo de seguridad de aplicaciones y un grupo de seguridad de red. El grupo de seguridad de red tendrá una regla de seguridad de entrada que permita el tráfico desde el ASG. El grupo de seguridad de red también tendrá una regla de salida que deniega el acceso a Internet.



The screenshot shows the Azure portal interface for creating an Application Security Group (ASG). The top navigation bar includes 'Home', 'Network foundation | Application security groups', and a back arrow. The main title is 'Create an application security group' with a three-dot menu icon. Below the title, there are tabs for 'Basics', 'Tags', and 'Review + create', with 'Basics' being the active tab. The 'Project details' section contains fields for 'Subscription' (set to 'Azure for Students') and 'Resource group' (set to 'az104-rg4'). The 'Instance details' section contains fields for 'Name' (set to 'asg-web') and 'Region' (set to 'Spain Central'). All required fields have a red asterisk next to them.

Creamos el grupo de seguridad de aplicación.

Es un recurso que permite agrupar máquinas virtuales (VMs) de manera lógica para administrar reglas de seguridad de red (NSG, Network Security Groups) más fácilmente.

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Home > Network foundation | Network security groups >

Create network security group ...

Basics Tags Review + create

Project details

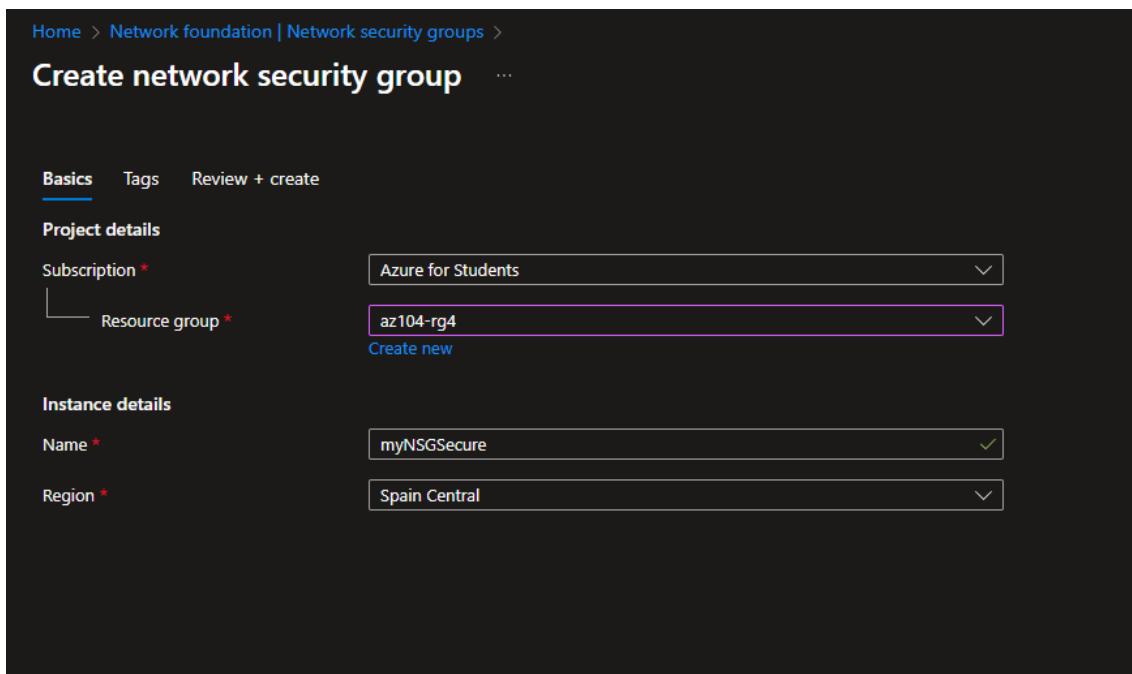
Subscription * Azure for Students

Resource group * az104-rg4 Create new

Instance details

Name * myNSGSecure

Region * Spain Central



Creo el grupo de seguridad de red.

Un NSG (Network Security Group) es un recurso que se utiliza para controlar el tráfico de red hacia y desde recursos en una red virtual (VNet), como máquinas virtuales, interfaces de red o subredes.



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The screenshot shows the Azure portal interface for managing a Network Security Group (NSG). On the left, the navigation menu includes Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings (Inbound security rules, Outbound security rules, Network interfaces), Subnets, Properties, Locks, Monitoring, Automation, and Help. The 'Subnets' option is currently selected. In the main content area, the 'myNSGSecure | Subnets' blade is displayed. A red box highlights the '+ Associate' button. To the right, a modal window titled 'Associate subnet' is open, also with a red box around it. It shows the 'Virtual network' dropdown set to 'CoreServicesVnet (az104-rg4)' and the 'Subnet' dropdown set to 'SharedServicesSubnet'. At the bottom of the modal is a blue 'OK' button.

Una vez creado el nsg, accedemos a los recursos y le asociamos la red virtual CoreServices y la subred sharedservices.



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The screenshot shows the Microsoft Azure portal interface for managing Network Security Group (NSG) security rules. The left sidebar navigation includes Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings (with Inbound security rules and Outbound security rules), Network interfaces, Subnets, Properties, Locks, Monitoring, Automation, and Help. The main content area displays the 'myNSGSecure | Inbound security rules' page for a Network security group named 'myNSGSecure'. At the top, there are buttons for Search, Add (highlighted with a red box), Hide default rules, Refresh, Delete, and Give feedback. A search bar and filter options (Priority, Name, Port, Protocol, Source, Destination) are also present. Below the filters, a table lists three existing security rules:

Priority	Name	Port	Protocol	Source	Destination
65000	AllowVnetInBound	Any	Any	Virt	
65001	AllowAzureLoadBalancerInBo...	Any	Any	Azui	
65500	DenyAllInBound	Any	Any	Any	



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Add inbound security rule

myNSGSecure

Source ⓘ

Application security group

Source application security groups

asg-web

No application security groups found

Source port ranges * ⓘ

*

Destination ⓘ

Any

Service ⓘ

Custom

Destination port ranges * ⓘ

80,443

Protocol

Any

TCP

UDP

ICMPv4

ICMPv6

Action

Allow

Deny

Priority * ⓘ

100

Add Cancel Give feedback

Creo la regla de tráfico entrante para permitir tráfico con el ASG.



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Home > CreateNetworkSecurityGroupBladeV2-20251201104139 | Overview > myNSGSecure

myNSGSecure | Outbound security rules

Network security group

+ Add Hide default rules Refresh Delete Give feedback

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Resource visualizer Settings Inbound security rules Outbound security rules

Filter by name Priority ↑↓ Name ↑↓ Port ↑↓ Protocol ↑↓ Source ↑↓ Destination ↑↓

Priority	Name	Port	Protocol	Source	Destination
65000	AllowVnetOutBound	Any	Any	Virt	Any
65001	AllowInternetOutBound	Any	Any	Any	Any
65500	DenyAllOutBound	Any	Any	Any	Any

Accedemos a las reglas de tráfico saliente donde vamos a crear una regla para denegar el acceso a internet.



DenyInternetOutbound

myNSGSecure

Source ⓘ
Any

Source port ranges * ⓘ
*

Destination ⓘ
Service Tag

Destination service tag ⓘ
Internet

Service ⓘ
Custom

Destination port ranges * ⓘ
*

Protocol

Any
 TCP
 UDP
 ICMPv4
 ICMPv6

Action

Allow
 Deny

Priority * ⓘ
4096

A screenshot of the Azure portal showing the configuration of a Network Security Group (NSG) rule. The rule is titled 'DenyInternetOutbound' and is associated with 'myNSGSecure'. The 'Source' is set to 'Any', and the 'Destination' is set to 'Internet' via a 'Service Tag'. The 'Action' is 'Deny', and the 'Priority' is 4096. The 'Protocol' dropdown shows 'Any' selected, along with other options like TCP, UDP, ICMPv4, and ICMPv6. The 'Destination port ranges' field contains a wildcard (*). The 'Source port ranges' field also contains a wildcard (*).

Regla para denegar el tráfico a internet.



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Configuración de zonas DNS de Azure públicas y privadas

Home > DNS zones >

Create a DNS Zone

Basics DNS Zone Editor Tags Review + Create

A DNS zone is used to host the DNS records for a particular domain. For example, the domain 'contoso.com' may contain a number of DNS records such as 'mail.contoso.com' (for a mail server) and 'www.contoso.com' (for a web site). Azure DNS allows you to host your DNS zone and manage your DNS records, and provides name servers that will respond to DNS queries from end users with the DNS records that you create. [Learn more](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ Azure for Students

Resource group * ⓘ az104-rg4

Create new

Instance details

This zone is a child of an existing zone already hosted in Azure DNS ⓘ

Name * raulcs.com

Resource group location * ⓘ (Europe) Spain Central

Creo una zona pública DNS.

Home > raulcs.com | Overview > raulcs.com

raulcs.com | Recordsets

+ Add Refresh Delete Give feedback

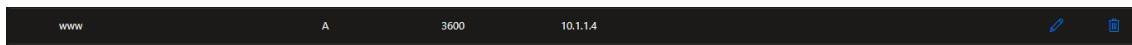
A record set is a collection of records in a zone that have the same name and are the same type. You can search for record sets that have been loaded on this page. If you don't see what you're looking for, you can try scrolling to allow more record sets to load. [Learn more](#)

Search Fetched 2 record set(s).

Name	Type	TTL	Value	Alias resource type	Alias target
ns1	NS	172800	ns1-04.azure-dns.com. ns2-04.azure-dns.net. ns3-04.azure-dns.org. ns4-04.azure-dns.info.		
soa	SOA	3600	Email: azuredns-hostmaster.microsoft.com Host: ns1-04.azure-dns.com. Refresh: 3600 Retry: 300 Expire: 2419200 Minimum TTL: 300 Serial number: 1		

Accedo al recurso creado, dentro de DNS Management creo un nuevo registro DNS.

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Registro añadido.

```

Windows PowerShell
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Instale la versión más reciente de PowerShell para obtener nuevas características y mejoras. https://

PS C:\Users\casado> nslookup www.raulcs.com ns1-04.azure-dns.com
Servidor: UnKnown
Address: 13.107.236.4

Nombre: www.raulcs.com
Address: 10.1.1.4

PS C:\Users\casado>

```

Comprobamos el registro, al utilizar nslookup sobre el registro creado y pidiendo al servidor ns1-04.azure-dns.com que nos resuelva el nombre nos devuelve la IP asignada al registro.

The screenshot shows the 'Create Private DNS Zone' wizard in the Azure portal. The 'Basics' tab is selected. The 'Project details' section shows a subscription dropdown set to 'Azure for Students' and a resource group dropdown set to 'az104-rg4'. The 'Instance details' section shows a name field set to 'private.raulcs.com' and a location dropdown set to '(Europe) Spain Central'.

Creo una zona privada de DNS.

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Home > private.raulcs.com_1764584199623 | Overview > private.raulcs.com | Virtual Network Links >

Add Virtual Network Link

private.raulcs.com

Link name *

Virtual network details

Only virtual networks with Resource Manager deployment model are supported for linking with Private DNS zones. Virtual networks with Classic deployment model are not supported.

I know the resource ID of virtual network ⓘ

Subscription *

Virtual Network *

Configuration

Enable auto registration ⓘ

Enable fallback to internet ⓘ

The ResolutionPolicy property is applicable exclusively to private link zones.

Dentro del recurso, accedemos a DNS management y creamos un link de red virtual.

El objetivo de esta configuración es permitir que las máquinas virtuales (VMs) y otros recursos dentro de la red virtual seleccionada (ManufacturingVnet) puedan **resolver los nombres de dominio** registrados en la Zona DNS Privada (private.raulcs.com).



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Name	Type	TTL	Value	Auto registered
sensorvm	A	3600	10.1.1.4	False
	SOA	3600	Email: azuredns-host.microsoft.com Host: azuredns.net Refresh: 3600 Retry: 300 Expire: 249200 Minimum TTL: 10 Serial number: 1	False

El propósito de esta configuración es crear un registro DNS de tipo A en una Zona DNS Privada de Azure para mapear un nombre de host interno a una dirección IP específica.