

Declarative Cloud Provisioning of NGINX Web Server Using Terraform and Azure Resource Modules

Core Infrastructure Components

laredo-vnet – Virtual Network

- Acts as the **private IP space** for your Azure resources
- Defines address ranges (e.g., 10.0.0.0/16) and subnets
- Enables secure communication between VMs, containers, and services

laredo-subnet-1 (implied) – Subnet

- A segmented portion of the VNet (10.0.1.0/24)
- Hosts your VM and NIC
- Can be isolated or governed via NSGs

Security and Access Control

laredo-nsg – Network Security Group

- Functions as a **layer 3/4 firewall**
- Contains **inbound/outbound rules** (e.g., allow SSH on port 22, HTTP on port 80)
- Associated with either the NIC or subnet to enforce traffic control

laredo-public-ip – Public IP Address

- Provides **external access** to your VM
- Used for SSH, HTTP, or other public-facing services
- Static allocation ensures consistent endpoint

Connectivity Layer

laredo-nic – Network Interface

- Connects your VM to the VNet and subnet
- Binds the public IP and NSG
- Handles IP configuration and routing

Monitoring and Diagnostics

NetworkWatcher_uksouth – Network Watcher

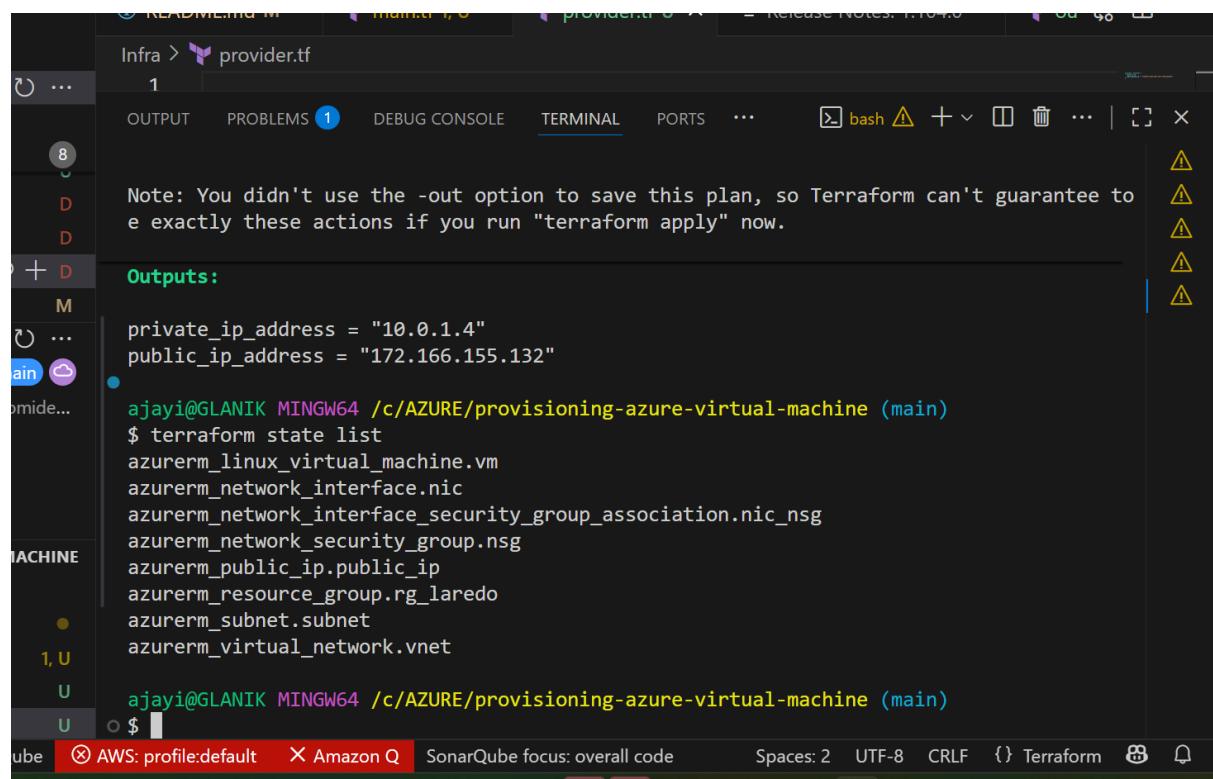
- Region-specific tool for **network diagnostics**
- Enables packet capture, connection monitoring, NSG flow logs, and topology mapping
- Essential for **troubleshooting latency, routing, and security issues**

Strategic Insight

This setup reflects a modular, cloud-native design:

- **Separation of concerns:** Networking, security, and compute are decoupled
- **Auditability:** NSGs and Network Watcher support traceable traffic flows
- **Scalability:** VNet and subnet architecture supports horizontal scaling

Artefacts Provisioned on Azure Cloud



The screenshot shows a terminal window with the following output:

```
private_ip_address = "10.0.1.4"
public_ip_address = "172.166.155.132"

ajayi@GLANIK MINGW64 /c/AZURE/provisioning-azure-virtual-machine (main)
$ terraform state list
azurerm_linux_virtual_machine.vm
azurerm_network_interface.nic
azurerm_network_interface_security_group_association.nic_nsg
azurerm_network_security_group.ng
azurerm_public_ip.public_ip
azurerm_resource_group.rg_laredo
azurerm_subnet.subnet
azurerm_virtual_network.vnet

ajayi@GLANIK MINGW64 /c/AZURE/provisioning-azure-virtual-machine (main)
$
```

Microsoft Azure

Dashboard > laredo-vnet Virtual network

Search: Analyze traffic within this network | Diagnose my virtual network | Evaluate routing for this virtual network

Overview

Essentials

- Resource group (move): laredo-01-rg
- Location (move): UK South
- Subscription (move): Azure subscription 1
- Subscription ID: f14b0f27-bd73-4dbf-a413-78b31e6d283e
- Tags (edit): Add tags
- Address space: 10.0.0.0/16
- DNS servers: Azure provided DNS service
- BGP community string: Configure
- Virtual network ID: bb118049-0eb2-4770-8b9a-556545926c36

Topology

View detailed topology

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Search

12:35 15/09/2025

Home > Recent >

Recent

Manage view Refresh ...

laredo-vm Virtual machine

Help me copy this VM in any region | Manage this VM with Azure CLI

Overview

Essentials

- Name: laredo-vm
- Status: Running
- Location: UK South
- Subscription (move): Azure subscription 1
- Subscription ID: f14b0f27-bd73-4dbf-a413-78b31e6d283e
- Tags (edit): Add tags
- Operating system: Linux (Ubuntu 18.04)
- Size: Standard B2s (2 vcpus, 4 GB memory)
- Primary NIC public IP: 172.166.155.132 (1 associated public IP)
- Virtual network/subnet: laredo-vnet/laredo-subnet-1
- DNS name: Not configured
- Health state: -
- Time created: 15/09/2025, 11:43 UTC

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

Virtual machine

- Computer name: LAREDO-VM
- Operating system: Linux (Ubuntu 18.04)
- VM generation: V1
- VM architecture: x64
- Agent status: Ready
- Agent version: 2.14.0.1
- Hibernation: Disabled
- Host group: -
- Host: -
- Proximity placement group: -
- Calculated values: -

Networking

- Public IP address: 172.166.155.132 (Network interface laredo-nic)
- 1 associated public IP
- Public IP address (IPv6): -
- Private IP address: 10.0.1.4
- Private IP address (IPv6): -
- Virtual network/subnet: laredo-vnet/laredo-subnet-1
- DNS name: Configure

Size

- Size: Standard B2s
- vCPUs: 2

Showing 1 - 7 of 7. Display auto count:

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Dashboard > **laredo-nic** Network interface

Why can't this network interface connect to its VM? | Analyze connectivity issues with this NIC

Search | Move | Delete | Refresh | Edit accelerated networking

Overview

Essentials

Activity log	Resource group (move) : laredo-01-rg	Private IPv4 address : 10.0.1.4
Access control (IAM)	Location (move) : UK South	Public IPv4 address : 172.166.155.132 (laredo-public-ip)
Tags	Subscription (move) : Azure subscription 1	Private IPv6 address : -
Resource visualizer	Subscription ID : f14b0f27-bd73-4dbf-a413-78b31e6d283e	Public IPv6 address : -
Settings	Accelerated networking : Disabled	Attached to : laredo-nsg (Network security group)
Monitoring	Virtual network/subnet : laredo-vnet/laredo-subnet-1	Type : Regular
Automation	Tags (edit) : Add tags	
Help		

Get started | Properties | JSON View

Enable Azure resources to communicate with each other

A network interface allows Azure resources to communicate with the internet, and on-premises resources. [Learn more](#)

Configure your IPs | Choose DNS server | Select network security group | Give feedback

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Dashboard > **laredo-nsg** Network security group

Analyze security rules for this network security group | Diagnose connectivity issues related to this security group | How do I create an alert to track firewall metric failures?

Search | Move | Delete | Refresh | Give feedback

Overview

Essentials

Activity log	Resource group (move) : laredo-01-rg	Custom security rules : 2 inbound, 0 outbound
Access control (IAM)	Location : UK South	Associated with : 0 subnets, 1 network interfaces
Tags	Subscription (move) : Azure subscription 1	
Diagnose and solve problems	Subscription ID : f14b0f27-bd73-4dbf-a413-78b31e6d283e	
Resource visualizer	Tags (edit) : Add tags	
Settings		
Monitoring		
Automation		
Help		

Inbound Security Rules

Priority ↑	Name ↑	Port = all	Protocol = all	Source = all	Destination = all	Action = all
1001	Allow-SSH	22	Tcp	Any	Any	Allow
1002	Allow-HTTP	80	Tcp	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

Outbound Security Rules

Priority ↑	Name ↑	Port = all	Protocol = all	Source = all	Destination = all	Action = all
65000	AllowVnetOutbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutbound	Any	Any	Internet	Internet	Allow
65500	DenyAllOutbound	Any	Any	Any	Any	Deny

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Microsoft Azure

Dashboard > laredo-public-ip Public IP address

Search (Can you check if my public IP is highly available) How to ensure public IP fault tolerance

Associate Dissociate Delete Move Refresh Open in mobile Give feedback

Overview

Activity log Access control (IAM) Tags Resource visualizer Settings Monitoring Automation Help

Tags (edit) Add tags

Get Started Properties Tutorials

Public IP address DDoS Protection

Resource GUID	IP address	Protection status
d10a9c91-7349-4201-817c-8d02a366aa07	172.166.155.132	Unprotected
	IPv4	Network inherited protection
Provisioning state	Succeeded	-
Allocation method	Static	-
Domain name label scope	-	-
Idle timeout (change)	4	-
Associated to	laredo-nic	-
Virtual machine	laredo-vm	-
Routing preference	Microsoft network	-

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2 cm of rain Wednesday

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https://portal.azure.com/#@lancerajay@yahoo.com.microsoft.com/resource/subscriptions/ff4b0f27-bd73-4dbf-a413-78b31e6d283e/resourcegroups/networkwatcher/providers...

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Dashboard > NetworkWatcher_uksouth Network Watcher

Search Analyze traffic with this Network Watcher Track flow metrics with this Network Watcher Run diagnostics for this network watcher

Overview

Activity log Access control (IAM) Tags Resource visualizer Settings Monitoring Automation Help

Tags (edit) Add tags

Get Started Properties Tutorials

Essentials

Resource group (move)	Location (move)	Subscription (move)	Subscription ID
: NetworkWatcherRG	: UK South	: Azure subscription 1	: ff4b0f27-bd73-4dbf-a413-78b31e6d283e

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12:37 15/09/2025

laredo-vm_OsDisk_1_8cbecca4f1134792b5e3a0ed2727946f

Disk

Overview

Essentials

Activity log	Resource group (move) : LAREDO-01-RG
Access control (IAM)	Disk state : Attached
Tags	Last ownership update time : 15/09/2025, 12:43:23
Diagnose and solve problems	Location : UK South
Resource visualizer	Subscription (move) : Azure subscription_1
> Settings	Subscription ID : f4ab0f27-bd73-4dfc-a413-78b31e6d283e
> Monitoring	Time created : 15/09/2025, 12:43:23
> Automation	
> Help	

Disk

Operating system type	Linux	Size	30 GB
Create option	Fromimage	Storage type	Standard HDD LRS
VM generation	V1	IOPS	500
VM architecture	x64	Throughput (Mbps)	60
Availability zone		Disk tier	-
Completion percent	100		
Provisioning state	Succeeded		
Performance plus	No		
Max shares	-		
On-demand bursting	-		
Hibernation supported	Yes		

Encryption

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Wind warning In effect

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Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

