VyOS Networks

NATIVEEDGE BLUEPRINT HIGH LEVEL DESIGN VYOS VNF

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1. Introduction

1.1. Overview

VyOS Universal router is a network operation system designed to allow a variety of network capabilities, such as router, firewall, vpn concentrator. This solution utilizes VyOS as a Virtual Network Function (VNF), functioning as a firewall and NAT gateway. It enables communication between our endpoints and the internet while enforcing policy rules. Our blueprint facilitates the deployment of network services.

1.2. Dependencies

Our VNF/VM is compatible with the KVM/OpenStack environment. In this case, depending on the availability of the native Edge infrastructure, we can provide our custom image, which includes cloud-init for deployment.

1.2.1 Software requirements

VyOS provides the image to run in the Native Edge endpoint, this qcow2 image contains cloud-init to run our deployment, we also need a Ubuntu server image to install nginx:

- **vyos-1.4.1-cloud-init-amd64.qcow2**
- **ubuntu 24.04 LTS.iso**

1.3. RAIDD

These are pre-requisite activities for successful use of the solution by the customer. Categories should be: Risk, Assumption, Issue, Decision or Dependency

N°	Category	Description	Impact	Owner	Priority
001	Assumption	The VyOS router must have proper hardware resources (CPU, RAM, and storage) to handle expected network traffic -recommended : **2 vCPu - 4 GB RAM - 10 GB Disk.**	Performance degradation or failure under load	Customer	High
002	Risk	Insufficient information to generate the firewall rule configuration may lead to security vulnerabilities	Potential security breaches or unauthorized access	Customer / Security Team	Medium
003	Issues	Limited documentation available for the custom deployment on native edge	Increased troubleshooting time and potential misconfigurations	VyOS / DELL / Customer	Low
004	Decision	Whether to use on bare metal or cloud-based deployment for VyOS	Impacts infrastructure costs and performance	Customer	Medium

1.4. Glossary/Definitions

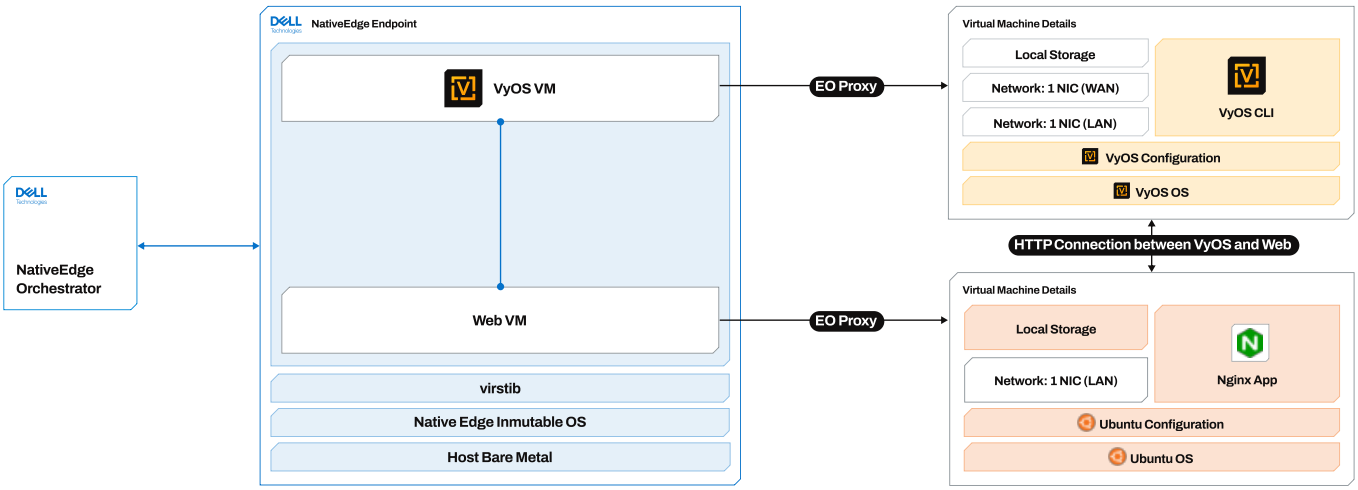
NED : NativeEdge Device

VNF : Virtual Network Function

VM : Virtual Machine

2. Architecture

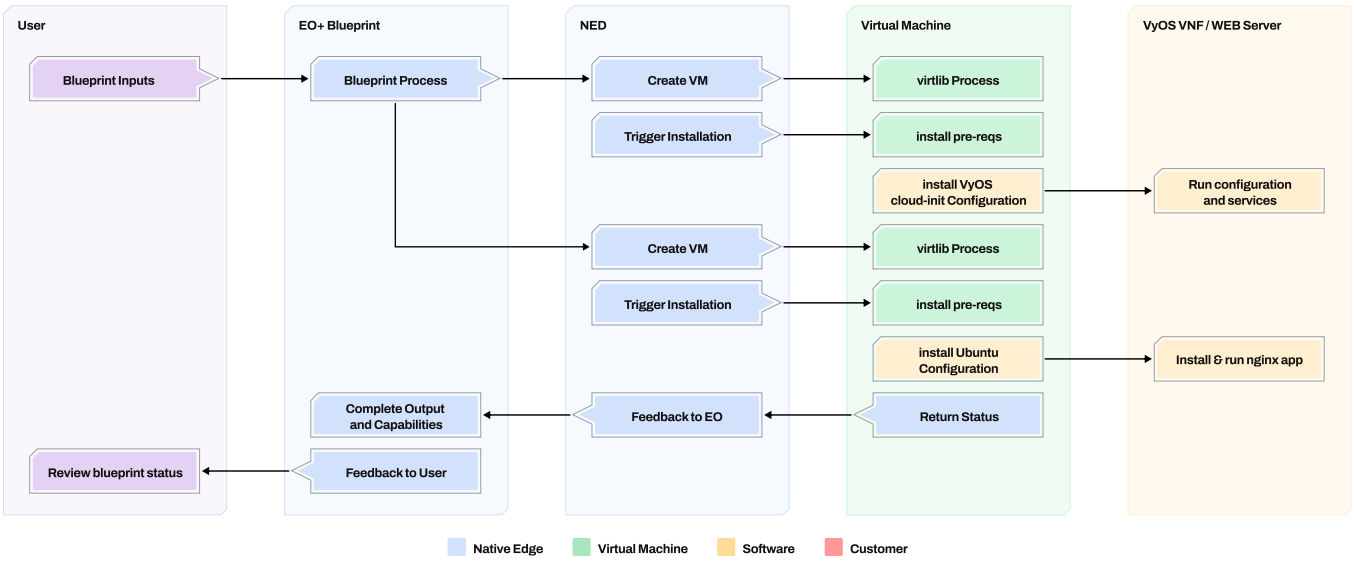
Below, we present the high-level architecture for our use case, outlining the components and virtual machines (VMs) utilized in this blueprint.



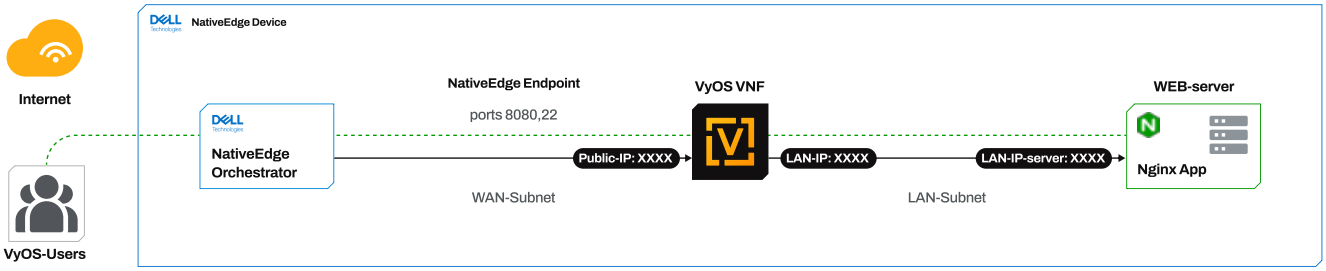
DELL-NativeEdge-Blueprint

3. Technical and Data Flows

3.1 main solution flow :



3.2 Data Flow:



3.3 Networking

VyOS is required to function as a Virtual Network Function (VNF) with two Layer 3 (L3) network segments. The first segment is a WAN interface, linked to a NIC with access to a public IP. The second segment is a LAN interface, enabling communication with our web server.

4. Blueprinting

4.1. Blueprint HLD

This solution consists of two key components: the VyOS VNF and a web server, both interconnected via a LAN segment. The VyOS instance must have internet access (WAN segment) and provide the necessary network services to ensure the web server can securely reach the internet. Our blueprint outlines both scenarios and provides the required inputs for deploying the solution efficiently.

4.2. Blueprint Tasks

Basis step to cover our installation in the Native Edge endpoint :

1. Setting Up VyOS on NED

1. **Download VyOS Image**
   - We provide the VyOS image from the blueprint.
2. **Create the VM in the blueprint file with resource information**
   - Check the blueprint file to VyOS VM
   - Configure VM settings:
     - Assign CPU, Memory, and Disk Space.
     - Configure network adapter (NAT/Bridged/Host-Only as required).
3. **Install VyOS on the VM**
   - Follow our steps to installation.

- Partition and install VyOS on the virtual disk.
- Reboot and remove the ISO from the VM.

4. **Initial VyOS Configuration**
   - Set hostname and basic network configuration.
   - Configure SSH access for remote management.
   - Save and commit changes.
5. **Networking Setup**
   - Set up interfaces (LAN, WAN).
   - Configure static IP or DHCP as needed.
   - Verify network connectivity.

2. Web Server VM Deployment

1. **Create the VM in the blueprint file, the New VM for Web Server**
   - Select OS (Ubuntu).
   - Assign CPU, RAM, and disk space.
   - Attach ISO for installation.
2. **Install Operating System**
   - Follow standard OS installation process.
   - Configure network settings (static IP or DHCP).
   - Install SSH for remote management.
3. **Set Up Web Server- plugin ansible (Nginx)**
   - Install Nginx **(sudo apt install nginx)**.
   - Start and enable the web server service.
   - Configure firewall rules (if applicable).
4. **Test Web Server**
   - Deploy a simple test page **(index.html).**
   - Access the web page from another machine to verify connectivity.

4.3. Blueprint Metadata

4.3.1. Blueprint Inputs

All inputs should align to our defined “common inputs”where possible, making sure that NativeEdge devices are catered for correctly.

the normal inputs for VM deployment are required to be shown(I.E.memory, CPU, Disk, GPU passthrough and network details).In addition, the following solutions-specific inputs are also required:

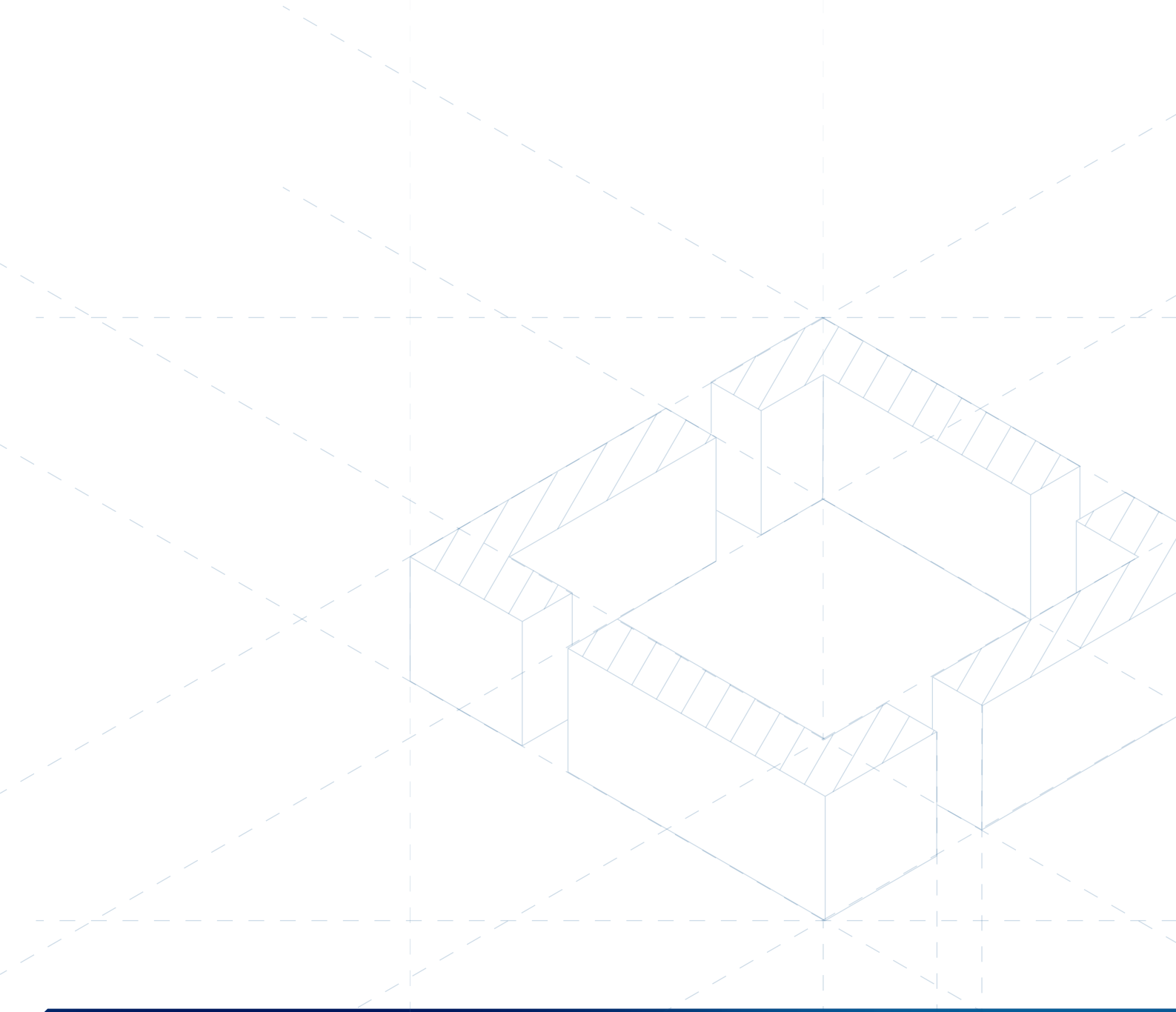
Type	NativeEdge Label	NativeEdge Description	HLD Notes
String	SSH private Key Secret Name	Secret name contains the SSH private key	N/A
String	SSH public key Secret Name	Secret name containing the SSH public key	add this key to the authorized_keys file as normal.
String	WAN public ip	ip address of the NIC in VyOS associate to WAN interface	**(only VyOS)** the value this input if the ip address to map with wan interfaces , it allow access to our VM
String	LAN ip address - VyOS	ip address of the second interfaces associate to VyOS LAN	**(only VyOS)** the value this input if the ip address to map with LAN interfaces , it allows access to communicate with WEB server VM
String	LAN ip address - WEB server	ip address of the second interfaces associate to WEB server	**(only WEB server)** the value this input if the ip address to map with LAN interfaces , it allows access to communicate with VyOS/internet

4.3.2. Blueprint Outputs

Capability Label	Capability Value
Application URL	Simply the ip address of the VyOS VM where we exposed the http web server: “http://192.168.0.1:8080”
initial username	**VyOS** is the initial username for our vm, it is configured when the vm is deployed.
initial password secretname	User inputs password during the installation NE secret is returned the secret name here as a capability.

4.3.3 Secret Name Label

NativeEdge Label	Description
Artifact Configuration Secret	he secret name that contains details that are needed to download the binary image and artifacts, for example , credentials. **The OS binary image (mandatory)**



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