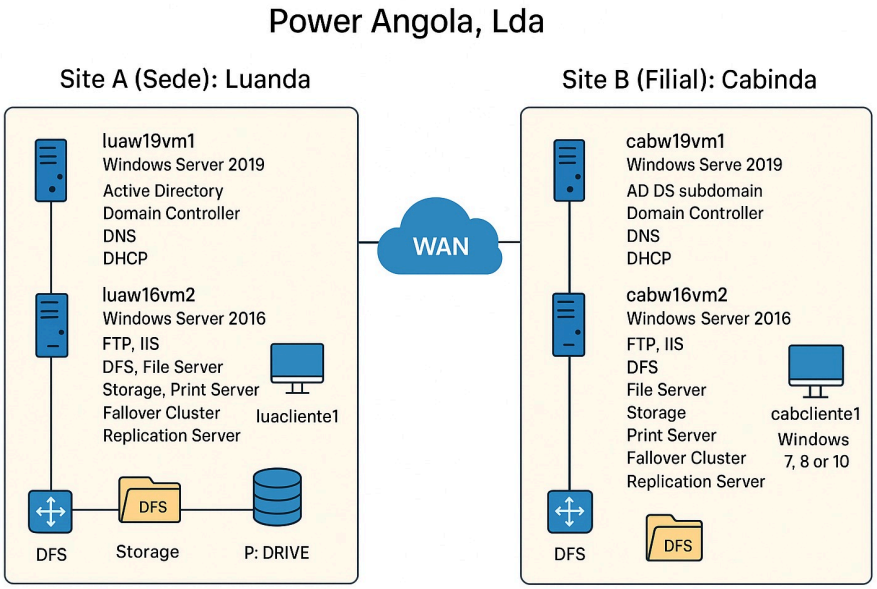

Network Infrastructure Implementation Project

By: António João Thone

System Administrator | Windows & Linux | Active Directory | Networking | Cloud Enthusiast

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1. Project Overview

This project aims to implement a **network infrastructure for POWER ANGOLA, Lda**, integrating the Cabinda branch with the Luanda headquarters. The objective is to provide both locations with the same working conditions and performance.

The infrastructure is based on **Windows Server 2016/2019 Enterprise Edition** and client machines running **Windows 7, 8, or 10**.

Critical services covered in the project include:

- **Active Directory (AD DS)**
- **Domain Name System (DNS)**
- **Dynamic Host Configuration Protocol (DHCP)**
- **Inter-site Routing**
- **Storage Spaces**
- **NIC Teaming**
- **Group Policy Objects (GPO)**

All of these were deployed in a **virtualized environment using VMware Workstation Pro**.

2. Virtual Environment Setup and Host Preparation

2.1. Physical Host Preparation

- **Luanda Host (Ubuntu):** Used as the WAN connection point.
- **Cabinda Host (Windows):** Connected via a crossover cable to simulate the WAN link.

VMware Workstation Network Configuration:

- **VMnet3:** Host-only, configured for Cabinda LAN (144.188.5.0/24).
- **VMnet4:** Bridged, linked to physical NIC, representing the WAN.

Cabinda Host Configuration:

- Ethernet adapter static IP: 144.188.5.20 / 24.
- Firewall rule: Allowed ICMP (ping) traffic from Ubuntu host.
- **Connectivity Test:** Ping confirmed between hosts (144.188.5.10, 144.188.5.11 – Luanda).

2.2. Creation and Installation of Virtual Machines (VMs)

Luanda (SITE A):

- **LUAW19VM1 (Windows Server 2019):** Primary Domain Controller, 2 vCPUs, 4 GB RAM.
- **LUAW16VM2 (Windows Server 2016):** File & Storage Server, 2 vCPUs, 4 GB RAM.

- **LUACLIENTE1 (Windows 10):** Client workstation, 2 vCPUs, 2 GB RAM.

Cabinda (SITE B):

- **CABW19VM1 (Windows Server 2019):** Additional Domain Controller, 2 vCPUs, 4 GB RAM.
- **CABW16VM2 (Windows Server 2016):** File & Storage Server, 2 vCPUs, 6 GB RAM.
- **CABCLIENTE1 (Windows 10):** Client workstation, 2 vCPUs, 4 GB RAM.

3. Detailed Site Configuration

3.1. Luanda (Headquarters)

LUAW19VM1 (Domain Controller):

- Hostname: LUAW19VM1.
- IP: 144.188.5.10.
- Installed Roles: **AD DS, DHCP, DNS**.
- Promoted to **root domain controller** of style.com.
- DHCP scope: 144.188.5.100–199, with exclusions for static IPs.

LUAW16VM2 (File Server):

- Hostname: LUAW16VM2.
- NIC Teaming: Team_Luanda (LAN1–LAN4).
- Team IP: 144.188.5.11.
- **Storage Spaces:**
  - Pool: DadosEmpresa.
  - 8 × 100 GB virtual disks.
  - Virtual Disk: Volume_Compartilhado (Two-way mirror, Thin provisioning).
  - Formatted with **ReFS**, drive letter D:.
- Shared Folder: Compartilhada, permissions for **Authenticated Users**.

LUACLIENTE1 (Client):

- Hostname: LUACLIENTE1.
- Obtains IP via DHCP.
- Joined to style.com domain.
- **GPOs:**
  - Map drive U: to \\LUAW19VM1\SHARE.
  - Custom wallpaper.

3.2. Cabinda (Branch)

CABW19VM1 (Domain Controller):

- Hostname: CABW19VM1.
- IP: 144.188.5.20.
- Installed Roles: **AD DS, DHCP, DNS, Remote Access**.
- Promoted as **additional domain controller** in style.local.
- DHCP scope: 144.188.5.160–200.

CABW16VM2 (File Server):

- Hostname: CABW16VM2.
- NIC Teaming: CAB_TEAM.
- Team IP: 144.188.5.201.
- **Storage Spaces:**
  - Pool: DadosEmpresaCabinda.
  - 8 × 100 GB disks.
  - Volume formatted with **ReFS/NTFS**, drive letter E:.
- Shared Folder: SHARE, permissions for **Authenticated Users**.

CABCLIENTE1 (Client):

- Hostname: CABCLIENTE1.

- Obtains IP via DHCP.
- Joined to style.com domain.

4. Testing and Validation

4.1. Luanda Tests (Before Inter-site Connection)

- **Connectivity:** Successful pings among LUAW19VM1, LUAW16VM2, LUACLIENTE1.
- **Name Resolution:** nslookup resolved internal names correctly.
- **DHCP & GPOs:** Automatic IP assignment and group policies applied.
- **File Access:** Shared folder \\LUAW19VM1\SHARE accessible.

4.2. Inter-site Tests (Luanda <-> Cabinda)

- **WAN Connectivity:** Successful pings between WAN and LAN machines across sites.
- **Cross-site Name Resolution:** Confirmed via nslookup.
- **File Sharing:** Cross-site file creation and access validated.
- **AD Replication:** New users created in one site could log in at the other. Verified with repadmin /showrepl.

5. Automation with Ansible

To ensure **replicability and scalability**, **Ansible playbooks** were developed.

- Enables re-deployment of services consistently.
- Reduces manual configuration time.
- Minimizes human errors.
- Playbooks organized in the **ansible repository folder** for reuse and adaptation.

6. Project Conclusion

The **POWER ANGOLA, Lda** infrastructure was successfully implemented, delivering a **distributed, scalable, and secure network**.

The project emphasized the importance of **documentation, organization, and testing** at each stage.
Configured technologies – **AD DS, DNS, DHCP, Dynamic Routing, Storage Spaces** – provide reliable, enterprise-grade services to support company operations, with clear potential for **future expansion**.