Active Directory Home Lab: Creation & Security Hardening

Domain: mopetech.ai

Environment: Oracle VirtualBox

Operating Systems: Windows Server 2022 (DC), Windows 8.1 (Client)

📖 Overview

This project demonstrates the deployment of a Windows-based network infrastructure. The primary focus was implementing the Principle of Least Privilege (PoLP) through structured Organizational Units (OUs) and restrictive Group Policy Objects (GPOs).

🛠️ Step 1: Domain Controller & Forest Setup

I promoted a Windows Server 2022 instance to a primary domain controller for the forest **(mopetech.ai).**

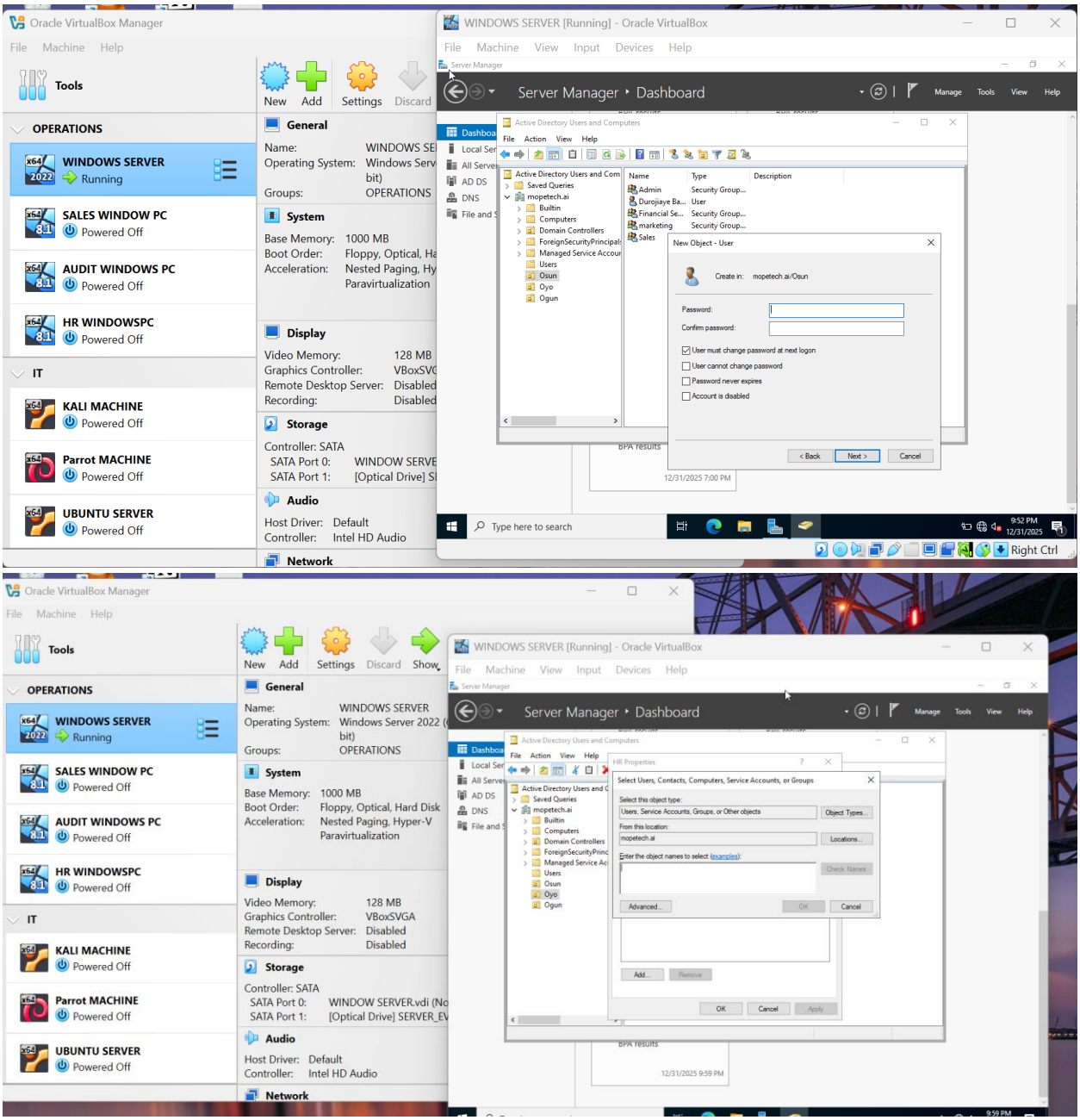
- **Role Installation:** Configured Active Directory Domain Services (AD DS) and DNS.
- **Infrastructure:** Set up the server with 1000 MB Base Memory and VBoxSVGA graphics for stable virtualization.

📂 Step 2: Directory Organization (OU Structure)

Following best practices, I moved away from a "flat" directory. I created regional Organisational Units (OU) to manage users and resources efficiently:

- **OUs Created:** Ogun, Osun, Oyo.
- **Administrative Groups:** These security groups were created: Sales, HR, Consultation, Finance, Booking, and Support handle Role-Based Access Control (RBAC).

- Users: Bamidele.Kurode, Durojaiye.Bande, Dayo Bankole, Rasaq Lawal, Dara Gbemi, Kunle Sean, Funmi Kosope.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Confirm password:
User must change password at next logon
User cannot change password
Password never expires
Account is disabled
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Operating System: Windows Server 2022 (
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Groups: OPERATIONS
System
Base Memory: 1000 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: Nested Paging, Hyper-V
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Display
Video Memory: 128 MB
Graphics Controller: VBoxSVGA
Remote Desktop Server: Disabled
Recording: Disabled
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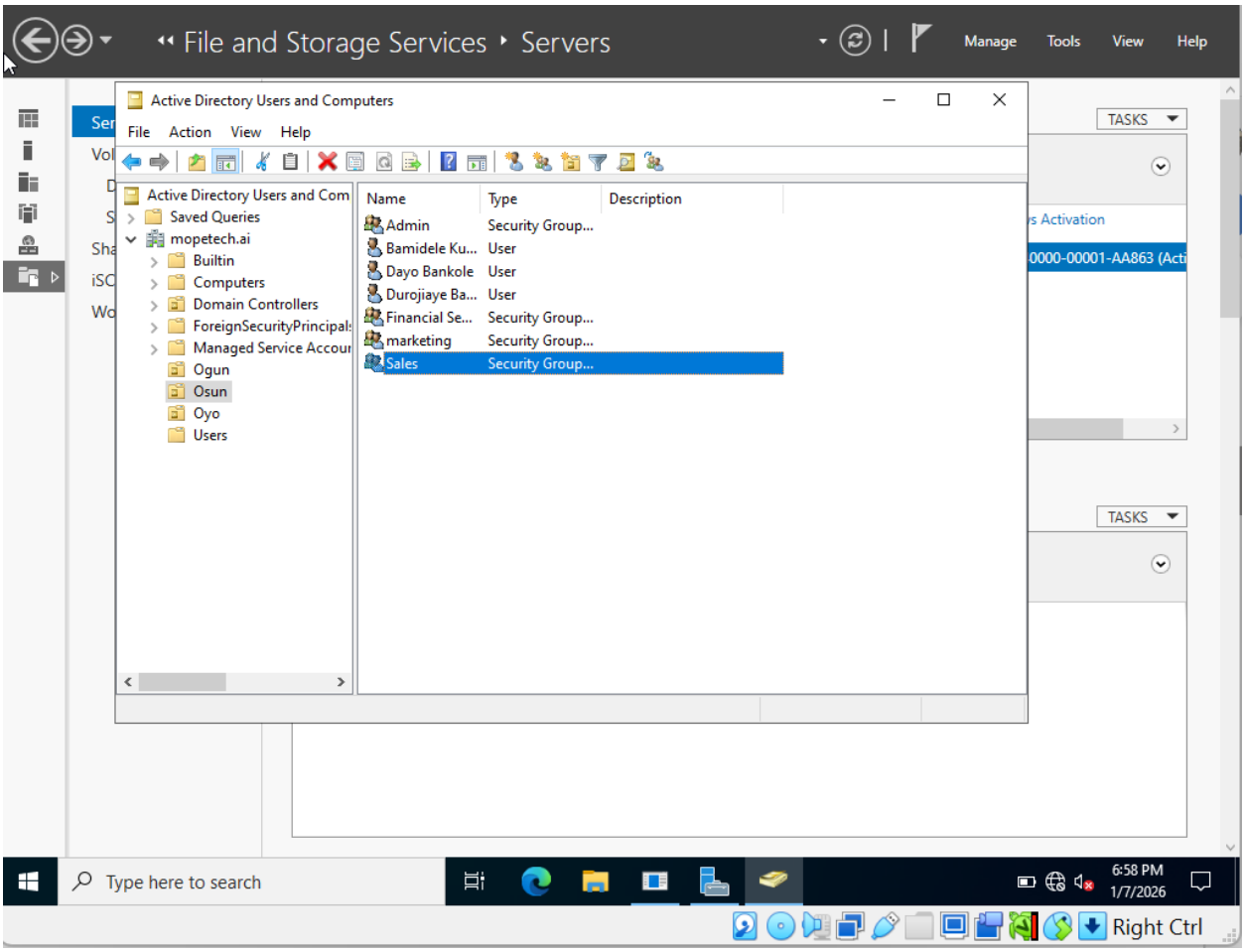
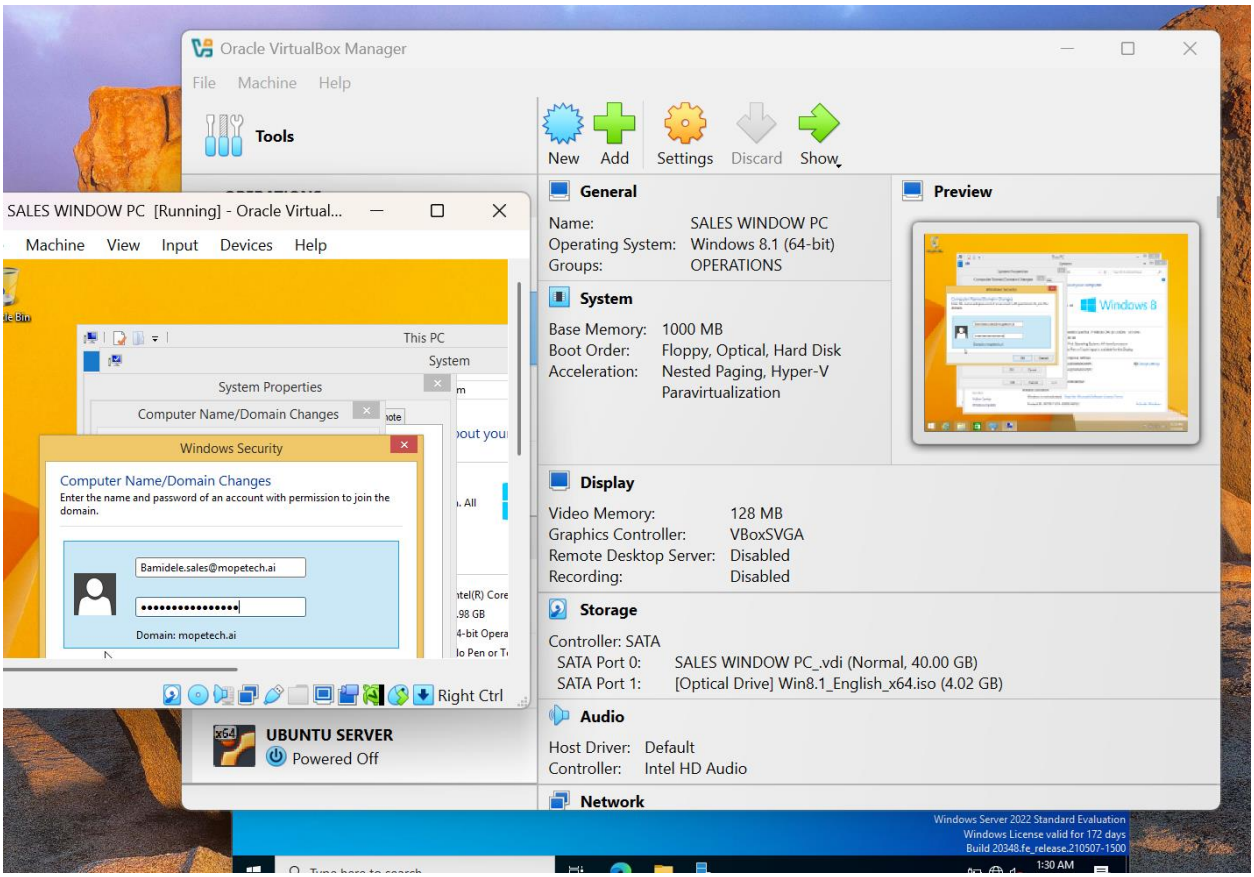


Step 3: Client Integration

I successfully joined a Windows 8.1 workstation (SALES WINDOW PC) to the mopetech.ai domain.

- **Authentication:** Verified domain connectivity by logging in with a delegated user account (Bamidele.sales@mopetech.ai).
- **Verification:** Confirmed the "Welcome to the mopetech.ai domain" status via System Properties.



Step 4: Network Configuration & Client Integration

To establish a functional link between the **Windows Server 2022 (DC)** and the **Windows 8.1 (Client)**, I performed a manual network alignment and domain join.

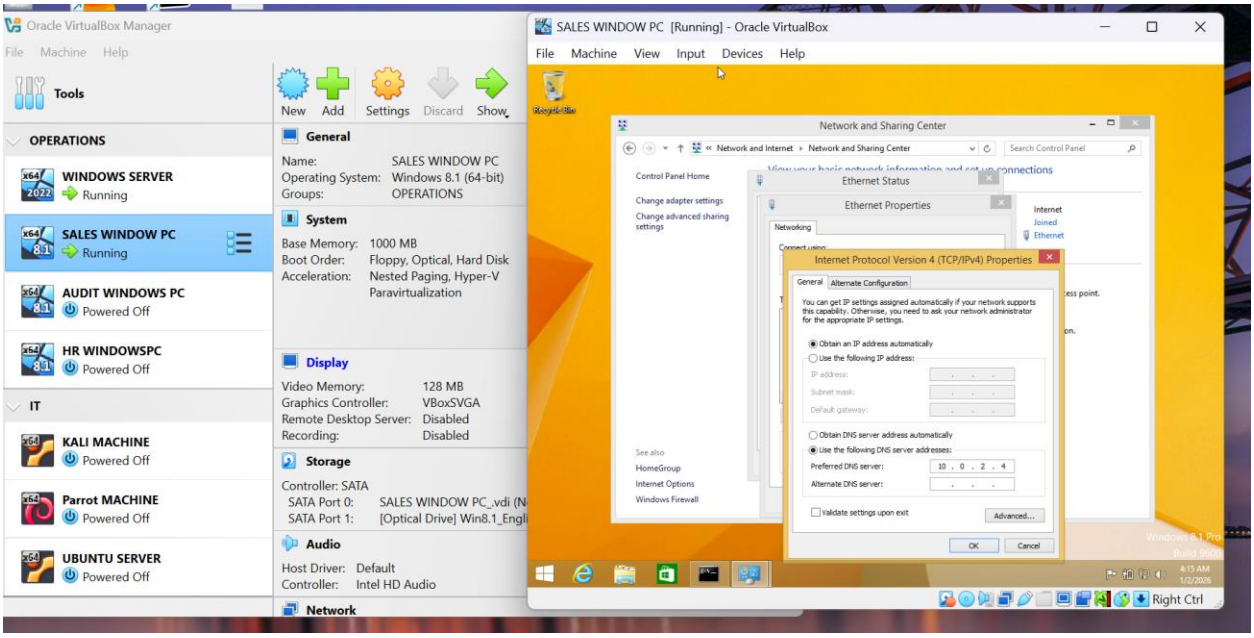
4.1. IP Addressing Schema

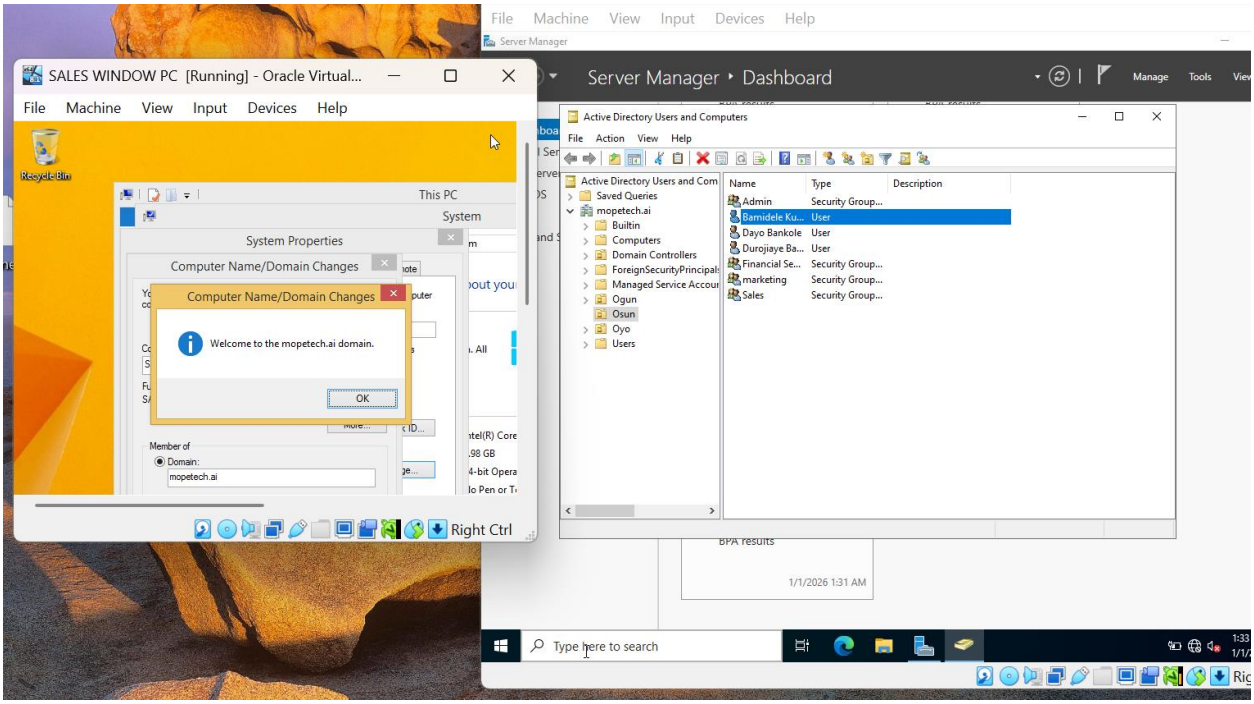
I assigned static IP addresses to ensure persistent connectivity within the virtual network:

Machine	Role	IP Address	DNS Server
Windows Server	Domain Controller	`10.0.2.4`	`127.0.0.1` (Self)
Sales Window PC	Client Workstation	`10.0.2.5`	`10.0.2.4` (DC)

The integration was confirmed successful when the client displayed the **"Welcome to the mopetech.ai domain"** notification.

- **Active Directory Update:** The SALES WINDOW PC object now automatically appears in the **Computers** container within the Active Directory Users and Computers (ADUC) console on the server.



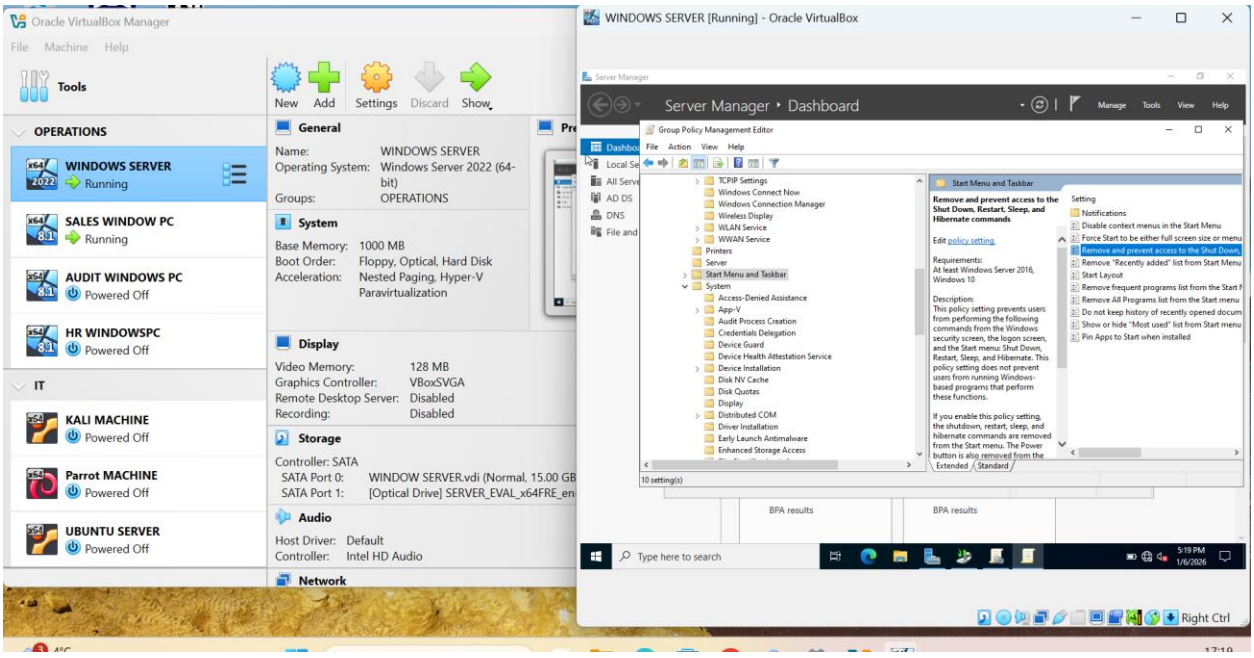


Step 4: Security Hardening (Group Policy)

To enforce the **Principle of Least Privilege**, I configured and deployed specific GPOs to restrict standard user capabilities:

Key Policies Implemented:

1. **Disable Shutdown Action:** Prevented non-admin users from shutting down or restarting the server/workstations via the Start Menu.
2. **Remove Access to Shut Down/Restart:** Enabled the "Remove and prevent access to the Shut Down, Restart, Sleep, and Hibernate commands" policy under *User Configuration > Administrative Templates > Start Menu and Taskbar*.
3. **Firewall Management:** Ensured Inbound Rules were active and monitored via Windows Firewall with Advanced Security.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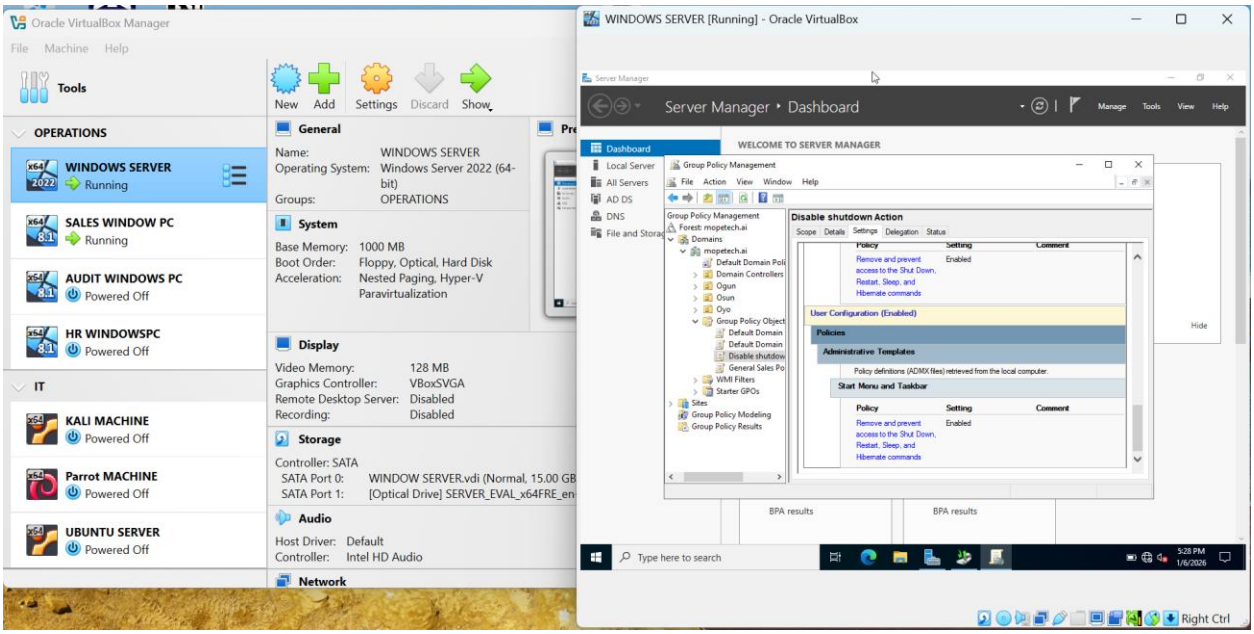
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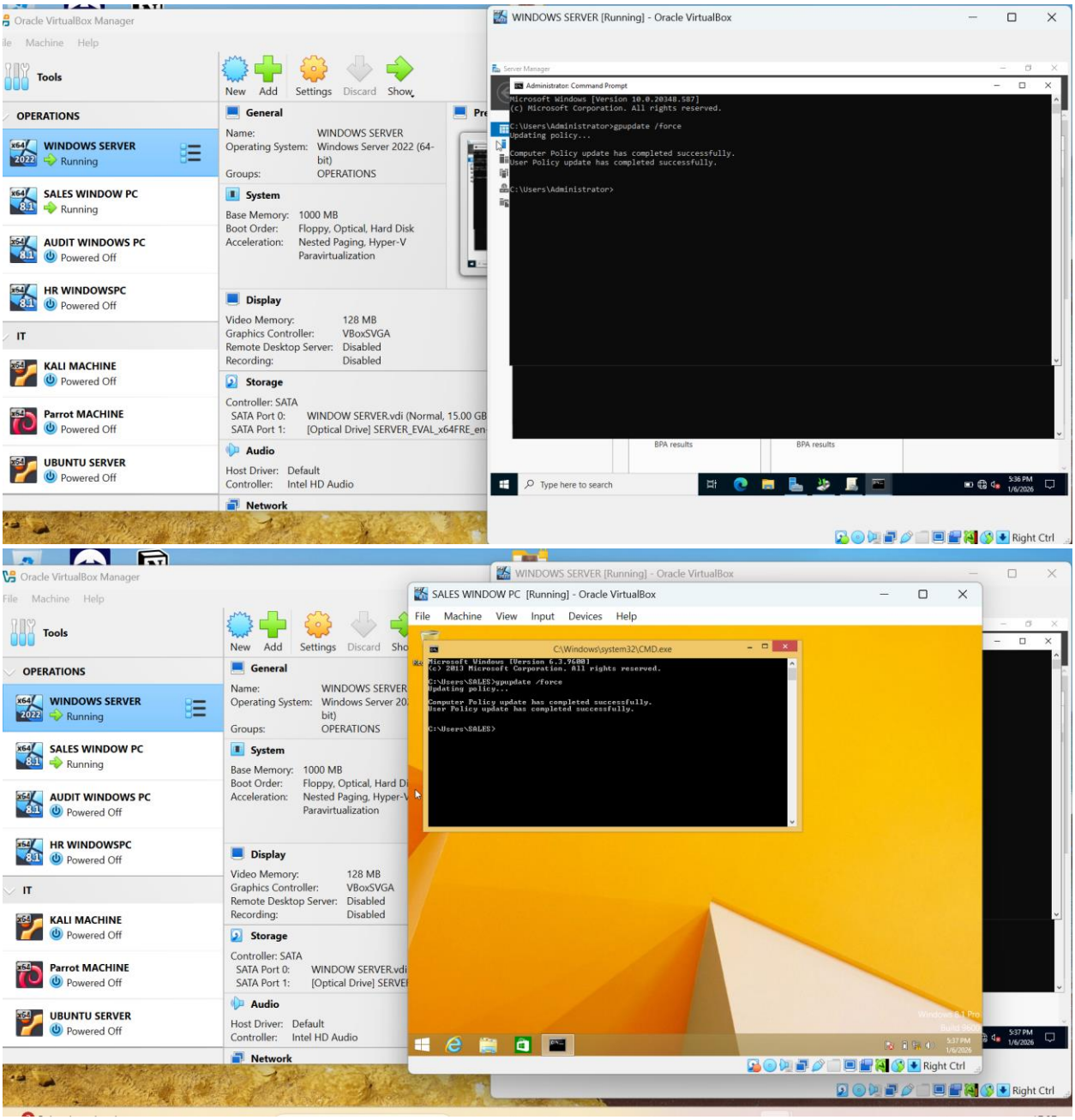
Step 5.0 Policy Enforcement:

I used the command line to force immediate application of these security settings across the domain:

DOS

gpupdate */force*



🚫 Step 5: Proof of Principle (Least Privilege)

To validate the security model, I attempted to access restricted system settings using a standard user account.

- **Result:** The system successfully blocked the action with a **"Restrictions"** error: *"This operation has been cancelled due to restrictions in effect on this computer."*
- **Conclusion:** This confirms that the PoLP is successfully preventing unauthorized configuration changes by domain users.