Building a Home Lab with Custom Workstation, Laptops, and Cisco Networking Equipment

1. Introduction Building a home lab is an essential step for IT professionals and cybersecurity enthusiasts to gain hands-on experience with networking, virtualization, and security concepts. This report outlines the setup of a home lab using a custom-built workstation, multiple laptops, a Cisco router, a Cisco switch, and VirtualBox for virtual machine-based testing.

2. Home Lab Components

- **Custom-built workstation** for running VirtualBox and hosting multiple virtual machines.
- **Various laptops** for testing different operating systems and network configurations.
- **Cisco router** for managing network traffic and security.
- **Cisco switch** for local network segmentation and device connectivity.
- **VirtualBox** for simulating various network environments and services.

3. Prerequisites

- A high-performance workstation with at least 16GB RAM and a multi-core processor.
- Multiple laptops with varying OS installations (Windows, Linux, macOS).
- Cisco router (e.g., Cisco 2950 or similar) with appropriate firmware.
- Cisco switch (e.g., Cisco 2600 or similar) for LAN connectivity.
- VirtualBox installed on the workstation with necessary ISO images for VMs.
- Ethernet cables and network adapters.

4. Setting Up the Cisco Networking Equipment

Step 1: Configure the Cisco Router

```
Router> enable
Router# configure terminal
Router(config)# hostname HomeLabRouter
Router(config)# ip domain-name homelab.local
Router(config)# crypto key generate rsa
Router(config)# username admin privilege 15 secret StrongPassword
Router(config)# line vty 0 4
Router(config-line)# transport input ssh
Router(config-line)# login local
Router(config-line)# exit
Router(config)# ip ssh version 2
Router(config)# exit
Router# write memory
```

Step 2: Configure the Cisco Switch

```
Switch> enable
Switch# configure terminal
Switch(config)# hostname HomeLabSwitch
```

```
Switch(config)# interface FastEthernet0/1
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 10
Switch(config-if)# exit

Switch(config)# vlan 10
Switch(config-vlan)# name HomeLab_VLAN
Switch(config-vlan)# exit
Switch(config)# exit
Switch# write memory
```

5. Configuring Virtual Machines in VirtualBox

- Install VirtualBox on the custom workstation.
- Create virtual machines with various operating systems (Windows, Linux, Kali, etc.).
- Assign network adapters to each VM (Bridged, NAT, Host-Only for different scenarios).
- Configure internal networking between VMs for simulation.
- Deploy security tools such as Wireshark, Metasploit, and Snort.

6. Testing Network and Security Configurations

- Ensure connectivity between VMs and physical devices.
- Utilize SSH and RDP for remote management of virtual and physical machines.
- Configure and test firewall rules and access control lists.
- Monitor network traffic using Wireshark.

7. Conclusion A well-built home lab allows IT professionals to experiment with real-world networking, virtualization, and security scenarios. Utilizing a combination of physical hardware and virtual environments enhances learning and provides practical experience in troubleshooting, network administration, and cybersecurity.