Lab 2: Deploying the Open vSwitch (OVS) Programmable Data Plane

Objective: To introduce the concept of a programmable data plane by deploying **Open vSwitch (OVS)** within GNS3 and understanding its role in the **NFV Infrastructure (NFVI)**.

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1. Technical Context

In the **Classical network appliance approach**, switching logic is fixed within proprietary hardware. In an SDN/NFV environment, we utilize **Open vSwitch (OVS)**. OVS is an open-source, multilayer virtual switch designed to enable network automation through programmatic extensions. In the ETSI NFV framework, OVS often serves as part of the **Virtual Infrastructure Manager (VIM)** layer, controlling how traffic flows between virtual machines.

2. Topology Requirements

- **Nodes**:
  - 2x VPCS (Host A, Host B).
  - 1x Open vSwitch (OVS) Appliance.
- **Connections**:
  - Host A (Eth0) ⟶ OVS (Port 1).
  - Host B (Eth0) ⟶ OVS (Port 2).

3. Procedure

Step A: Importing the OVS Appliance

1. In GNS3, navigate to **File > Import appliance**.
2. Select the openvswitch.gns3a file (available in the GNS3 marketplace).
3. Follow the prompts to install it on the **GNS3 VM**, which acts as your **NFVI**.

Step B: Building the Logical Network

1. Drag the OVS appliance and two VPCS nodes onto the workspace.
2. Connect the nodes as specified in the Topology Requirements.
3. **Power on** all nodes.

Step C: Basic OVS Configuration

Unlike a standard "plug-and-play" switch, OVS requires manual bridge creation to begin forwarding. Open the OVS console and execute:

1. **Create a Bridge**: ovs-vsctl add-br br0

2. **Add Ports to the Bridge**:
    - ovs-vsctl add-port br0 eth0
    - ovs-vsctl add-port br0 eth1
3. **Verify Configuration**: ovs-vsctl show

Step D: Connectivity Testing

1. Assign IP addresses to the VPCS nodes:
    - **Host A**: ip 10.0.0.1 255.255.255.0
    - **Host B**: ip 10.0.0.2 255.255.255.0
2. Execute a ping: ping 10.0.0.2.

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4. Technical Analysis: The Data Plane

In this lab, the OVS bridge represents the **Data Plane**[66]. At this stage, it acts as a "learning switch." In later labs, we will separate the **Control Plane** by connecting this OVS instance to an external SDN Controller, allowing for advanced functions like **Service Function Chaining (SFC)**.

Lab 2 Assessment Questions

1. Compare the "Classical" switch from Lab 1 with the OVS appliance. How does OVS support the concept of **Standard High Volume Ethernet Switches** described in the NFV vision?
2. Based on the ETSI framework, which component is responsible for managing the OVS resources you configured today?
