Team Project: Network Path Restoration using OpenFlow

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Design/Setup

Execute

Finish

Motivation

- ➢ Experiment node challenges using GENI testbed
  - ➢ node and/or link failure
  - ➢ regional challenges
- ➢ Examine resilience of current backbone
  - ➢ under regional challenges
  - ➢ take advantage of geodiversity in backbone network
- ➢ Test our geodiverse routing protocol
  - ➢ fast response to large scale challenges
  - ➢ provide geodiverse path required by application

Objective

- ➤ **Initial effort using simple topology**
  - ➤ two end hosts with three OpenFlow switches
- ➤ **OpenFlow controller responds to link failures**
 - ➤ manage automatic network path restoration

Methodology

➢ **Build a network with two disjoint paths**

  ➢ from a source node to a destination node.

➢ **Establish a primary flow through the first path**

➢ **Bring down a node or link on the primary flow**

➢ **OpenFlow controller establish a second flow**

  ➢ upon receiving notification of failure

➢ **Measure the traffic disruption time**

GENI Resources

- ➤ Aggregate
  - ➤ Utah-ProtoGENI
- ➤ Flack
  - ➤ visually topology setup
- ➤ OpenFlow switches
  - ➤ Open vSwitch
- ➤ POX controller
  - ➤ control different flows
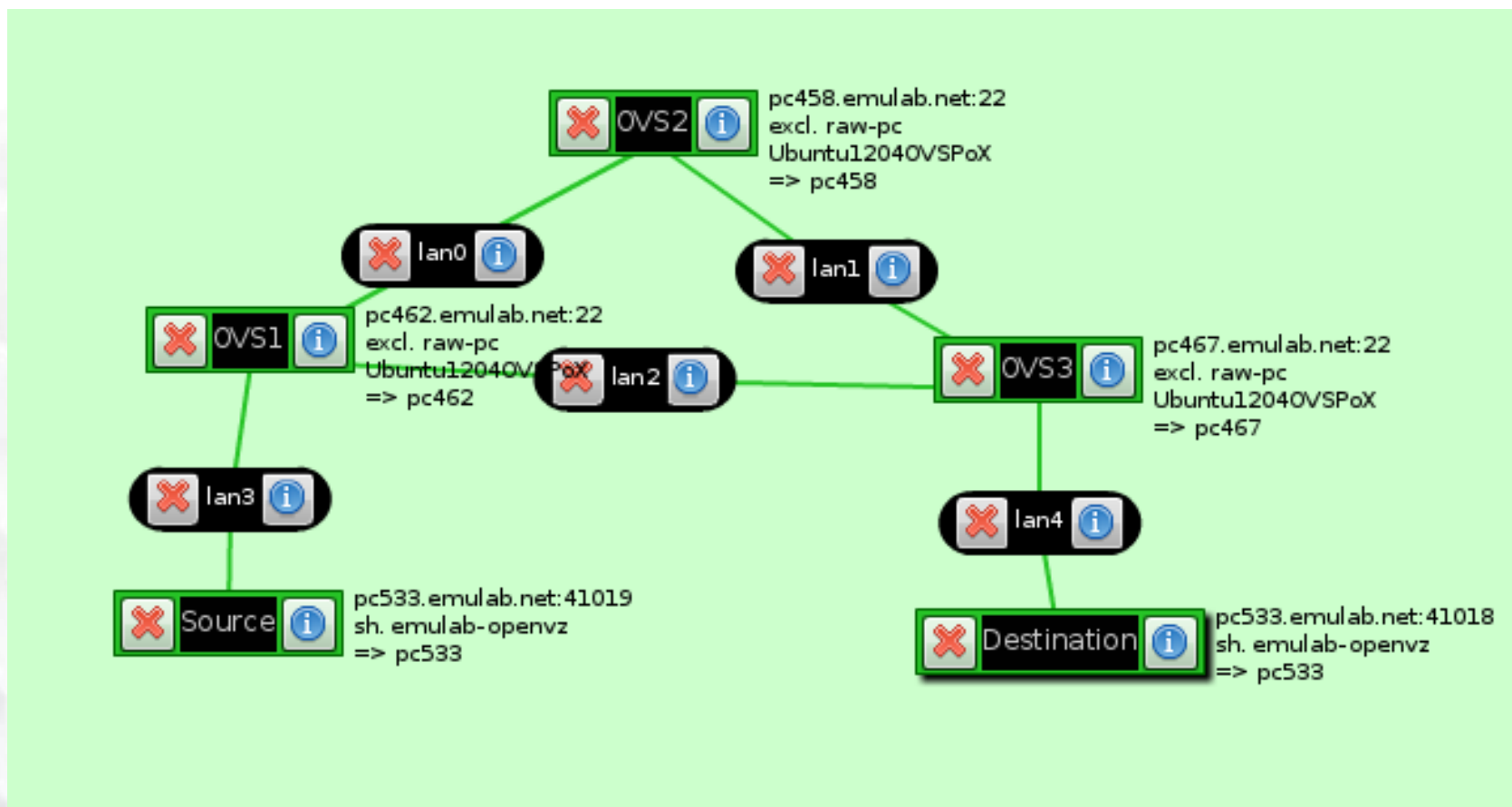
Initial Topology

➢ All flows are controlled by the OVS1 Openflow controller
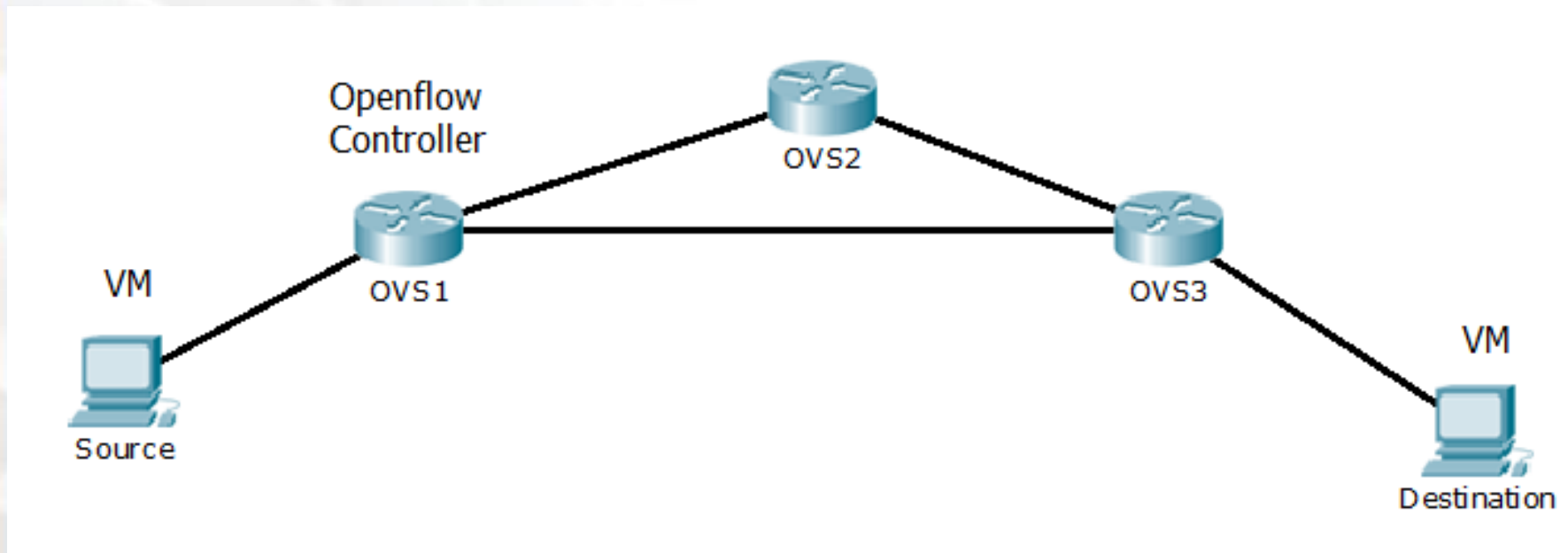
- ➤ Install the primary flow in OVS1, OVS2 and OVS3
- ➤ Shutdown OVS2
- ➤ Upon receiving the notification
  - ➤ install the backup flow in OVS1 and OVS3
- ➤ Measure the disruption time
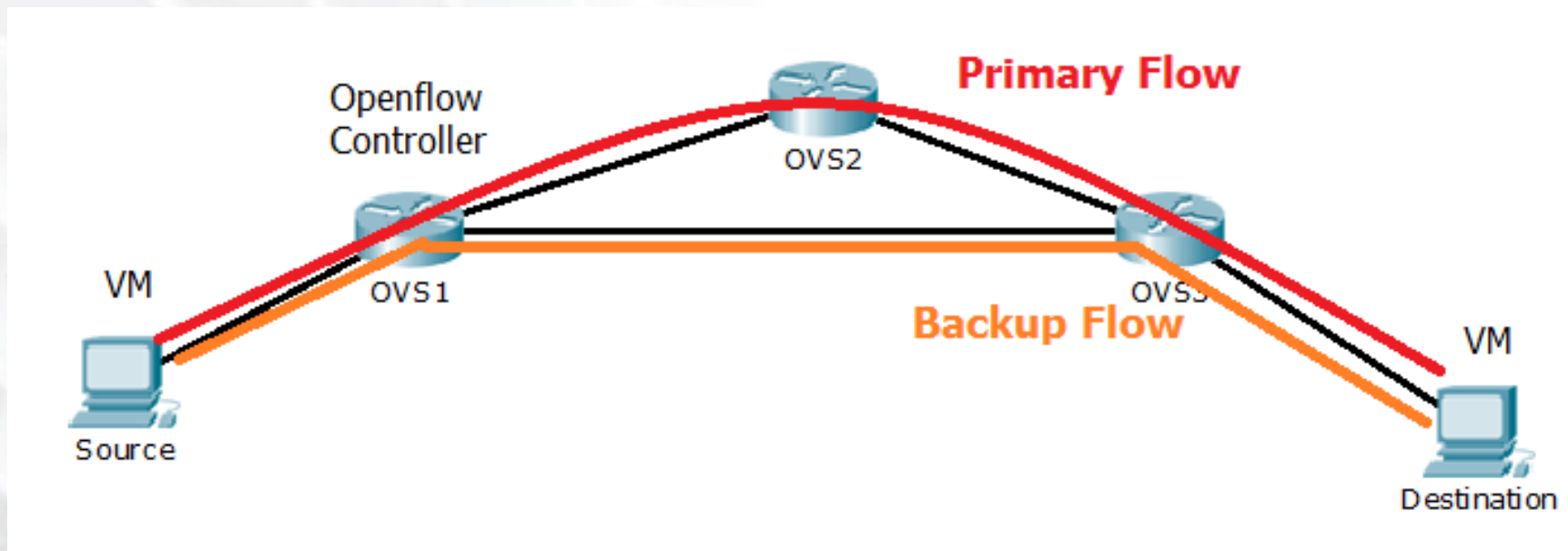
Topology in Flack

Controller Implementation

➢ Implemented the controller in POX

➢ Controller installs primary flow once starts

  ➢ install flows in both OVS1 and OVS3

  ➢ OVS2 operates as learning switch

➢ When controller receives the connection down from OVS2

  ➢ install the backup flow into the OpenFlow switches

Demo

Future work

- ➢ **Experiment with more complex topology**
    - ➢ with nodes separated geographically
- ➢ **Experiment geodiverse routing protocol**
- ➢ **Experiment with physical OpenFlow switches**

Questions?