# OSM Hackfest – Session 5
Modeling EPA capabilities in VNF

Eduardo Sousa (Whitestack)

EPA support combined with SDN Assist enables chaining of high performance VNFs

1. Accurate assignment of resources at VM level
2. Proper assignment of I/O interfaces to the VM
3. **SDN gives the ability to create underlay L2 connections**
   - Interconnecting VMs
   - Attaching external traffic sources

EPA
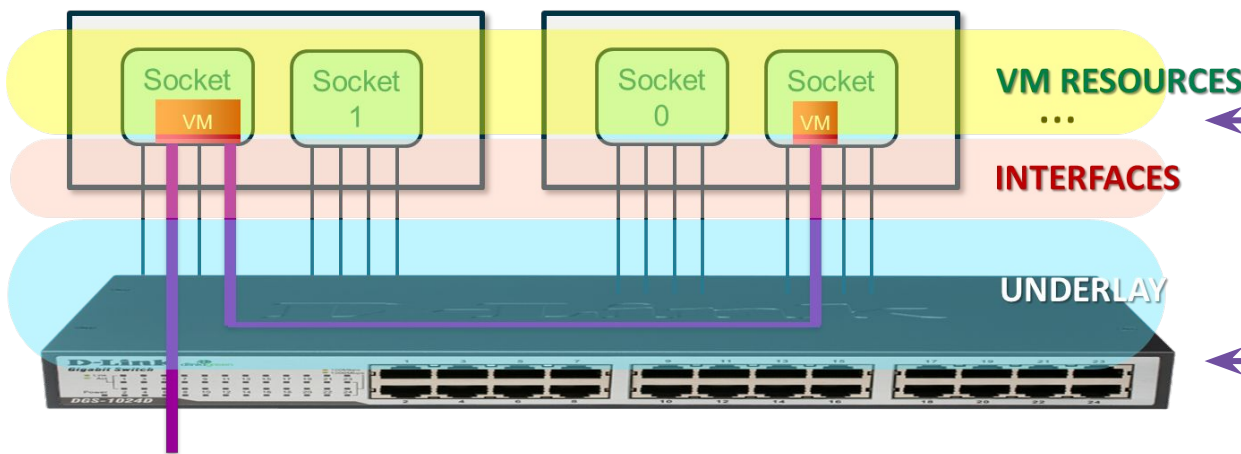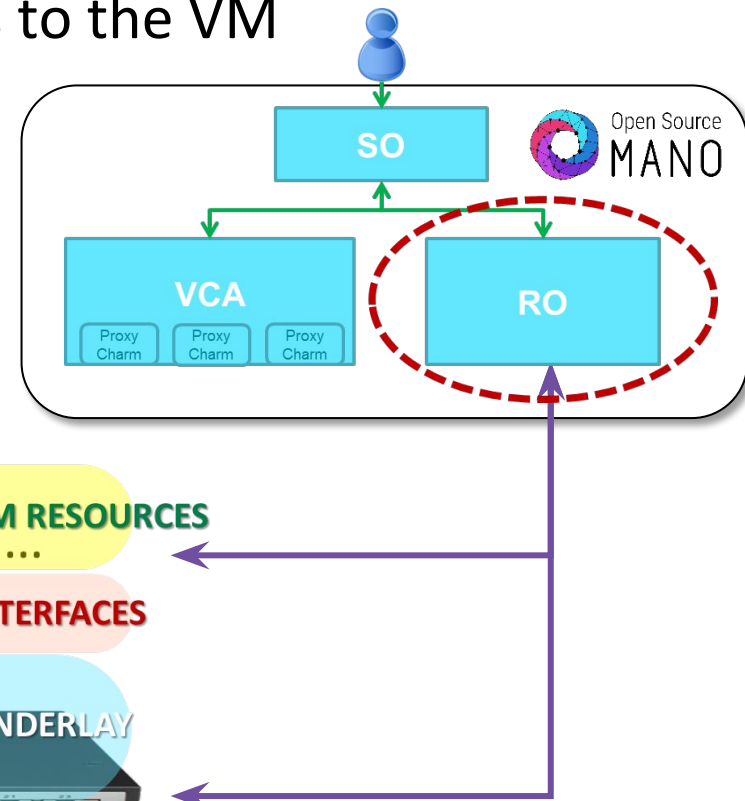
- **EPA features** like use of large hugepages memory, dedicated CPUs, strict NUMA node placement, and the use of passthrough and SR-IOV interfaces, **can be used in OSM's VNF descriptors since Rel Zero**.

- If your VIM supports EPA, then you don't need to do anything extra to use it from OSM. VIM connectors in OSM take advantage of EPA capabilities if the VIM supports it. All you need to do is build your descriptors and deploy.

- Openstack configuration for EPA (reference guide):
  - https://osm.etsi.org/wikipub/index.php/Openstack_configuration_(Release_THREE)#Configure_Openstack_for_OSM_.28EPA.29
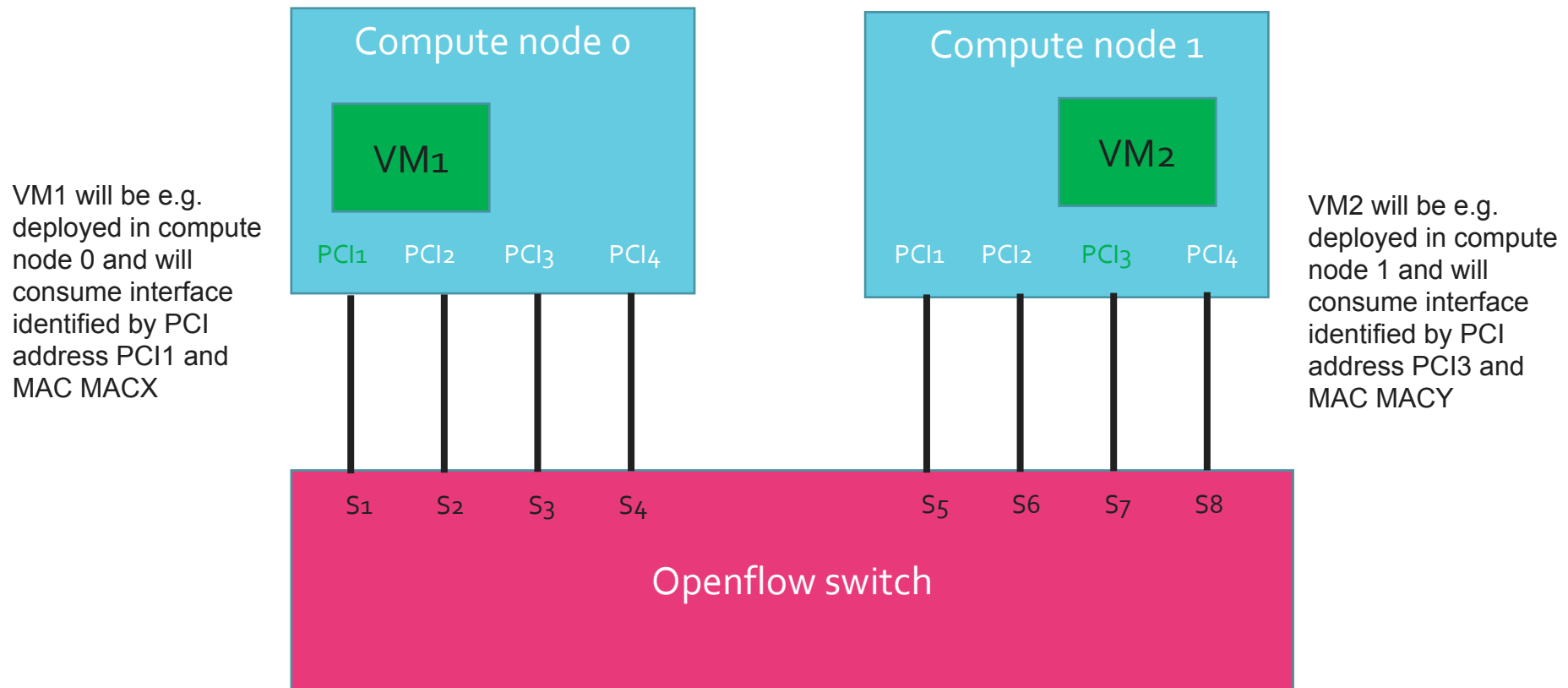
SDN assist

- This feature allows to use an external controller to create the underlying connectivity

- Wiki page:
  - https://osm.etsi.org/wikipub/index.php/EPA_and_SDN_assist

- Requirements:
  - A dataplane switch with Openflow capabilities that will connect the physical interfaces of the VIM compute nodes.
  - An external SDN controller controlling the previous dataplane switch.
  - The mapping between the switch ports (identified by name) and the compute node interfaces (identified by host-id and PCI address)
  - Some VIMs as Openstack requires admin credentials in order to be able to get the physical place of the SRIOV/passthrough VM interfaces

SDN assist. The way it works

- OSM will deploy the VMs of a NS with Passthrough and/or SRIOV interfaces

- OSM will get from the VIM (in your case, Openstack) the compute node where the VM was deployed and the physical interface assigned to the VM (identified by its PCI address).

- OSM will map those interfaces to Openflow ports in the switch making use of the mapping that you should have introduced in the system

- OSM will create the dataplane networks by talking to the SDN controller and connecting the appropriate Openflow ports to the same network.
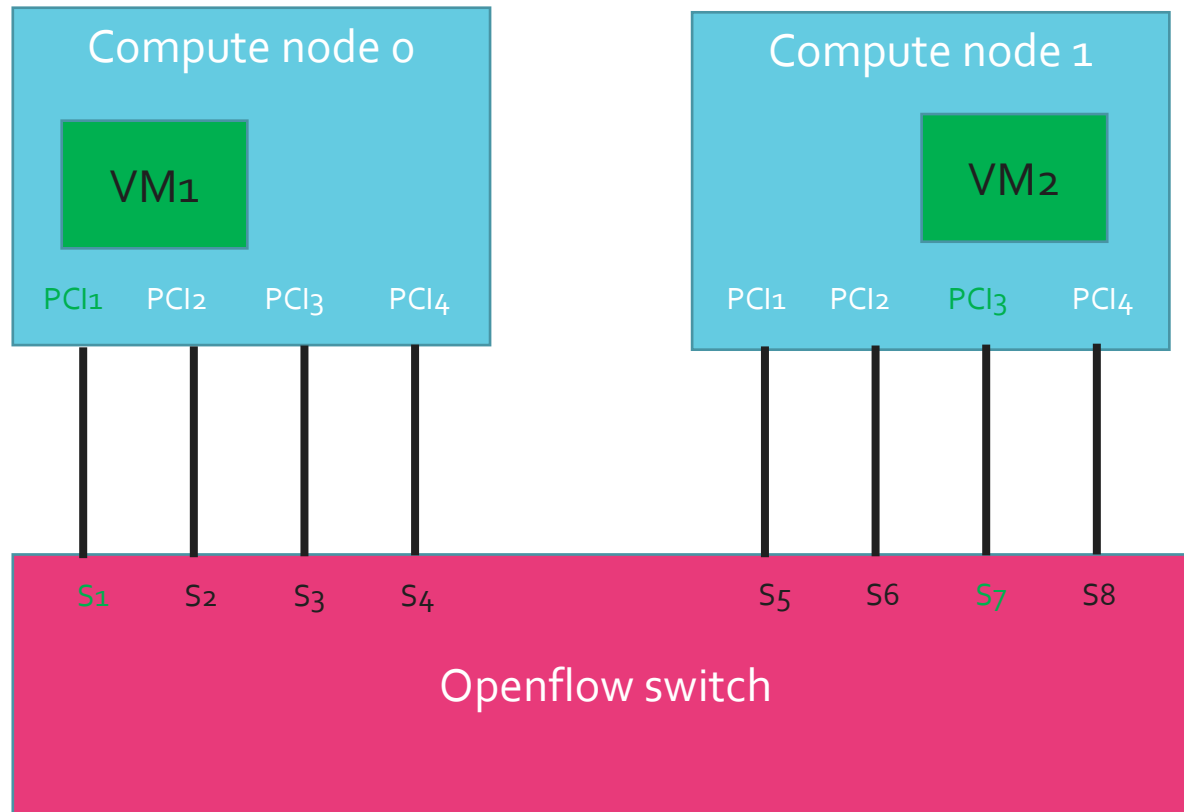
SDN assist. The way it works
1) VMs are deployed

VM1 will be e.g. deployed in compute node 0 and will consume interface identified by PCI address PCI1 and MAC MACX

VM2 will be e.g. deployed in compute node 1 and will consume interface identified by PCI address PCI3 and MAC MACY

Compute node 0

VM1

PCI_1 PCI_2 PCI_3 PCI_4

Compute node 1

VM2

PCI_1 PCI_2 PCI_3 PCI_4

S_1 S_2 S_3 S_4 S_5 S_6 S_7 S_8

Openflow switch

SDN assist. The way it works
2) OSM uses port mapping to identify the ports in the switch

Compute node 0

VM1

PCI1   PCI2   PCI3   PCI4

Compute node 1

VM2

PCI1   PCI2   PCI3   PCI4

The interface at PCI address PCI1 of compute node 0 is connected to port S1 in the switch

S1   S2   S3   S4   S5   S6   S7   S8

Openflow switch

The interface at PCI address PCI3 of compute node 1 is connected to port S7 in the switch

SDN assist. The way it works
3) OSM talks to the SDN controller and connect the ports to the same network.

Compute node 0

VM1

PCI1   PCI2   PCI3   PCI4

Compute node 1

VM2

PCI1   PCI2   PCI3   PCI4

S1   S2   S3   S4   S5   S6   S7   S8

Openflow switch

SDN controller
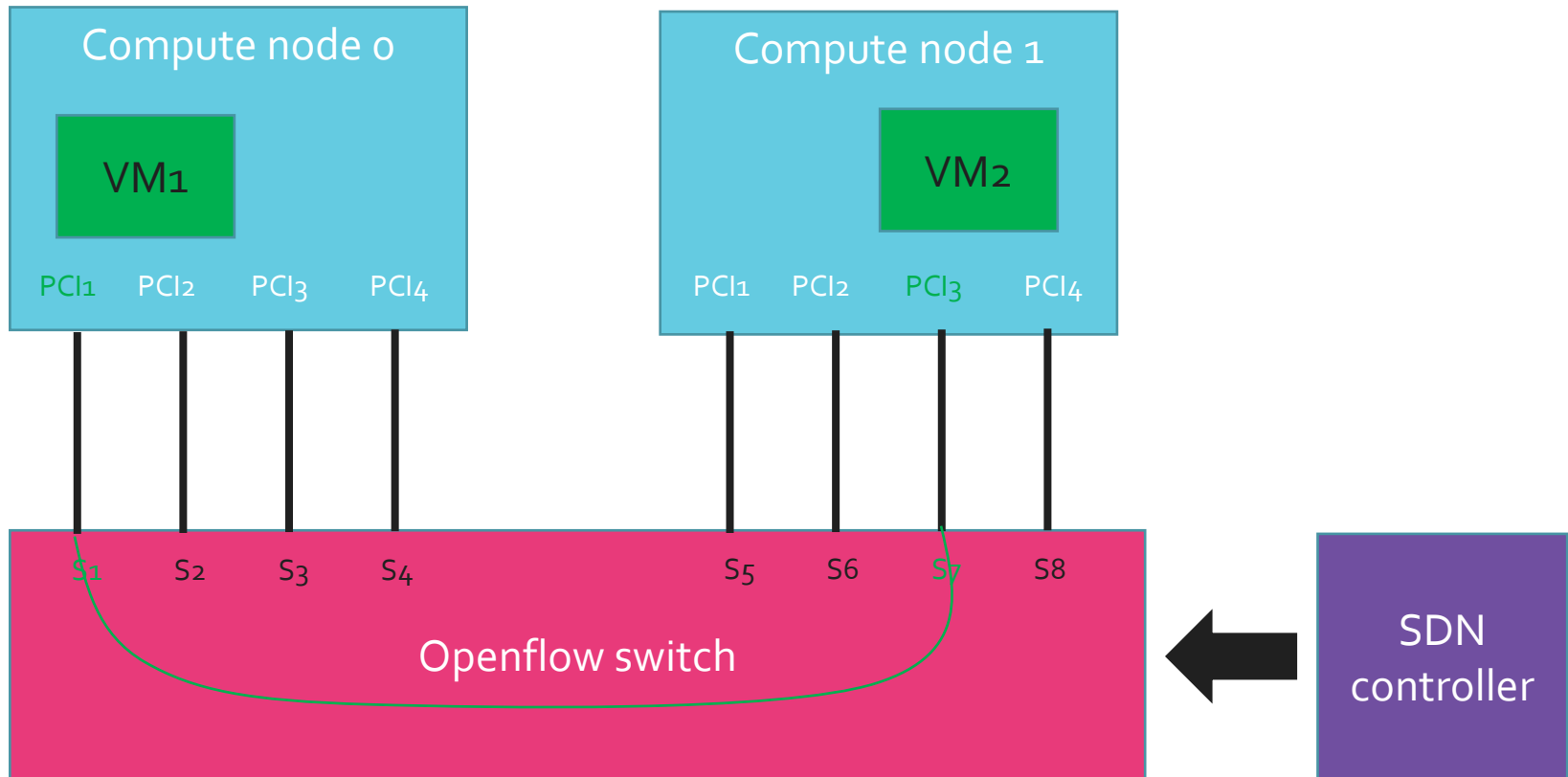
Example of rules for E-LINE and PCI passthrough interfaces:
IN: Port S1 → OUT: Port S7
IN: Port S7 → OUT: Port S1

Device role tagging

- Whenever a new NS is deployed, and if the VIM allows it, VM interfaces will be tagged with the interface name specified in the descriptor

- This allows proper identification of interfaces in the VM

- A service and a script have to be pre-installed in the VM:
  - RedHat-based VMs: https://github.com/oglok/udev_data
  - Ubuntu-based VMs: https://github.com/gcalvino/udev_data
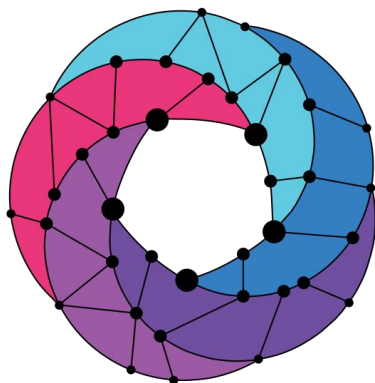
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