

# Deploying OVN on Windows with OpenStack and Kubernetes

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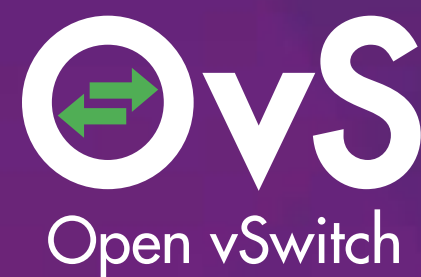
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## Part 1

# Deploying an OpenStack environment using **OVN** and **networking-ovn**



# Quick recap on Neutron

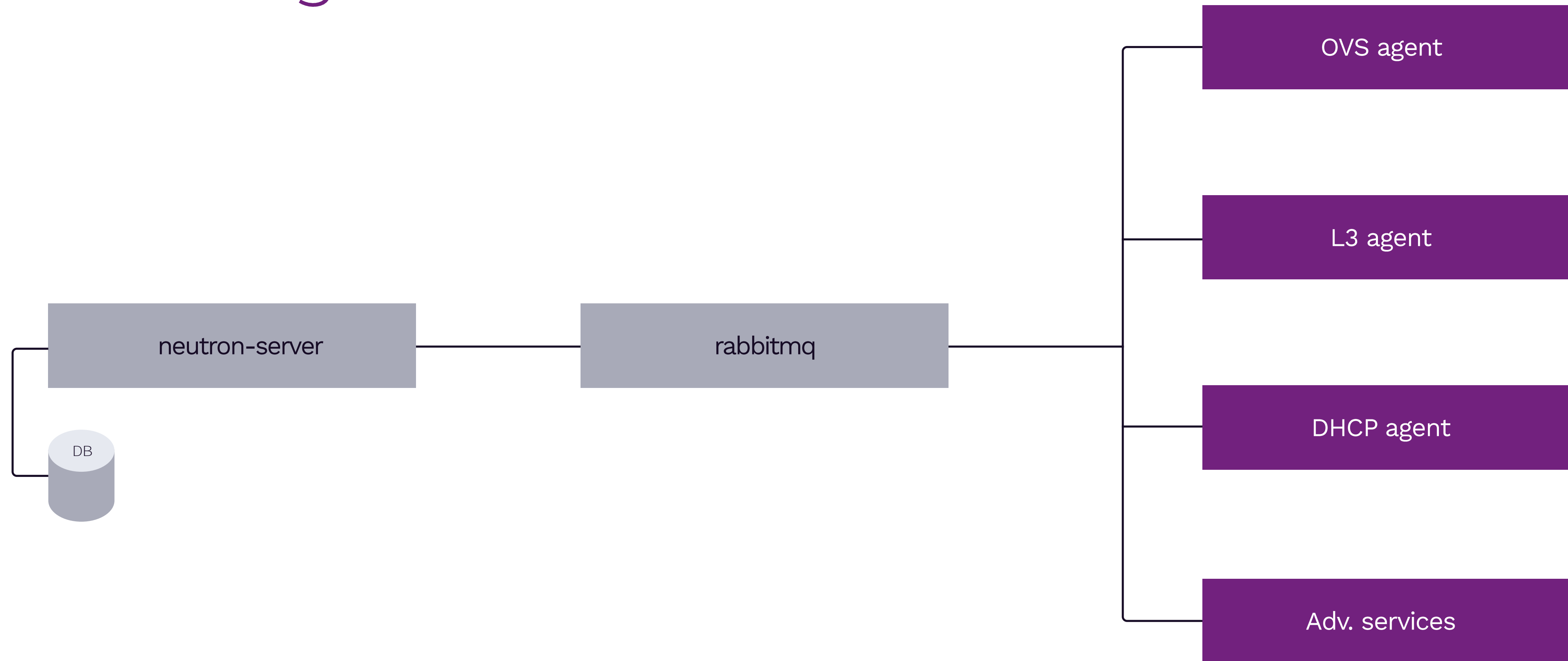
Majority of implementations consist of Python agents, which have several drawbacks:

- + Takes a toll on messaging broker;
- + It requires advanced networking services;
- + It uses namespaces to provision the network.

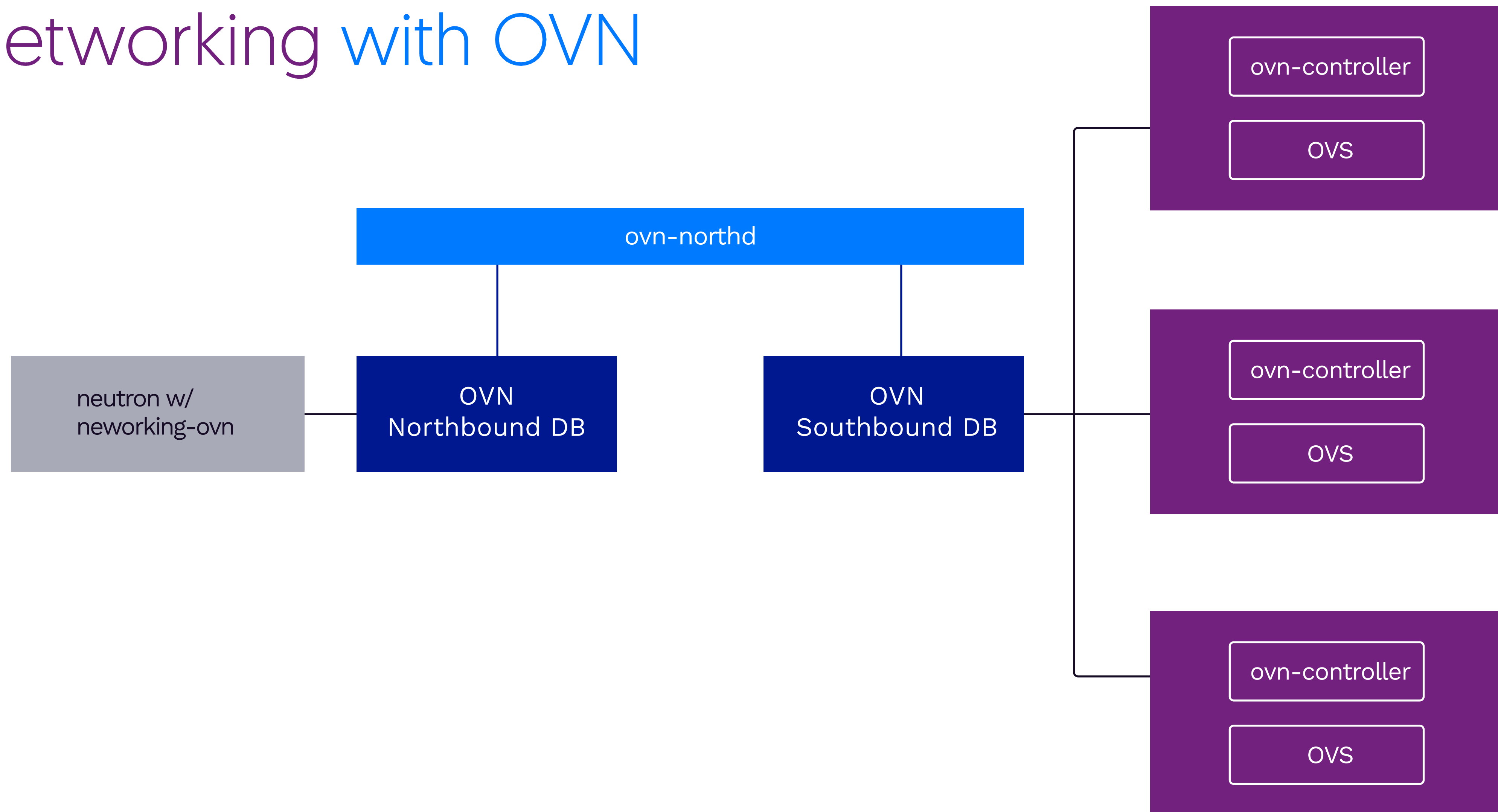
The new proposed implementation OVN (Open Virtual Network) tackles a few shortcomings:

- + Built in advanced services;
- + Uses a database model instead of an RPC model.

# Networking without OVN



# Networking with OVN



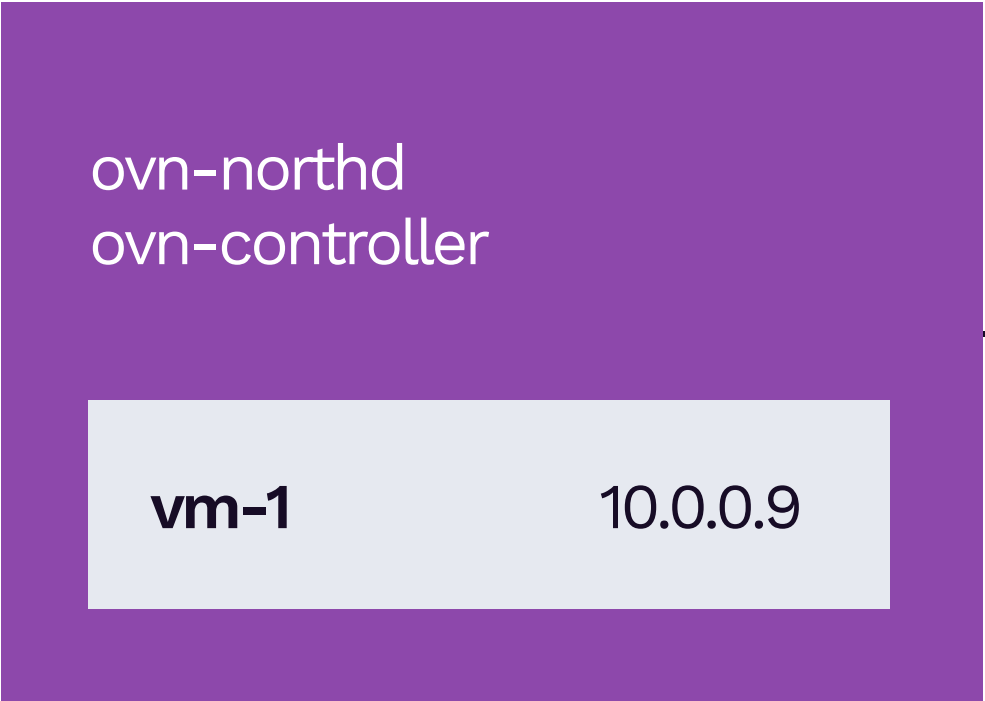
# Adding a Windows node

- + Install using the MSI
- + This will create services for:
  - OVS:  
ovsdb-server;  
ovs-vswitchd.  
Datapath (Hyper-V vSwitch Forwarding Extension)
  - OVN  
ovn-controller.

# Configuring a Windows Node

- + Enable the Hyper-V vSwitch extension
- + Start the OVS services.
- + Configure information for **ovn-controller**:
  - system-id
  - ovn-bridge
  - ovn-remote
  - ovn-nb
  - ovn-encap-ip
  - ovn-encap-type

DevStack AiO



Hyper-V





Demo

# Debugging OVN environments

- + Look into **ovn-northd, ovn-controller, ovs-vswitchd, ovsdb-server** logs
- + For logical flows, use **ovn-trace**
- + For physical flows, use **ovs-appctl ofproto/trace**
- + For in depth kernel flows, please use **ovs-dpctl**
- + Use packet sniffers to look what happens to a packet

# Debugging OVS Windows specific problems

- + Look if services are running
- + Look if the OVS extension is enabled and running (on a single Hyper-V VMSwitch), you can also look into ovs-vsitchd logs
- + Look if OVN/OVS services are stalling
- + Look up the route table and change it accordingly to your setup
- + Verify general connectivity
- + Check tunneling IPs for connectivity
- + Update NIC drivers where applicable

# Windows Datapath

- + Supports **GRE, GENEVE, STT, VXLAN** tunnels
- + Supports almost all of the matching flows
- + Supports the majority set actions
- + OVS bridges work the same as on Linux (since 2.7)
- + Supports multiple **VTEP**
- + Supports multiple **NICs**
- + Supports packet recirculation



# Windows Datapath

## Conntrack (stateful firewalling)

- + Supported on: ICMP, TCP, UDP, FTP
- + Support for NAT will be added soon added

## OVS/OVN Windows CI's:

- + Unit test: <http://64.119.130.115/ovs/>
- + Neutron-ovs-agent: in house testing
- + Neutron networking-ovn: TBA
- + Datapath unit tests: TBA.

# Windows Datapath

OVS Windows enhancements which will be added in the next release cycles:

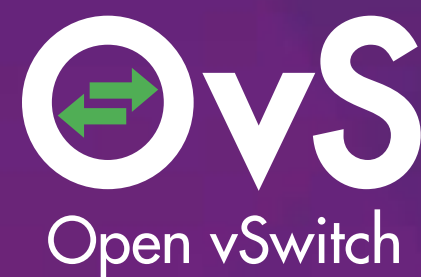
- + Megaflows
- + IPv6 tunnels
- + IPv6 Conntrack
- + Performance improvements

# Windows Datapath: Community

- + Currently, the most active devs are from VMware and Cloudbase Solutions
- + We welcome any new developers or reviewers on the Windows side
- + Patches can be sent at [dev@openvswitch.org](mailto:dev@openvswitch.org)
- + Pull requests welcome on <https://github.com/openvswitch/ovs>

## Part 2

# Deploying an **Kubernetes** environment using **OVN** and **ovn-kubernetes**





# Benefits of an OVN Kubernetes deployment

- + Hybrid deployments
  - Allows deployments with mixed Linux and Windows containers
- + Can be deployed on:
  - On premise (OpenStack, etc)
  - Azure
  - AWS
  - GCE
- + Deploying on hybrid clouds (use case video [Azure + AWS](#))

# History of OVN with Kubernetes

- + Initial PoC was done by Guru Shetty
- + Implemented CNI plugin
- + CNI (container network interface) is:
  - An abstraction model over networks;
  - Every provider can write a plugin;
  - Think about ML2 from Neutron.

# OVN in Kubernetes

- + OVN provides agnostic virtualization to containers
- + It supports **overlay**
- + On Linux
  - Uses CNI plugin
  - Kubernetes will invoke the CNI

# OVN in Kubernetes continued

+ On Windows:

- CNI porting in progress (removing Linux dependencies)
- PoC Python daemon:

Listens to docker events

Takes care of the setup

We need to look inside the container

Static MAC/IP defined in OVN.



# Windows with OVN and Kubernetes

- + Container feature/Hyper-V feature enabled
- + Deploying:
  - Install OVS MSI;
  - Install Kubernetes binaries;
  - Setup variables.
- + Tutorial on GCE:
  - <https://github.com/apprenda/kubernetes-ovn-heterogeneous-cluster>

# Windows with OVN and Kubernetes (continued)

- + **ovn-kubernetes** is the default for mixed environments
- + More tutorials will be added
- + CNI is moving under CNCF
- + Community effort: #sig-windows community, Apprenda and authors from:  
<https://github.com/apprenda/kubernetes-ovn-heterogeneous-cluster>

Google Cloud Platform

**demo-gateway-gce**

ovn-controller

IP: 35.185.20.118

Google Cloud Platform

**demo-master**

ovn-northd  
ovn-controller  
kubernetes controller manager  
kubernetes api server  
kubernetes scheduler

IP: 35.185.74.97

**demo-windows-worker-gce**

ovn-controller  
kubelet

IP: 104.196.176.189

Google Cloud Platform

**demo-linux-worker-gce**

ovn-controller  
kubelet

IP: 35.185.42.199

Google Cloud Platform

**demo-windows-worker-aws**

ovn-controller  
kubelet

IP: 52.14.250.243

AWS

**demo-linux-worker-aws**

ovn-controller  
kubelet

IP: 52.15.190.213

AWS



# Demo



# Useful links

Where to download OVS/OVN distribution: <http://openvswitch.org/download/>; <https://cloudbase.it/openvswitch/> (includes signed drivers!)

Open vSwitch documentation: <http://docs.openvswitch.org/en/latest/>, <http://superuser.openstack.org/articles/author/alin-serdean/>

Open Virtual Network documentation: <http://blog.spinirne.com/2016/09/a-primer-on-ovn.html>

Where to report bugs and ask questions: [bugs@openvswitch.org](mailto:bugs@openvswitch.org), [ovs-discuss@openvswitch.org](mailto:ovs-discuss@openvswitch.org), <https://ask.cloudbase.it>,  
<https://github.com/openvswitch/ovs-issues>

OVS conference presentations: <http://openvswitch.org/support/ovscon2016/>, <http://openvswitch.org/support/ovscon2015/>,  
<http://openvswitch.org/support/ovscon2014/>

ovn-kubernetes: <https://github.com/openvswitch/ovn-kubernetes> (Python/GO)

Heterogenous Kubernetes cluster: <https://github.com/apprenda/kubernetes-ovn-heterogeneous-cluster> (GCE deployment)

For help and questions you can ask on slack channel [#sig-windows](#)

Setup on public providers:

<https://www.youtube.com/watch?v=lc6uu-mvs1w&list=PL3wS6qV9GtxeROM4AQX5pmfoMHQ0zKI0d>

Questions?



[www.cloudbase.it](http://www.cloudbase.it)