Agenda

• OVS
  – Introduction & Architecture
  – Features
  – Container support
  – Roadmap

• OVN
  – ovn-kubernetes

• Demo

• Questions
• OVS solution for Microsoft Hyper-V
• Collaboration b/n VMware Inc. and Cloudbase Solutions
• Consists of:
  – Ported OVS userspace code
  – Windows datapath (OVSEXT – Hyper-V forwarding extension)
• Hyper-V extensible switch
• OVS components
  – OVS userspace
  – OVSExt driver
• Userspace – Kernel communication
• Packet Flow
• Skb ~ Nbl (Net buffer list)
Architecture

Root Partition (Host)

- **ovs-*ctl**
- **ovs-vswitchd**
- **dpif-netlink**
- **netdev-windows**
- **netlink_socket(emulation)**

Kernel

- Interface device
- Netlink Message Impl.
- Flowtable
- vport table
- Packet Processing

OVS Forwarding Extension

Child Partitions (Guest)

- Virtual Machine #1
- Virtual Machine #2
- Physical NIC

Hyper-V extensible switch

NDIS Stack

Hyper-V Internal NIC

1. INGRESS
2. INTERMEDIATE
3. EGRESS
4. User
5. Kernel
6. 1
7. 6
8. 7
Features

• Supported OS
  – Windows family 8 (2012/Win8)
  – Windows family 9 (2012 R2, Win 8.1)
  – Windows family 10 (2016 LTSC, 1709, 1803, 1809)

• Supports most of the matching flows and actions
• Supports GRE, GENEVE, STT, VXLAN tunnels
• Supports hardware offloads
• Stateful firewall support with connection tracking and recirculation
• Supports multiple NICs, VTEPS and BONDING
Containers on Windows

- Prerequisites: Windows 10 / Server 2016 family
- Containers also use “VM Switch” for networking
- OVS hooks on to the VM switch for managing container networking similar to VMs
Recent datapath changes

• Stabilizing driver
• Conntrack support
  – NAT
  – IP fragments
  – zone limits
  – Performance optimization
• Continuous integration with unit tests
• Introduce support for Host Network Stack (HNS) API’s
Roadmap

• Adding support for PCAP interfaces
• Megaflows
• UFID (unique flow identifier)
• IPv6 conntrack and tunnels
• Other tunnels (NSH, LISP)
OVN in Kubernetes

• OVN provides virtualization for containers
• ovn-kubernetes
• overlay model
• On Linux/Windows:
  – Implements CNI plugin
• Daemonsets for easier deployment
• HA for OVN is available from OVS 2.10
How to deploy ovn-kubernetes

• Vagrant setup:

• Ansible playbook:

• Please check them out

• Feel free to open issues and provide feedback
Benefits of an ovn-kubernetes deployment

• Distributed firewalling for PODs
• Can be used together with service-meshes (Istio, etc)
• Full heterogenous deployment (Linux + Windows, on-prem + off-prem with IPSEC support via OVN for encryption)

• **ovn-kubernetes** is heavily used in mixed environments (since alpha Windows support in Kubernetes)

• **Openshift** Tech. Preview (starting 3.9) supports **ovn-kubernetes** environments (including Windows nodes)
Roadmap for ovn-kubernetes

- OVN golang bindings (branch)
- Integration with kops, kubespray, etc
- Add Kubernetes operator for ovn-kubernetes
- Enhance ansible playbooks and vagrant setup
Diagram of the demo environment
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/

• Where to report bugs and ask questions: bugs@openvswitch.org, ovs-discuss@openvswitch.org, https://github.com/openvswitch/ovs-issues, https://ask.cloudbase.it


• ovn-kubernetes: https://github.com/openvswitch/ovn-kubernetes
Questions?

- Join us on the ovs IRC channel #openvswitch every Tuesday at 10:00 AM PST.