Fully Scalable Networking with MidoNet

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Agenda: Introduction to MidoNet

1. MidoNet Advantages
2. Open vSwitch vs MidoNet
3. Understanding MidoNet
4. MidoNet Community
MidoNet
Advantages

Introduction
Distributed Networking Services

- Logical Switching
- Logical Routing
- Logical Firewall
- Logical Layer 4 Load Balancer
- MidoNet (RESTful) API
Distributed Controller

- Resiliency: No Single Point of Failure (SPOF)
- Scalability: Fully Distributed Architecture
- Performance: Single Virtual Hop
Distributed Architecture

- SDN intelligence at edges
- Resource usage at edge
- Grows with the cloud
- Fully Distributed Gateways
  - L3 GW: Multiple BGP Border Nodes
  - L2 GW: Multiple HW VXLAN Tunnel End-Points (VTEP)
Additional Features (I)

- Agnostic of underlay
- Only just L3 connectivity required
- Floating IPs
- Firewall bound to each vPort
- Stateful & Stateless NAT
- FWaaS
- Port Mirroring
Additional Features (II)

- Supports Docker in OpenStack (nova-docker)
- Docker Networking (libnetwork)
- Puppet Modules (others upcoming)
- Apache License (ASLv2)
- many many more...
Open vSwitch vs MidoNet

Neutron Plugin Comparison
MidoNet (MN) Architecture
OVS: Centralized Controller Model (I)
MN: Distributed Controller Model

MidoNet Agents act as distributed controller

Network State Database

Logical Network topology stored in distributed database

Private IP Network

VM

MidoNet Agent

Linux Kernel

Distributed scale out Gateways

Active Gateways

Internet

VM

MidoNet Agent

Linux Kernel

MidoNet Agent removes need for Service Nodes and IPTables
OVS: Centralized Controller Model (II)
MidoNet Agent programs the Kernel to provide services like security groups, routing, load balancing, and floating IPs.
OVS: Active / Standby Gateway Model

All outgoing flows travel through the active gateway node.
MN: Fully Distributed Gateway Model
Understanding MidoNet

MidoNet 101
Physical Topology (Underlay)
Physical Topology (Underlay)
Physical Topology (Underlay)
Virtual Topology (Overlay)
Virtual Topology (Overlay)
Virtual Topology (Overlay)
Virtual Topology (Overlay)
Virtual Topology (Overlay)

Provider Router

Tenant Router

Tenant Network

10.0.0.0/24 (subnet)

External Network
Virtual Topology (Overlay)

Provider Router

Tenant Router

Tenant Network

NAT: 10.0.0.0/24
<-> external

External Network

Network 10.0.0.0/24 (subnet)
Virtual Topology (Overlay)

Provider Router

Tenant Router

Tenant Network

NAT: 10.0.0.0/24 <-> external

10.0.0.1

10.0.0.0/24 (subnet)

External Network
Virtual Topology (Overlay)

Provider Router

Tenant Router

Tenant Network

NAT: 10.0.0.0/24

<- external

External Network

10.0.0.1

10.0.0.0/24 (subnet)

VM 1

VM 2

10.0.0.0/24

VM 1

VM 2
Virtual Topology (Overlay)

Provider Router

Tenant Router

Tenant Network

NAT: 10.0.0.0/24 <-> external

External Network

10.0.0.1

10.0.0.0/24 (subnet)

VM 1

10.0.0.2

VM 2

10.0.0.3

10.0.0.0/24

10.0.0.2

10.0.0.3
Existing Infrastructure

MidoNet Gateway

Network State Database

External Network

Virtual Topology Stored in NSDB

NAT: 10.0.0.0/24 <-> external

Provider Router

Tenant Router

Tenant Network

10.0.0.1

10.0.0.0/24 (subnet)

10.0.0.2

10.0.0.3

10.0.0.0/24

10.0.0.1

10.0.0.0/24 (subnet)

External Network Provider Router

Tenant Router

Tenant Network

VM 1

VM 2

VM 1

VM 2
Let’s send a package from VM1 to VM2
Let’s send a package from VM1 to VM2
Query Topology, Simulate Data Flow
Query Topology, Simulate Data Flow
Query Topology, Simulate Data Flow
Query Topology, Simulate Data Flow
Query Topology, Simulate Data Flow
Query Topology, Simulate Data Flow
Query Topology, Simulate Data Flow
Establish Tunnel & Route Packet
Establish Tunnel & Route Packet
Establish Tunnel & Route Packet
Establish Tunnel & Route Packet
Establish Tunnel & Route Packet
Subsequent Packages Travel Near Line-Speed
Subsequent Packages Travel Near Line-Speed
Existing Infrastructure
Network State Database

MidoNet Gateway

External Network

Same for Traffic to/from External Network
Same for Traffic to/from External Network
Existing Infrastructure

MidoNet Gateway

Network State Database

External Network

Same for Traffic to/from External Network
Existing Infrastructure

MidoNet Gateway

Network State Database

External Network

Same for Traffic to/from External Network
Existing Infrastructure

Network State Database

External Network

Midonet Gateway

Same for Traffic to/from External Network
Same for Traffic to/from External Network
MidoNet Community

Join us to find out more!
Overview

- In flux: joining OpenStack in 2016
- Landing Page: https://www.midonet.org/
  - Blog, Wiki, Docs, etc.
  - Getting Help
  - How to Contribute
  - Downloads
- Twitter: @midonet / Freenode IRC: #midonet
Quickstart

Executing this command in an Ubuntu 14.04 VM will install the latest MidoNet with OpenStack:

```
curl -sL quickstart.midonet.org | sudo bash
```

Check script before piping it to sudo bash!
Questions?

ask.midonet.org
Thanks!

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