Setup of a Service VM as an IPv6 vRouter

Bin Hu, AT&T
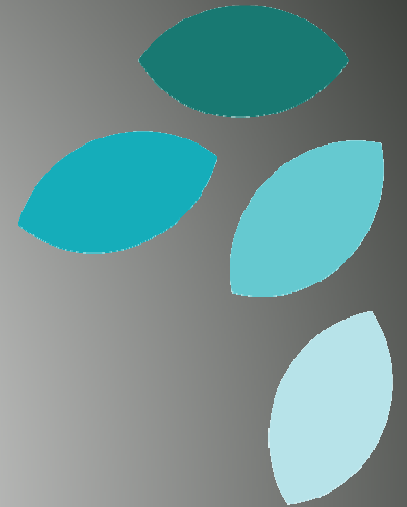
Meenakshi Kaushik, Cisco

Sridhar Gaddam, RedHat

LINUX FOUNDATION
COLLABORATIVE PROJECTS

Content

- Goal

- Design

- Underlay Network Topology

- Setup Steps

- Topology from Horizon UI after Setup

- Gaps in ODL and Workaround

- Lessons Learned of Setup in a Single Laptop Environment

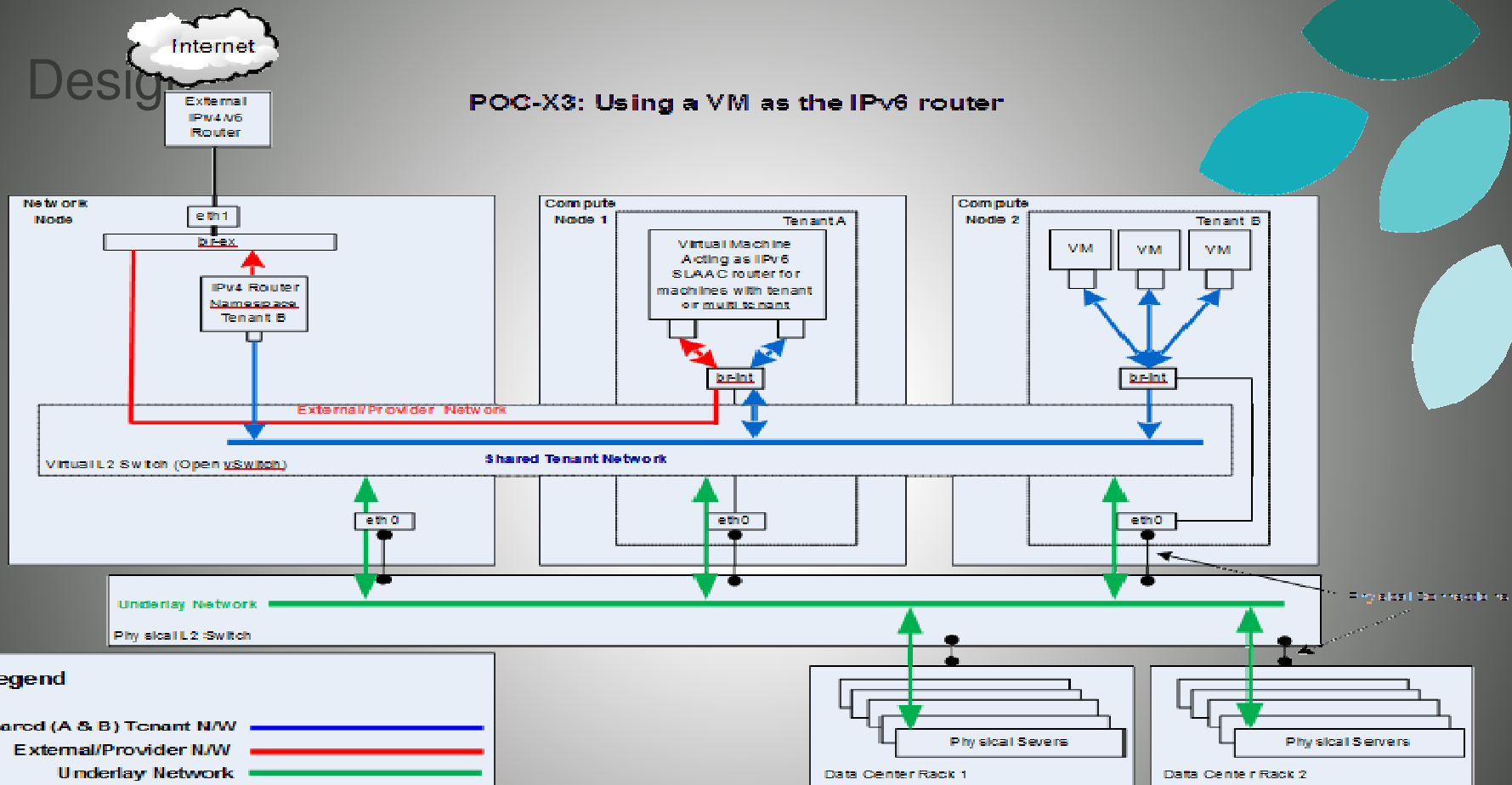- Marching to Brahmaputra

- Acknowledgement

Goal

A Service VM in OpenStack+ODL environment that is capable of (1) advertising IPv6 Router Advertisements (RA) to the VMs on the internal network (2) IPv6 Forwarding (i.e., North-South traffic), i.e. capability of an IPv6 vRouter

- Gap Analysis

- Expand IPv6 vRouter capability to any VM

  – Allow for any 3rd-party solution, e.g. IPv6 vRouter VNF as an alternative of Neutron Router or ODL Router
  – Allow for open innovation
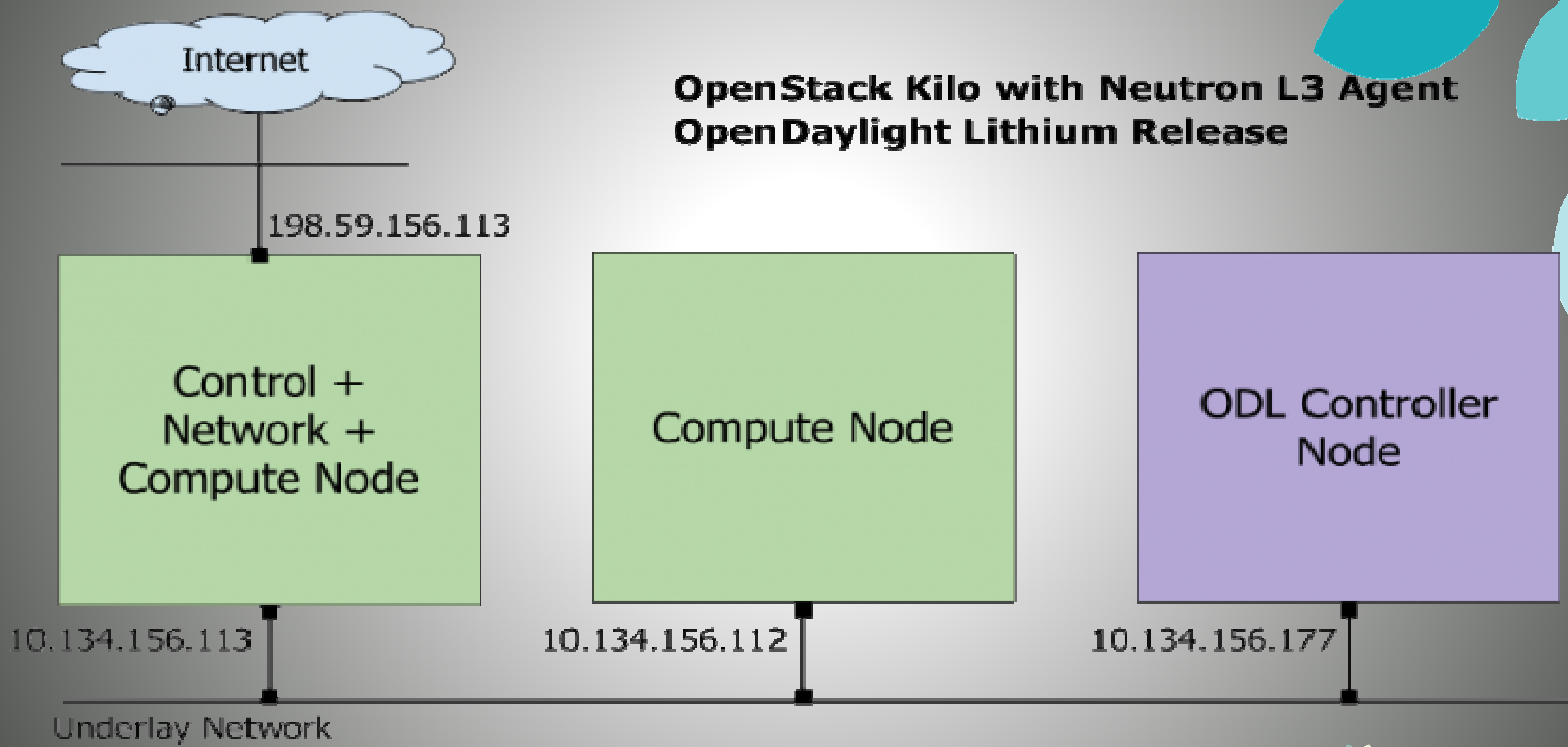
OPNFV

POC-X3: Using a VM as the IPv6 router

Underlay Network Topology

Internet

OpenStack Kilo with Neutron L3 Agent
OpenDaylight Lithium Release

198.59.156.113

Control +
Network +
Compute Node

Compute Node

ODL Controller
Node

10.134.156.113   10.134.156.112   10.134.156.177

Underlay Network

Setup Steps (1 of 2)

- https://wiki.opnfv.org/ipv6_opnfv_project/bottomup_exercise

- Step 0: set up infrastructure

  - Prepare 3 hosts with 8GB RAM and 40GB each
    - 4GB RAM and 20GB storage minimum
  - Set up underlay networks and external access network

- Step 1: set up ODL controller in ODL Controller Node

  - https://wiki.opnfv.org/ipv6_opnfv_project/bringup_odl_controller
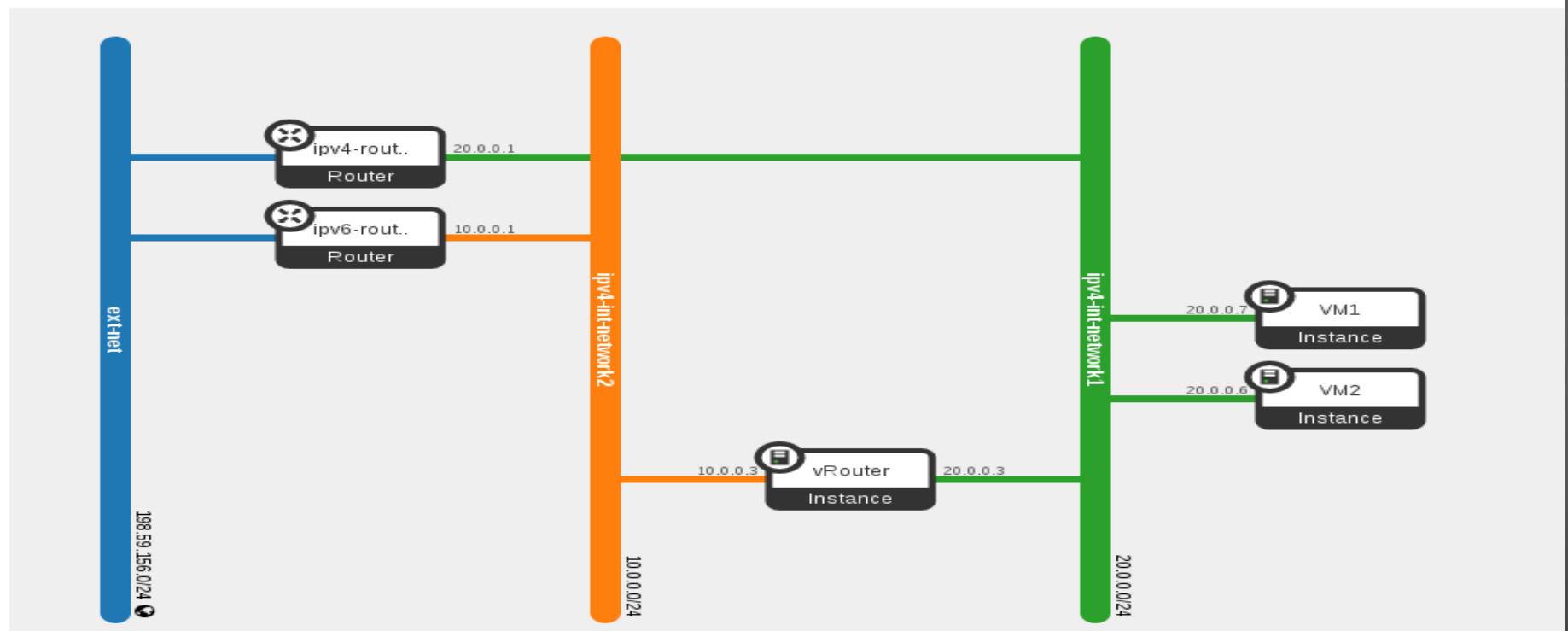
Setup Steps (2 of 2)

- Step 2: set up OS Controller Node

  – https://wiki.opnfv.org/ipv6_opnfv_project/setup_osodl_ctrlnwcom_node
- Step 3: set up OS Compute Node

  – https://wiki.opnfv.org/ipv6_opnfv_project/setup_osodl_compute_node
- Step 4: create networks, subnets, and spawn and configure VMs in integrated OS+ODL environment to complete experiment

  – https://wiki.opnfv.org/ipv6_opnfv_project/create_networks

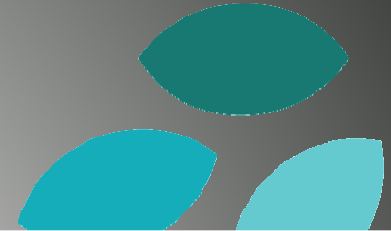# Topology from Horizon UI after Setup

Gaps in ODL and Workaround

Gap	Workaround
IPv6 Router is not supported in ODL and lack of IPv6 IPAM - ODL net-virt provider in Lithium release only supports IPv4 Router. - Support for IPv6 Router is planned using Routing Manager as part of Beryllium Release.	- Use neutron-l3-agent instead of odl-l3 for L3 connectivity - Use ODL for L2 switch
Security Group is not supported in ODL	- Completely disable Security Group feature in Neutron - Neutron ML2 Port Security Extension is not relevant any more
Shared tenant networks are not supported in ODL	- Single tenant for network mapping
ODL net-virt provider doesn't support IPv6 - Java exception	- Use manual configuration - Expected to be fixed in Beryllium

Lessons Learned of Setup in a Single Laptop Environment

- RAM Size – 32GB RAM preferred in a single laptop

  – 8GB RAM and 40GB storage for each node
  – 4GB RAM and 20GB storage minimum for each node

- Tricks of Network Setup in Virtual Box

  – Internal Network, Host-Only, Bridged, NAT, NAT Network
  – 32-bit / 64-bit, Windows / Linux

- External, routable IP address for a laptop to different locations

Marching to Brahmaputra

- To document Gap Analysis (User's Guide)

- To document setup instructions (Install Guide)

- Deployment workflow:

    – Installer deploys core package of Brahmaputra, including testing
    – Disable odl-l3 and enable neutron-l3-agent (due to ODL gaps)
    – Our Step 4 instructions to set up IPv6 vRouter
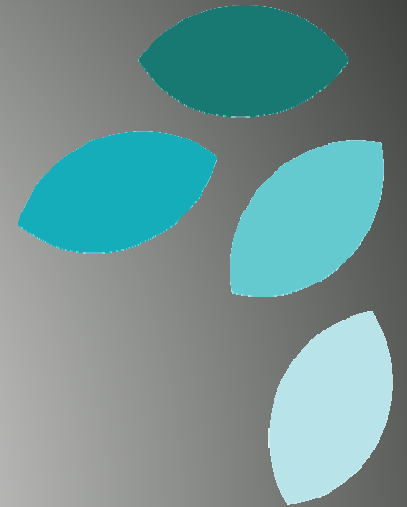
Acknowledgement

- All additional contributors of IPv6 project, particularly

  - Mark Medina (ClearPath) for initial network design
  - Jonne Soininen (Nokia) for SME in IPv6 area
  - Iben Rodriguez (Spirent) for providing VCT Lab infrastructure, and help at every step of lab setup
  - Cristian Valean (Cloud Base Solutions) for lab setup, access and support
  - Hannes Frederic Sowa (RedHat) for SME in IPv6 in Linux kernel
  - Prakash Ramchandran (Huawei) for active participation and testing