Overview

- What is Whitebox Networking

- Pros/Cons

- The hardware

- The software

- The IPv6 Capability and the SDN intersection

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What is Whitebox Networking?

OEM
Switch

3rd Party
Operating System

What is Whitebox Networking?

- The software disconnected from the hardware

- Buy switch/router hardware, buy or install another operating system

- The operator decides the mix of the two – not the networking vendor

- Some big uses:

  - Facebook uses Wedge/FBOSS – Centos-like

  - Google uses Pluto – Big Switch-like

Pros – Whitebox Networking

- No vertical lock-in – bare metal philosophy
  - Hardware servers don't do this, why should switches?
- Scripting!!! Perfect for auto provisioning
  - BASH, Python, Ruby, Puppet, etc
- You build to your network, not the other way
  - Avoid the self-licking ice cream cone
- Largest expense in enterprise IT today is the network
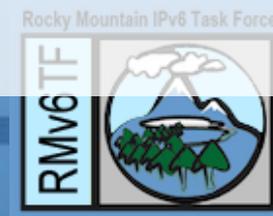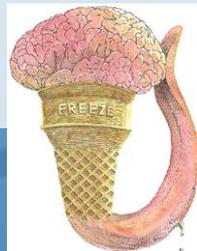
Cons – Whitebox Networking

- Network engineers can no longer be sectarian in their chosen vendor

- Operators have to understand the details of their network now, in order to choose the OS

- OS and hardware support is so-so

  - Getting better, various on OS vendor

- Must be familiar in GNU/Linux

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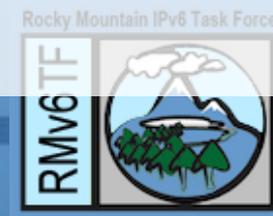
Whitebox Networking Hardware

- The "big 5" hardware switch makers
    - Quanta
    - Acton/Edge-Core
    - Delta/DNI/Agema
    - Dell (limited)
    - Penguin Computing

Quanta

Acton/Edge-Core

Penguin Arctica

Delta/DNI

Agema ToR

Dell S4810-S6000

Whitebox Network OS

- The "big 3" Network OS
  - Big Switch (SwitchLight OS)
  - Pica8 (PicOS)
  - Cumulus Networks
    (Cumulus Linux)
- ONIE – Open Network Install Environment

SwitchLight OS IPv6 Capabilities

- BigSwitch – SwithLight OS
  - SwitchLight CLI – Not Linux BASH
    - Big Tap/Big Cloud Fabric with SwitchLight controls all
    - Limited CLI – meant for API
  - Follows ONIE standard
  - Layer 2 – (VLAN, VXLAN, CoS, PVSTP, RSTP/STP, LACP)
  - Full IPv6 routing protocols (BGP, OSPFv3)
    - Quagga no support for OSPFv3 authentication
    - OSPF Equal Cost Multipath
  - IPv6 management (RADIUS, LDAP, SSH, SNMPv3)
  - First Hop Security (IPv6 RA Guard)

SwitchLight OS IPv6 Capabilities

- DHPv6 server, Relay , SLAAC support
  - Includes RA Options in SLAAC (RDNSS)
- No IPv6 Multicast Routing
- Full IPv6 ACLs (NetFilter – ip6tables)
- Full IPv6 integration with OpenFlow/SDN systems
  - Big Network SDN Controller

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Pica8 OS IPv6 Capabilities

- Pica8– PicOS
    - Dual-Boot!
        - Pica8 CLI or custom hardware Open vSwitch
    - Layer 2 – (VLAN, VXLAN, CoS, PVSTP, RSTP/STP, LACP)
    - Full IPv6 routing protocols (BGP, OSPFv3)
        - XORP routing engine
    - IPv6 management (RADIUS, LDAP, SSH, SNMPv3)
    - First Hop Security (IPv6 RA Guard)

Cumulus Linux OS IPv6 Capabilities

- Cumulus Networks – Cumulus Linux OS

  ** Demo capabilities at end and our Table! **

  - No Proprietary CLI (GNU/Linux BASH shell)

  - Based on Debian Linux

  - Layer 2 – (VLAN, VXLAN, CoS, PVSTP, RSTP/STP), LACP

  - Full IPv6 routing protocols (BGP, OSPFv3)

    - Quagga no support for OSPFv3 authentication

    - OSPF Equal Cost Multipath

  - IPv6 management (RADIUS, LDAP, SSH, SNMPv3)

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Cumulus Linux OS IPv6 Capabilities

- First Hop Security (IPv6 RA Guard)

- DHPv6 server, Relay , SLAAC support

  - Includes RA Options in SLAAC (RDNSS)

- No IPv6 Multicast Routing

- Full IPv6 ACLs (NetFilter – ip6tables)

- Full IPv6 integration with SDN

  - SDN controller – Vmware NSX

  - Overlay – PLUMGrid, Nuage, Midokura, etc

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IPv6 Whitebox Networking Summary

- All Linux OS vendors have 99.99% IPv6 support today! (re: no OSPFv3 auth)

- Lots of hardware to choose from: Big 6

- Three types of OS to choose from

  - Traditional Switch CLI: BigSwitch

  - Hybrid CLI and Open vSwitch API: Pica8

  - True GNU/Linux networking OS: Cumulus Linux

- All have excellent scripting and SDN API integration – perfect for auto-provisioning

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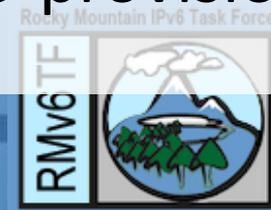
Cumulus Linux/Acton Demo!

- Show IPv6 addressing
- Show IPv6 neighbors
- Show OSPFv3 neighbors
- Ping.....

Spine 1

RID 10.2.1.3

Spine 2

RID 10.2.1.4

OSPFv3 Area 0

RID 10.2.1.1

RID 10.2.1.2

Leaf 1

Leaf 2

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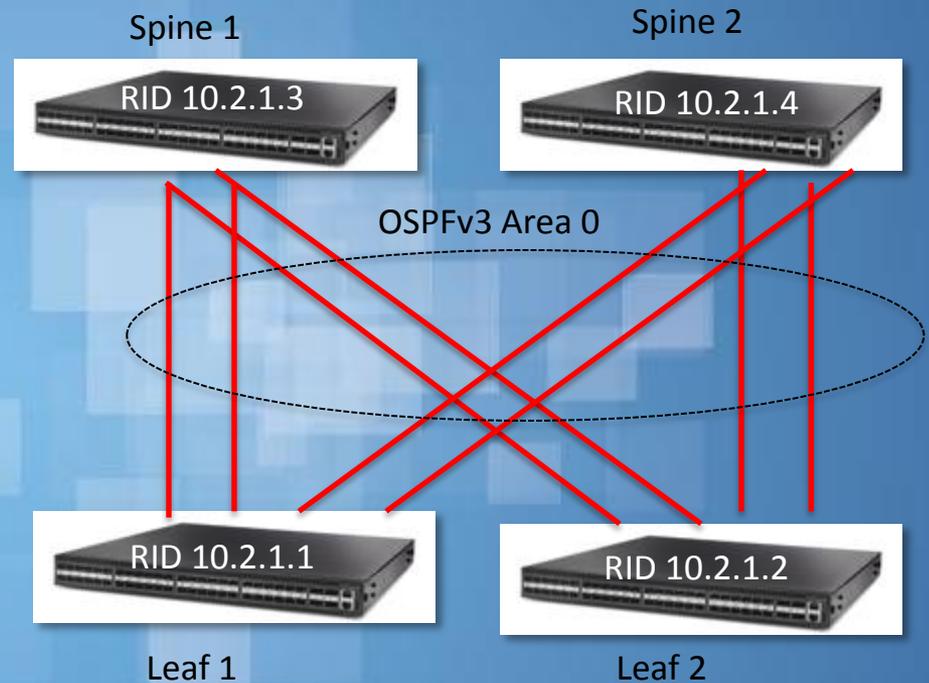
Further Reading

- Infoworld ONL article:

  - http://www.infoworld.com/t/networking/your-next-network-operating-system-linux-228846

- Packet Pushers:

  - http://packetpushers.net/switching-to-linux-for-switches/

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Thank you

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