



EVPN to the host

Host multitenancy

Atilla de Groot

Atilla de Groot | Sr. Systems Engineer, HCIE #3494 | Cumulus Networks

Agenda



EVPN to the Host

- Multi tenancy use cases
- Deployment issues
- Host integration with EVPN
- Caveats and future work

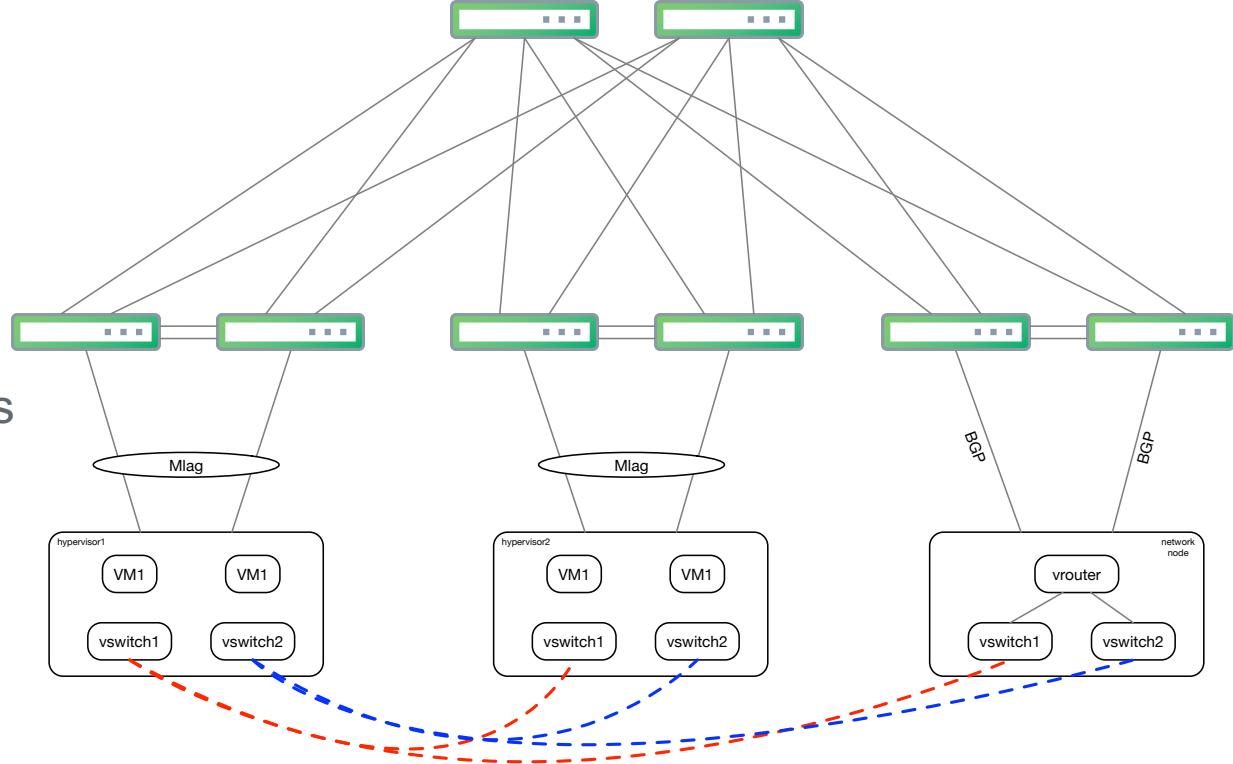
Multi tenancy use cases

Virtualization environments



VM environments

- MLAG to hypervisors
- Vxlan between hosts
- Double overlay
- Dedicated network nodes



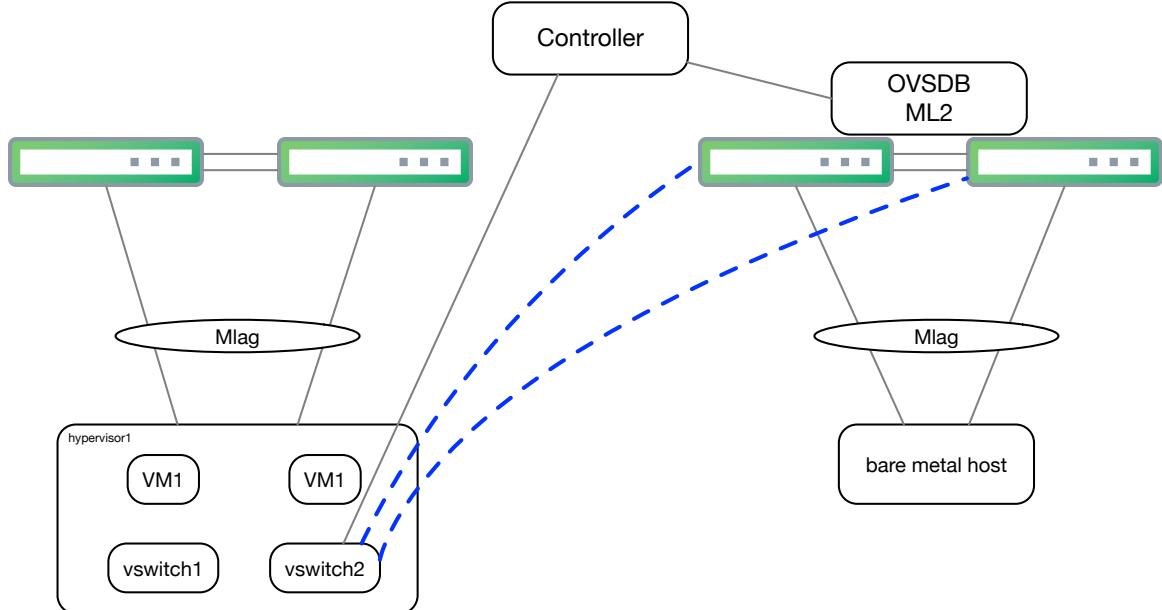
Multi tenancy use cases

VM deployment issues



Architecture issues

- MLAG to hypervisors
- Vxlan between hosts
- Double overlay
- Dedicated network nodes
- Orchestration problems



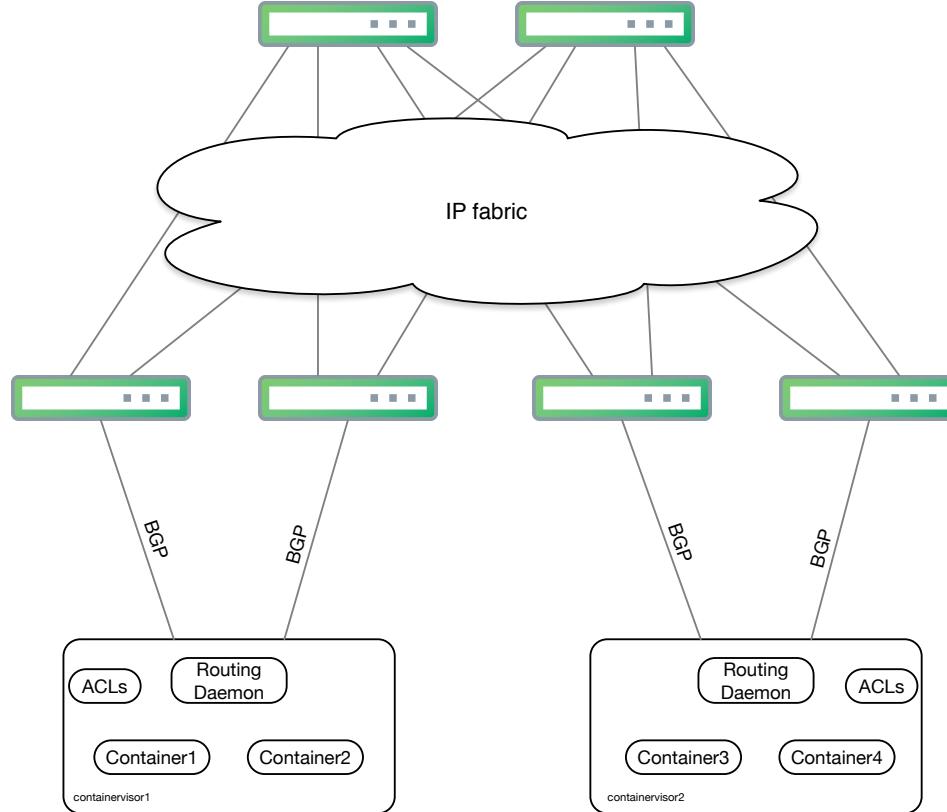


Multi tenancy use cases

Container environments

Container environments

- BGP to hosts
- Host route advertisement
- Docker management
- Container overlay



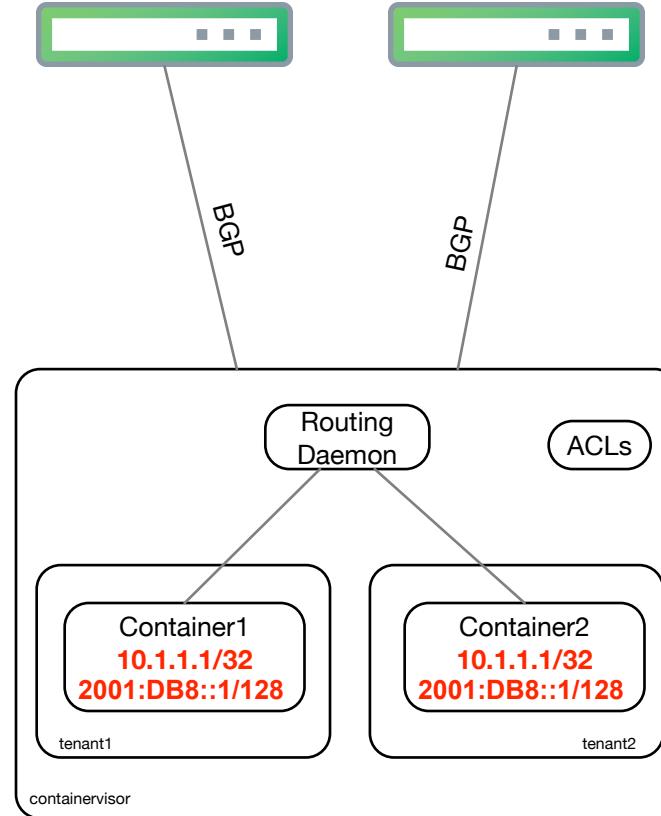


Multi tenancy use cases

Container deployment issues

Architecture issues

- Host networking
- Multi-tenancy
- IP prefix overlap
- ACL management



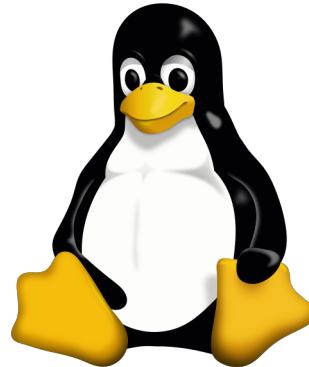
Host integration with EVPN

Open standards



EVPN on hosts

- Vlan aware bridge
- VRF in Linux kernel
- VxLAN
- Free Range Routing with EVPN
- Ifupdown2
- Iproute2



```
cumulus@server01:~$ uname -a
Linux server01 4.17.0-041700-generic #201806041953 SMP Mon
Jun 4 19:55:25 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux
```

```
cumulus@server01:~$ vrf list
```

VRF	Table

mgmt	1001
tenant3	1002
tenant2	1003
tenant1	1004



Host integration with EVPN

Host connectivity

Host connectivity

- Routing to hosts
- BGP unnumbered
- RFC5549
- Loopback advertisement
- EVPN address family

```
auto eth1  
iface eth1
```

```
auto eth2  
iface eth2
```

```
interface eth1  
  ipv6 nd ra-interval 10  
  no ipv6 nd suppress-ra  
interface eth2  
  ipv6 nd ra-interval 10  
  no ipv6 nd suppress-ra
```

```
router bgp 65501  
  bgp router-id 10.250.250.1  
  bgp bestpath as-path multipath-relax  
  neighbor FABRIC peer-group  
  neighbor FABRIC remote-as external  
  neighbor FABRIC timers 1 3  
  neighbor eth1 interface peer-group FABRIC  
  neighbor eth2 interface peer-group FABRIC  
!  
  address-family ipv4 unicast  
    redistribute connected route-map loopbacks  
    exit-address-family  
!  
  address-family l2vpn evpn  
    neighbor FABRIC activate  
    advertise-all-vni  
    advertise ipv4 unicast  
    advertise ipv6 unicast  
    exit-address-family  
!  
  route-map loopbacks permit 10  
    match interface lo
```

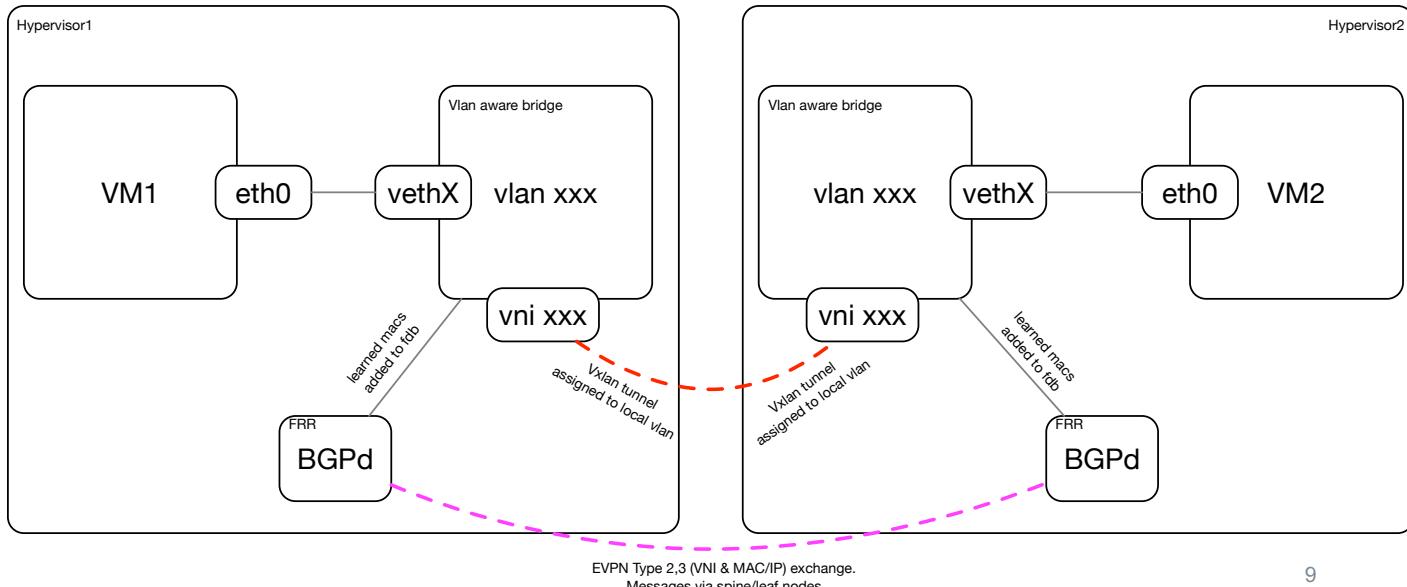
Host integration with EVPN

L2 tenancy



L2 tenancy

- Vlan-aware bridge
- ARP / ND suppression
- L2VNIs
- EVPN Type-2



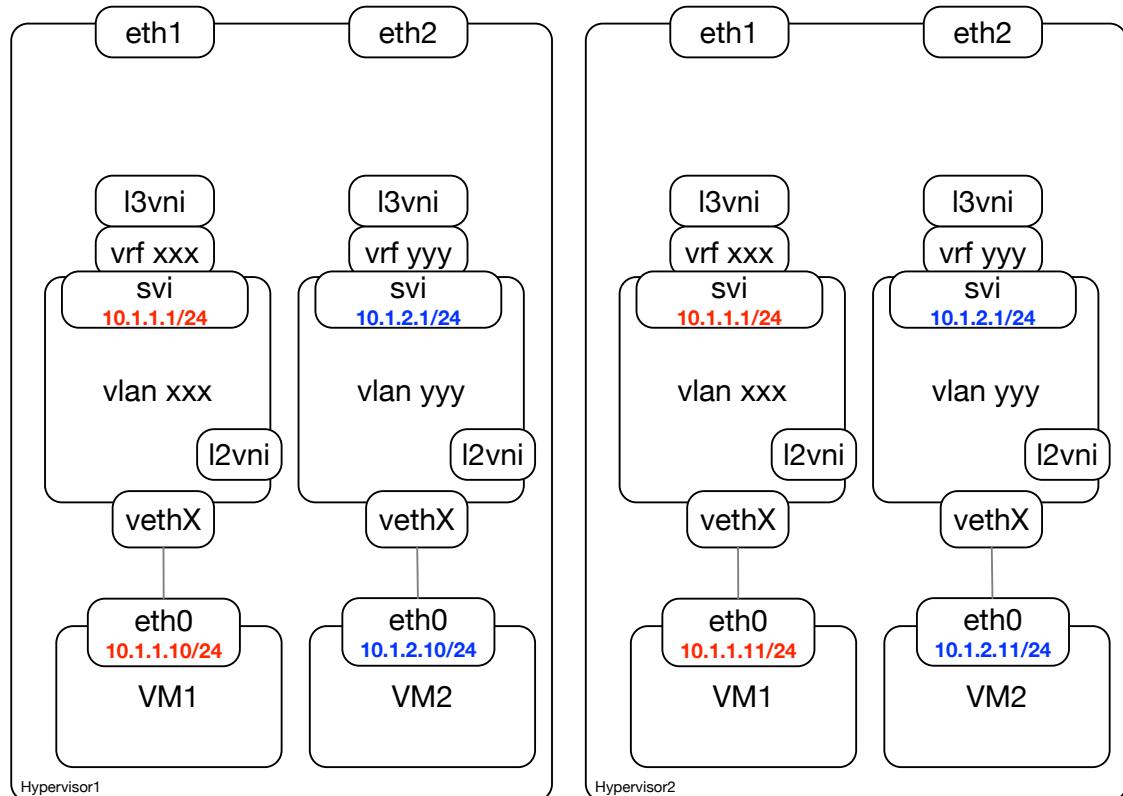
Host integration with EVPN

Distributed routing



Distributed routing

- Gateway location
- SVIs on host
- Anycast gateway
- Local host routing



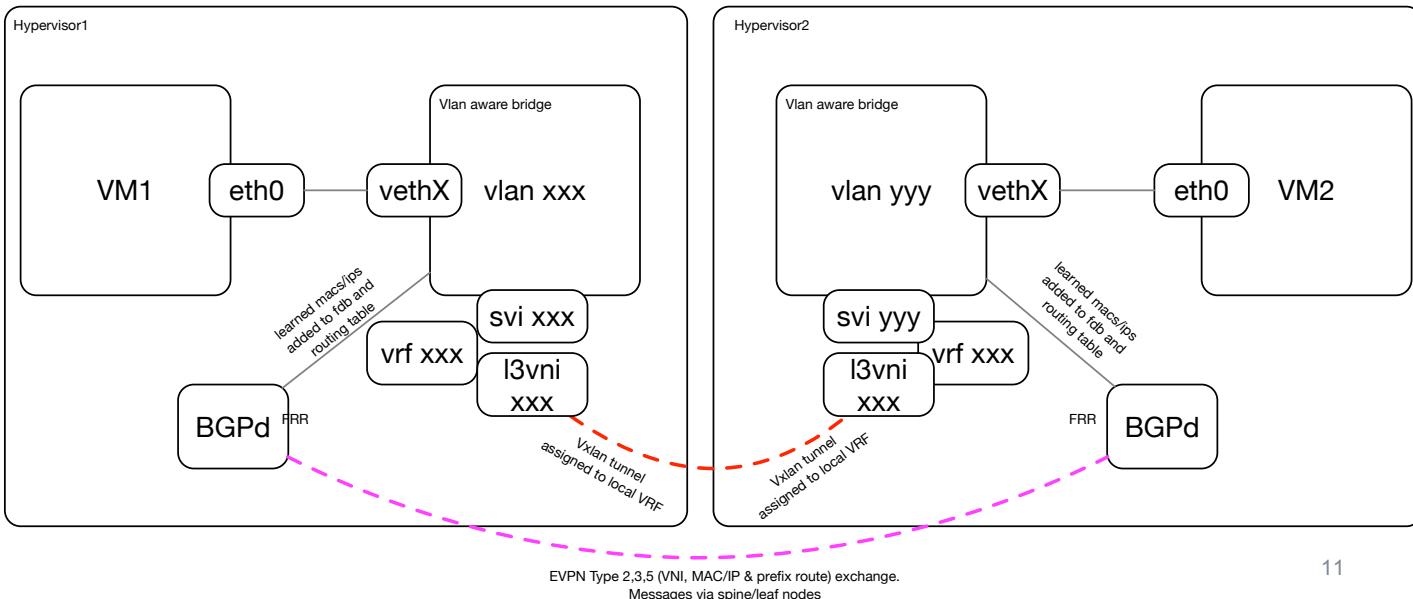
Host integration with EVPN

L3 tenancy



L3 tenancy

- VRFs on host
- Prefix advertisement
- L3VNIs
- EVPN Type-5



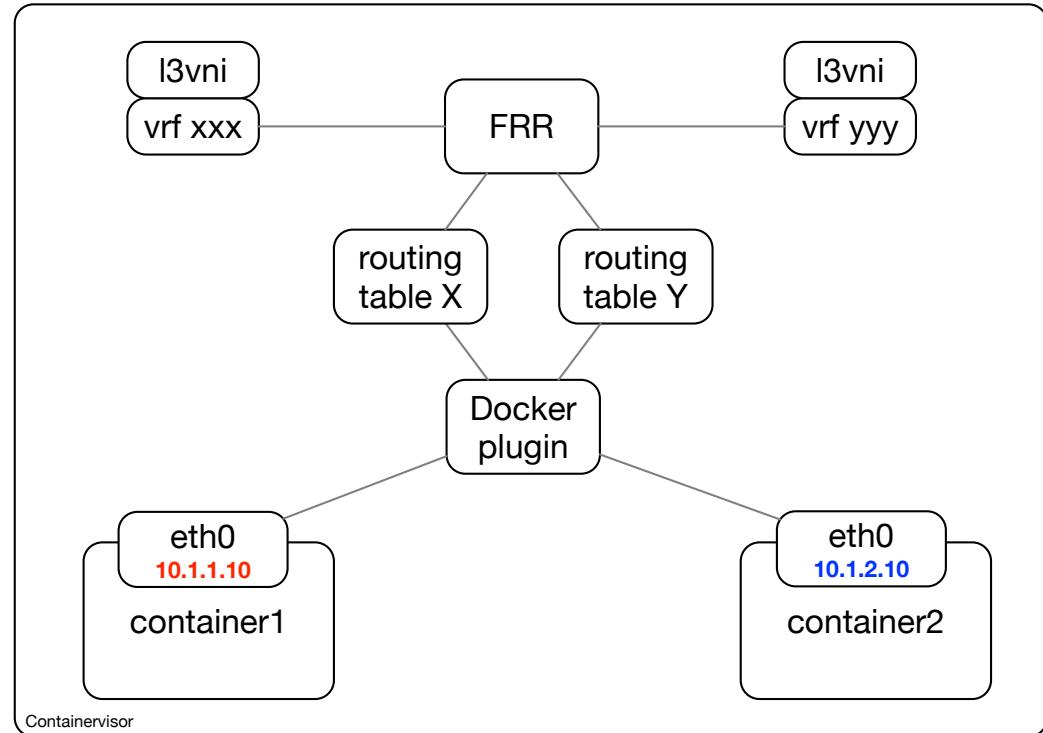
Host integration with EVPN

Container integration



Container integration

- Container IP redistribution
- Host route advertisement
- Prefix overlap
- No ACLs for tenant segregation



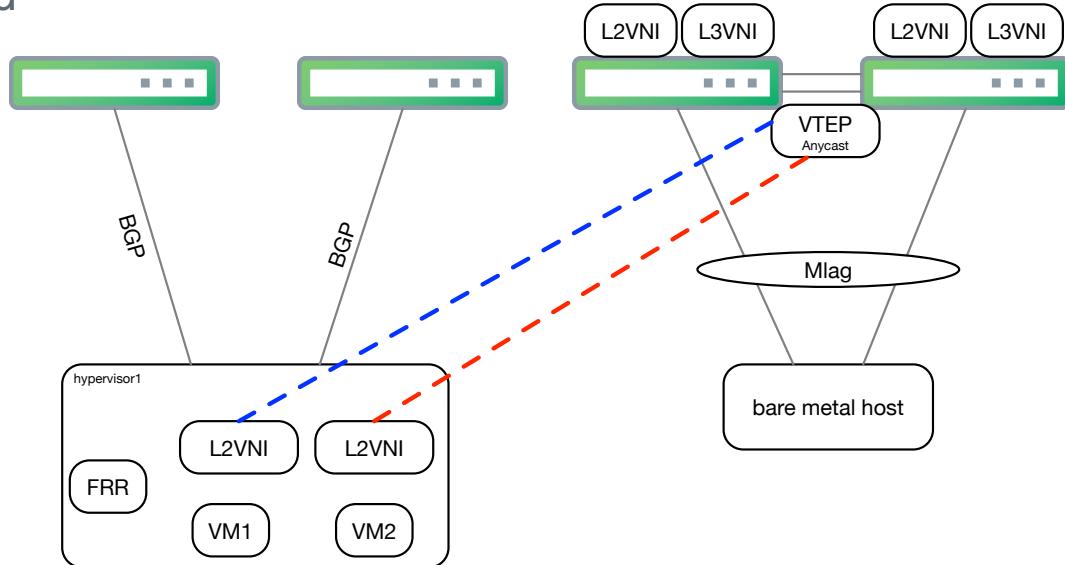
Host integration with EVPN

Bare metal integration



Bare metal integration

- Integration with RFC standard
- L2 stretching
- L3 tenancy
- Distributed routing





Future work

Proof of technology

Proof of technology

- Commercial support
- Software / tools availability
 - Linux kernel
 - FRR
- Demo

```
cumulus@server01:~$ uname -a
Linux server01 4.17.0-041700-generic
#201806041953 SMP Mon Jun 4 19:55:25 UTC
2018 x86_64 x86_64 x86_64 GNU/Linux
```

```
cumulus@server01:~$ bridge vlan
port vlan ids
bridge 1 PVID Egress Untagged
1010
1011
1012
1013
1014
```

VRF	Table
mgmt	1001
tenant3	1002
tenant2	1003
tenant1	1004

```
cumulus@server01:~$ sudo vtysh -c "show bgp evpn vni"
      VNI      Type RD          Import RT          Export RT          Tenant VRF
* 101010    L2  10.250.250.1:5    65501:101010    65501:101010    tenant1
* 101012    L2  10.250.250.1:3    65501:101012    65501:101012    tenant2
* 101014    L2  10.250.250.1:7    65501:101014    65501:101014    tenant3
* 404001    L3  172.30.11.1:8     65501:404001    65501:404001    tenant1
* 404002    L3  172.30.13.1:9     65501:404002    65501:404002    tenant2
* 404003    L3  172.30.15.1:10    65501:404003    65501:404003    tenant3
```



Future work

Orchestration & Caveats

Orchestration

- Openstack neutron
- Kubernetes / Swarm
- Host / Network management

Head-end replication

- BUM anycast
- Merchant silicon limitations
- Multicast replication
- PIM-SM



Future work

Route leaking & Micro segmentation

Route-leaking

- Inter tenant traffic
- Service tenant
- FRR implementation

Micro segmentation

- Host traffic filtering
- Filtering with BPF
- Flowspec for ACL distribution

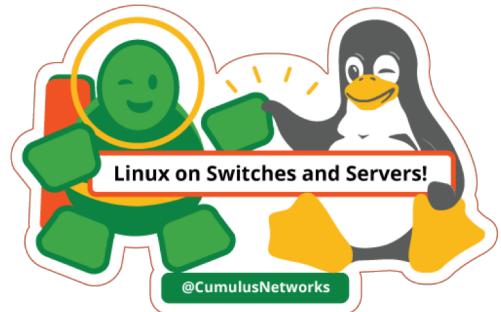


EVPN to host demo





Questions ?





Thank you!

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