

The background features a dark grey grid with various network-related icons. On the left, there are three large circular icons with black outlines and green arrows pointing left, right, and then left again. In the center, there is a white circle with a black outline containing a white double-headed arrow. To the right of this is the text 'vs' in a large, white, sans-serif font. The background also includes smaller green circular icons with arrows, hexagonal shapes, and dashed lines, suggesting a network or data flow theme.

OVN

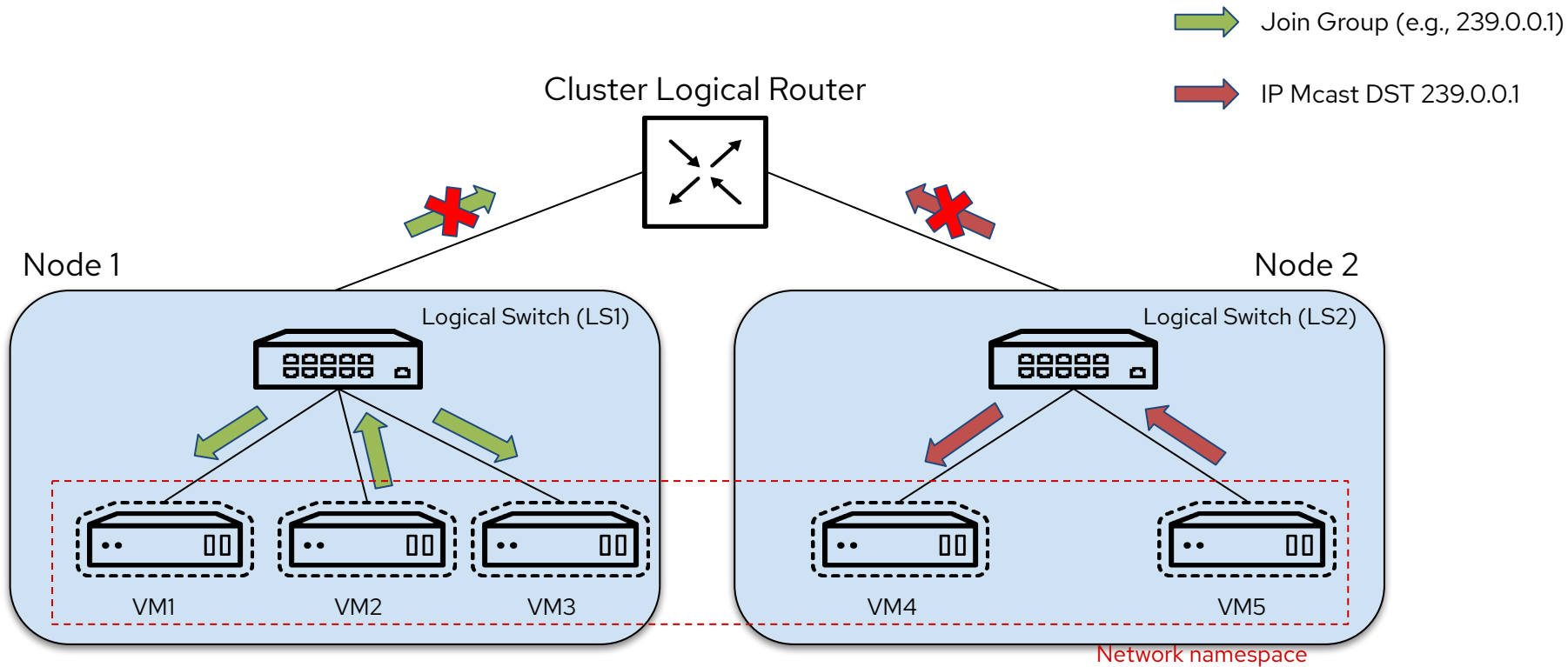
Open vSwitch

December 10-11, 2019 | Westford, MA

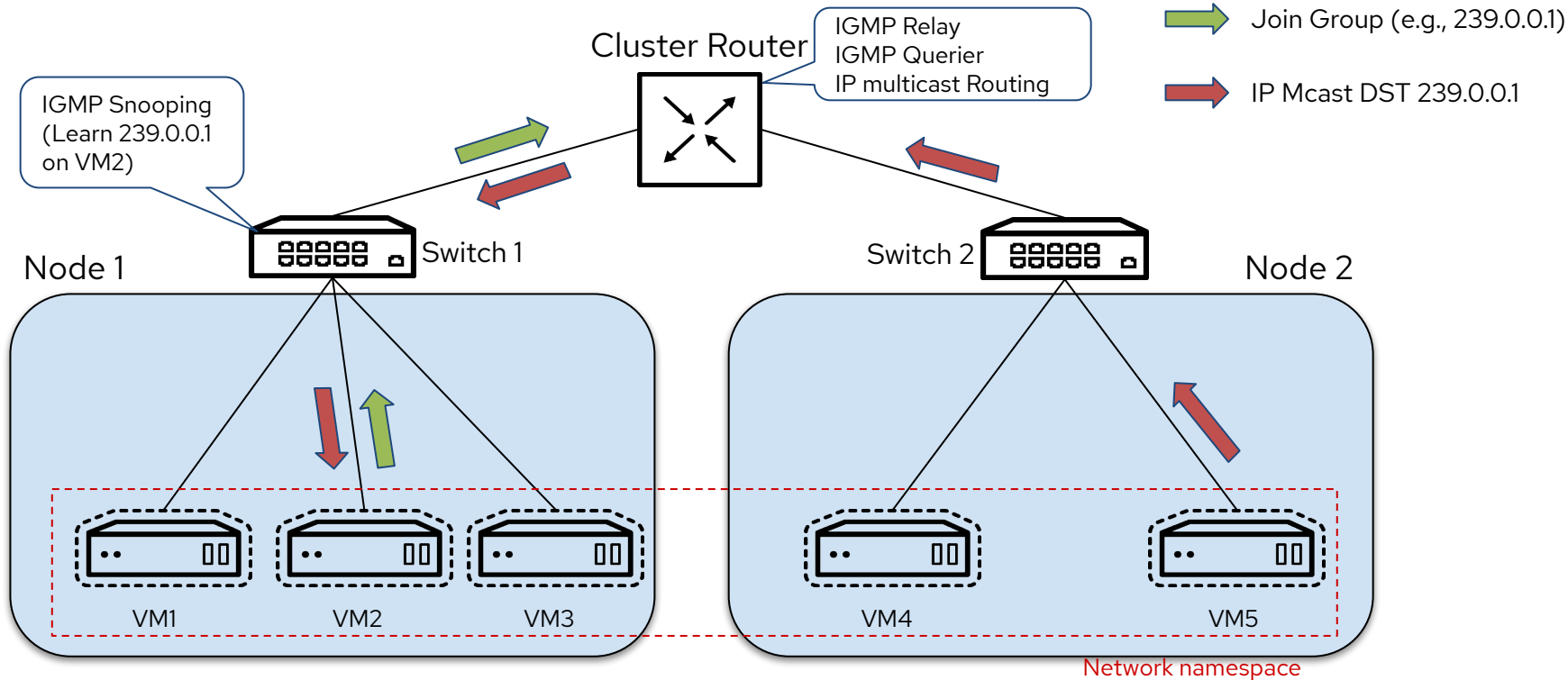
IP Multicast in OVN IGMP Snooping and Relay

Dumitru Ceara, Red Hat

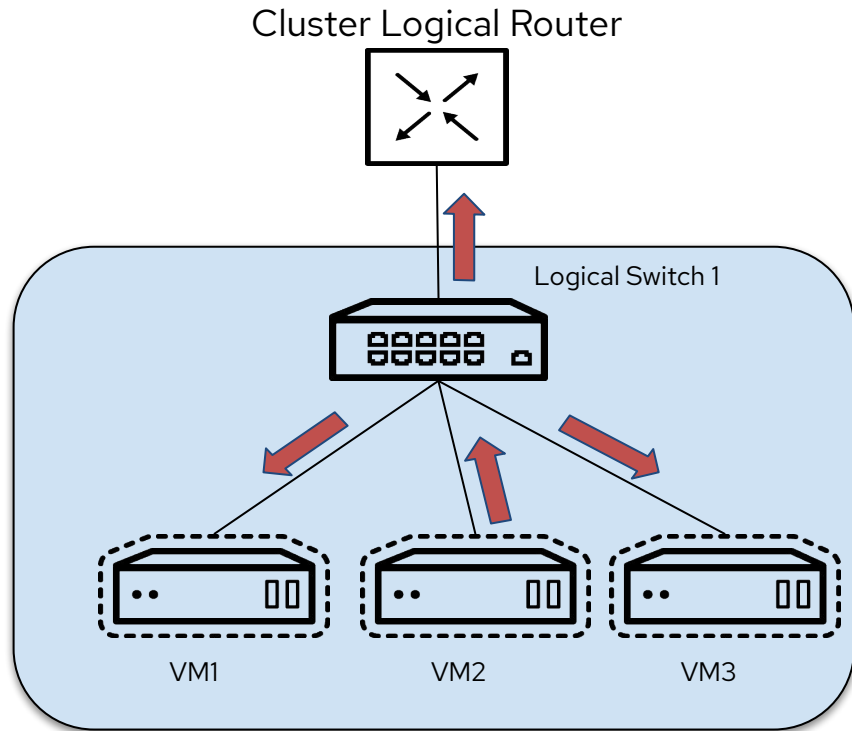
Problems with IP Multicast in OVN



"Traditional" networking use case



IP Multicast in an OVN logical switch (no snoop)



➔ IP Mcast DST 239.0.0.1

`Logical_Flow: match=ip4.mcast, action=output(MC_FLOOD)`

`Multicast_Group: name=MC_FLOOD, ports={vm1,vm2,vm3,sw1-lrp}`

Simplified OVS Flows (in sequence):

`SetReg(LogOutPort=vm1),resubmit(egress_pipeline)`

`SetReg(LogOutPort=vm2),resubmit(egress_pipeline)`

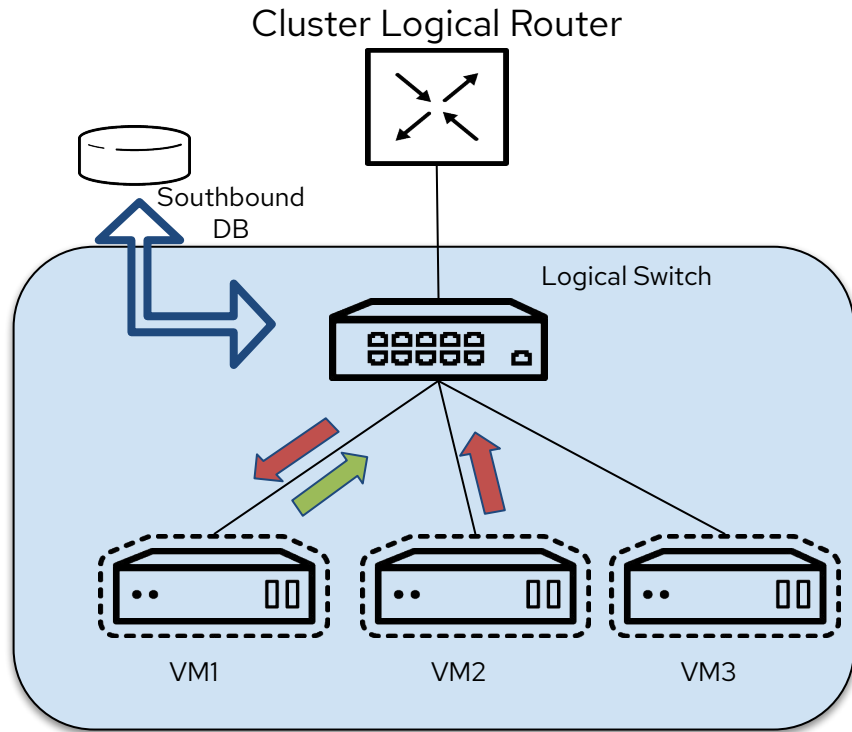
`SetReg(LogOutPort=vm3),resubmit(egress_pipeline)`

`SetReg(LogOutPort=sw-lrp),resubmit(egress_pipeline)`

Issues:

- Flood to all switch ports
- Multicast_group implementation requires sequentially executing the pipeline for each port in the flood group (4k resubmit limit)

IP Multicast in an OVN logical switch (with snoop)



➡ Join Group (e.g., 239.0.0.1)

Logical_Flow: match=igmp,action=controller(...)

IGMP_Group: datapath=LS,ports={vm1},chassis=Node1

ovn-northd (update Southbound DB):

Multicast_Group(MC-239.0.0.1, ports={vm1})

Logical_Flow(239.0.0.1, output(MC-239.0.0.1))

➡ IP Mcast DST 239.0.0.1

Logical_Flow: match=ip4.dst==239.0.0.1,action=output(239.0.0.1)

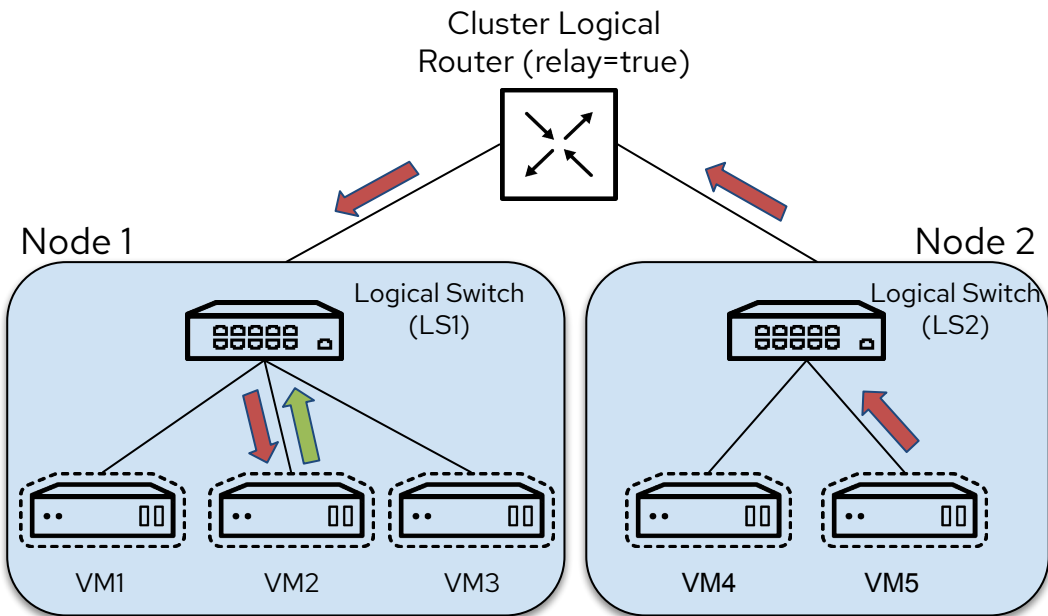
Multicast_Group: name=239.0.0.1, ports={vm1}

Simplified OVS Flows (in sequence):

SetReg(LogOutPort=vm1),resubmit(egress_pipeline)

Quite similar to "traditional" snooping!

Now let's route..



➡ Join Group (e.g., 239.0.0.1)

Logical_Flow: match=igmp,action=controller(...)

IGMP_Group: datapath=LS,ports={vm1},chassis=Node1

ovn-northd (update Southbound DB):

Multicast_Group(LS1,MC-239.0.0.1,ports={vm1})

Logical_Flow(LS1,239.0.0.1,outputport(MC-239.0.0.1))

Multicast_Group(LR, MC-239.0.0.1, ports={rtr-ls1})

Logical_Flows(239.0.0.1,outputport(MC-239.0.0.1),dec_ttl, update_mac)

➡ IP Mcast DST 239.0.0.1

Logical_Flow: LS2,match=ip4.mcast,
action=clone(MC_MRROUTER_FLOOD)

Multicast_Group: LS2,name=MC_MRROUTER_FLOOD,
ports={sw2-lrp}

Logical_Flow: LR,match=ip4.dst==239.0.0.1,
action=outputport(MC-239.0.0.1)

Multicast_Group: LR,name=239.0.0.1, ports={lrp-sw1}

Logical_Flow: LS1,match=ip4.dst==239.0.0.1,
action=outputport(MC-239.0.0.1)

Multicast_Group: LS1,name=239.0.0.1, ports={vm2}

Status, future work, potential issues

IGMP Snooping and Querier:

- available in OVN 2.12

IGMP Relay:

- available in OVN master

Static Multicast configuration:

- allows per port flood configuration for multicast
- enables connectivity to upstream multicast routers
- available in OVN master

Concerns:

- additional load on ovn-controller and ovn-northd
- the 4k resubmit limit is harder to reach for IP multicast traffic but still possible if many hosts join the same groups
- IPv6 support (MLD) to be implemented

Thanks!

