

XenSummit



SDN - Openflow + OpenVSwitch + Quantum

Luiz Ozaki

Locaweb

August 27-28, 2012
San Diego, CA, USA



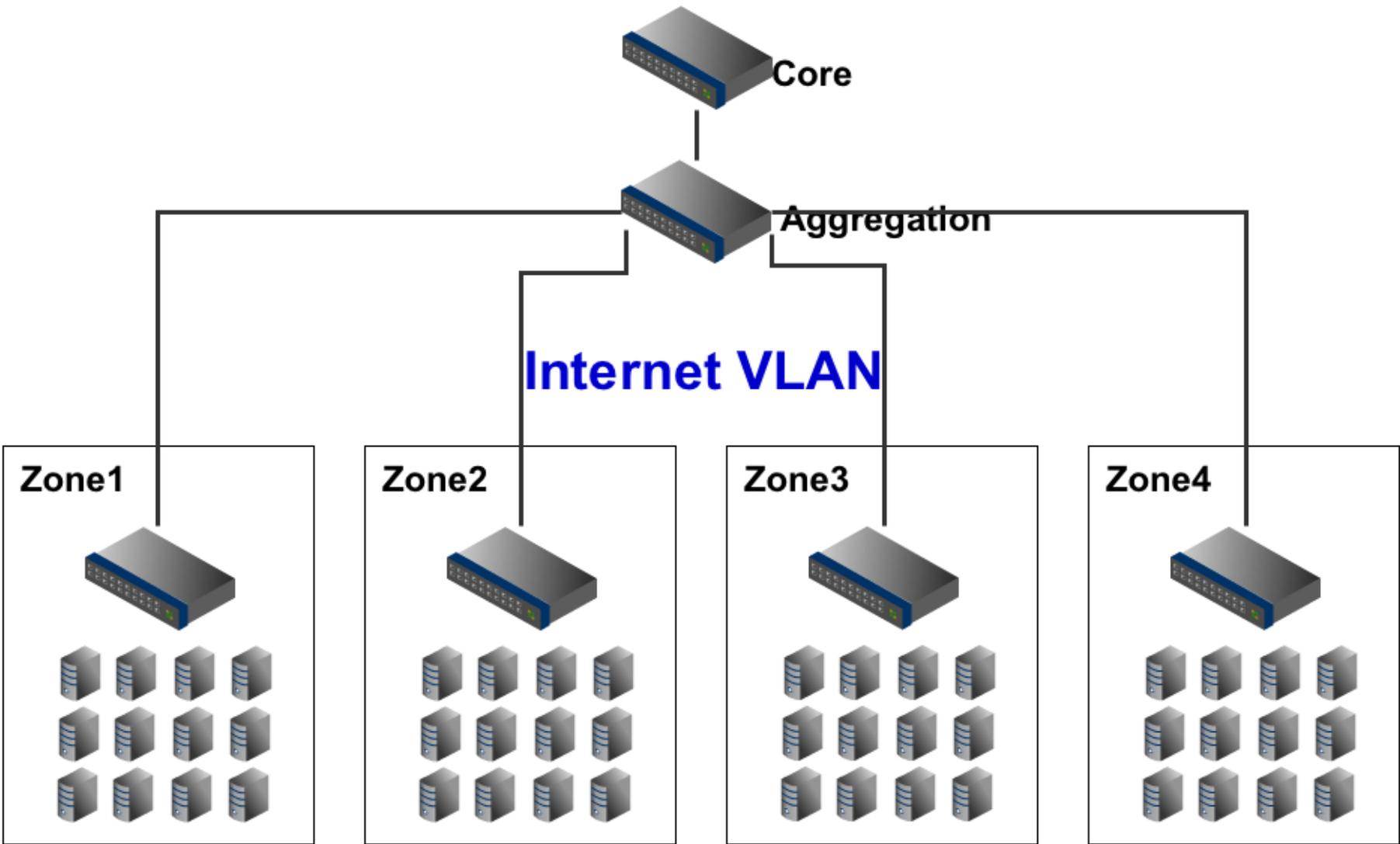
Agenda

- Locaweb
- Motivation
- SDN
- OpenVSwitch
- Openflow
- Quantum
- Future
- Summary

Locaweb

- September, 2008 - Locaweb Cloud Computing solution released
- 4.409 Cloud customers*
 - +15% @ SDN Infrastructure - Released April
- Total +10000 Clouds
- 3 datacenters (SPO - JK, SPO - ITA, MIA)
- Leader in Hosting in Brazil and Latin America**
- IaaS, PaaS, SaaS

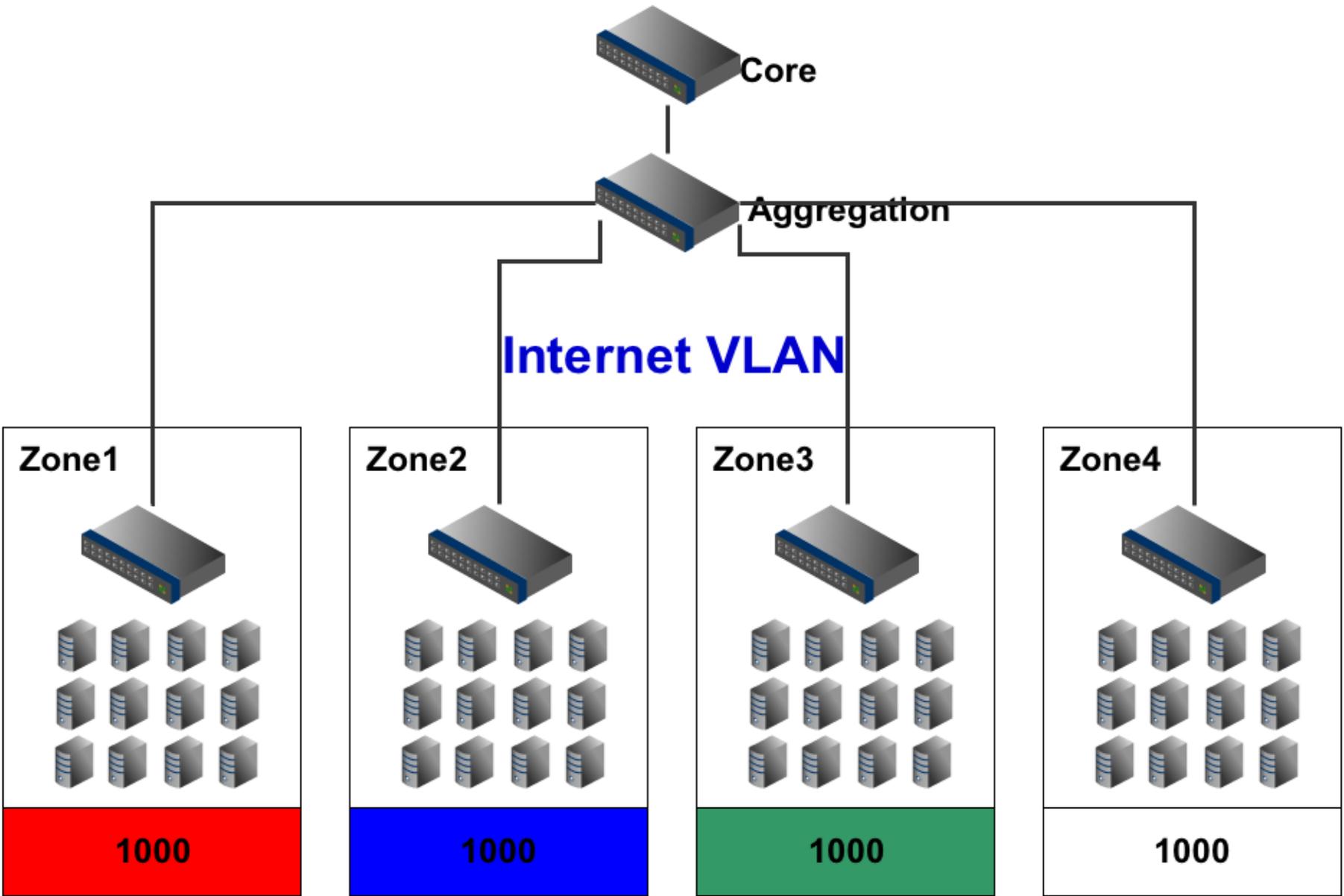
Architecture Evolution

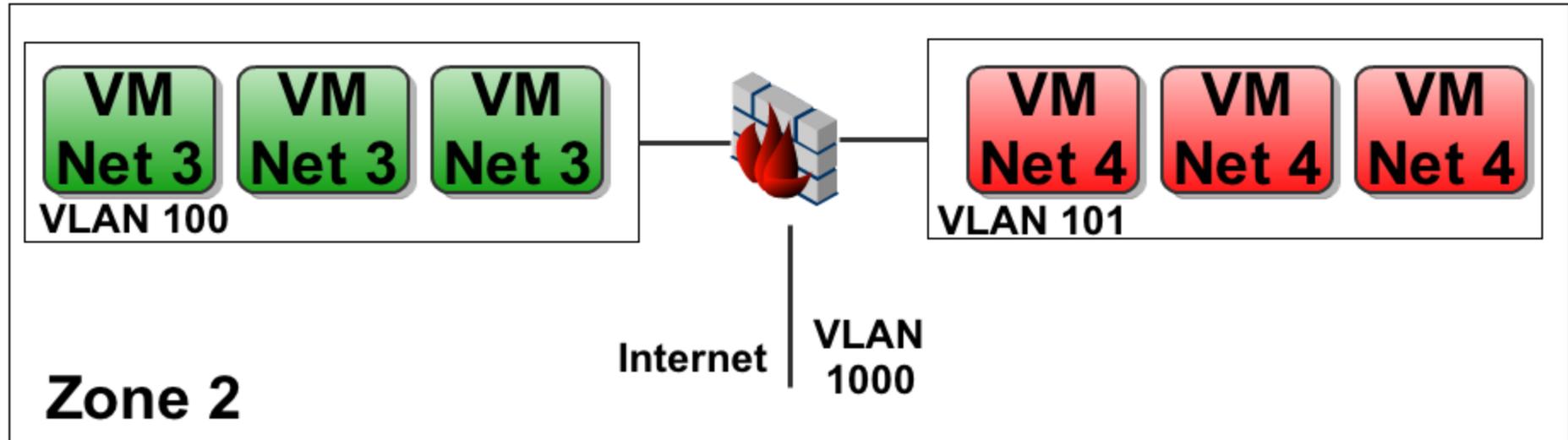
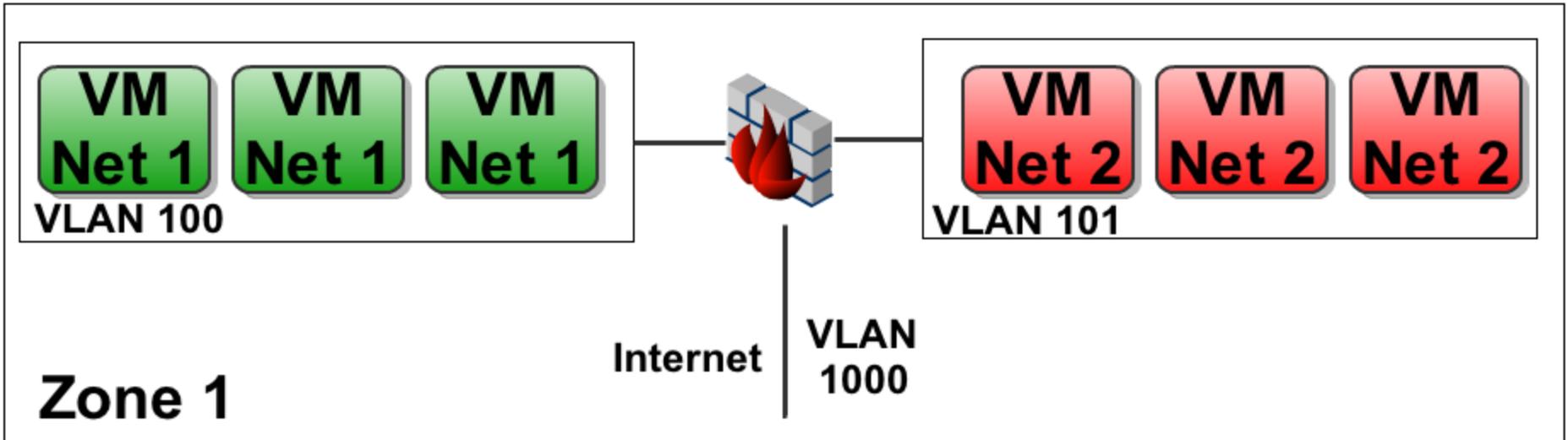


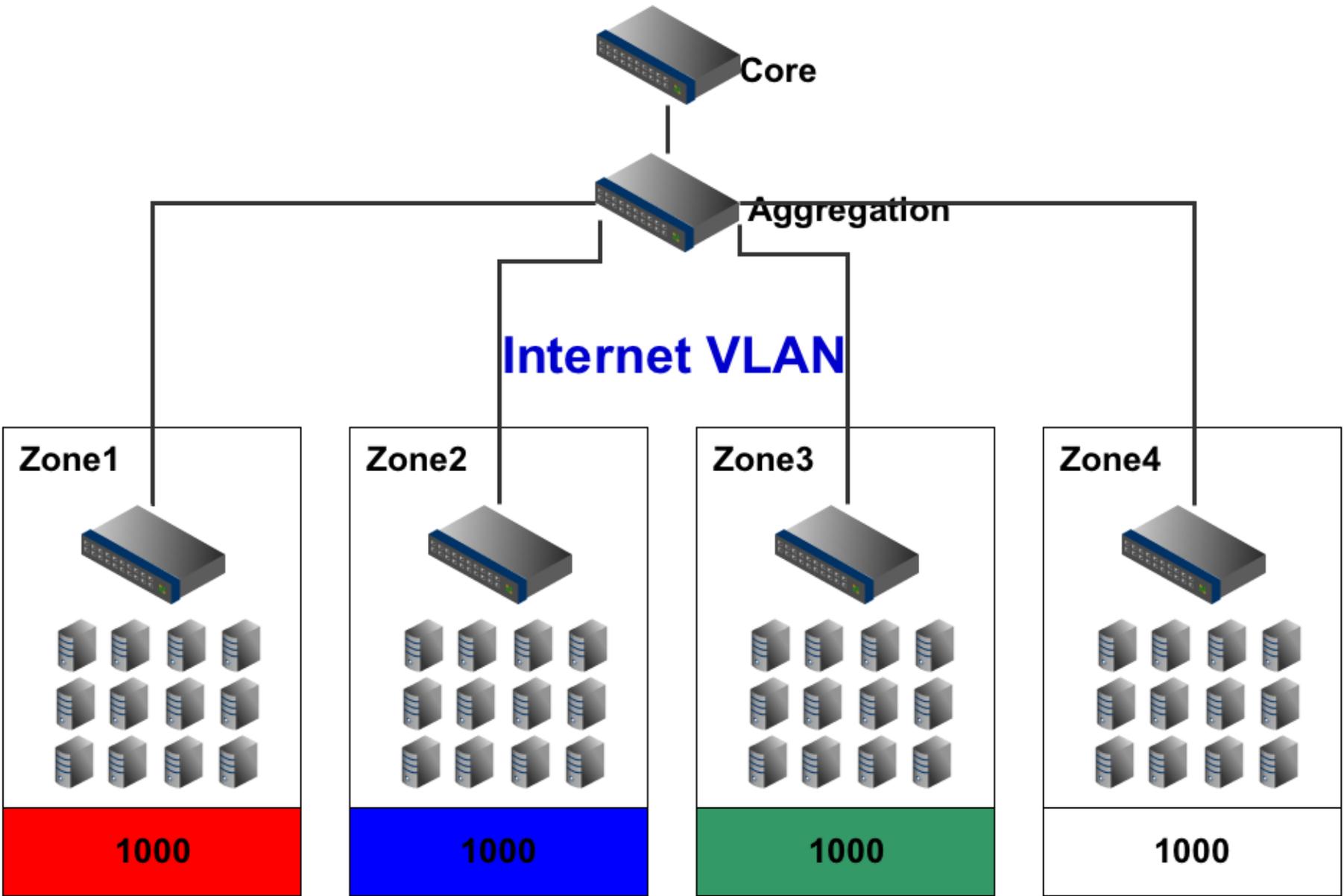
Motivation

- VLANs
 - Cloud <> Physical
 - Cloud <> Cloud
 - Cloud <> Storage
- Multi-tenancy
- 10 Gbps
- East/west traffic

- VLANs limitation
- NAT ?







Motivation

- VLANs
 - Cloud <> Physical
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 - VLANs limitation
 - NAT ?
- ## New network

Motivation

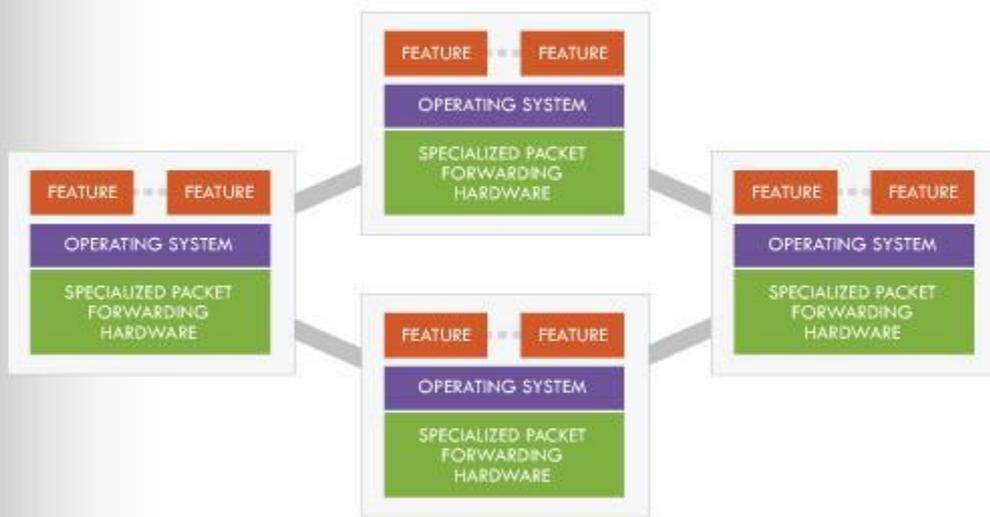
- Vendor solutions available
 - VXLAN
 - NVGRE
 - Q-n-Q
 - Proprietary Solutions
 - More

Motivation

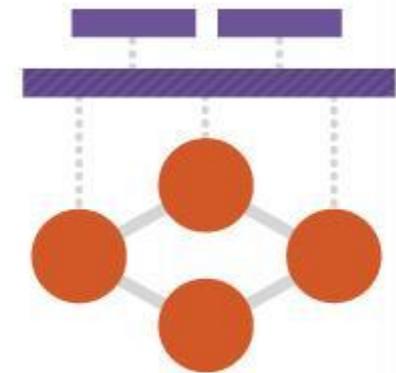
- Vendor solutions available
 - VXLAN
 - NVGRE
 - Q-n-Q
 - Proprietary Solutions
 - More
- Opensource solutions available
 - EBTables/Iptables
 - OpenVSwitch
 - Openflow

SDN

OpenFlow/SDN Difference



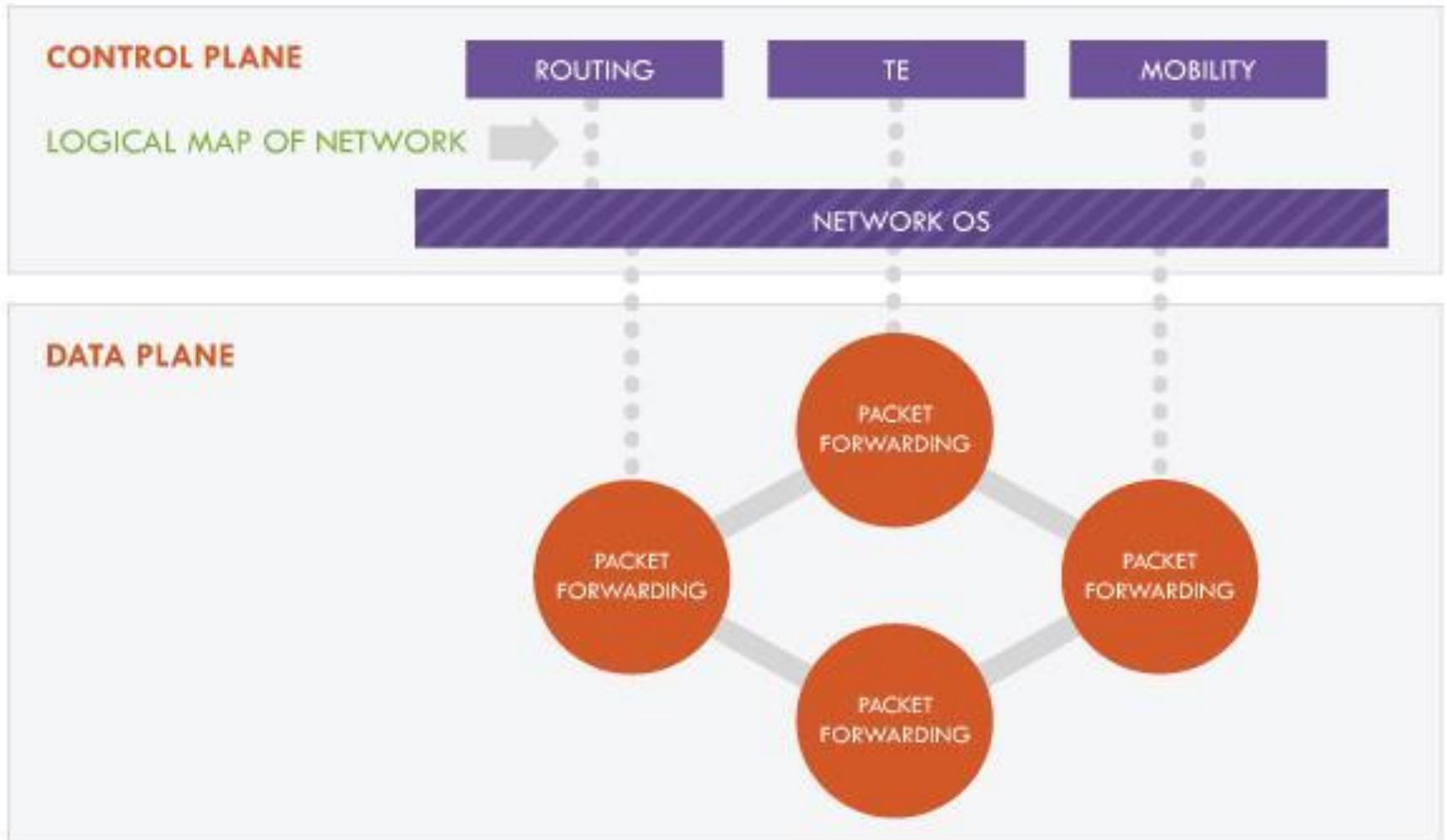
Network of vertically integrated,
closed, proprietary switches



OpenFlow/SDN:

- Separation of control and data plane
- Open interface between control and data plane
- Open interface to the control plane
- Network control and management features in software

SDN



OpenFlow

2008 - The OpenFlow Switching specification was created in 2008 to evangelize and support OpenFlow. Although hosted at Stanford University, our goal is for OpenFlow to be owned by the community – for the betterment of research and innovation in networking.

Openflow

- **Match**

- **in_port**
- **dl_vlan**
- **dl_src**
- **dl_dst**
- **dl_type**
- **nw_dst**
- **nw_src**
- **nw_proto**
- **tp_src**
- **tp_dst**

- **Action**

- **strip_vlan**
- **mod_vlan_vid**
- **mod_***
- **output**

Switch

Switch Port	Src MAC	Dst MAC	Eth Type	VLAN	Src IP	Dst IP	Proto	S-port	D-port	Action
-	-	00:01	-	*	-	-	-	-	-	FWD

Firewall

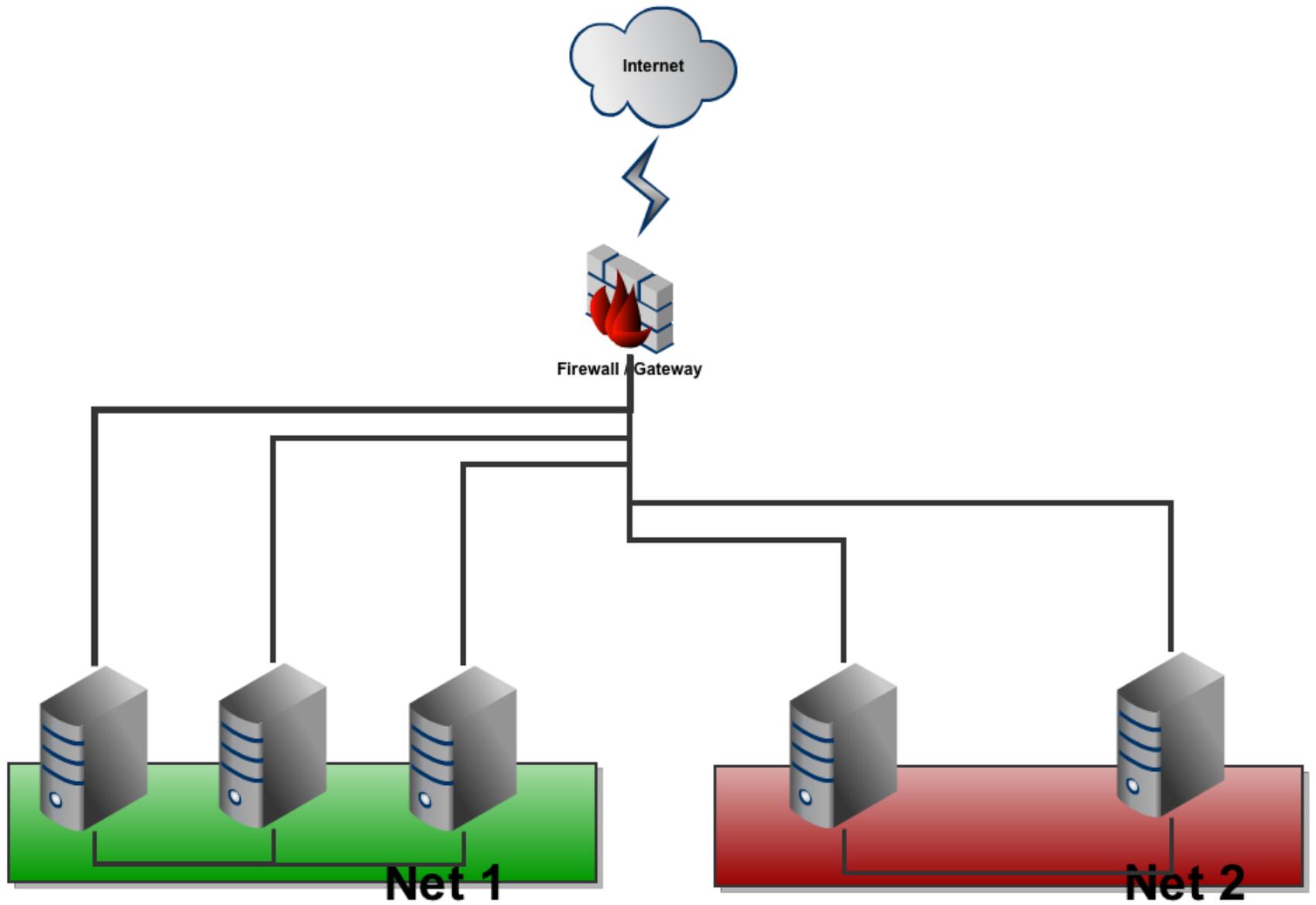
Switch Port	Src MAC	Dst MAC	Eth Type	VLAN	Src IP	Dst IP	Proto	S-port	D-port	Action
-	-	-	-	-	192...	10...	TCP	*	80	FWD

Route

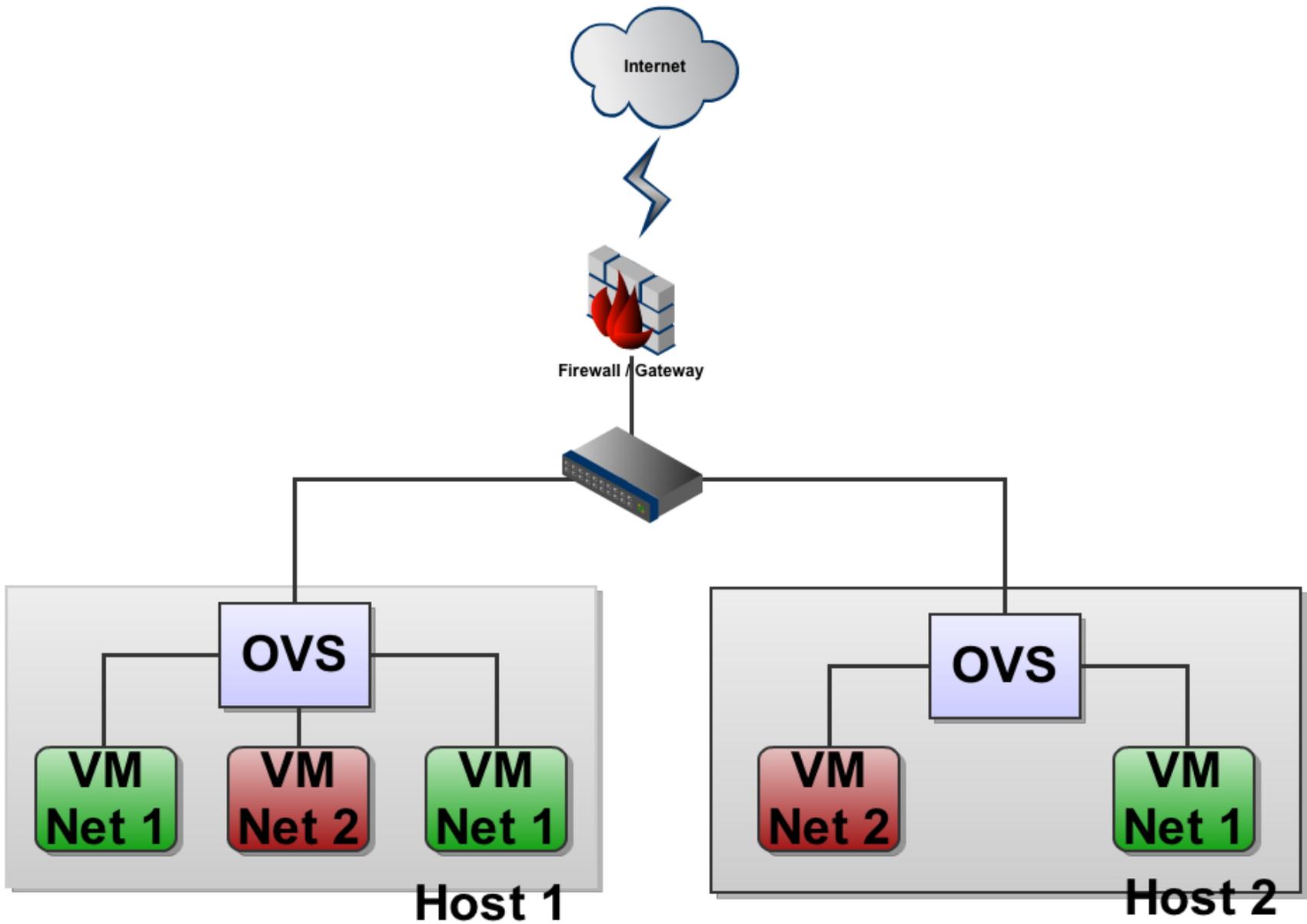
Switch Port	Src MAC	Dst MAC	Eth Type	VLAN	Src IP	Dst IP	Proto	S-port	D-port	Action
-	-	-	-	-	-	10...	-	-	-	port10

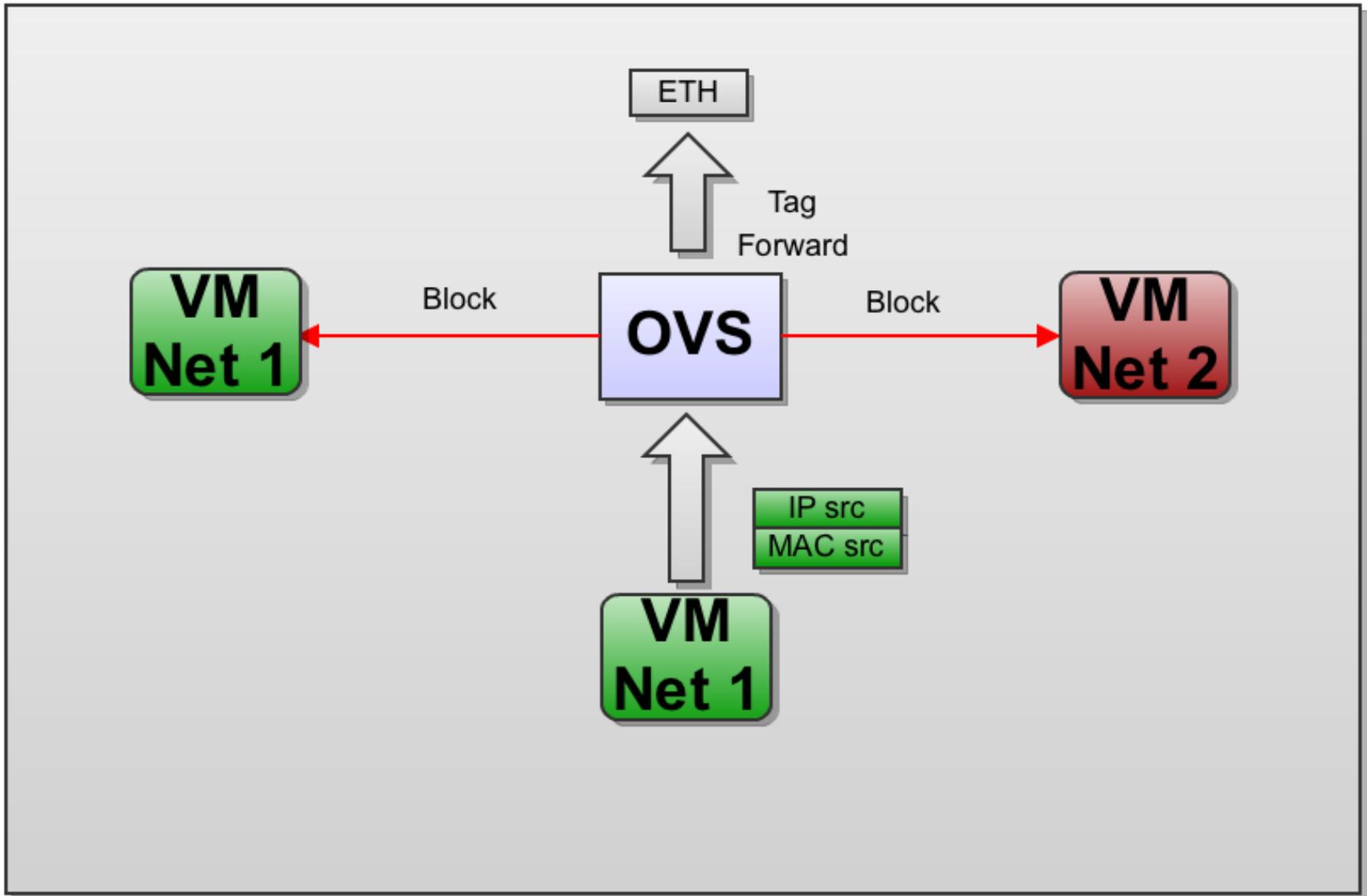
Flow

Switch Port	Src MAC	Dst MAC	Eth Type	VLAN	Src IP	Dst IP	Proto	S-port	D-port	Action
10	00:02	00:01	0800	10	10...	192...	tcp	12345	80	port22



**Network
Abstraction**





Unicast Out

Host

Openflow

priority=40000,

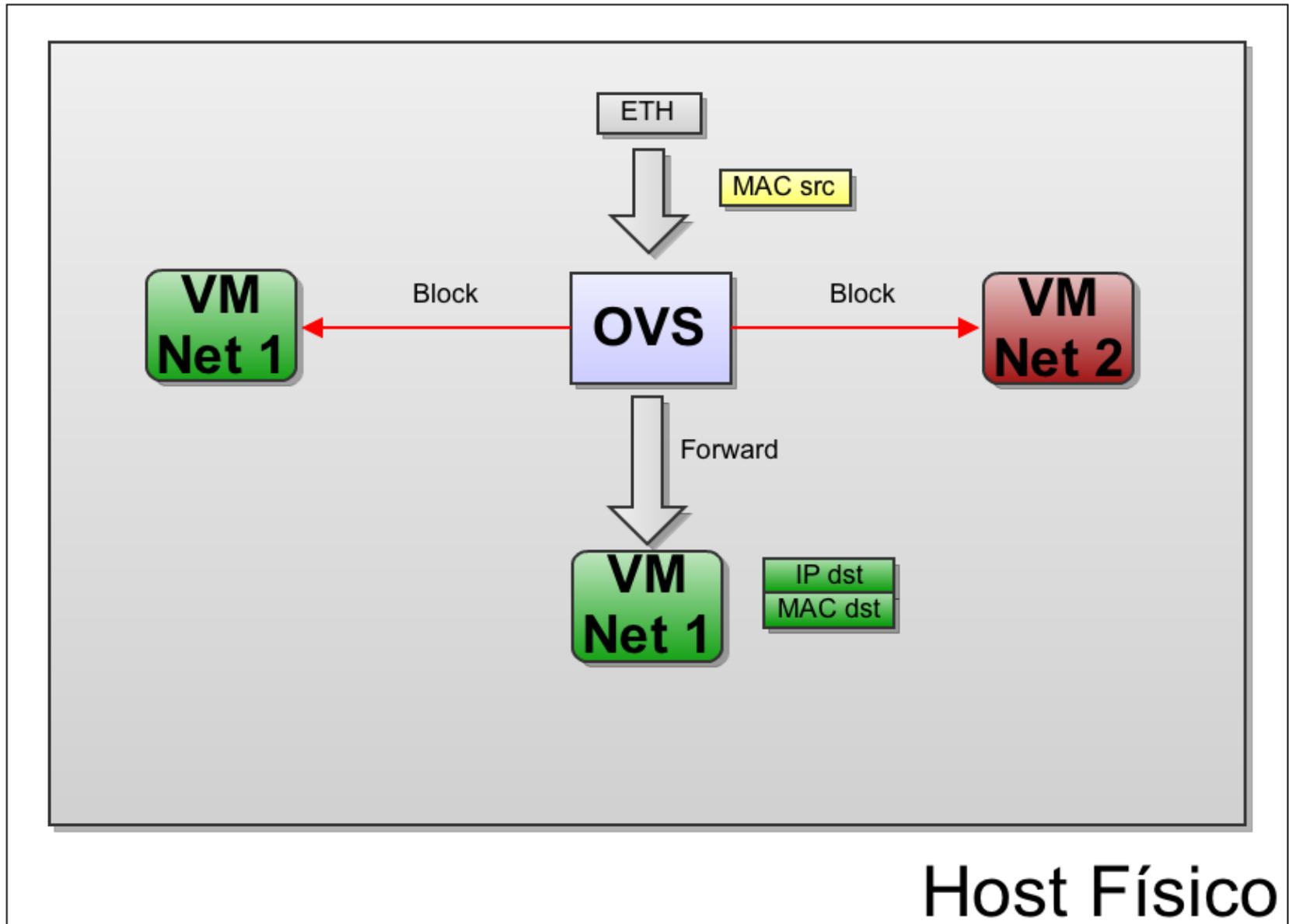
ip,

in_port=60,

dl_src=fa:5d:aa:ac:93:fd,

nw_src=186.202.139.5

actions=mod_vlan_vid:325,bundle(eth_
src,0,hrw,ofport,slaves:1,2)



Unicast Inbound

Openflow

priority=25000,

dl_src=44:1e:a1:17:0d:2c,

dl_dst=fa:5d:aa:ac:93:fd

actions=strip_vlan,output:60

Openflow

priority=40000,

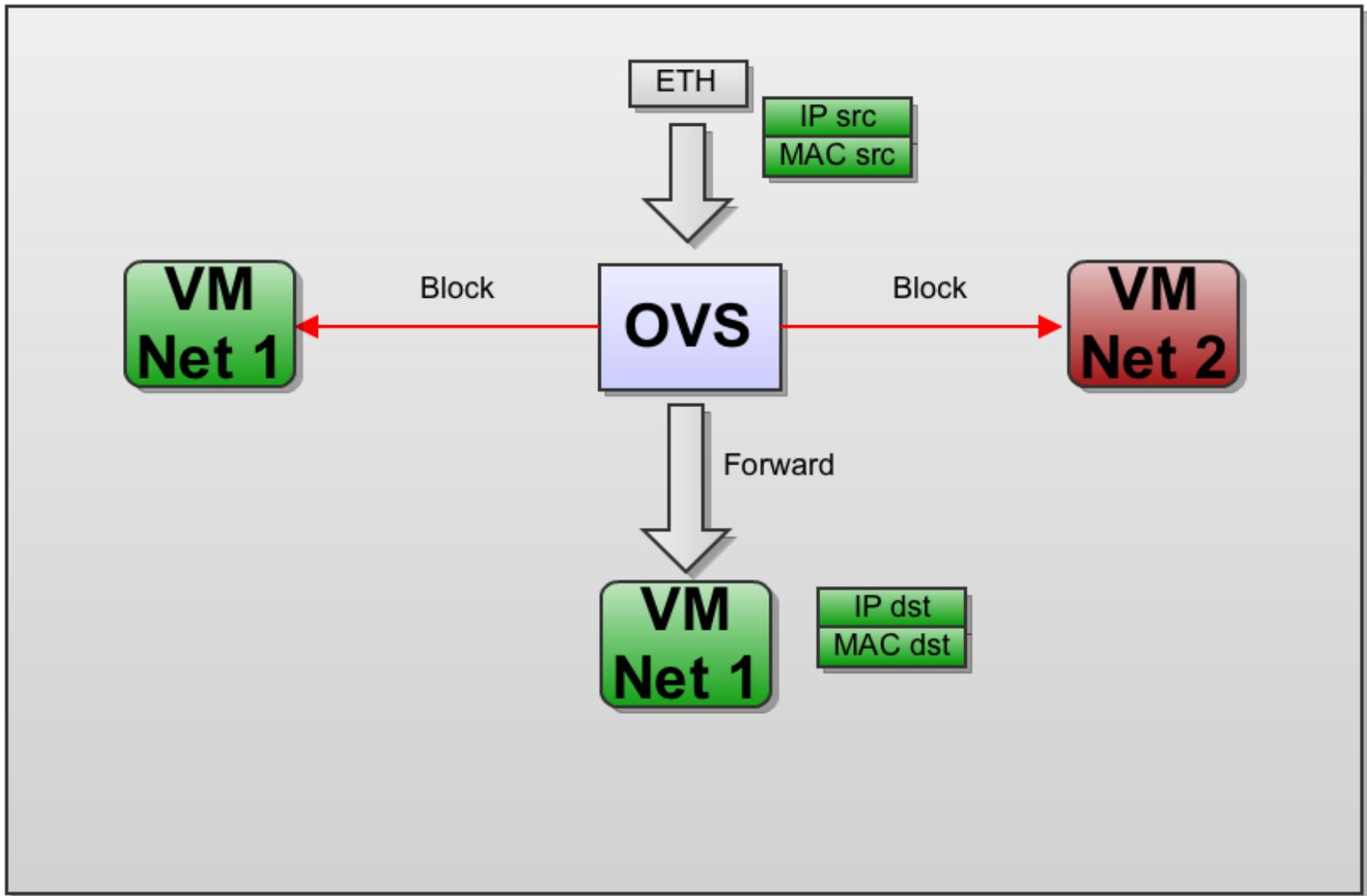
ip,

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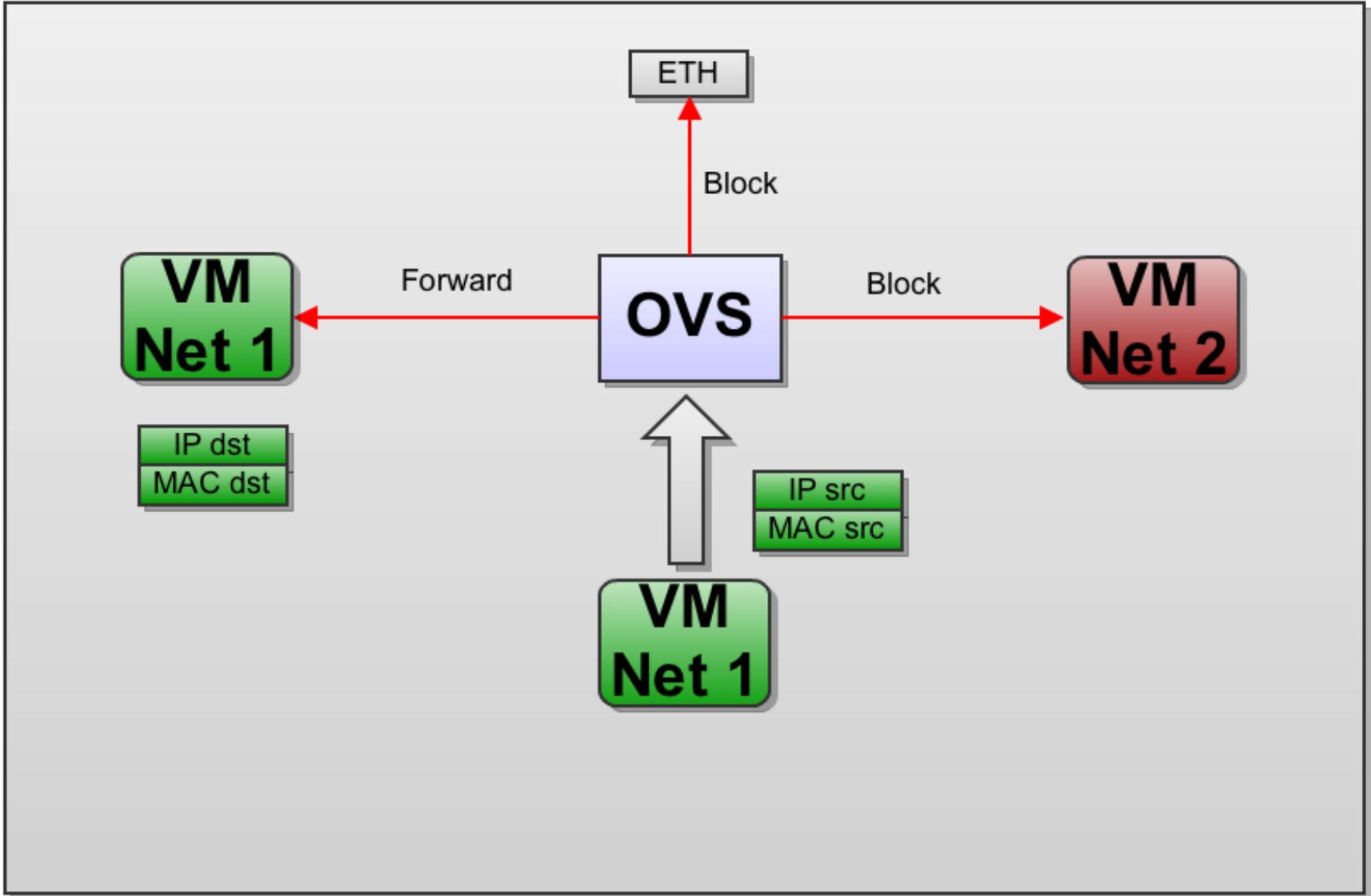
nw_src=186.202.139.5

actions=mod_vlan_vid:325,bundle(eth_src,0,hrw,ofport,slaves:1,2)



Virtual LAN

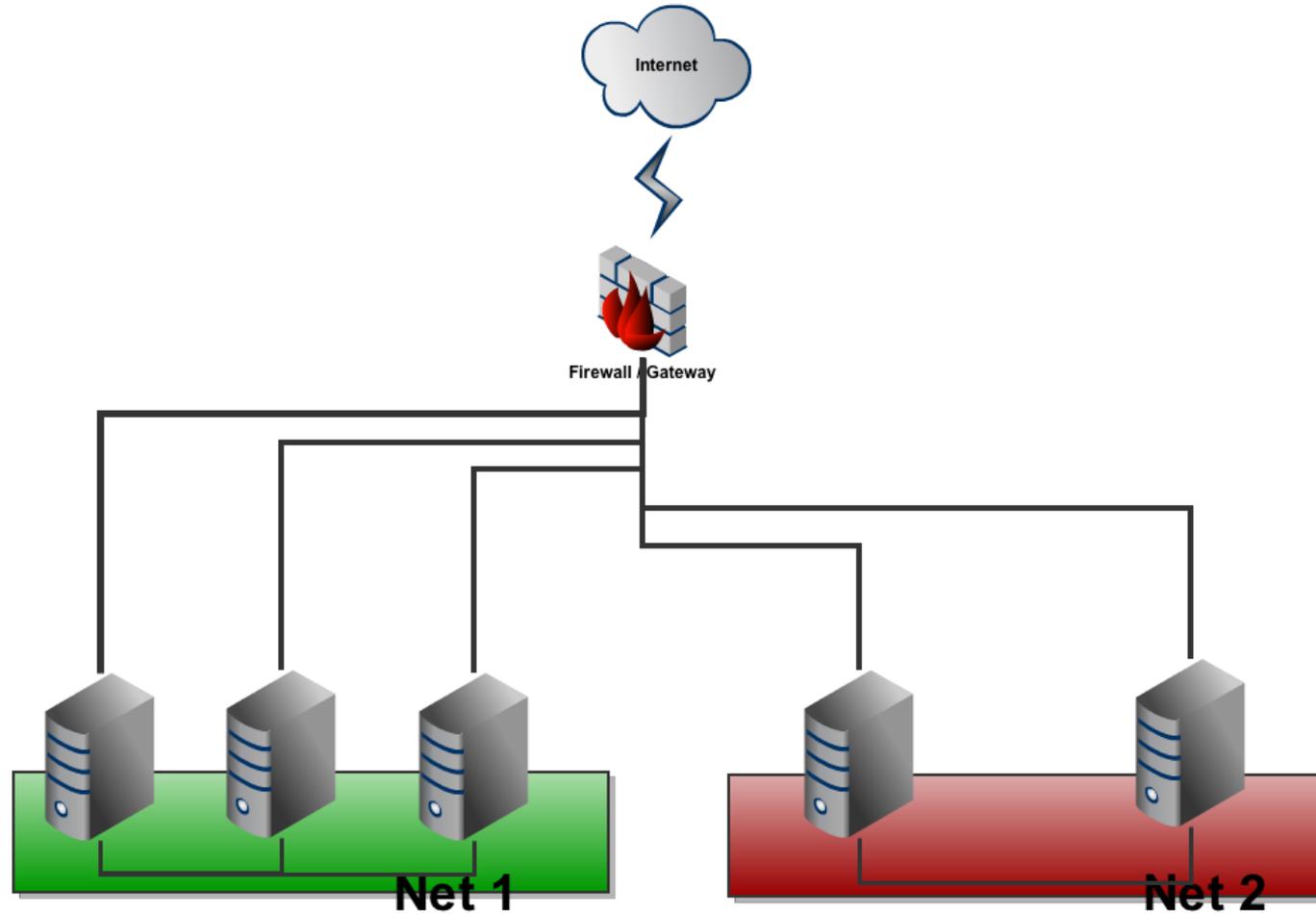
Host



Virtual LAN

Host

Quantum



**Network
Abstraction**

Future

- Better network simulations
- Openflow based Routers
- NAT
- Firewall
- DHCP
- Arp proxy
- Security
- Anti-SPAM
- Load Balance
- etc.....

Summary

- SDN
 - +15% cloud SDN
 - 3900 flow/seg (average)
 - 6000 flow/seg (peak)
 - Low impact implementation
 - Physical switches compatibility (Openflow 1.0)
 - Better self-demand driven
 - Unified Management (API)

Links

- <https://github.com/locaweb/quantum>
- <http://openvswitch.org>
- <http://openflowhub.org>
- <http://www.openflow.org>
- <https://www.opennetworking.org>
- <http://opennetsummit.org>
- <https://github.com/trema/trema>

XenSummit



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Questions ?

Luiz Ozaki

luiz.ozaki at gmail.com

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A panoramic view of a city skyline with various skyscrapers and buildings under a clear blue sky.

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Thank you !

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A dark, calm body of water reflecting the sky and buildings from the top image.