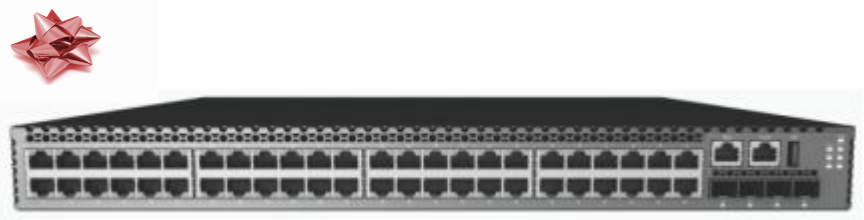
Rocker

Scott Feldman

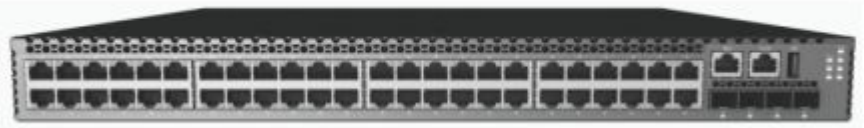
netdev 0.1

2015 Ottawa



Network OS

Mgmt CLI	Control Protocols	Monitoring
Power Mgmt	Forwarding Databases	Automation



Network OS

Mgmt CLI

Control Protocols

Monitoring

Power Mgmt

Forwarding Databases

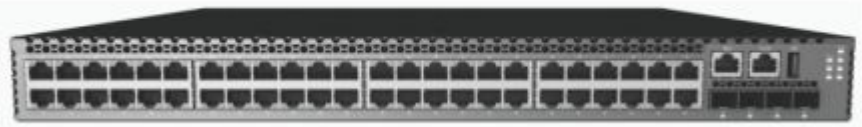
Automation

NDA

SDK

$$$

Hardware Access



Linux

Mgmt CLI

Control Protocols

Monitoring

Power Mgmt

Forwarding Databases

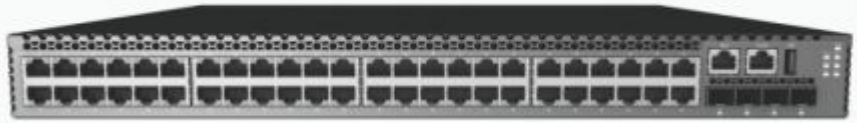
Automation

NDA

SDK

$$$

Hardware Access



Linux

Mgmt CLI

Control Protocols

Monitoring

Power Mgmt

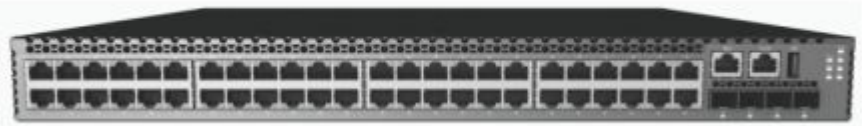
Forwarding Databases

Automation

Switchdev

driver

Hardware Access



Linux

Mgmt CLI

Control Protocols

Monitoring

Power Mgmt

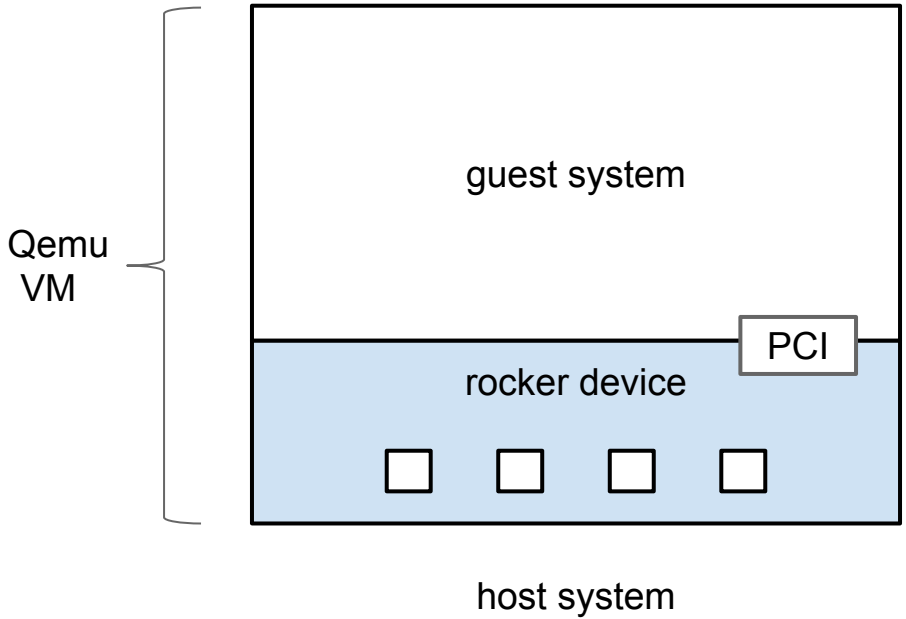
Forwarding Databases

Automation

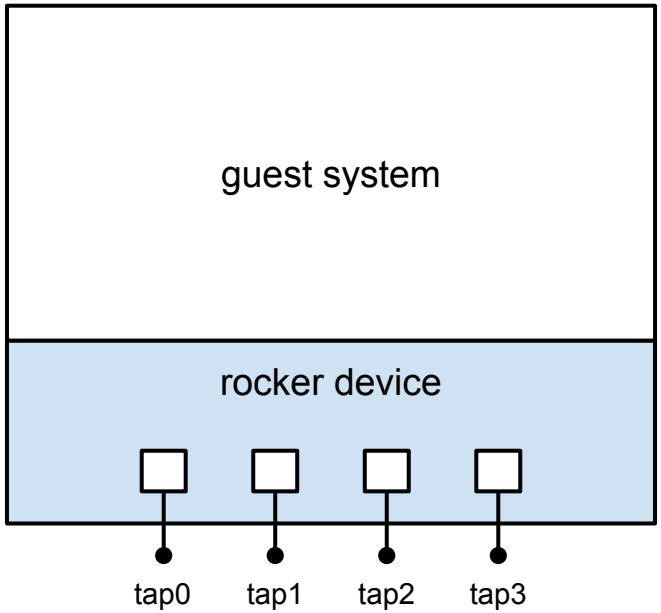
Switchdev

rocker driver

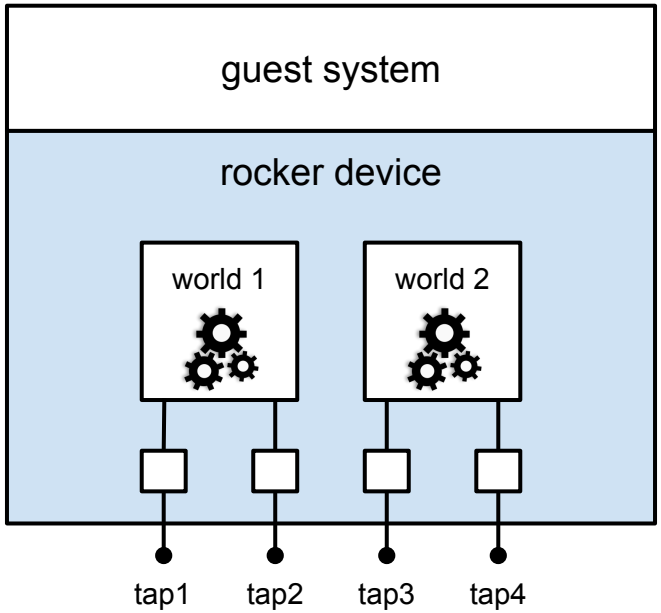
Hardware Access



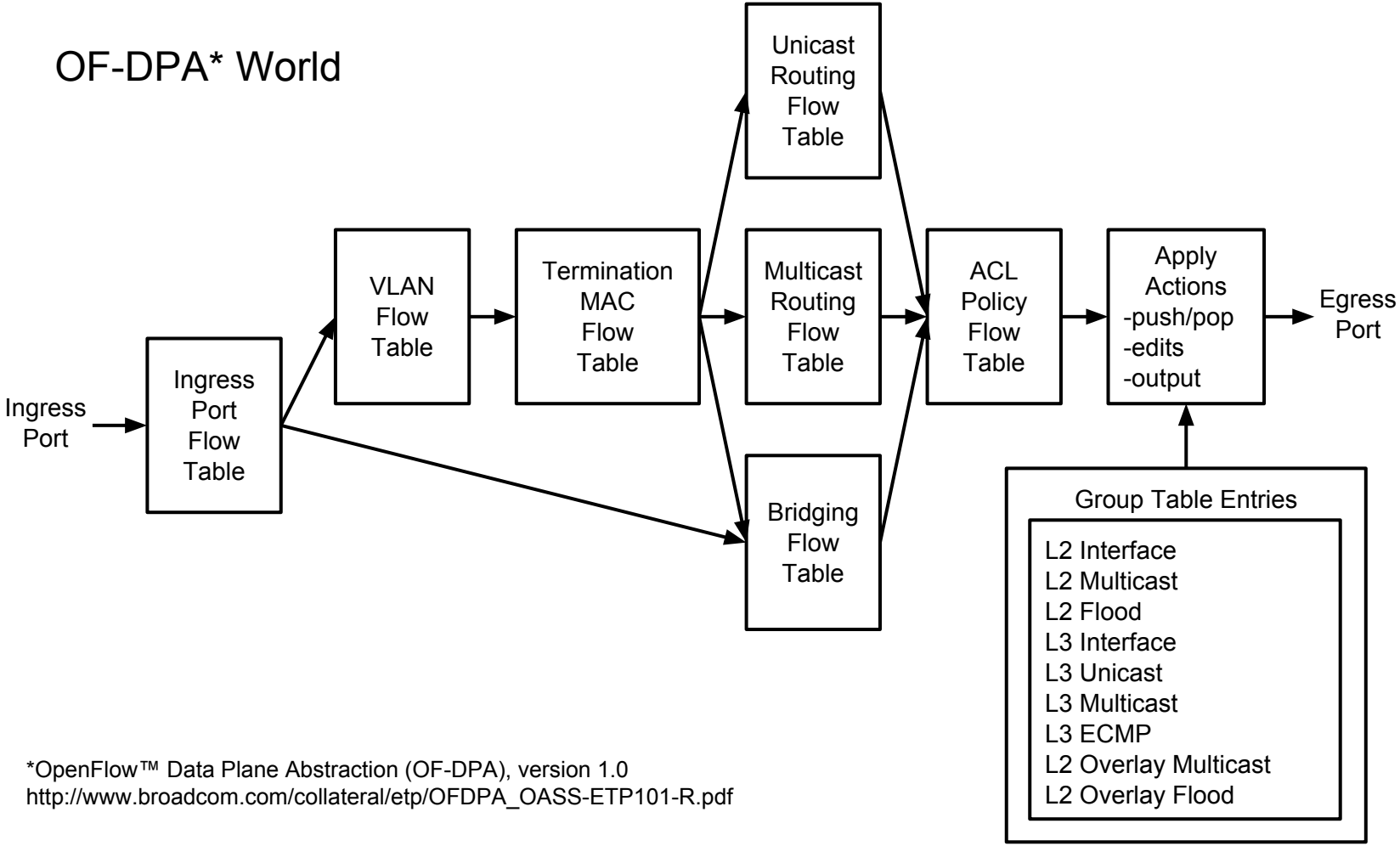

```
-device rocker,name=sw1,len-ports=4,ports[0]=dev1,ports[1]=dev2, \
                        ports[2]=dev3,ports[3]=dev4
```



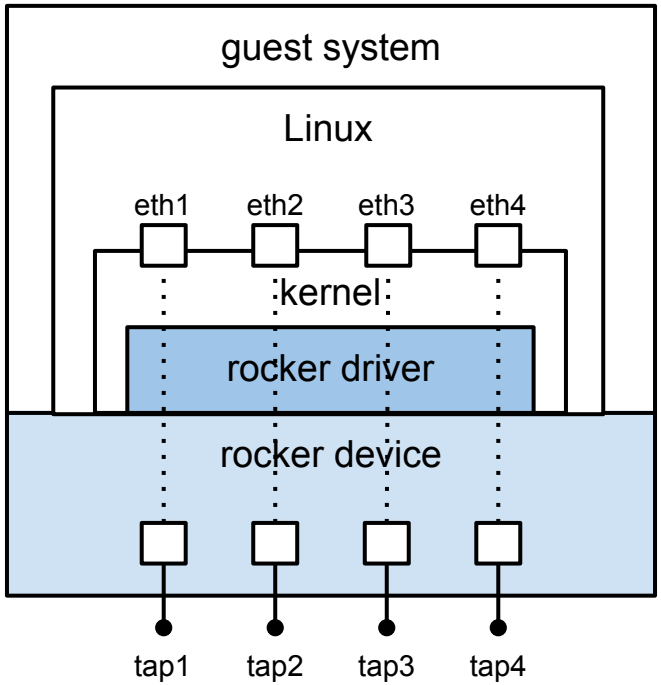

```
-netdev tap,ifname=tap1,dev=dev1 -netdev tap,ifname=tap2,dev=dev2 -netdev \ tap,
ifname=tap3,dev=dev3 -netdev tap,ifname=tap4,dev=dev4
```


guest system
rocker device
world 1
world 2
tap1
tap2
tap3
tap4

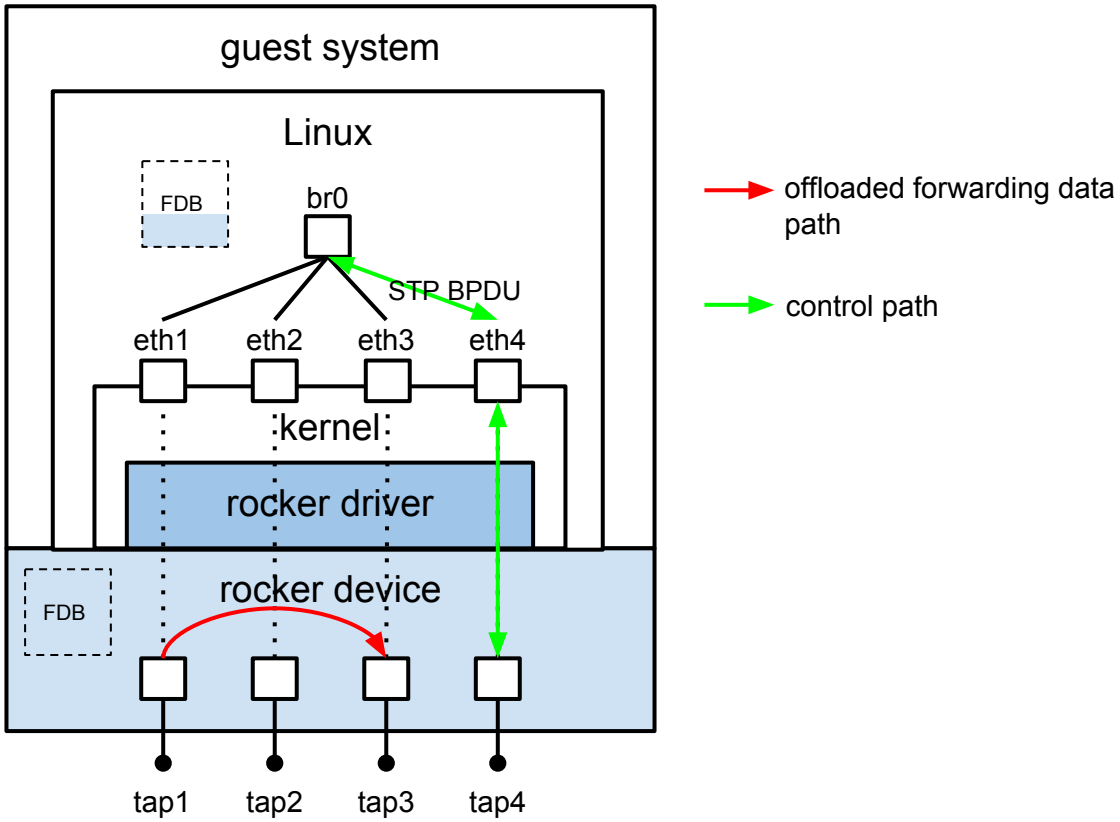
OF-DPA* World



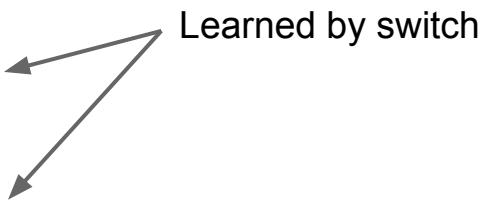
*OpenFlow™ Data Plane Abstraction (OF-DPA), version 1.0
http://www.broadcom.com/collateral/etp/OFDPA_OASS-ETP101-R.pdf


guest system
Linux
eth1
eth2
eth3
eth4
kernel
rocker driver
rocker device
tap1
tap2
tap3
tap4

L2 Offload

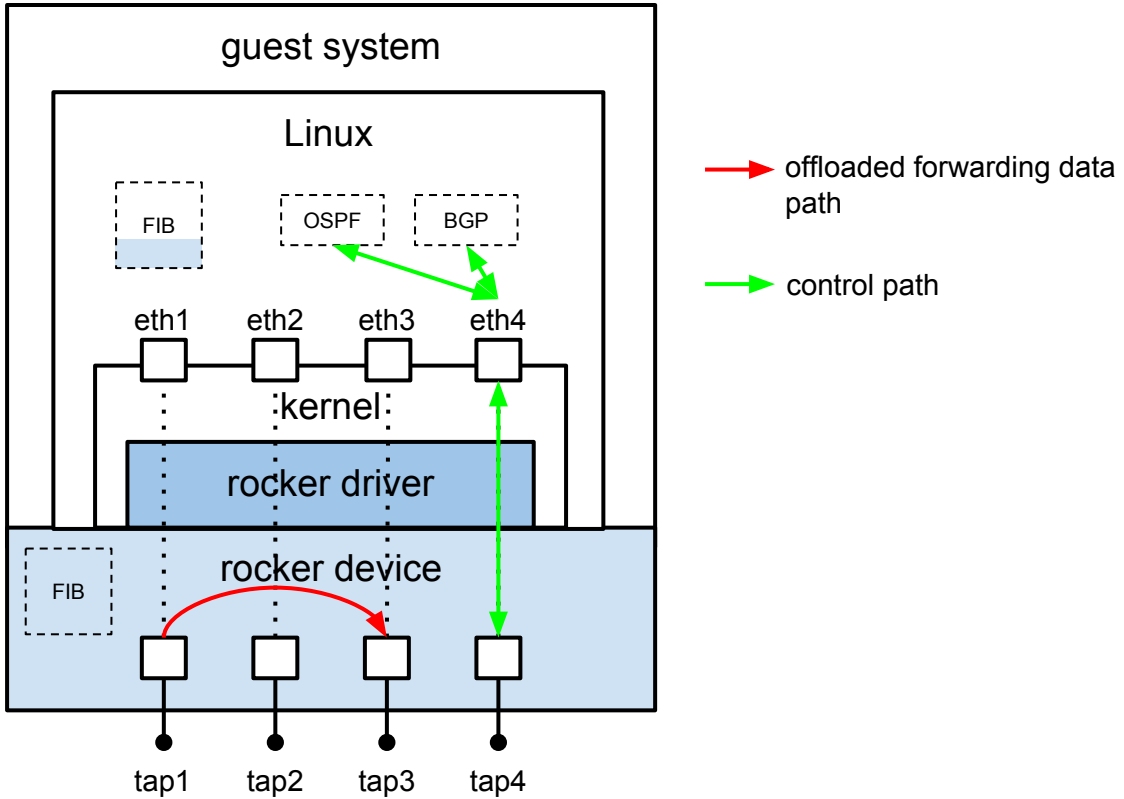

guest system
Linux
FDB
br0
STP BPDU
eth1
eth2
eth3
eth4
kernel
rocker driver
rocker device
FDB
tap1
tap2
tap3
tap4
offloaded forwarding data path
control path

```
$ /sbin/bridge fdb
33:33:00:00:00:01 dev eth0 self permanent
01:00:5e:00:00:01 dev eth0 self permanent
33:33:ff:00:00:00 dev eth0 self permanent
01:80:c2:00:00:0e dev eth0 self permanent
52:54:00:12:35:01 dev swp1 master br0 permanent
00:02:00:00:02:00 dev swp1 master br0  external
00:02:00:00:02:00 dev swp1 self
52:54:00:12:35:02 dev swp2 master br0 permanent
00:02:00:00:03:00 dev swp2 master br0  external
00:02:00:00:03:00 dev swp2 self
33:33:00:00:00:01 dev br0 self permanent
01:00:5e:00:00:01 dev br0 self permanent
33:33:ff:12:35:01 dev br0 self permanent
```



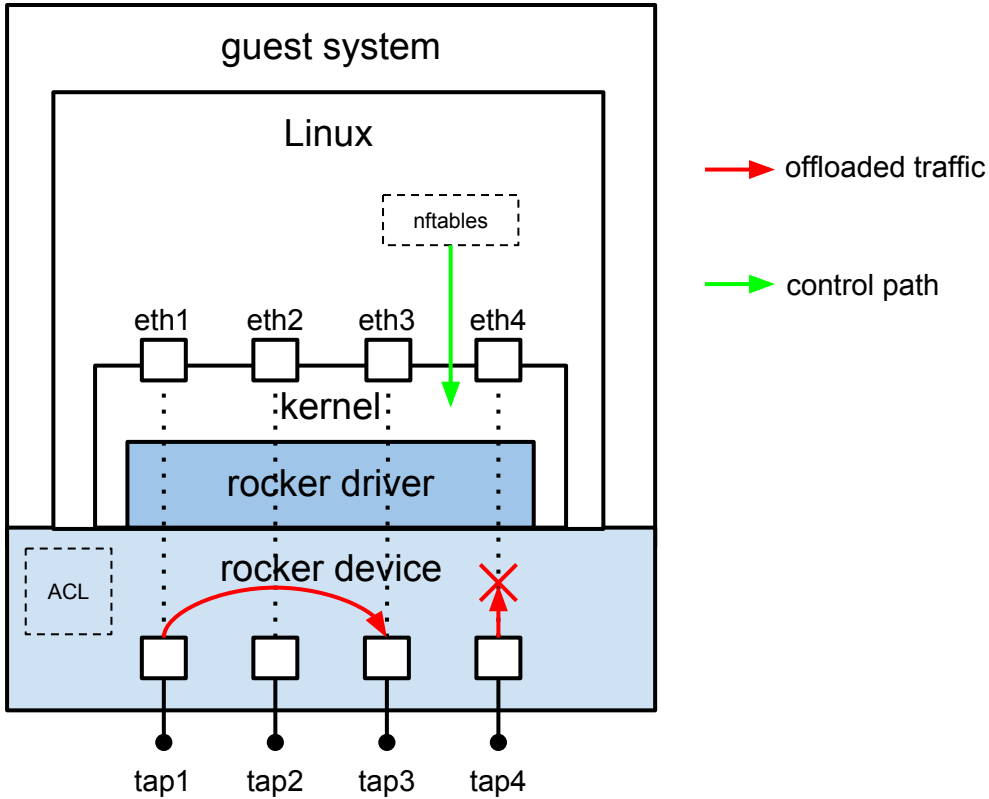
```
(qemu) info rocker-of-dpa-flows sw1
prio tbl hits key(mask) --> actions
3    50  10   vlan 3840 dst 00:02:00:00:03:00 --> write group 0x0f000002 goto tbl 60
3    50  13   vlan 3840 dst 00:02:00:00:02:00 --> write group0x0f000001 goto tbl 60
1    30       IP dst 11.0.0.0/32 --> write group 0x0f000000 goto tbl 60
1    30       IP dst 11.0.0.0/24 --> write group 0x0f000000 goto tbl 60
1    30       IP dst 11.0.0.255/32 --> write group 0x0f000000 goto tbl 60
1    30  10   IP dst 11.0.0.3/32 --> write group 0x0f000000 goto tbl 60
0    20       pport 2 vlan 3840 IPv6 dst 52:54:00:12:35:02 --> goto tbl 30
0    20       pport 2 vlan 3840 IP dst 52:54:00:12:35:02 --> goto tbl 30
1    20  8    pport 2 vlan 3840 IPv6 dst 33:33:00:00:00:00(ff:ff:00:00:00:00) --> goto tbl 40
1    20       pport 2 vlan 3840 IP dst 01:00:5e:00:00:00(ff:ff:ff:80:00:00) --> goto tbl 40
3    60  1    pport 2 vlan 3840 dst 01:80:c2:00:00:00(ff:ff:ff:ff:ff:f0) --> write group 0x0f000000
0    20       pport 1 vlan 3840 IPv6 dst 52:54:00:12:35:01 --> goto tbl 30
0    20  10   pport 1 vlan 3840 IP dst 52:54:00:12:35:01 --> goto tbl 30
1    50  6    vlan 3840 --> write group0x4f000000 goto tbl 60
1    20  8    pport 1 vlan 3840 IPv6 dst 33:33:00:00:00:00(ff:ff:00:00:00:00) --> goto tbl 40
1    20       pport 1 vlan 3840 IP dst 01:00:5e:00:00:00(ff:ff:ff:80:00:00) --> goto tbl 40
3    60  1    pport 1 vlan 3840 dst 01:80:c2:00:00:00(ff:ff:ff:ff:ff:f0) --> write group 0x0f000000
1    10  22   pport 2 vlan 0 --> apply new vlan 3840 goto tbl 20
1    10  33   pport 1 vlan 0 --> apply new vlan 3840 goto tbl 20
1    0   55   pport 0(0xffff0000) --> goto tbl 10

(qemu) info rocker-of-dpa-groups sw1
id (decode) --> buckets
0x0f000002 (type L2 interface vlan 3840 pport 2) --> pop vlan out pport 2
0x0f000001 (type L2 interface vlan 3840 pport 1) --> pop vlan out pport 1
0x4f000000 (type L2 flood vlan 3840 index 0) --> groups [0x0f000002,0x0f000001]
0x0f000000 (type L2 interface vlan 3840 pport 0) --> pop vlan out pport 0
```

L3 Offload

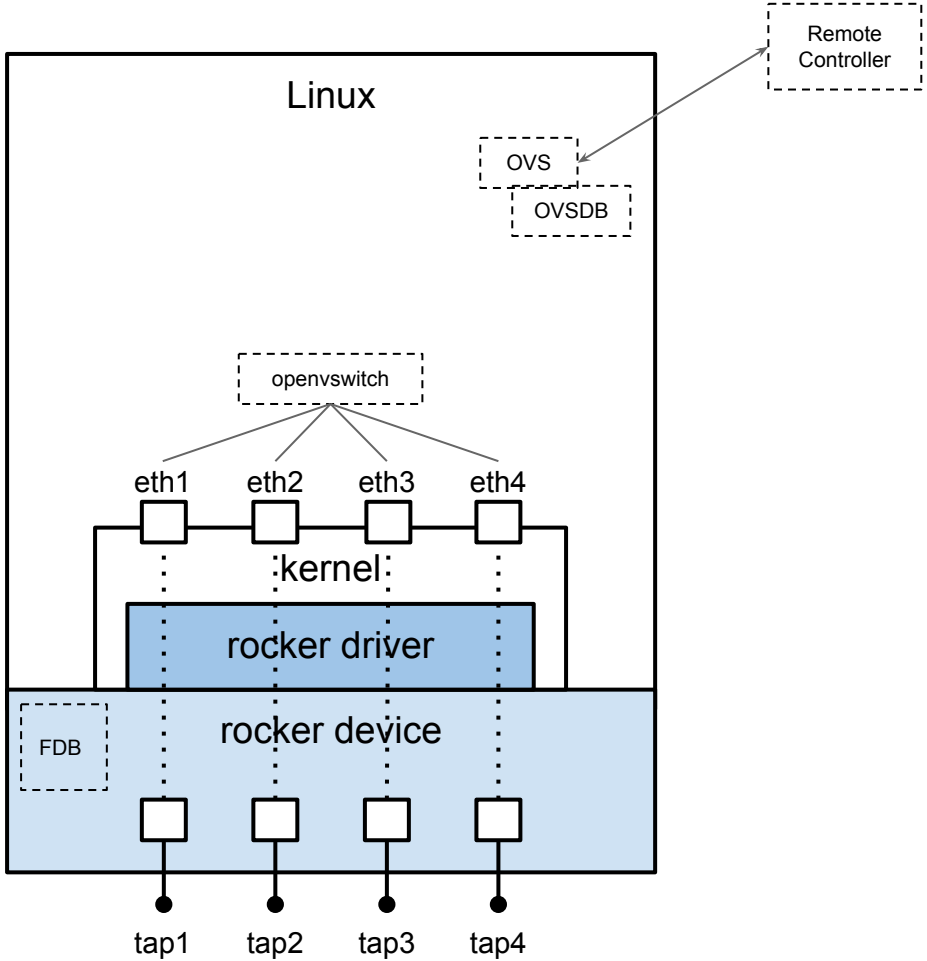

guest system
Linux
FIB
OSPF
BGP
eth1
eth2
eth3
eth4
kernel
rocker driver
rocker device
FIB
tap1
tap2
tap3
tap4
offloaded forwarding data path
control path

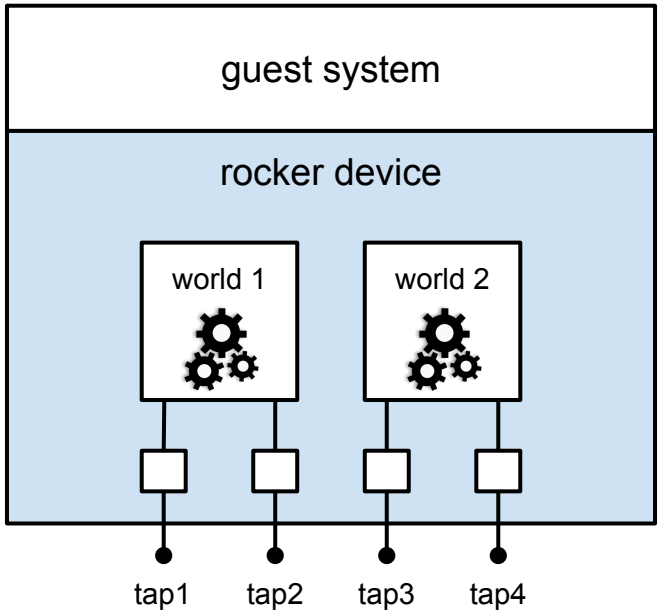
Future

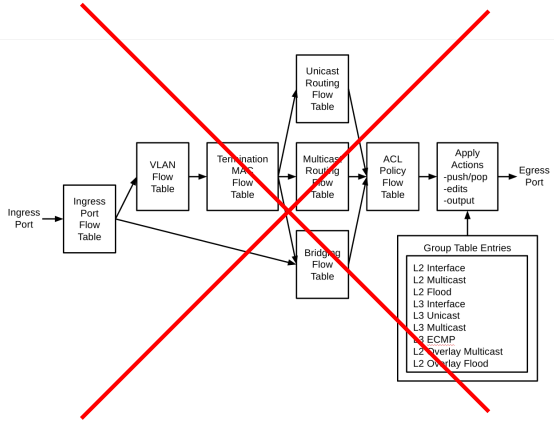
ACL Offload


guest system
Linux
nftables
eth1
eth2
eth3
eth4
kernel
rocker driver
rocker device
ACL
tap1
tap2
tap3
tap4
offloaded traffic
control path

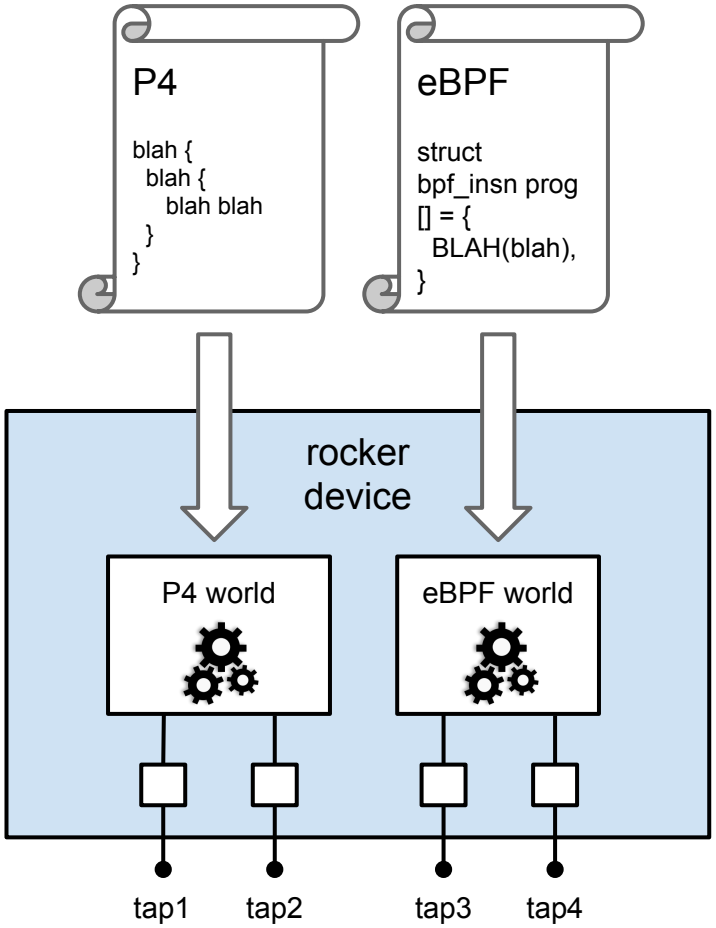
OVS Offload


Remote Controller
Linux
OVS
OVSDB
openvswitch
eth1
eth2
eth3
eth4
kernel
rocker driver
FDB
rocker device
tap1
tap2
tap3
tap4


guest system
rocker device
world 1
world 2
tap1
tap2
tap3
tap4



Fixed pipeline, c. 2014



Questions? Answers?