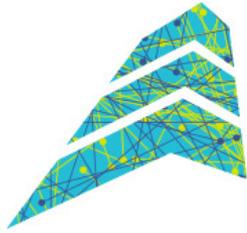




OPEN NETWORKING
FOUNDATION



ATRIUM

Open SDN Distribution

Saurav Das

Principal System Architect, ONF

With contributions from ONF Atrium Management team
and many others ...



Project Atrium Goals

1. Integration

- Create vertically-integrated open-source stacks
- From open-source components, OF1.3 & Hardware
- Enable network operators to download distribution from a single location

2. Interoperability

- Enable multiple hardware vendors to plugin to stack
- Allows end-users to select different hardware classes for common use-cases.

3. Deployments

- Work hand-in-hand with operators on deployable use cases leading to trials.
- Give operators confidence in pure SDN solutions

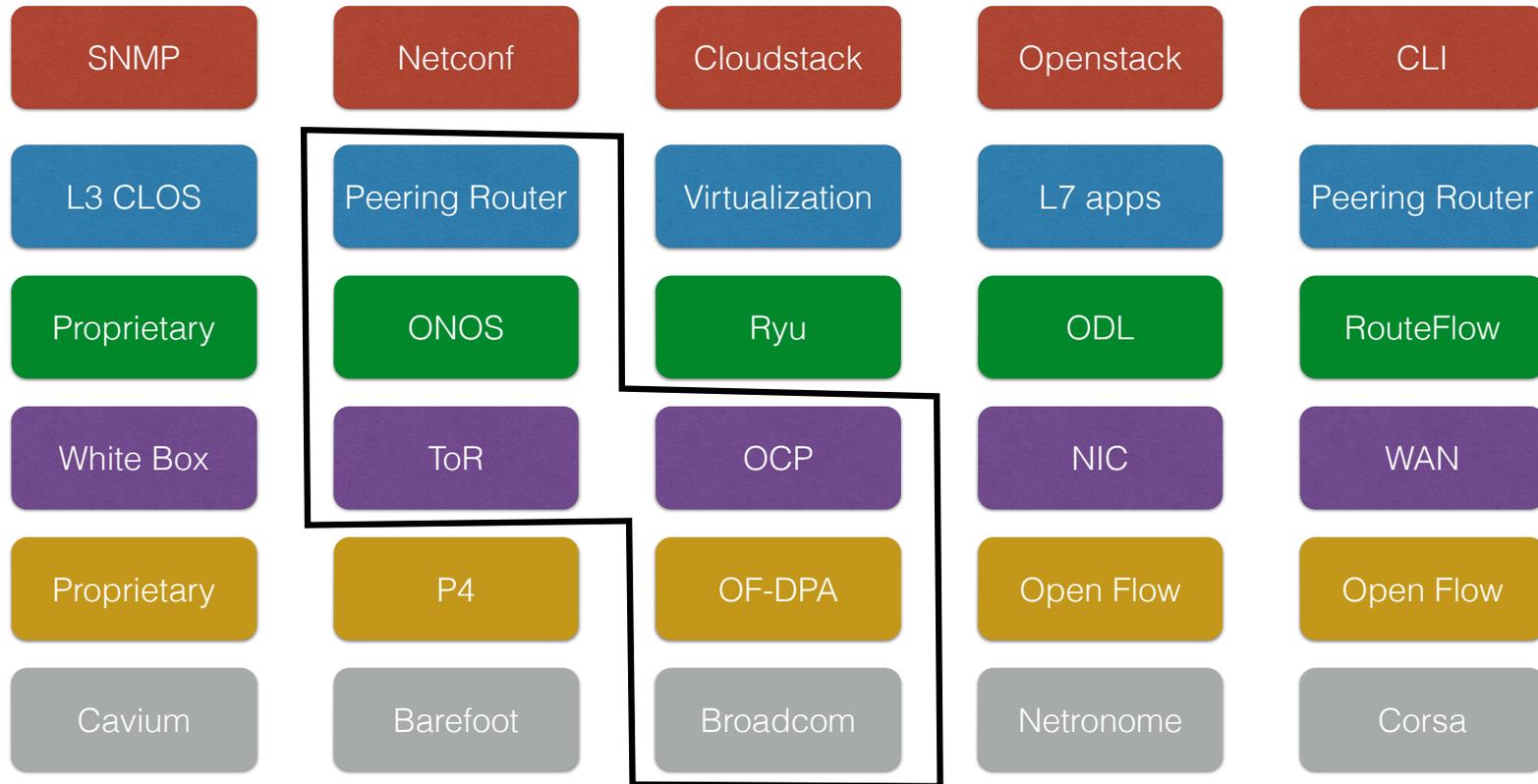


SDN Provides a Lot of Choices

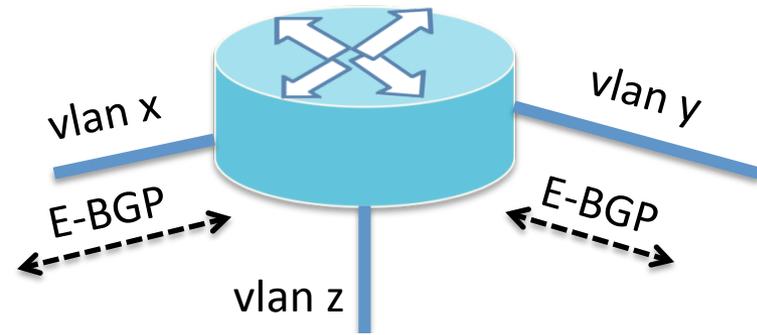
Orchestration	SNMP	Netconf	Cloudstack	Openstack	CLI
Application	Load Bal	Virtualization	L3 CLOS	L7 apps	Peering Router
Controller	Proprietary	ONOS	Ryu	ODL	RouteFlow
Hardware	White Box	ToR	OCF		WAN
HAL	Proprietary	P4	OF-DR		Open Flow
Silicon	Cavium	Barefoot	Broado		Corsa



Solution: Vertically Integrated Stack == SDN Distribution



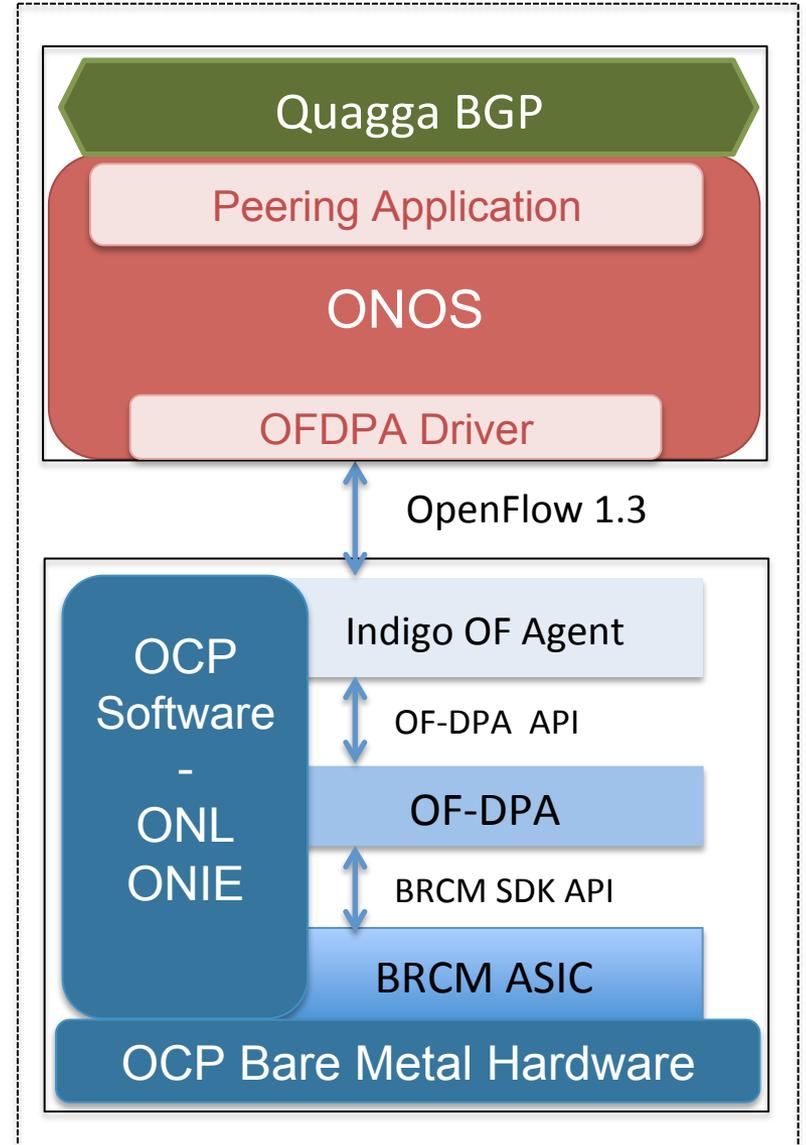
What is Atrium today?



Accton 5710

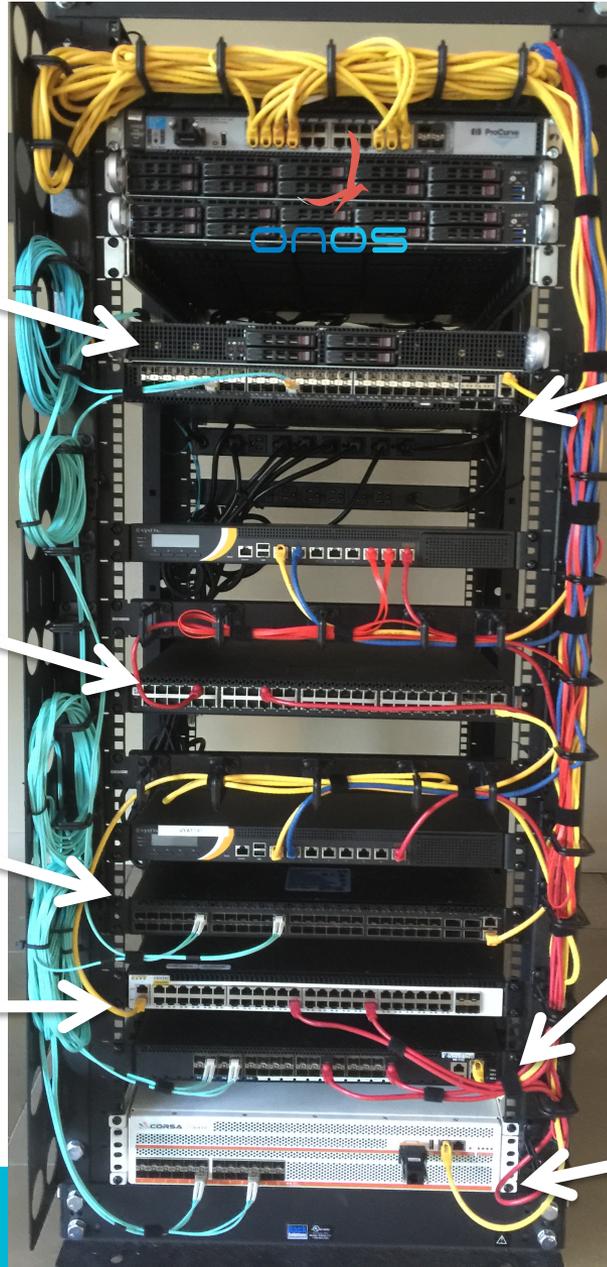


Quanta LY2



OCP: Open Compute Project; **ONL**: Open Network Linux; **ONIE**: Open Network Install Env; **BRCM**: Broadcom Merchant Silicon ASICs; **OF-DPA**: OpenFlow Datapath Abstraction

What is Atrium today?



NETRONOME

ONOS

Accton
Making Partnership Work

PICAO
OPEN NETWORKING

Quanta

NoviFlow
switching made smarter

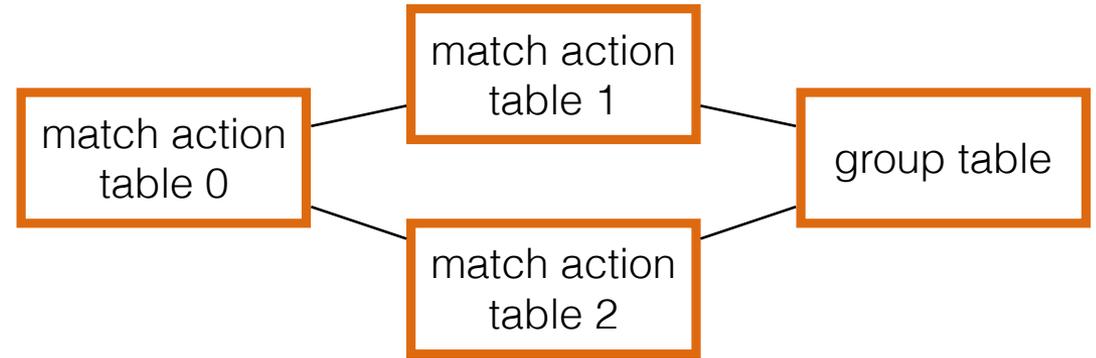
 **centec**
networks

 **CORSA**



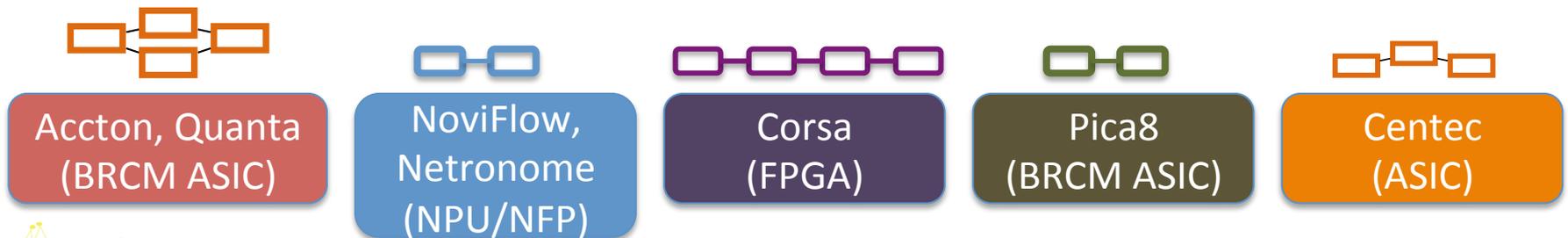
A Closer Look at Interoperability

Different combinations of Match-Action Tables form Different OF 1.3 pipelines

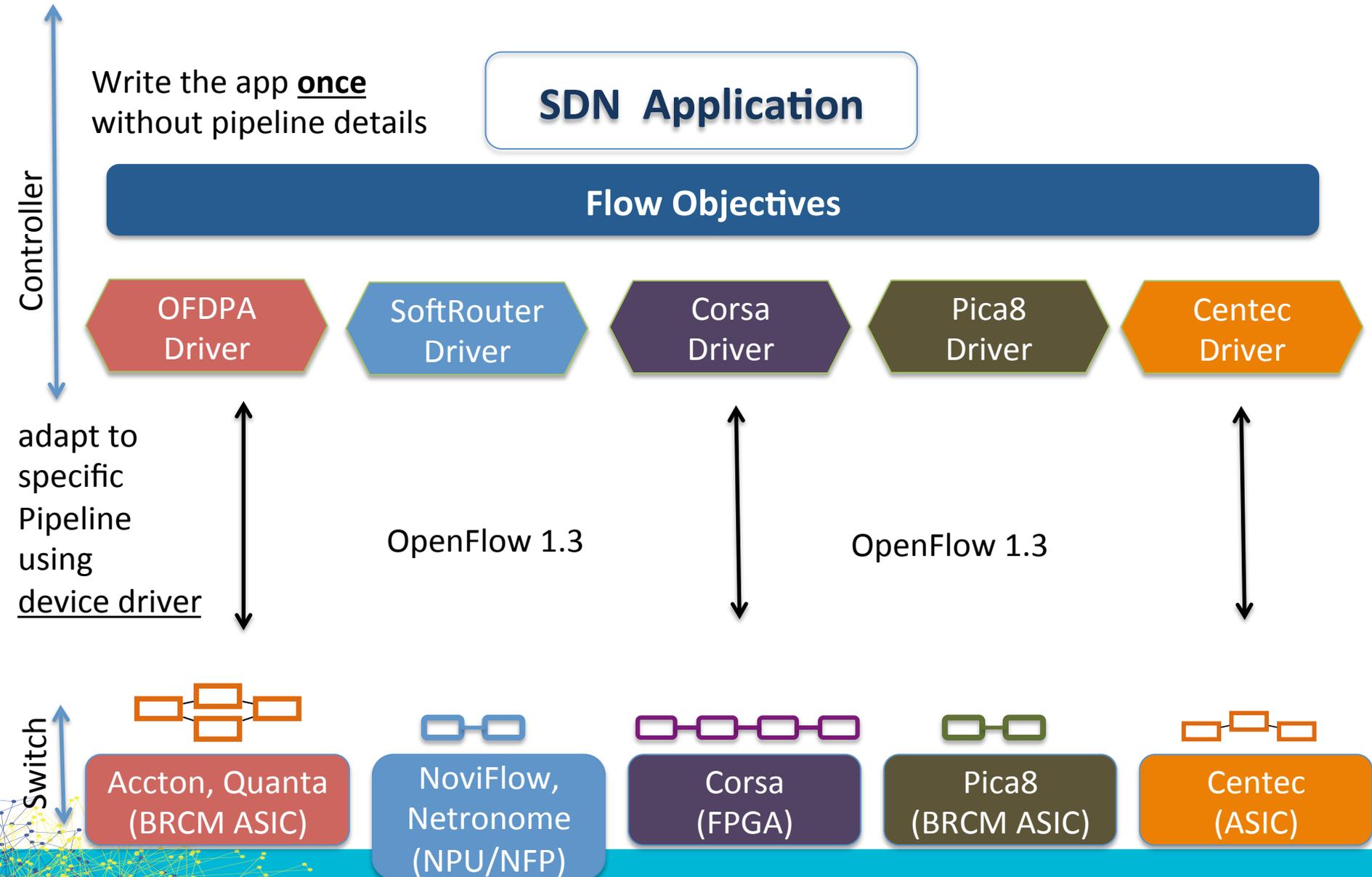


How can a controller manage these differences?

How can an application work across these differences?

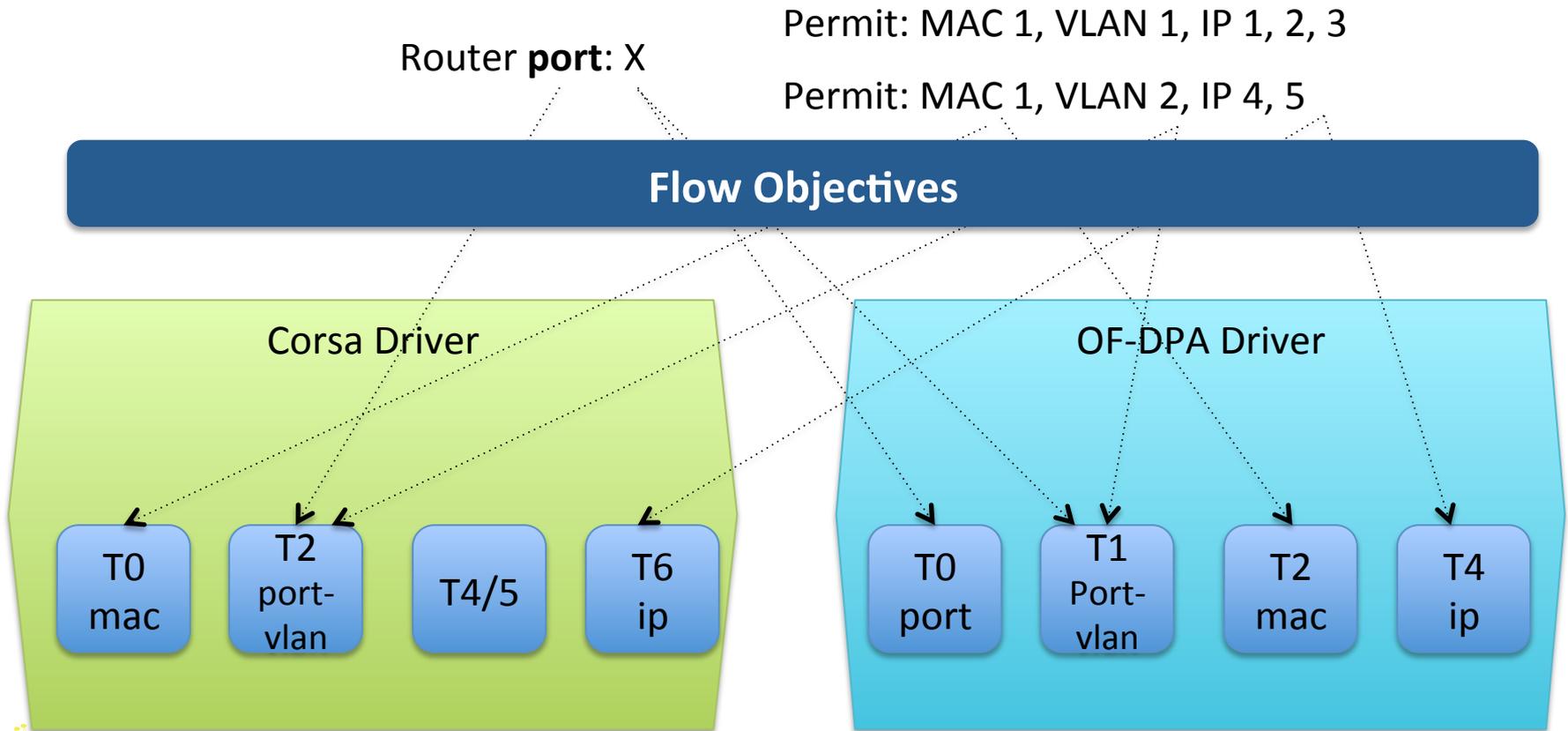


Solution: Flow Objectives API



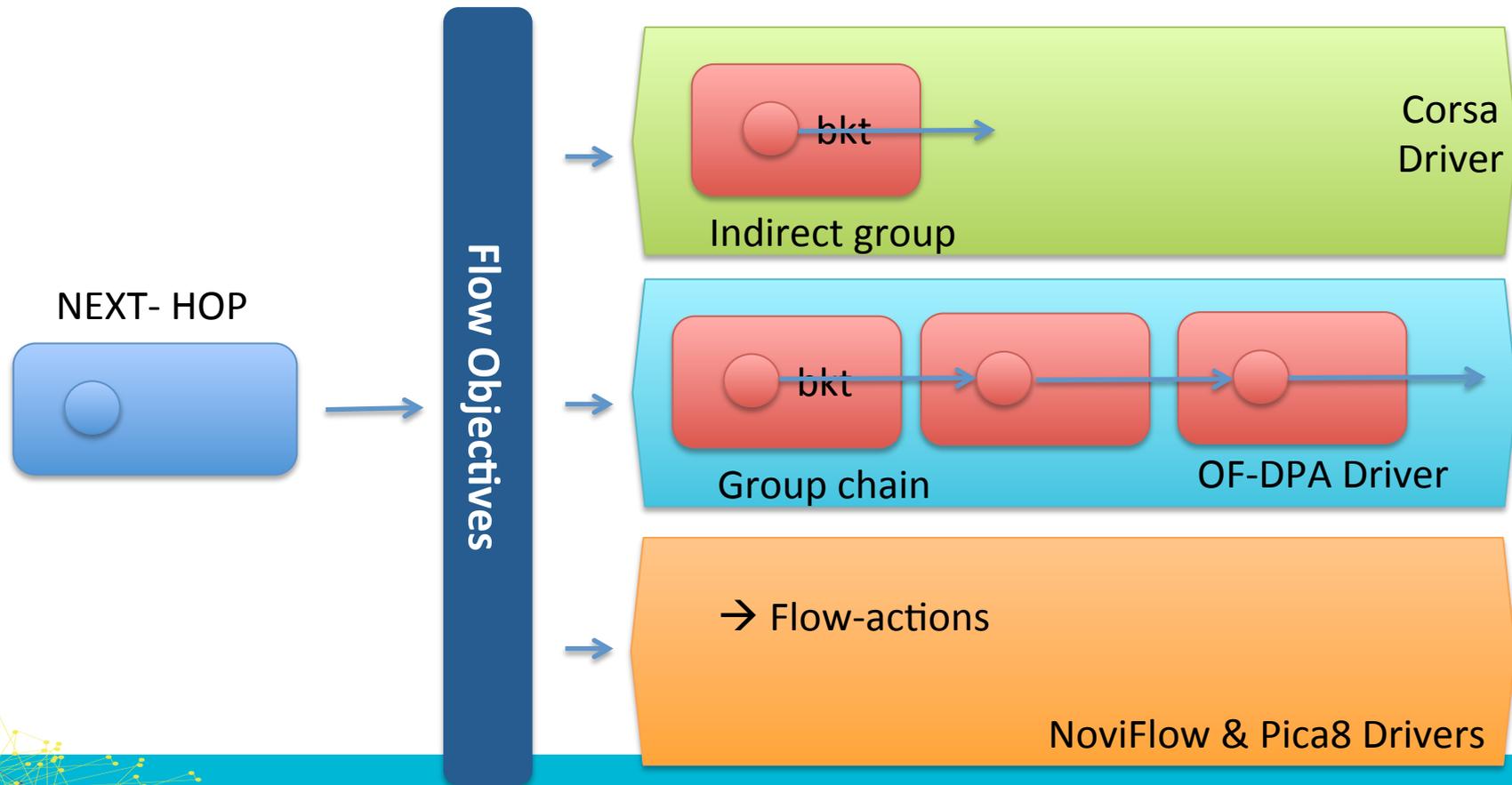
Example: Filtering Objective

- Filter → only Permit or Deny options
- On match fields of packet header

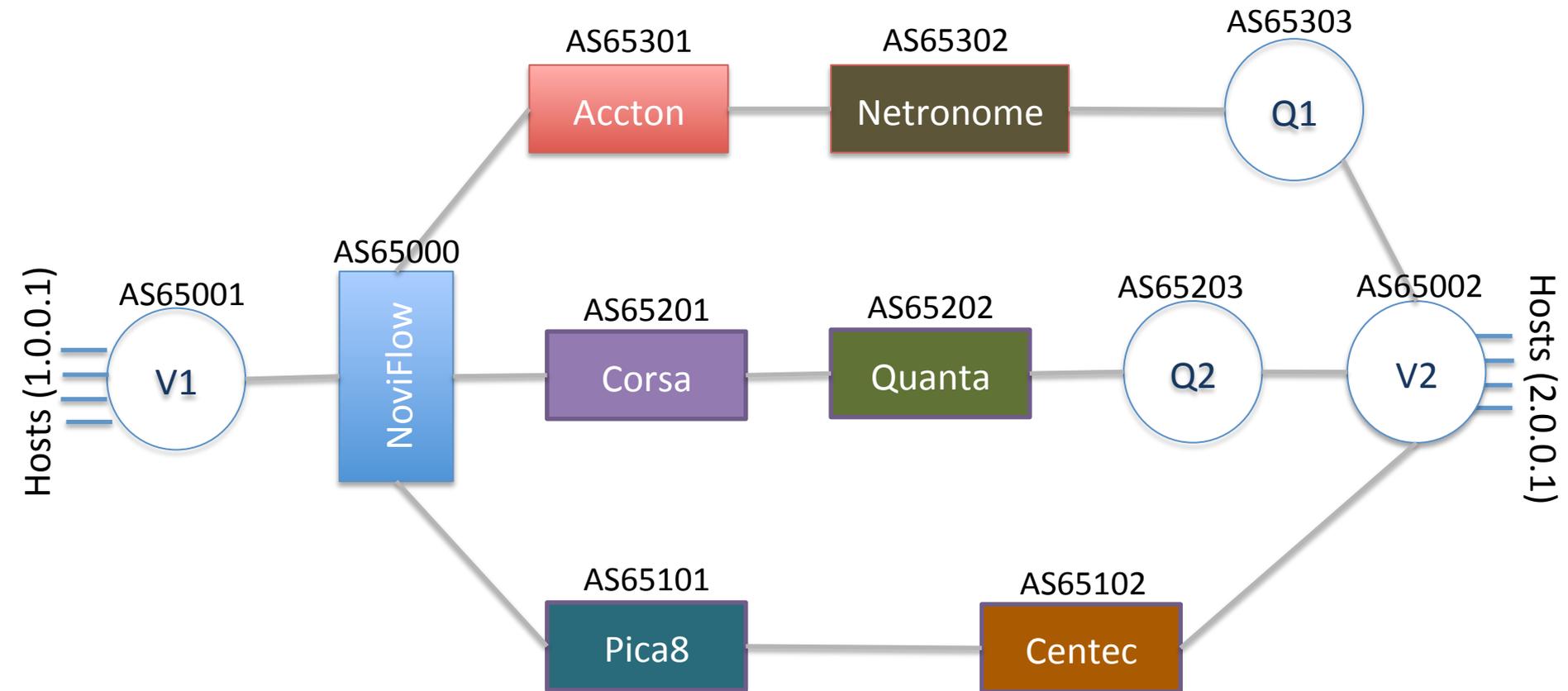


Example: Next Objective

- Next → next hop for forwarding
- Similar to OF 1.3 group, but ...



Atrium Demo @ SDN Solution Showcase



```

bgp1> sh ip bgp
BGP table version is 0, local router ID is 192.168.10.101
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete
  
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 1.0.0.0/24	192.168.10.1	1			0 65001 i
* 2.0.0.0/24	192.168.22.1				0 65201 65202 65203 65002 i
*	192.168.13.1				0 65301 65302 65303 65002 i
*>	192.168.11.1				0 65101 65102 65002 i

Total number of prefixes 2

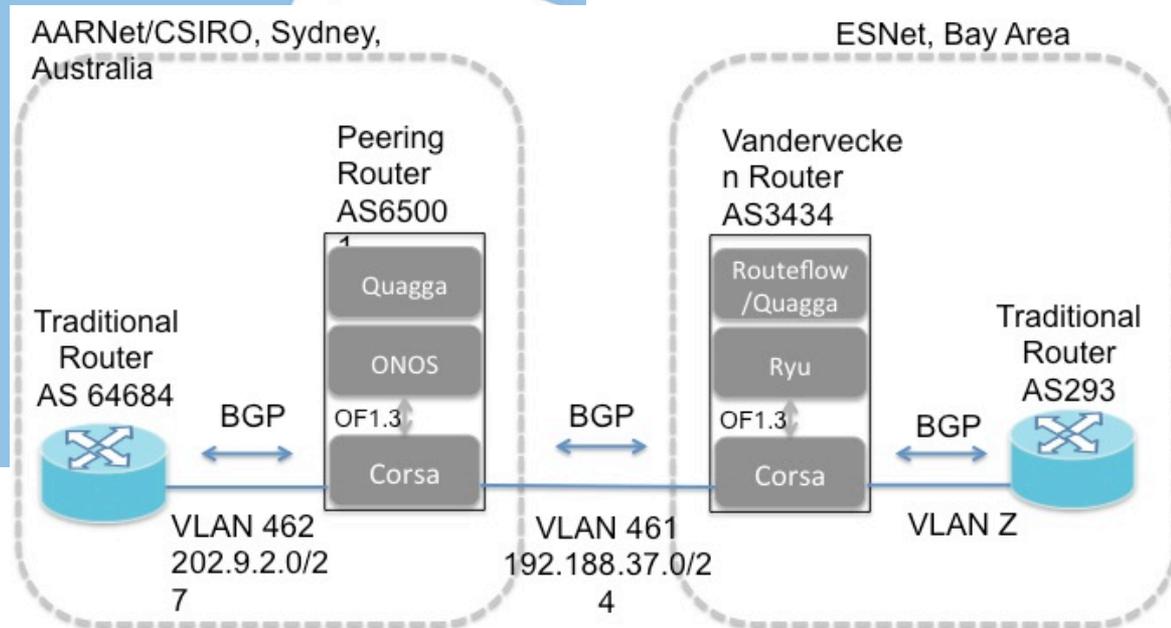
```

bgp1> sh ip bgp summary
BGP router identifier 192.168.10.101, local AS number 65000
RIB entries 3, using 336 bytes of memory
Peers 5, using 22 KiB of memory
  
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	65000	30090	31109	0	0	0	1d01h43m	0
192.168.10.1	4	65001	31095	31114	0	0	0	1d01h43m	1
192.168.11.1	4	65101	30775	30784	0	0	0	21:07:07	1
192.168.13.1	4	65301	28322	28339	0	0	0	18:11:55	1
192.168.22.1	4	65201	25959	25974	0	0	0	21:23:24	1

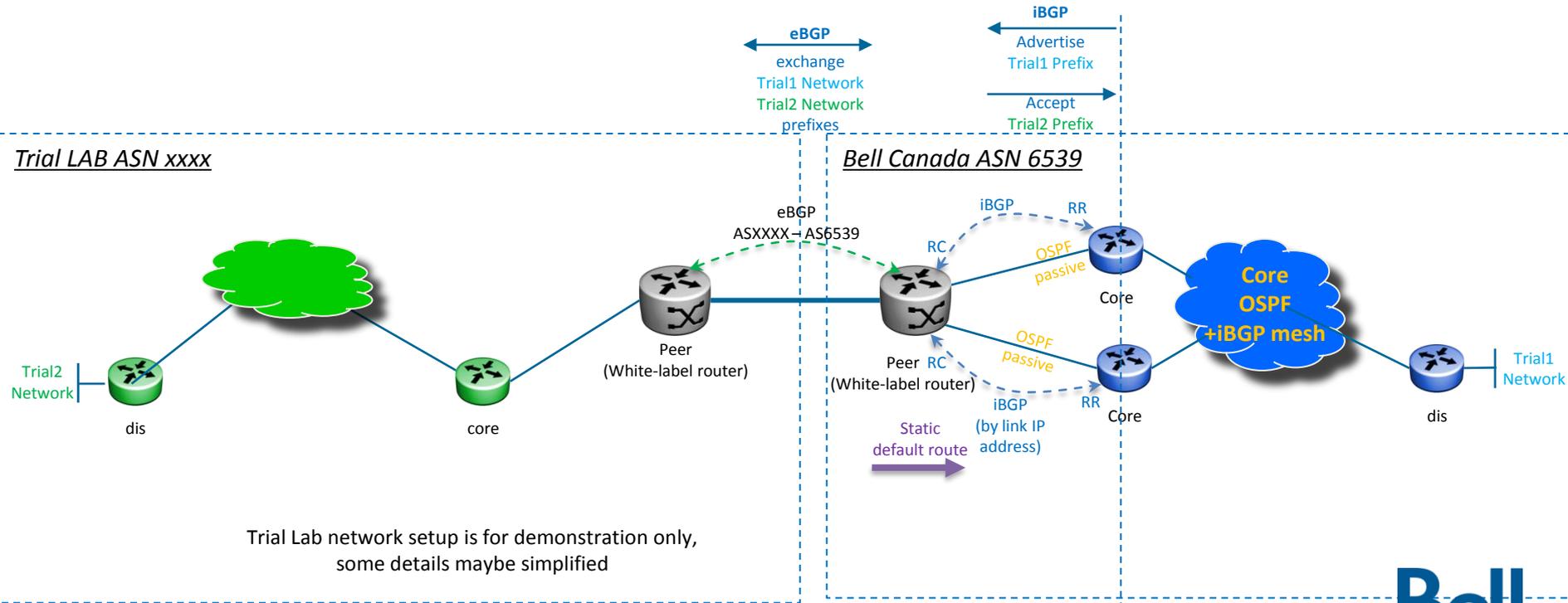
Total number of neighbors 5

Atrium Pre-release Deployment



Atrium Post-release Operator Engagements

phase 1 – Trial Lab (white-label box) <--> Trial AS6539 (white-label box)



What's Next?

1. Continued Improvements

- Hardening & Stability
- Performance
- Missing features: untagged, runtime-config, static-routes
- Hardware Automated Test Infrastructure

2. New Features

- IGP & ECMP support
- Requests from operators (eg. Route filtering)

3. Other platforms

- OpenDaylight support

LEARN MORE & JOIN THE COMMUNITY:

<https://groups.opensourcesdn.org/wg/Atrium/dashboard>



Summary

Integration

- Atrium 1st release brings together ONOS, Quagga, OCP components (ONL, ONIE) and OFDPA with white-boxes + vendor equipment
- Open SDN Distribution (2015/A release: June 30th)

Interoperability

- ONF builds 7 routers!
- Key architectural contribution: Flow Objectives & Device Drivers

Deployments

- Pre release deployment in Sydney.
- More coming as we engage operators

Acknowledgements

- All the switch vendors, ONF management team, ON.Lab support
- Ali Al-Shabibi & Jonathan Hart (ON.Lab)
- Rob Sherwood (Big Switch Networks)

