
REANZ

MAY 28, 2015

Software-Defined Networking

Enabling your network to do what you actually want it to

REANNZ

What does SDN actually mean?

- open
- standard
- fine-grained

www.opennetworking.org

OpenFlow for Radio Astronomy

- Specialised use case
- Control over the complete stack
- Control over the path from end to end

Does it work?

Does it work?

Yes!

We use it in our office.

REANNZ Production Deployments:

- Faucet
- Cardigan

REANNZ Prototypes:

- Fastlane
- CODR
- NFShunt

Faucet

- Our office switch
- Minimum viable product
- Generate operational experience
- Eat dogfood

Cardigan

- Distributed Router
- Collaboration between VuW, REANNZ and Citylink
- Peering between REANNZ and WIX
- Code used for international peering between AARNet and ESnet

Fastlane

On-the-fly flow prioritisation

CODR

- On demand bandwidth reservation
- OpenFlow implementation of ESnet's OSCARS
- Early stage proof of concept

https://www.es.net/engineering-services/oscars/

NFShunt

- OpenFlow firewall bypass
- Made by Simeon Miteff at SANReN
- Identifies science flows and redirects them around firewall

Google’s B4

- Possibly world’s largest WAN
- 70-100% utilisation
- OpenFlow controlled
- Also used within google datacentres

Potential for Radio Astronomy

- Application–Network communication
- Multicast
- Load-balancing

Practical Realities

OpenFlow Match Fields (layer 2 and below).

Switch input port.

Switch physical input port.

Metadata passed between tables.

Ethernet destination address.

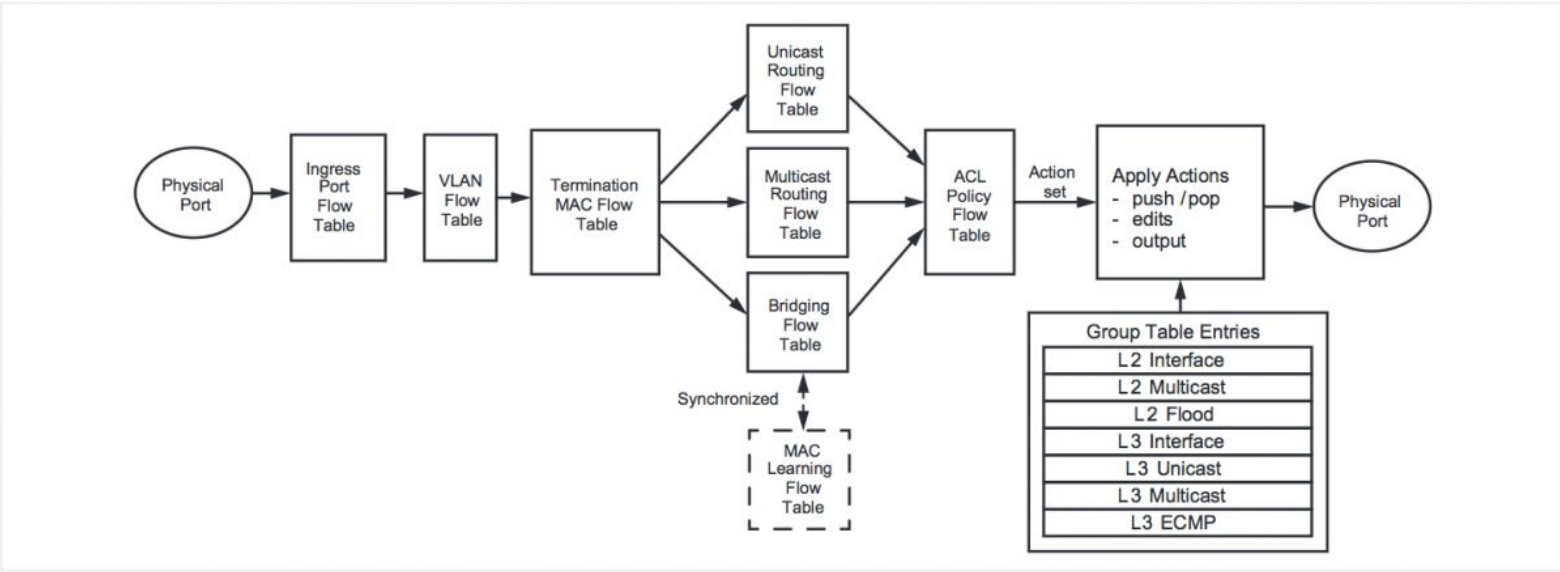
Ethernet source address.

Ethernet frame type.

VLAN id.

VLAN priority.

Practical Realities



Abstract Switch Pipeline for Bridging and Routing

P4

- Protocol independent
- What I wish SDN would be
- Not quite so well supported

http://onrc.stanford.edu/p4.html