SDN with Open Switch Designs

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Topics

- SDN, NFV and Ethernet Switches
- Many years of maturity
- OpenFlow and Tables
- An open pipeline implementation
- An open switch implementation example
Many Flavors of SDN

- OpenFlow
- Network Virtualization
- Open Daylight with a plethora of SB interfaces
- Disaggregated Network OS & Switch
Not all NFs are Alike

- Some are packet throughput intensive
- Others are instructions per packet intensive
- Optimized ASICs ideal for switching & routing
ASICs - Many Years of Maturity

- Scalable Layer 2 and Layer 3 forwarding
- ECMP and sophisticated hashing
- Traffic management and QoS
- Tunneling (MPLS, IP-in-IP, Mac-in-Mac etc.)
- Statistics and OAM protocols
- Emerging network virtualization

- Implemented as tables and pipelines
- SDN requires that they are open, standardized
ONF OpenFlow v1.3+ Multi-table pipeline
- Enables scale
- FAWG TTP initiatives

“…today’s devices don’t ‘natively’ speak the OpenFlow primitives. That’s a challenge when applications require multiple flow tables on hardware. FAWG is enhancing the OpenFlow framework to support multi-flow table OpenFlow on non-native hardware, to promote OpenFlow on traditional hardware…”
- FAWG, ONF

“…Developed a detailed example of a specific TTP that supports basic switching and routing, as well as L2 and L3 multicast and Layer 3 ECMP….”
- FAWG, ONF
An Open TTP for Physical Switches (e.g., StrataXGS Arch)

- OpenFlow Data Plane Abstraction (OF-DPA) Open API and specification
- L2, L3, Group, VXLAN, ACL Tables (v1.0)
- MPLS and others (v2.0 future)
Agility in the DC & WAN Edge

- Leverage existing device tables & scale
- 10X+ better utilization of ASIC resources
- DC use case (with OF-DPA v1.0)
  - Low latency forwarding for mice flows
    - Routing table, ECMP table, hardware hashing
  - Engineered redirects for elephant flows
    - Using policy ACL table
- WAN edge use case (future)
  - Utilize MPLS and VLAN or VXLAN Tables
  - Dynamic MPLS WAN to Multi-tenant DC tunnels
An Open Switch Implementation

Covers many flavors of SDN:
1. OpenFlow
2. Disaggregated Network OS model
3. Overlays-based network virtualization

Available on GitHub

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Many flavors of SDN

ASICs ideal for switching & routing NFs

OF 1.3+ can scale on proven switch ASICs

OF-DPA is an openly published example TTP
  • For widely deployed switch architecture

Open Switch implementation covers:
  • Multiple flavors of SDN
  • Dynamic DC and WAN Edge provisioning apps
Thank You