

# True Hardware Virtualization

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# To Quote Jerry

Virtualization is not “emulation” or “simulation”

- Full Line Rate on all virtualized switches

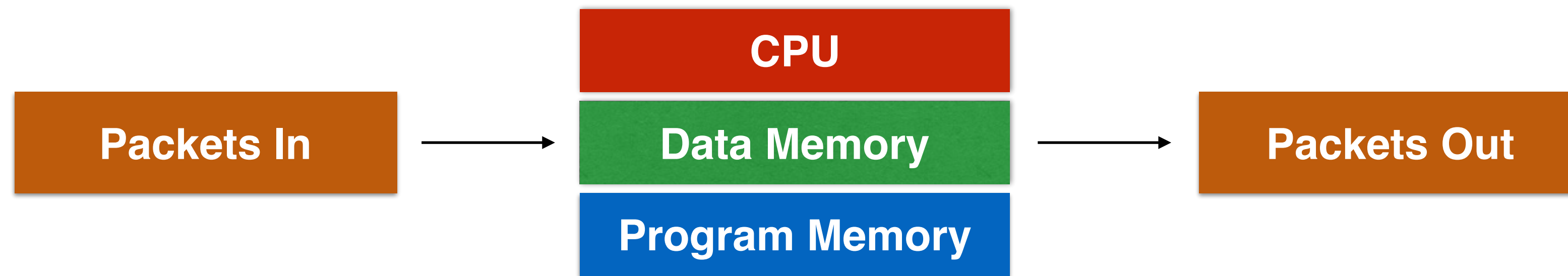
- Hardware level QoS applied to all virtualized switches

Virtualization is not “partitioning” / “slicing” / “delegation”

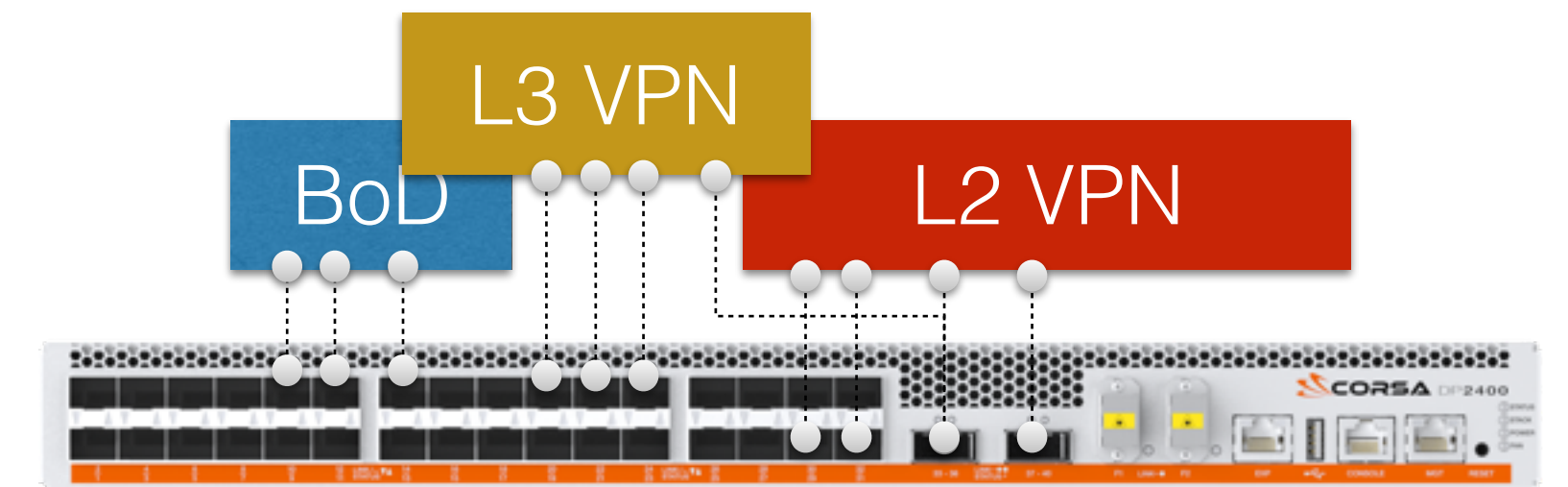
- Full Table Capacity on all virtualized switches

Hardware Virtualization needs more than a thin veneer of software

# What does a networking “hypervisor” look like ?

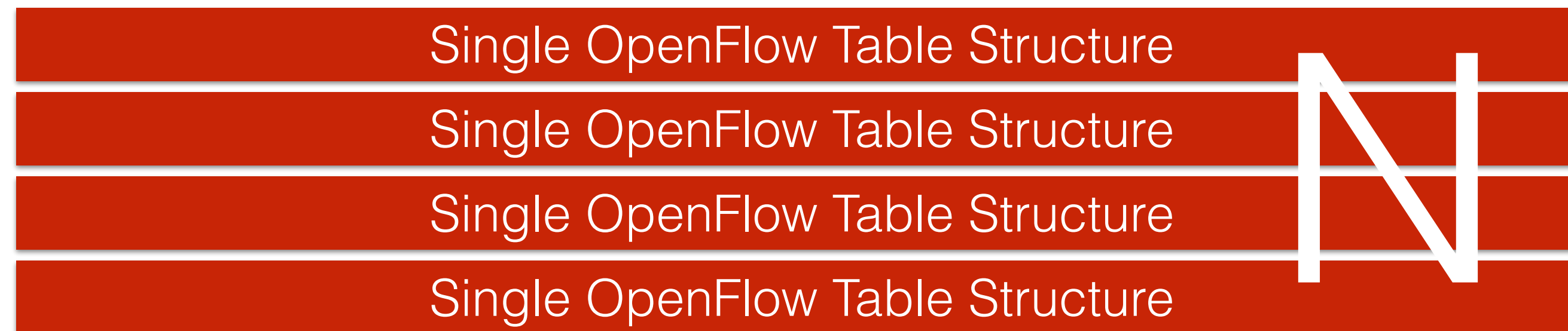
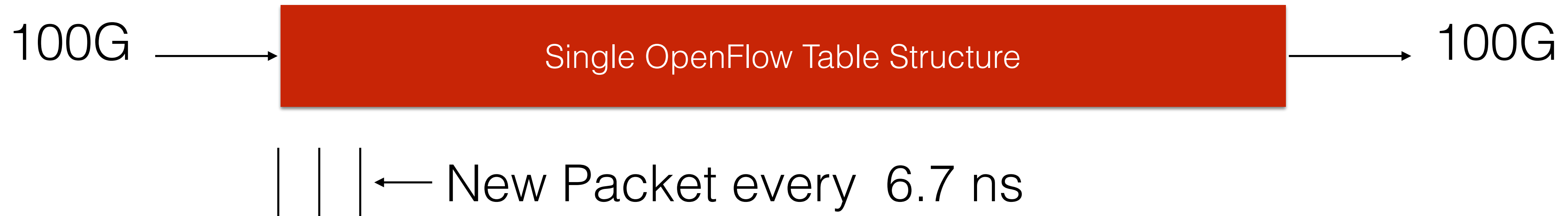


Finite Hardware Resources



What happens when we put N open flow switches inside a single hardware switch ?

# Packet Processing Unit ( CPU )

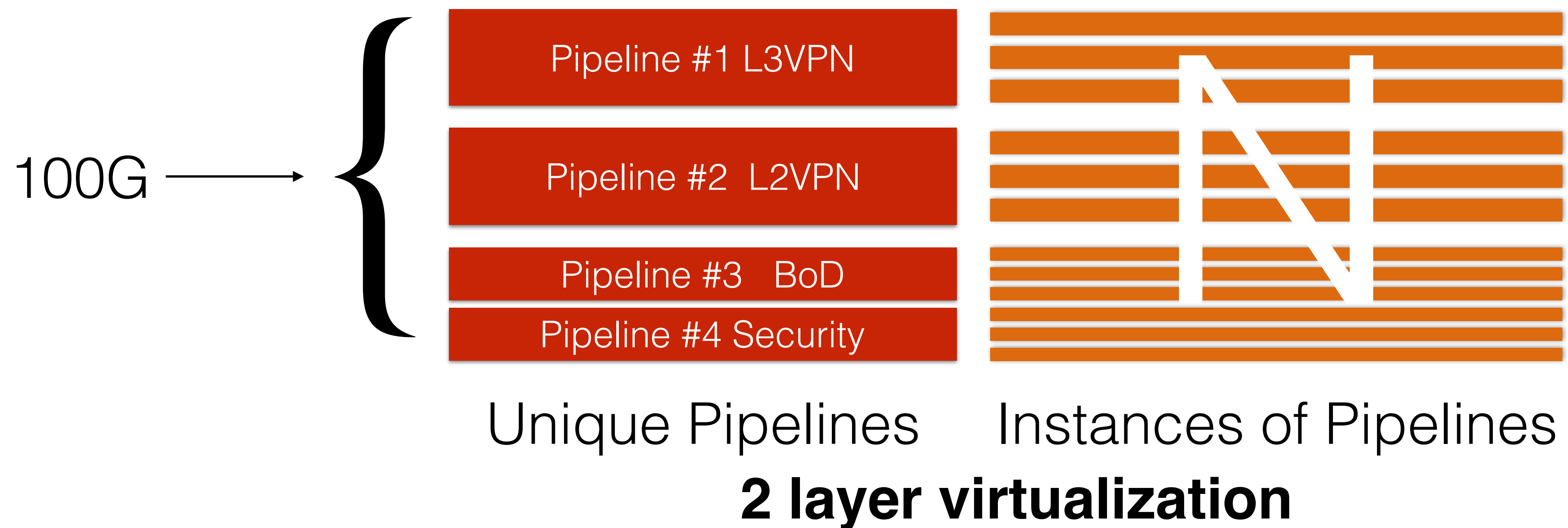
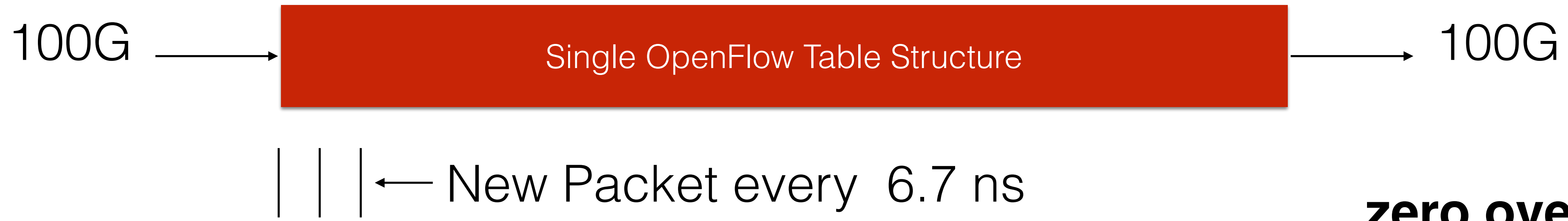


Simple Approach : Select 1 of N table structures

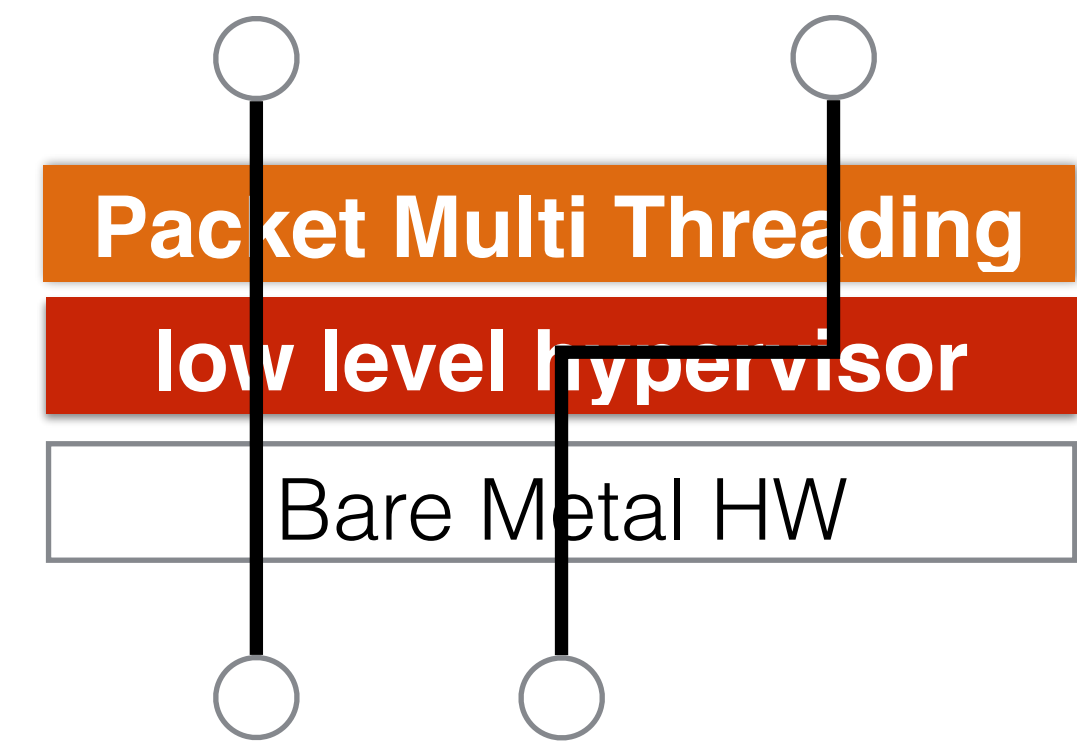
N = 4    N = 8    N = 256 ?

Ouch ! Code space is becoming a problem.

# Packet Processing Unit ( CPU )

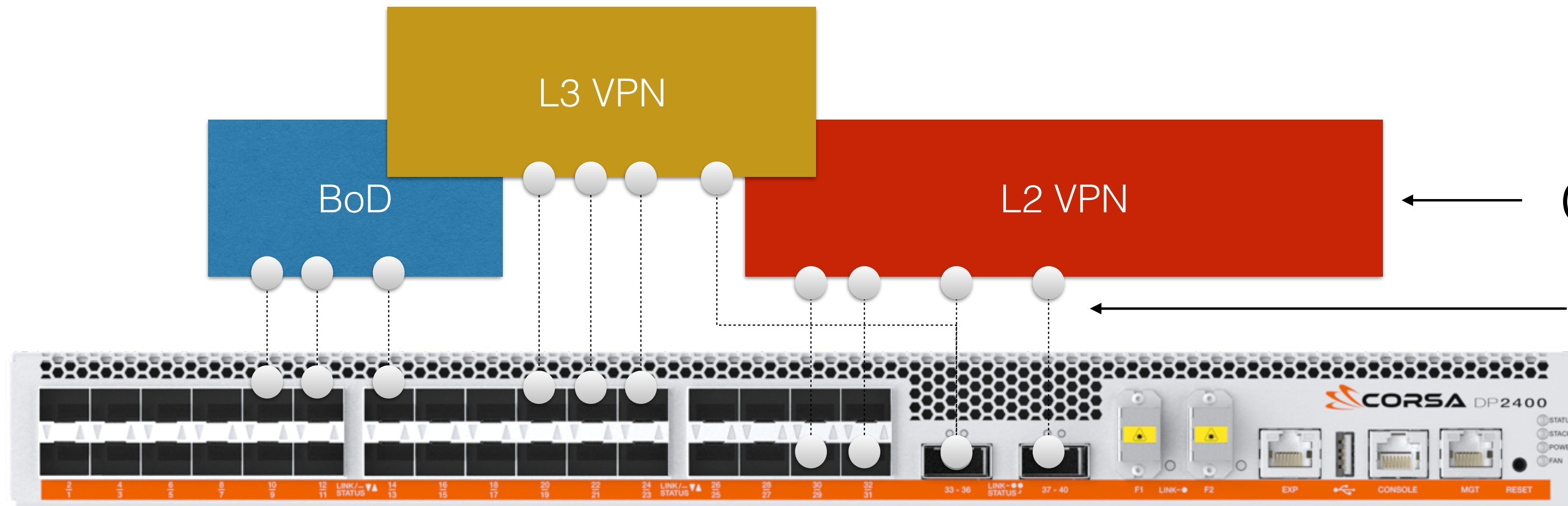


**zero overhead  
context  
switching**





# Multilayer QoS



← OF 1.3+: Shaping / WFQ

← Tunnel: Shaping / WFQ

← Port: Shaping / WFQ

# Summary

Proper SDN virtualization

1. Fast context switching to ensure full 100G line rate performance
2. Multi program and Multi threading structure to maximize program memory
3. Algorithmic lookups with built in virtualization to ensure table size scale
4. ASIC based QoS for massive scale in both overlay and underlay layers

The rest is simple :)