



OVS

Open vSwitch

December 7th-8th, 2021

Aaaand Action!

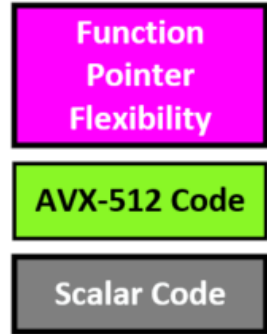
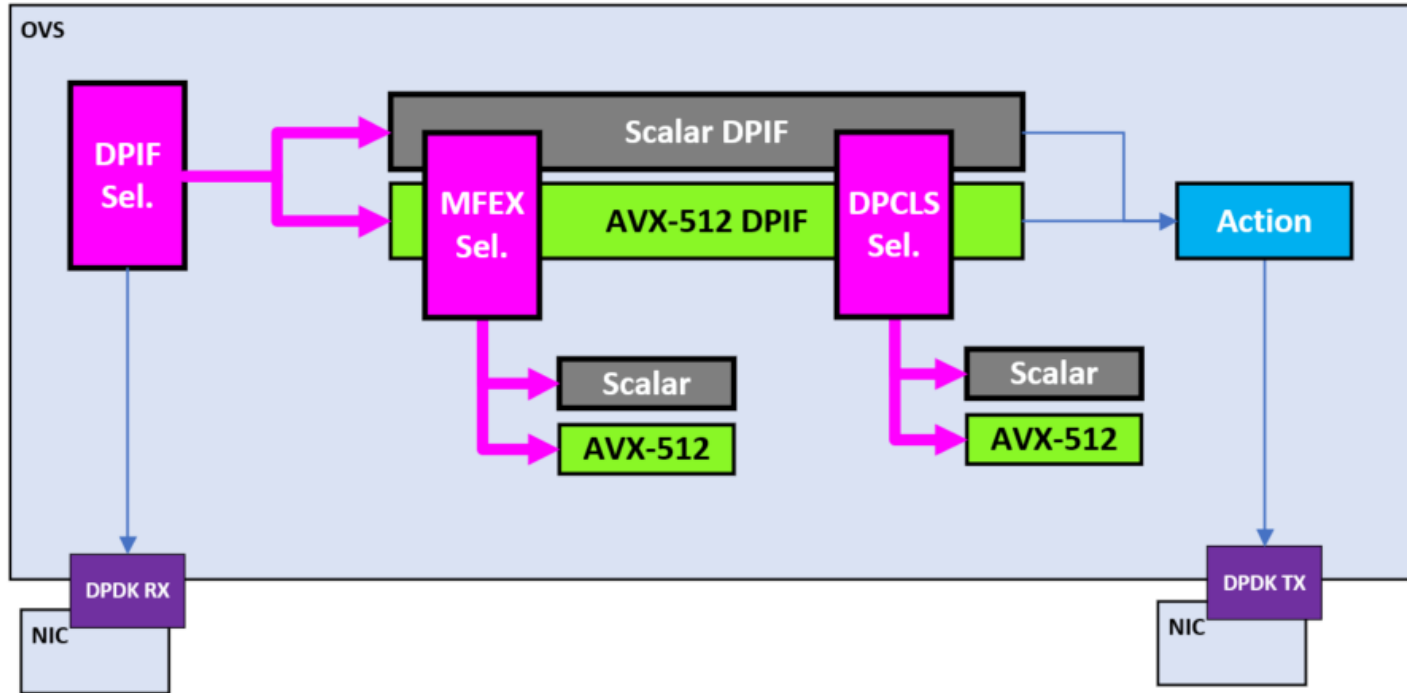
Using AVX512 to optimize OVS packet modifications

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Intel

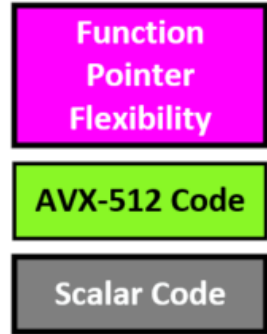
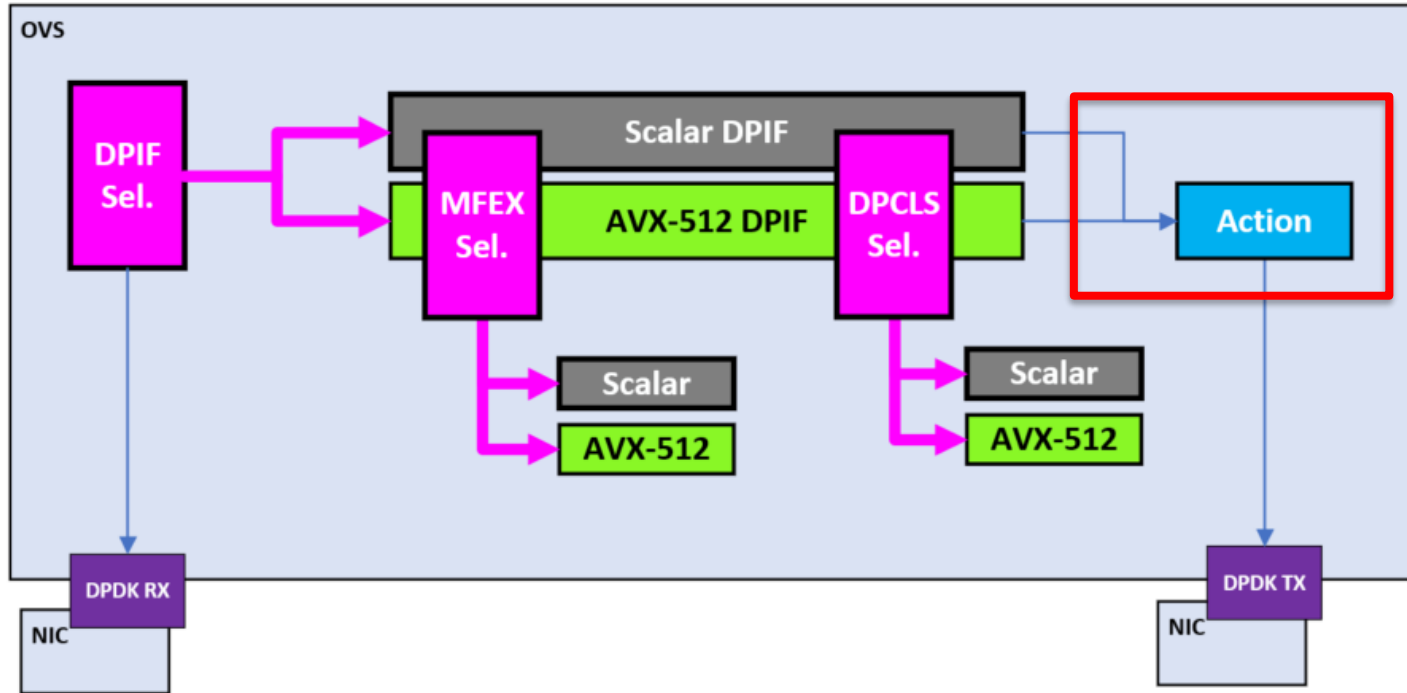
OVERVIEW

- **Introduction**
 - OvS Actions
 - Current State
- **Optimizing Actions**
 - Code Refactoring
 - Testing & Validation
 - SIMD packet modification
- **Upstreaming & Future Work**

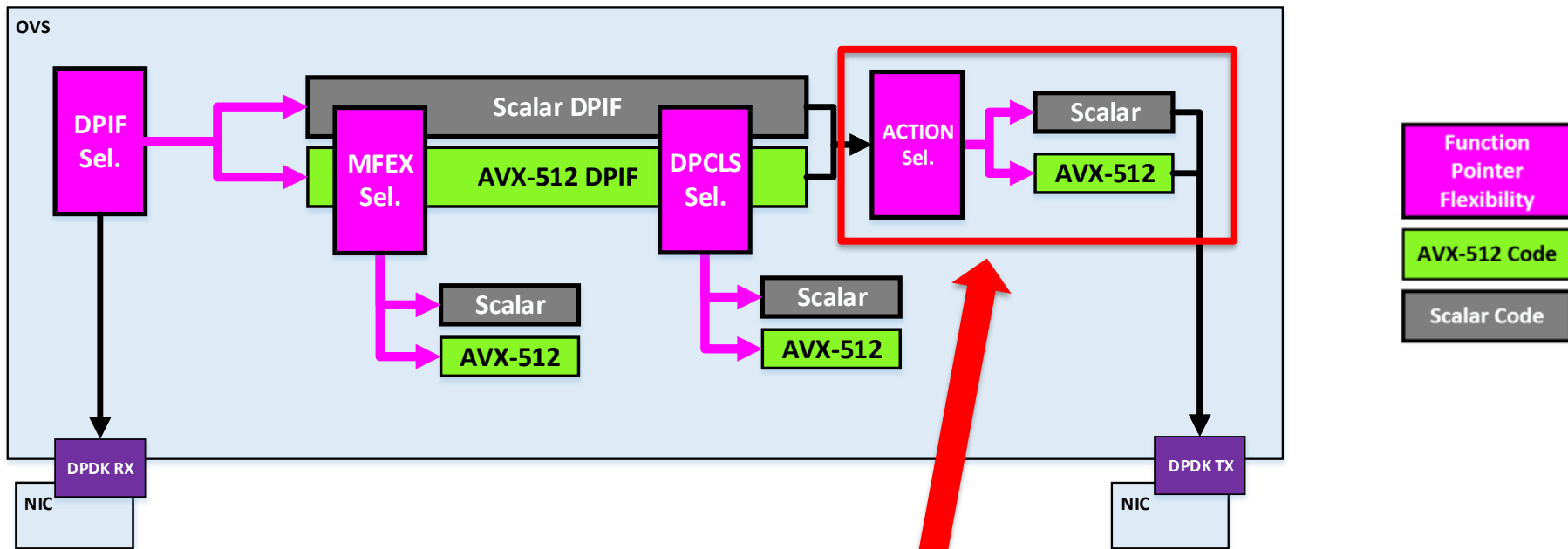
OvS 2.16 Datapath Overview



OvS 2.16 Datapath Overview



Datapath with Actions Optimizations



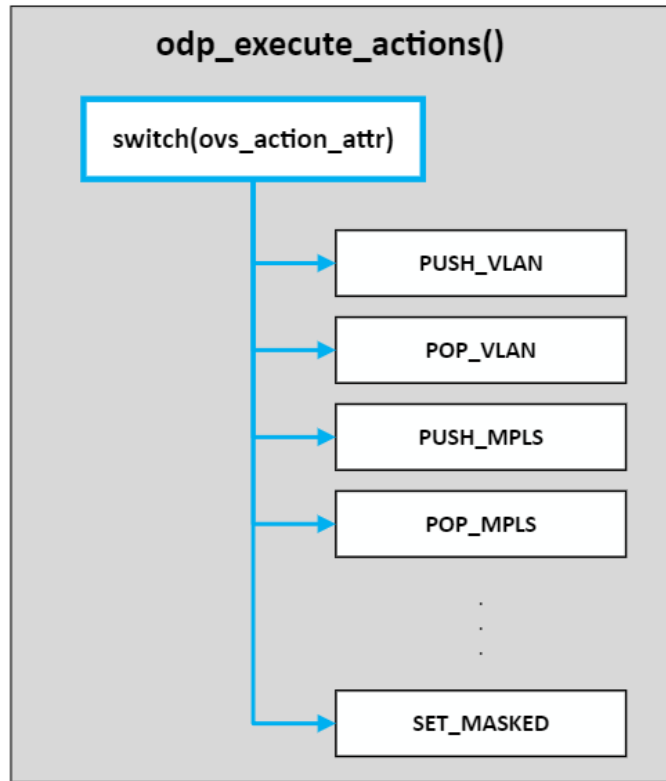
**Actions Refactor
And Optimization**

Actions : Current State

Implementation Today

- One large switch containing all actions
- Difficult to optimize individual actions

What about splitting the single switch() into smaller functions...



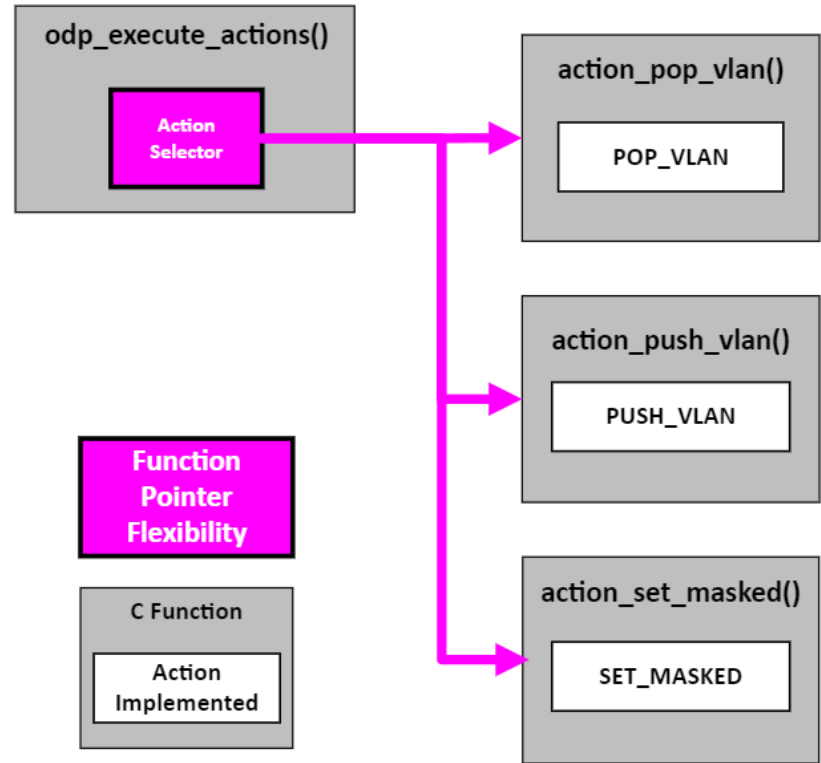
Actions : Refactor

Refactoring existing code

- Smaller per-action functions

Refactor is better for

- Testing individual actions
- Optimizing individual actions



Usage

\$ ovs-appctl dpif-netdev/action-impl-get

Available Actions implementations:

scalar (available: True, active: False)

autovalidator (available: True, active: False)

avx512 (available: True, active: True)

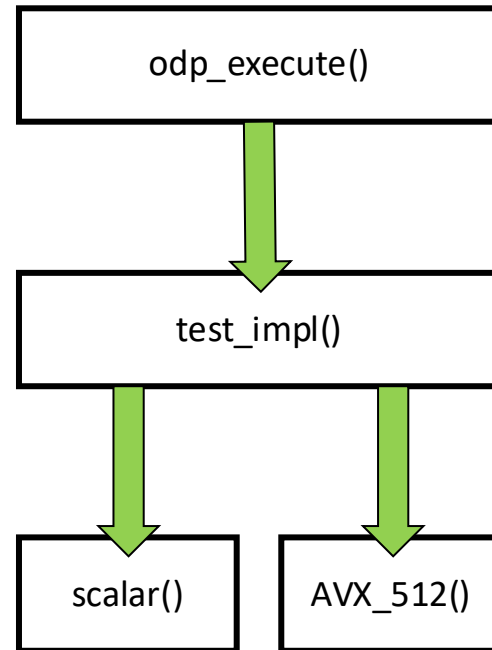
\$ ovs-appctl dpif-netdev/action-impl-set scalar

\$ ovs-appctl dpif-netdev/action-impl-set avx512

\$ ovs-appctl dpif-netdev/action-impl-set autovalidator

Testing & Validation

- **Action Implementations**
 - Scalar
 - AVX-512
 - AutoValidator
- **Automated Testing**
 - Action Function Pointer re-use
 - Tests all other implementations
 - Validates results as Identical



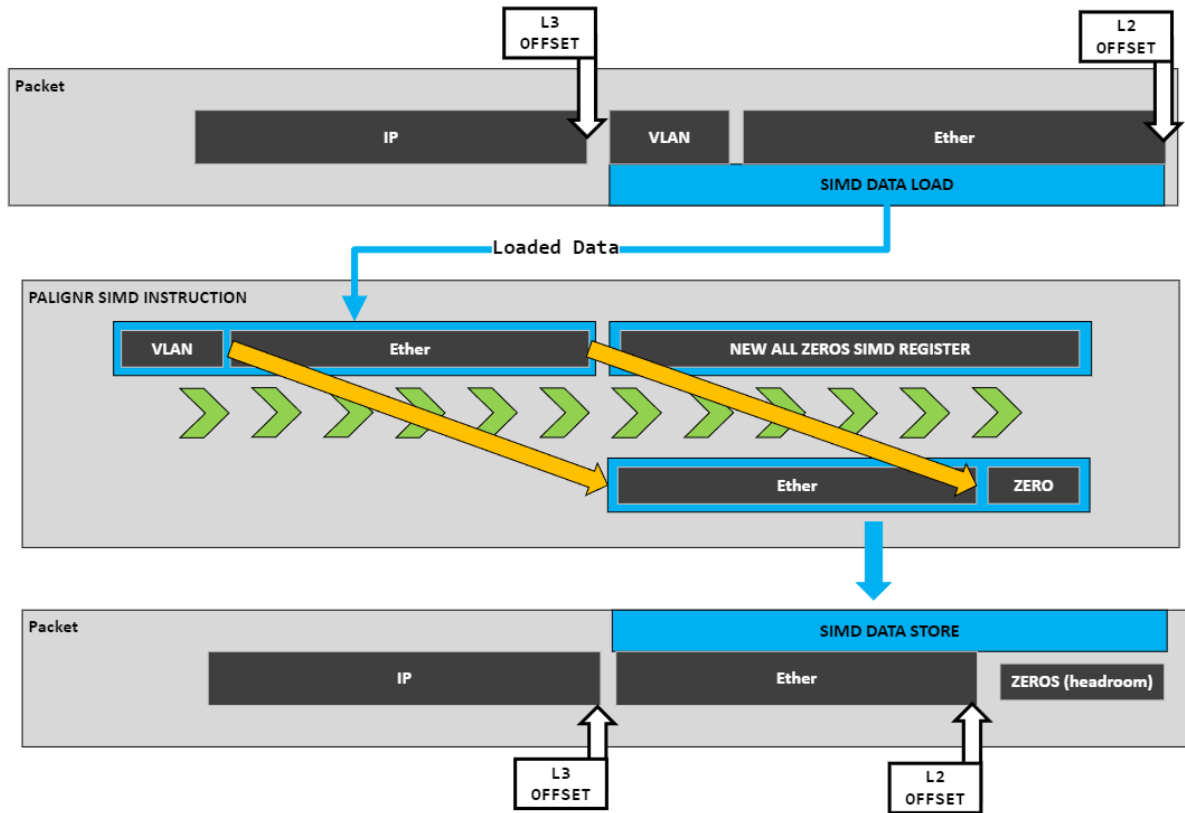
Previous talk presented at OvS Conf '19 - <https://www.youtube.com/watch?v=x0bOpojnpmU>

Example SIMD Optimization : POP VLAN

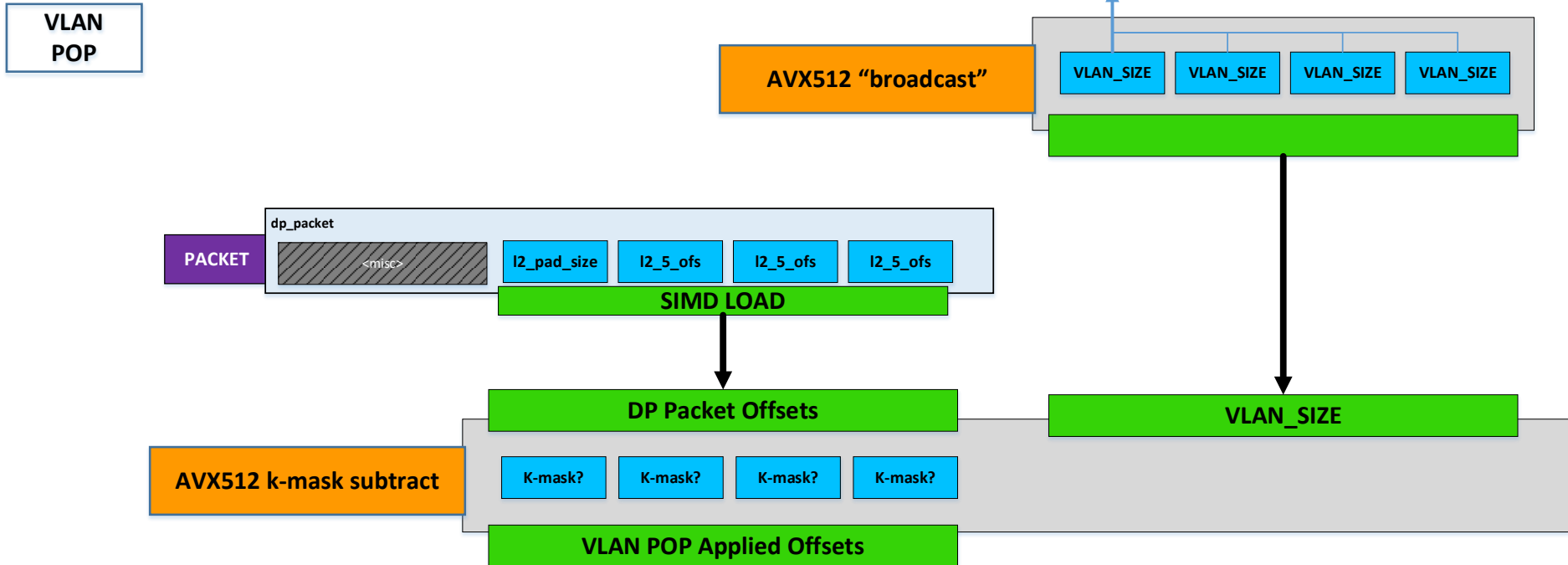
Example SIMD Optimization for “Pop VLAN” Action

Instructions Required:

- 1x AVX-128 Load
- 1x “Align Right” (palignr)
- 1x AVX-128 Store

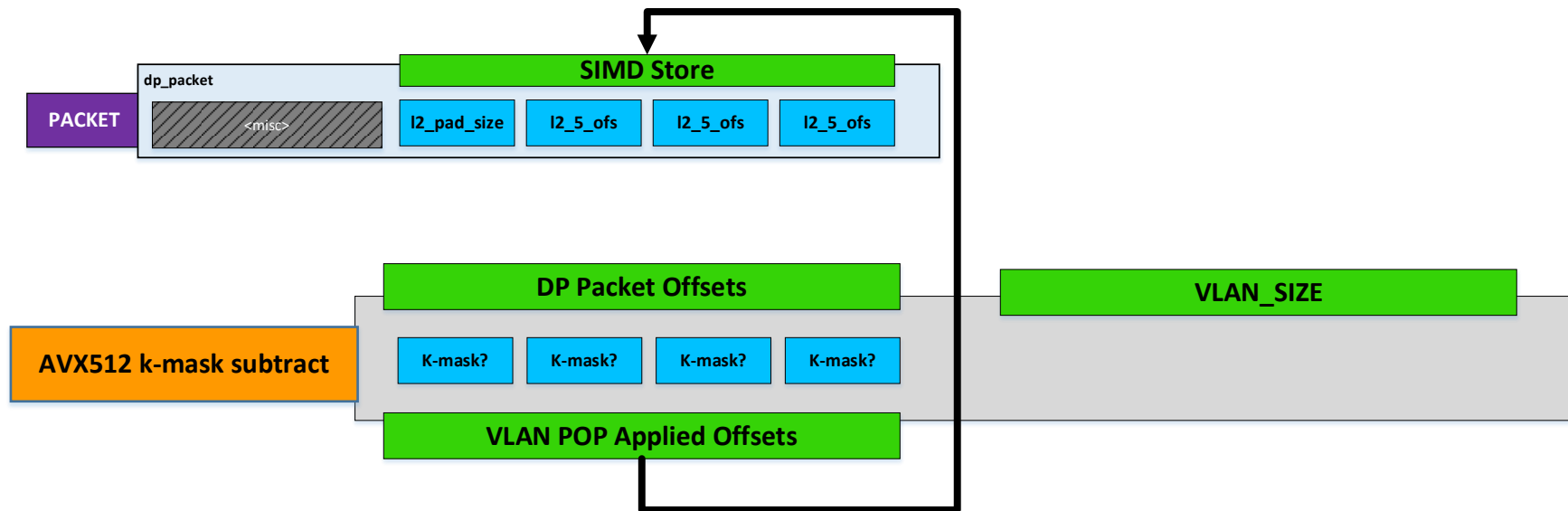


Example SIMD Optimization : POP VLAN



Example SIMD Optimization : POP VLAN

VLAN
POP





? Questions ?

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