

The background features a dark grey color with intricate white and green circuit-like patterns, including hexagons, lines, and nodes. Several large circular icons with green arrows pointing in various directions (left, right, and double-headed) are scattered across the scene. The text is centered and rendered in a clean, white, sans-serif font.

**OVS**

**Open vSwitch**

November 8th-10th, 2022

**Take 2: Action!**

**Now with a focus on how SIMD benefits performance**

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# Checksums

Version	TOS	Total Length
ID		Fragment Offset
TTL	Proto	Checksum
Source Address		
Destination Address		

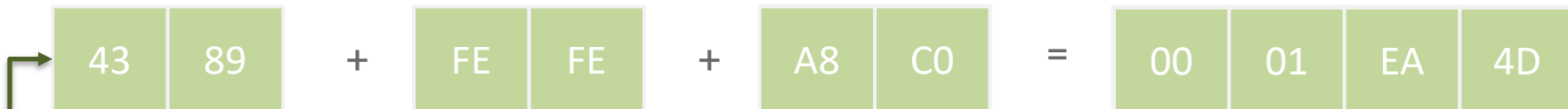
$(16 \text{ bit sum of entire packet}) + \text{checksum} = 0xFFFF$

# Scalar Checksum (RFC 1624) – “Incremental Update”

```
uint32_t sum = ~old_csum + ~old_val + new_val
```

```
ip_src= 1.1 1.1 -> 192.168.0.7
```

```
recalc_csum16()
```



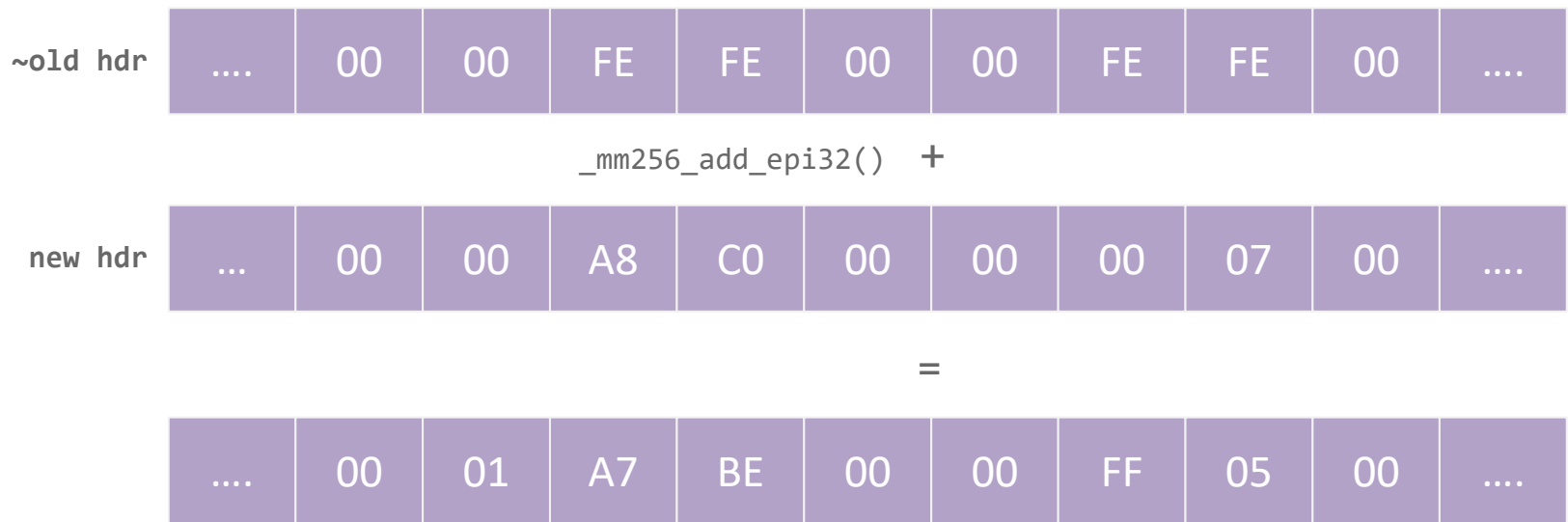
```
csum_finish()
```



**10-16 times**

# SIMD “get delta” Checksum

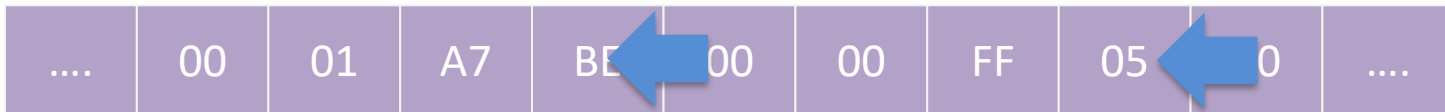
avx512\_get\_delta()



# SIMD "get delta" Checksum

avx512\_get\_delta()

\_mm256\_add\_epi32()



csum\_finish()

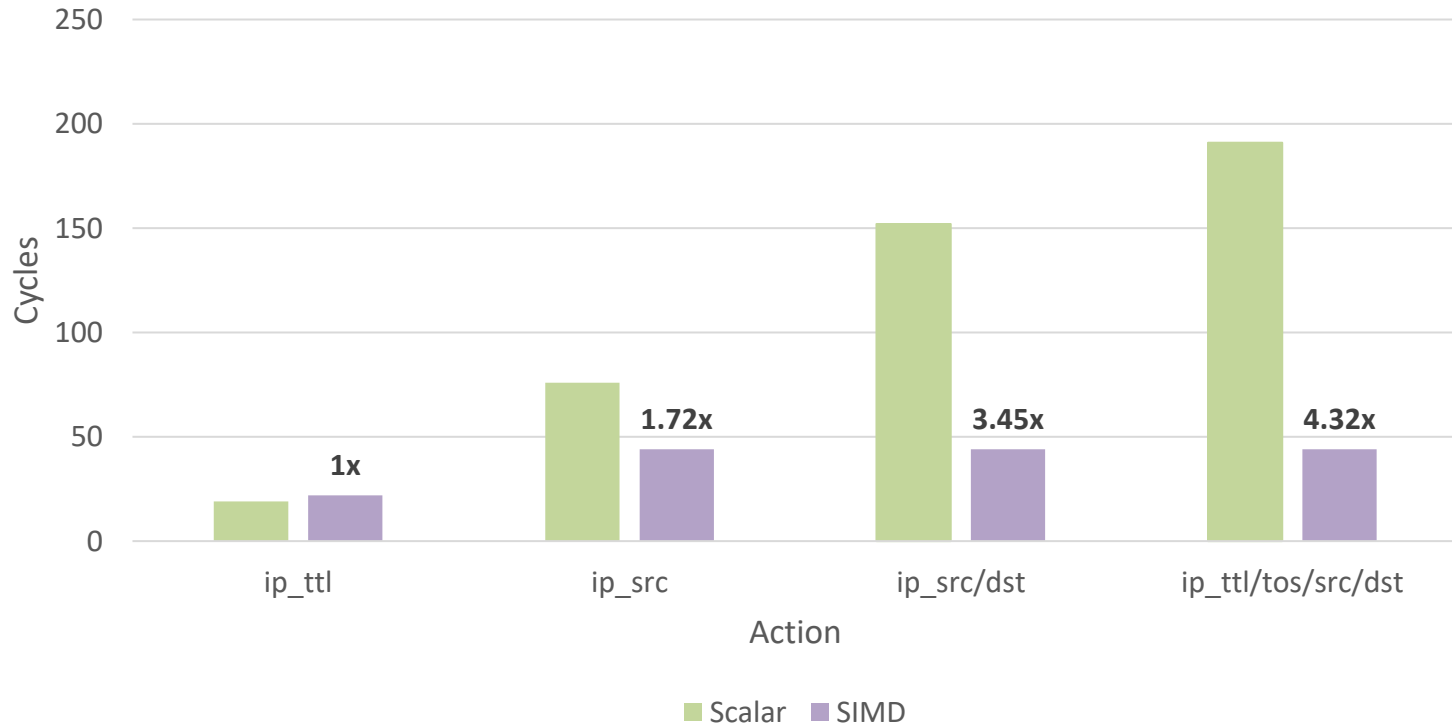
+

=



# Performance Benefits

Incremental vs. Delta Method





# ? Questions ?

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[IPv6 patch - https://patchwork.ozlabs.org/project/openvswitch/list/?series=320103](https://patchwork.ozlabs.org/project/openvswitch/list/?series=320103)

[Aaaand Action! Using AVX512 to optimize OVS packet modifications](#)