

A Vision to Software-Centric Cloud Native Network Functions:

Achievements and Challenges

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Agenda

Background

5G/6G, Network Slicing

Cloud Native N/W

Clos, Softwarization

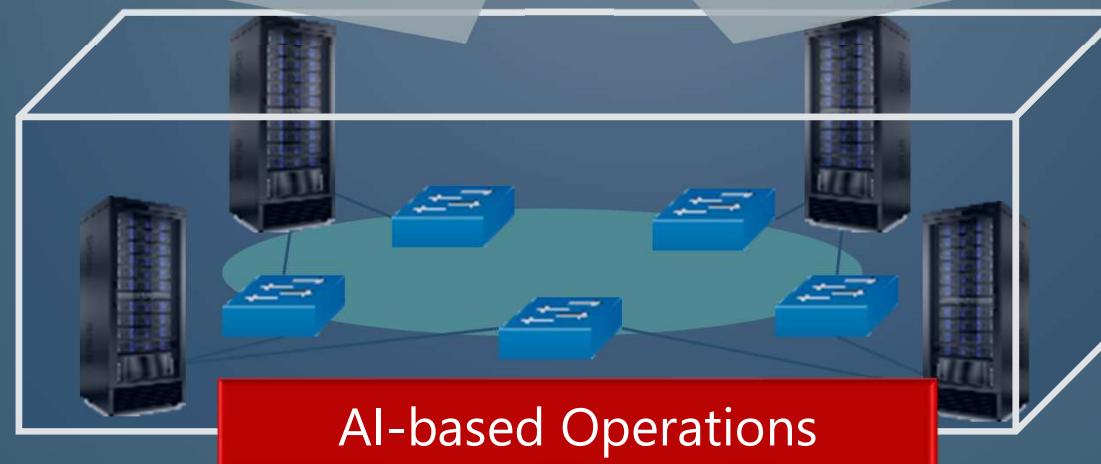
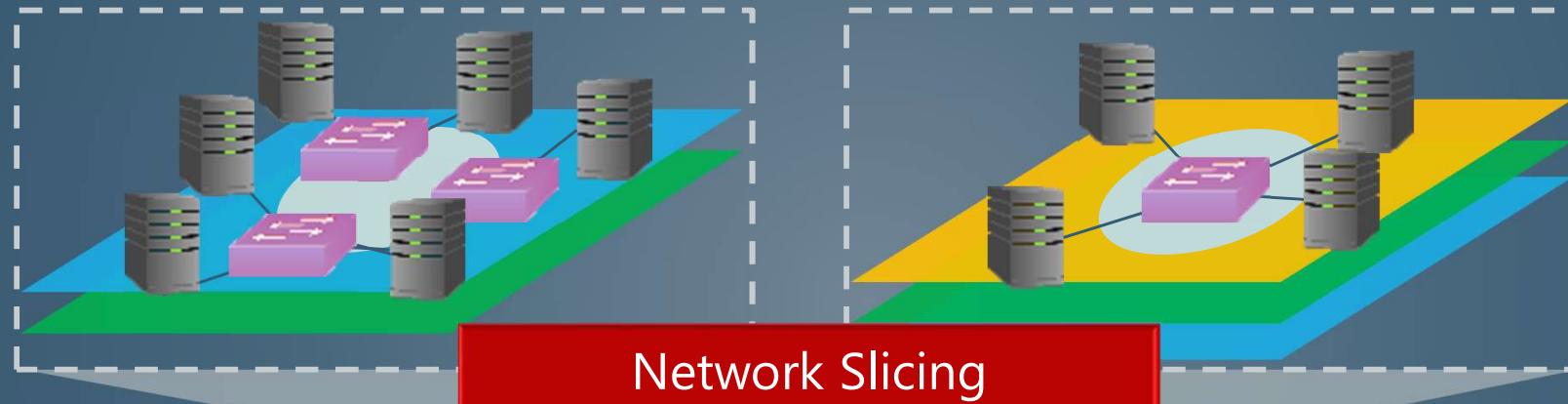
Problem Statement

Packet I/O, Virtual Network I/O

Future Challenges

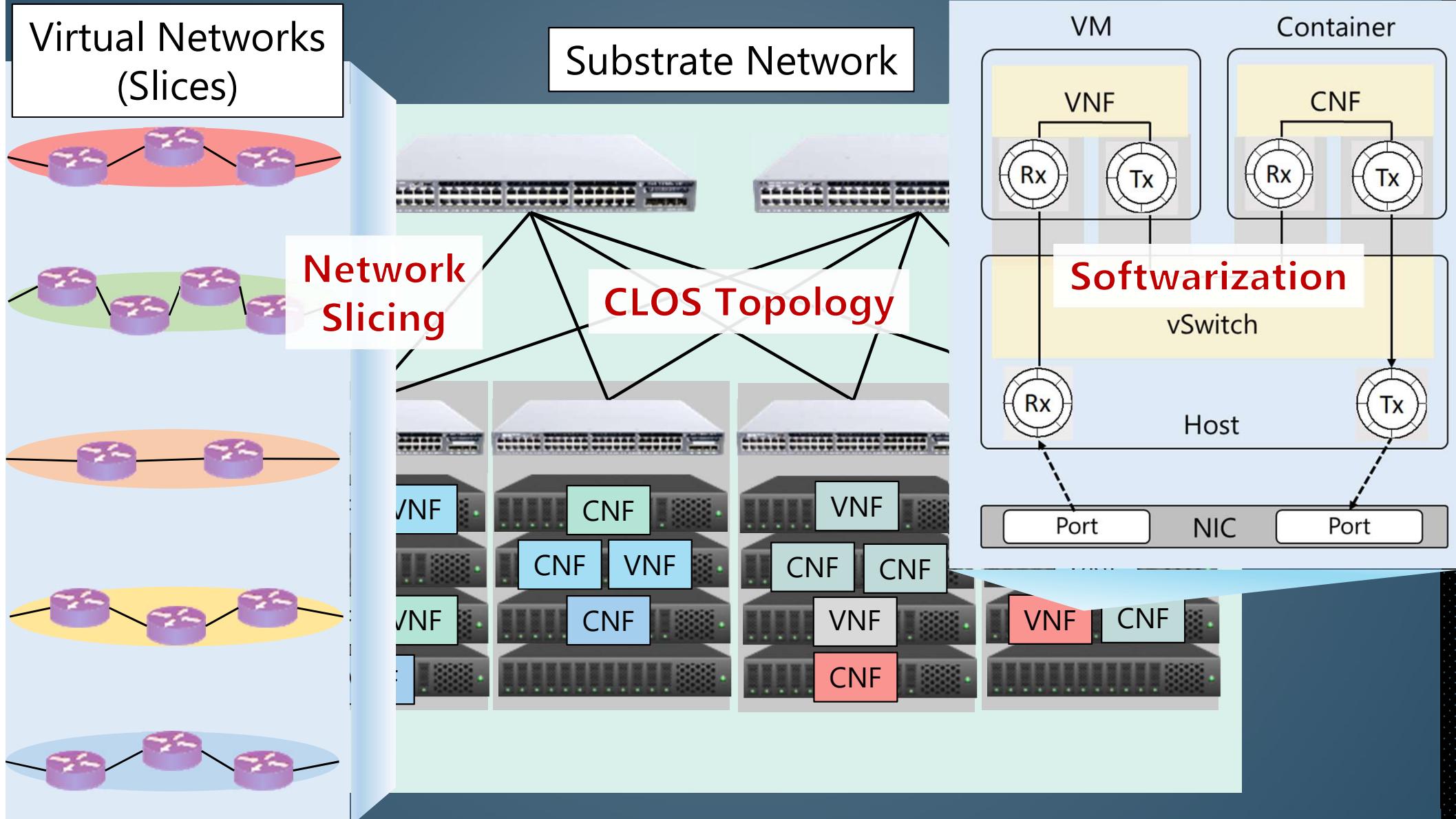
Background

On demand composition & automated management

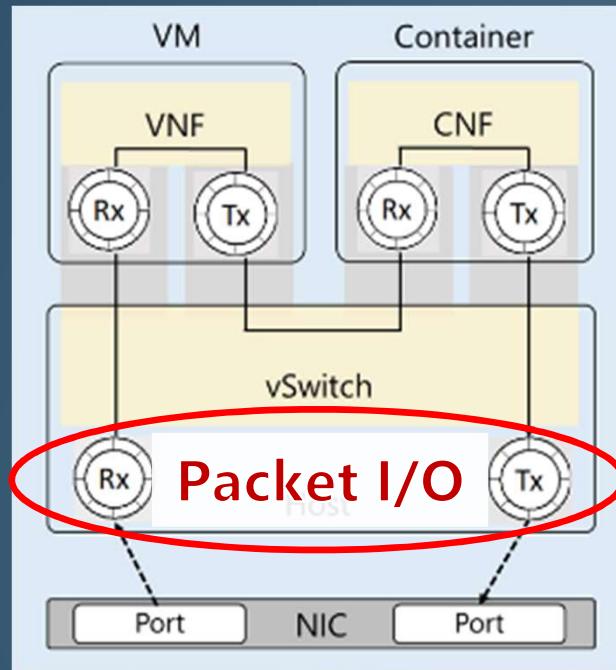


Software-centric network infrastructure is necessary! 2

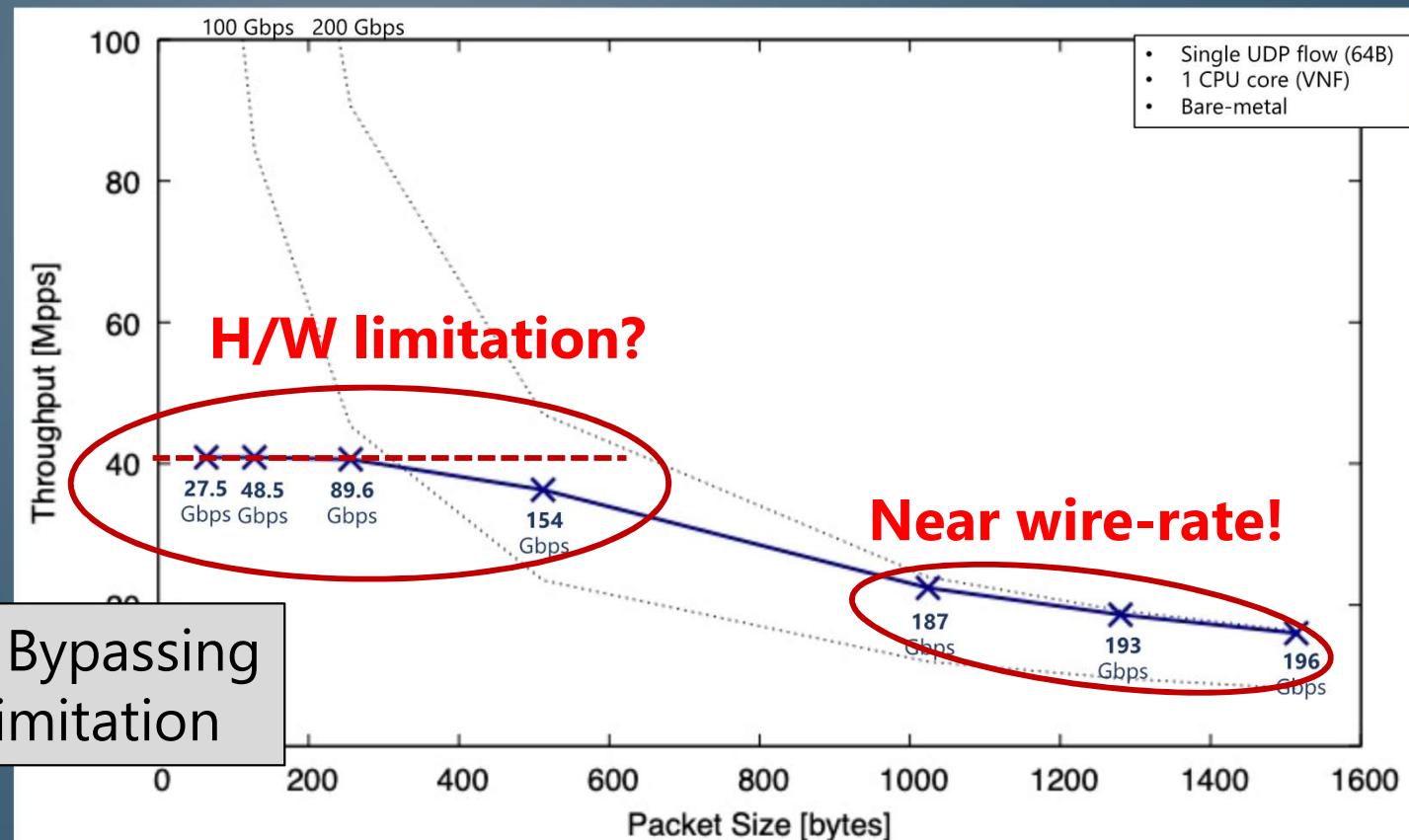
Cloud Native Networking



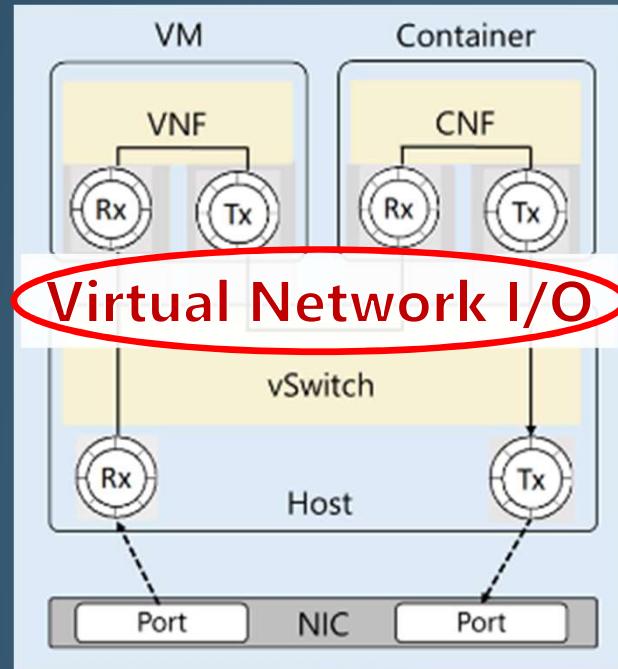
Problem Statement: Packet I/O



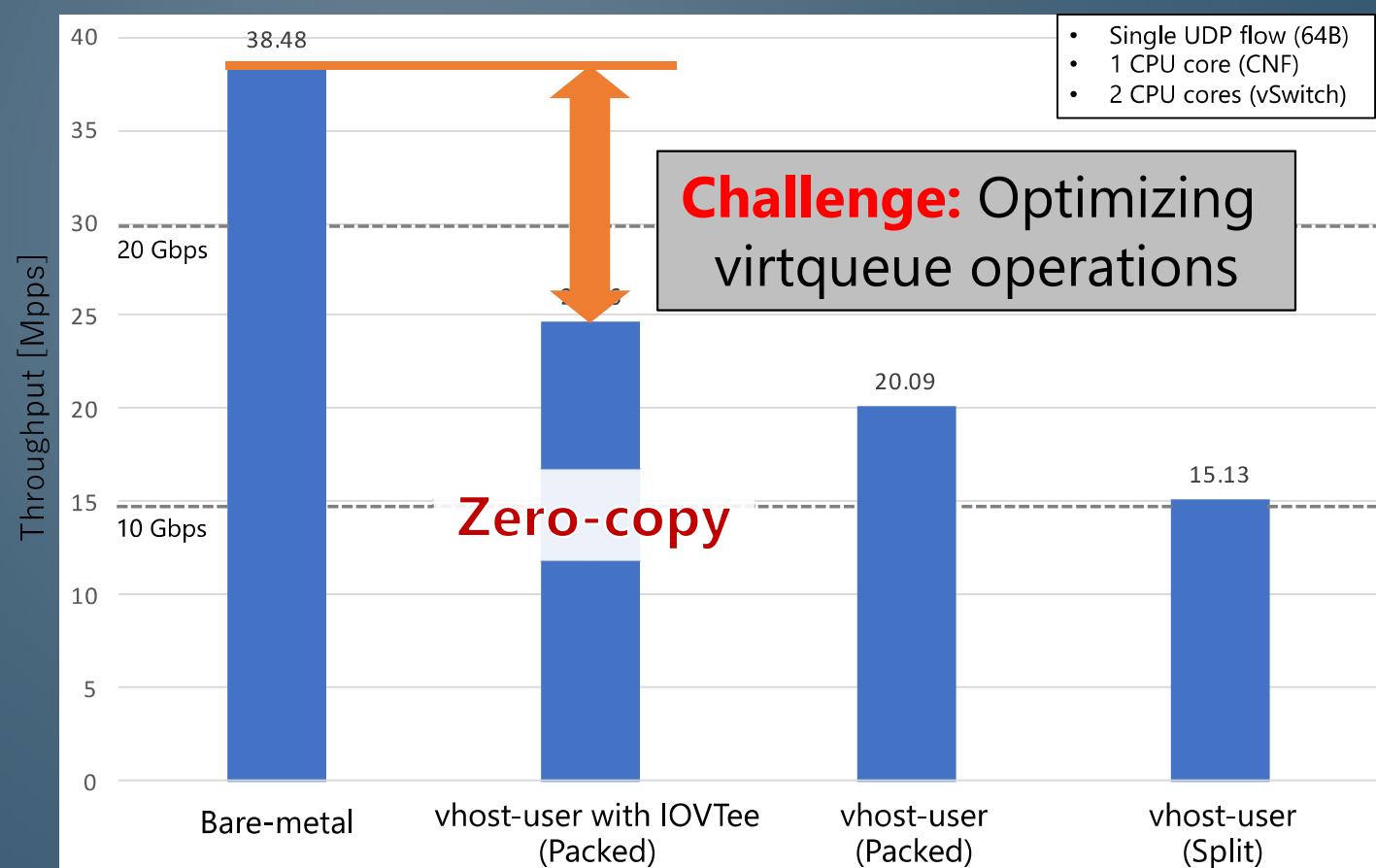
Upper-bound throughput
of COTS servers



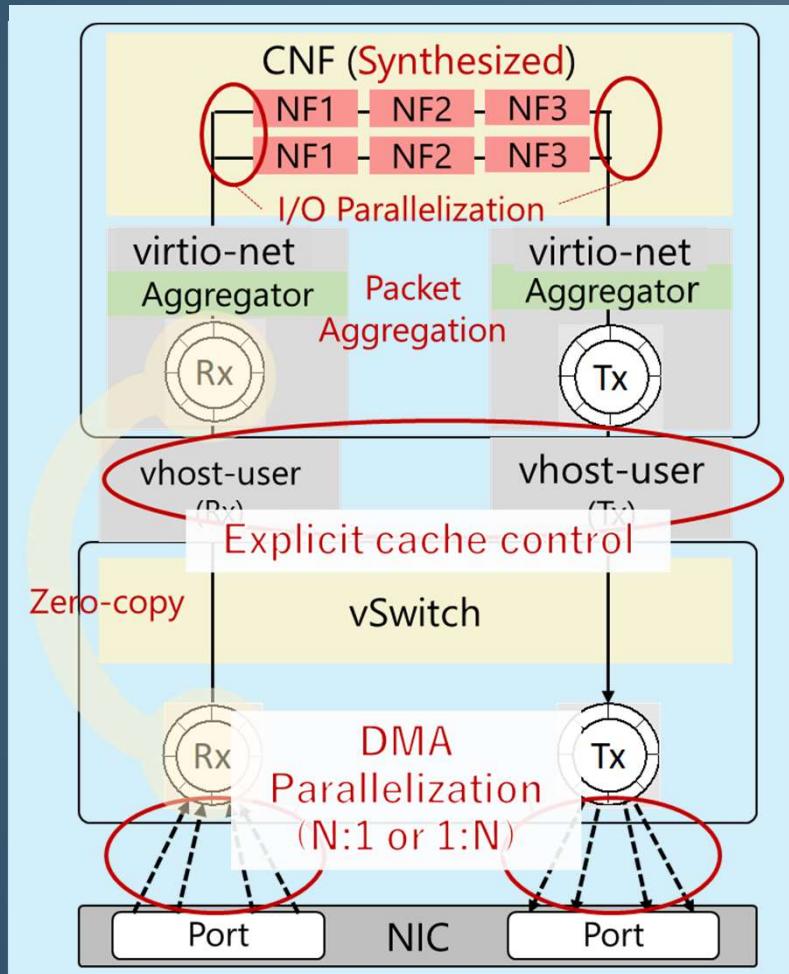
Problem Statement: Virtual Network I/O



Upper-bound throughput of VNF/CNF



Future Challenges



Packet I/O

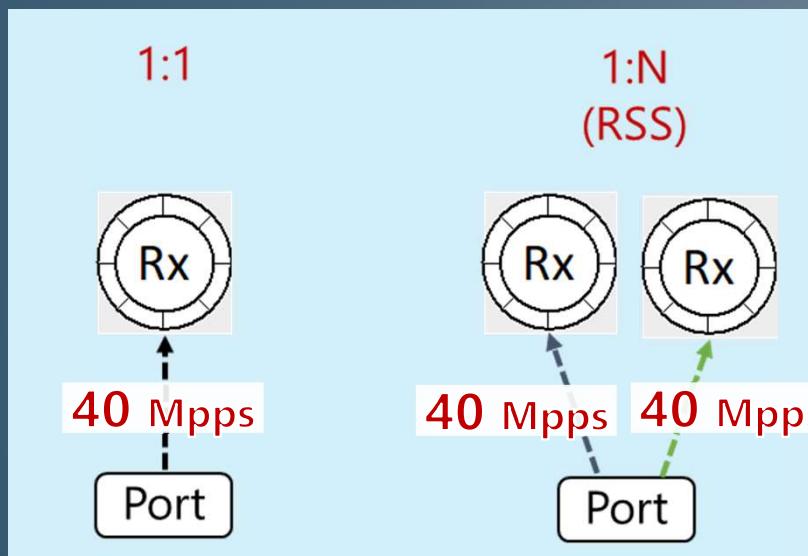
- Datapath Parallelization
 - I/O (Rx/Tx queue) (1:N)
 - DMA (N:1)

Virtual Network I/O

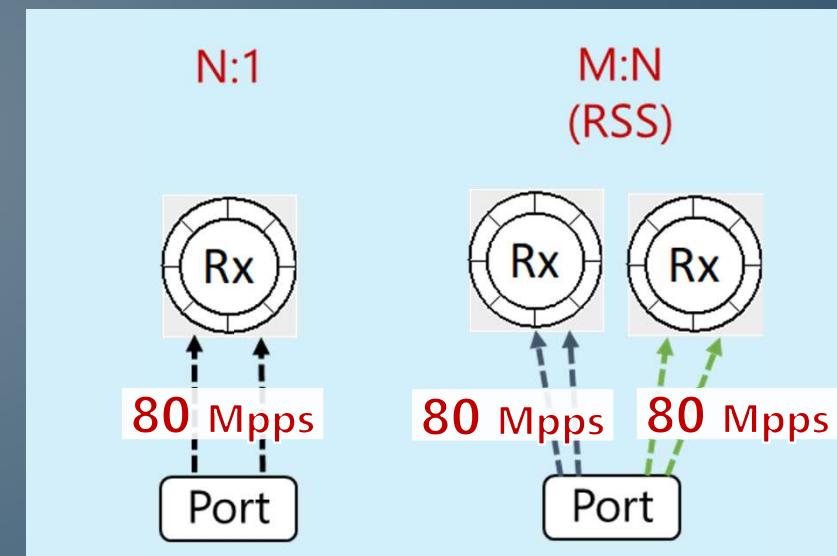
- Optimization of cache usage
 - Data structure
 - Explicit cache control

Parallel DMA (N:1)

Single flow - Single DMA
(Existing)



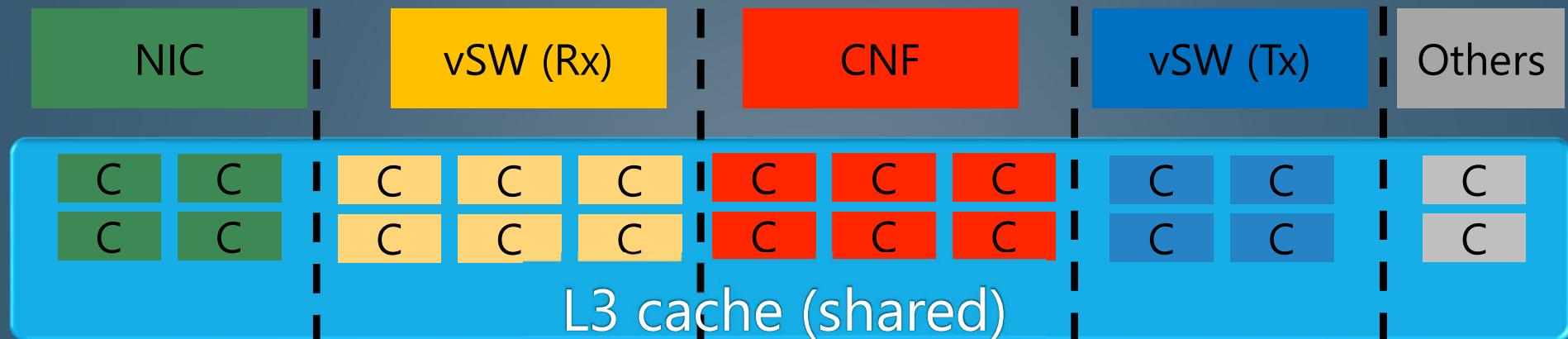
Single flow - Multiple DMA
(Proposal)



Explicit Cache Control

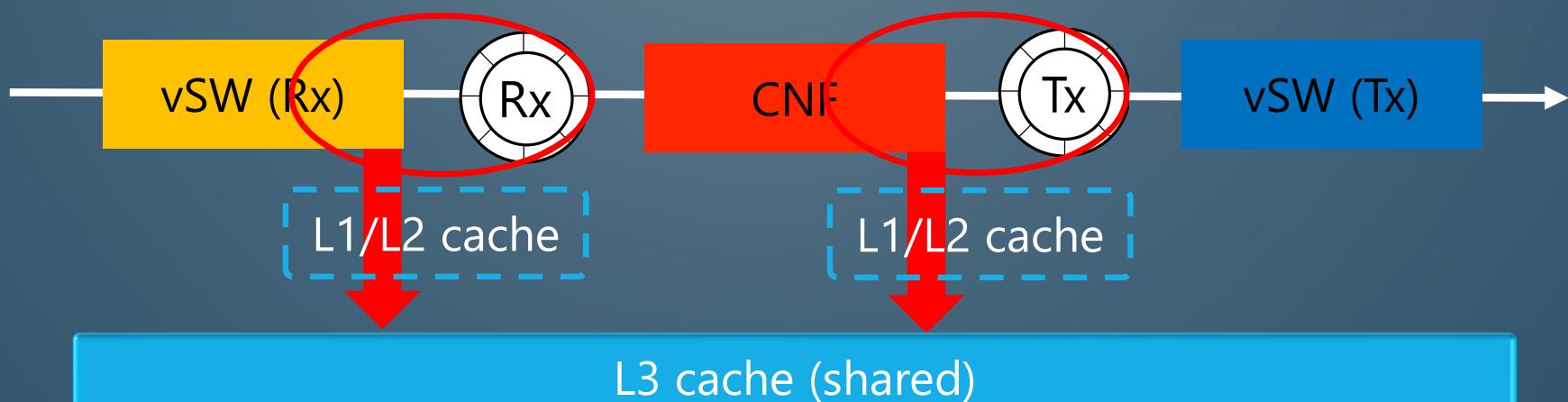
Application-Aware Allocation

ex) Intel CAT

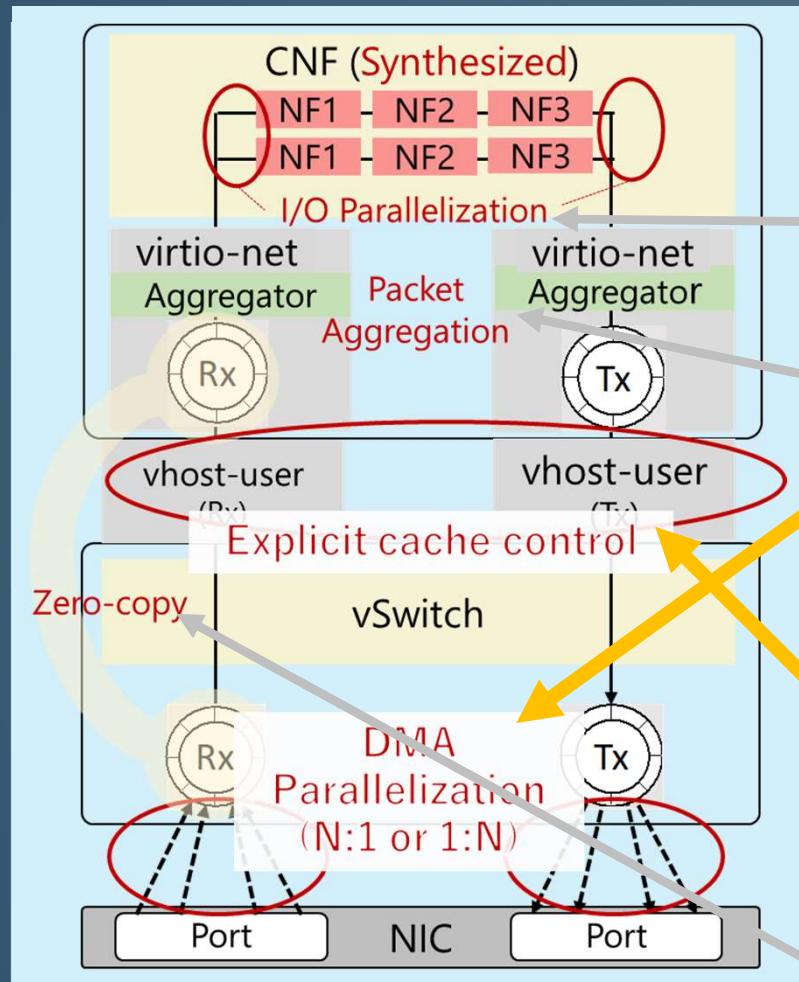


Avoiding Cache Pollution

ex) CLDEMOTE



Conclusion



Packet I/O

- Datapath Parallelization
 - I/O (Rx/Tx queue) (1:N)
 - DMA (N:1)
- Packet Aggregation

Virtual Network I/O

- Optimization of cache usage
 - Data structure
 - Explicit cache control
- Zero-copy

Deeply understanding/leveraging Harware is imerative! 9