



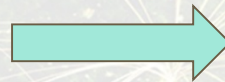
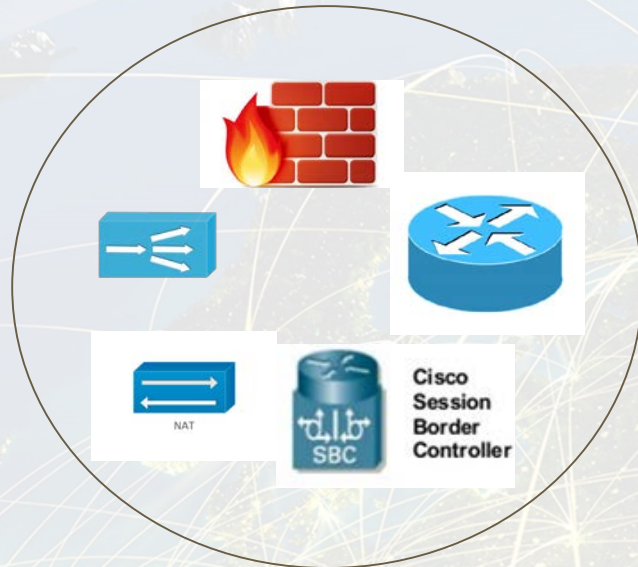
DPDK Summit

Packet Steering for Multicore Virtual Network Applications over DPDK

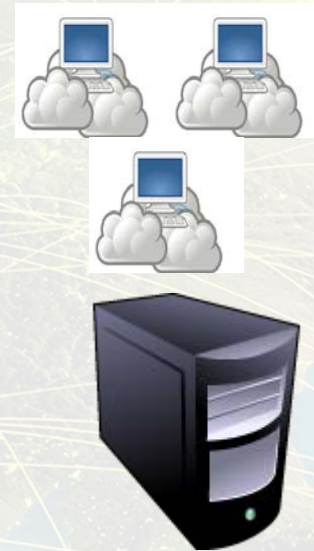
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Virtual Network Applications (VNFs)



Virtual Network Functions(VNFs)

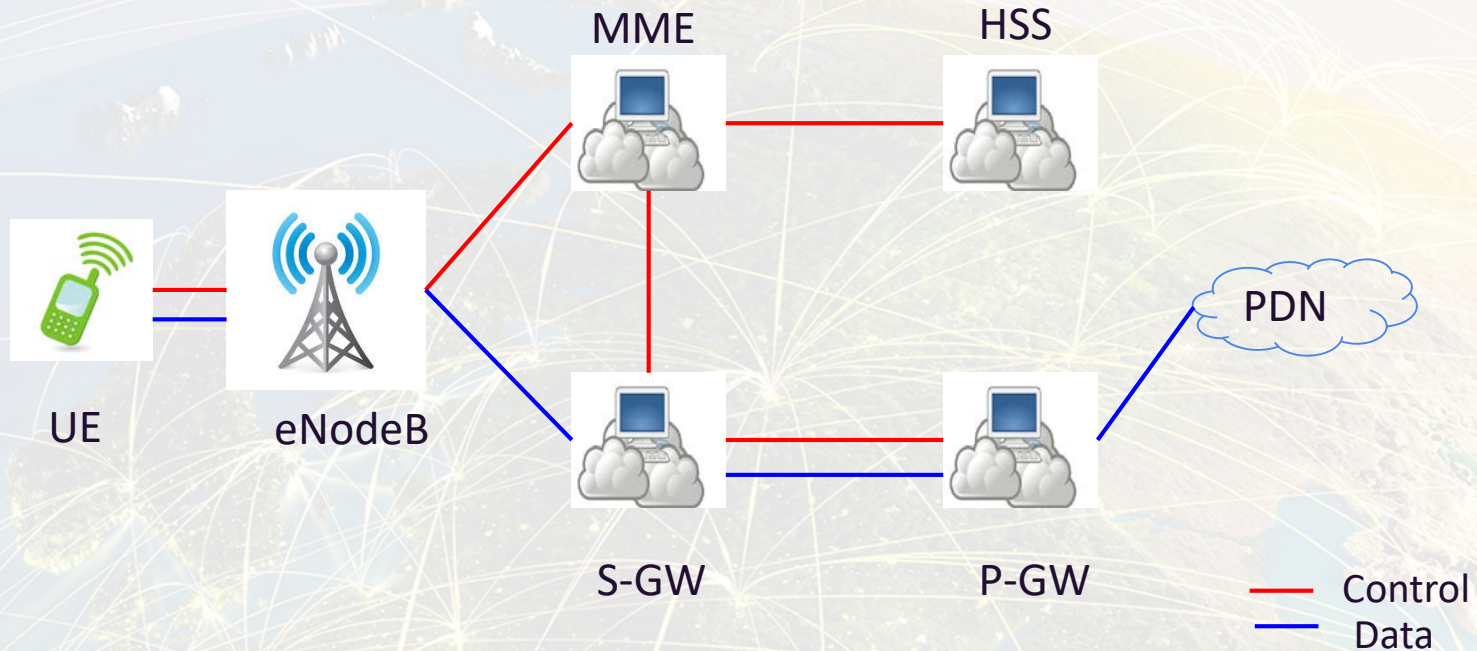


Commodity Servers

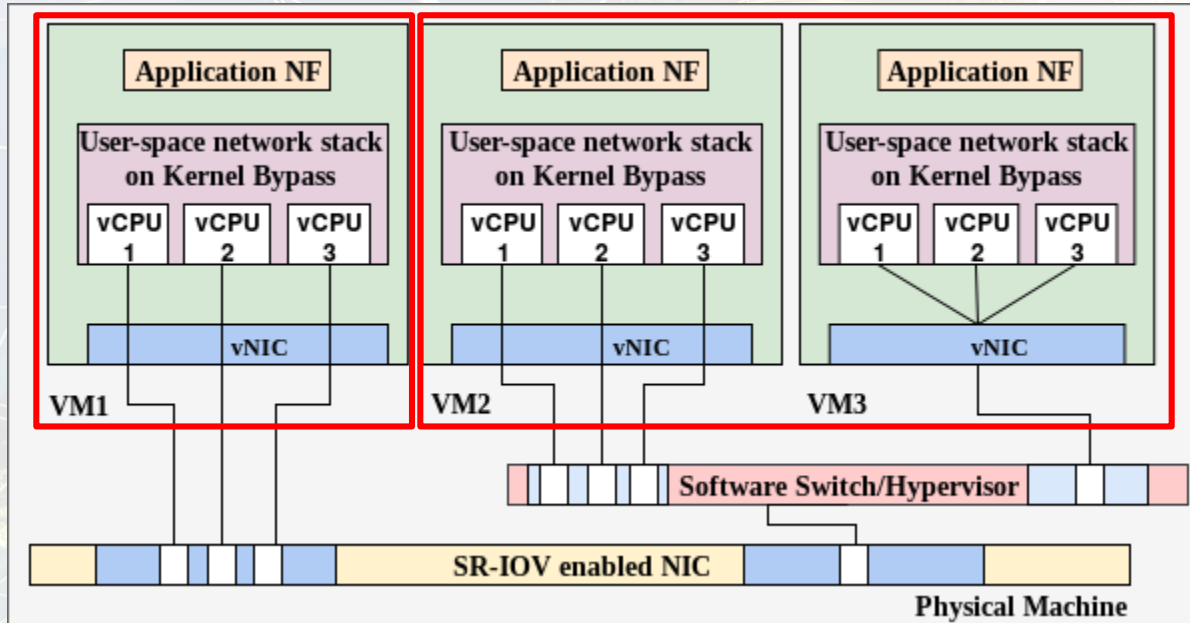
Network Application Types

- IP layer network functions
- Application layer network functions

Application layer VNF example: LTE-EPC



Multi-core VNF over a kernel bypass stack

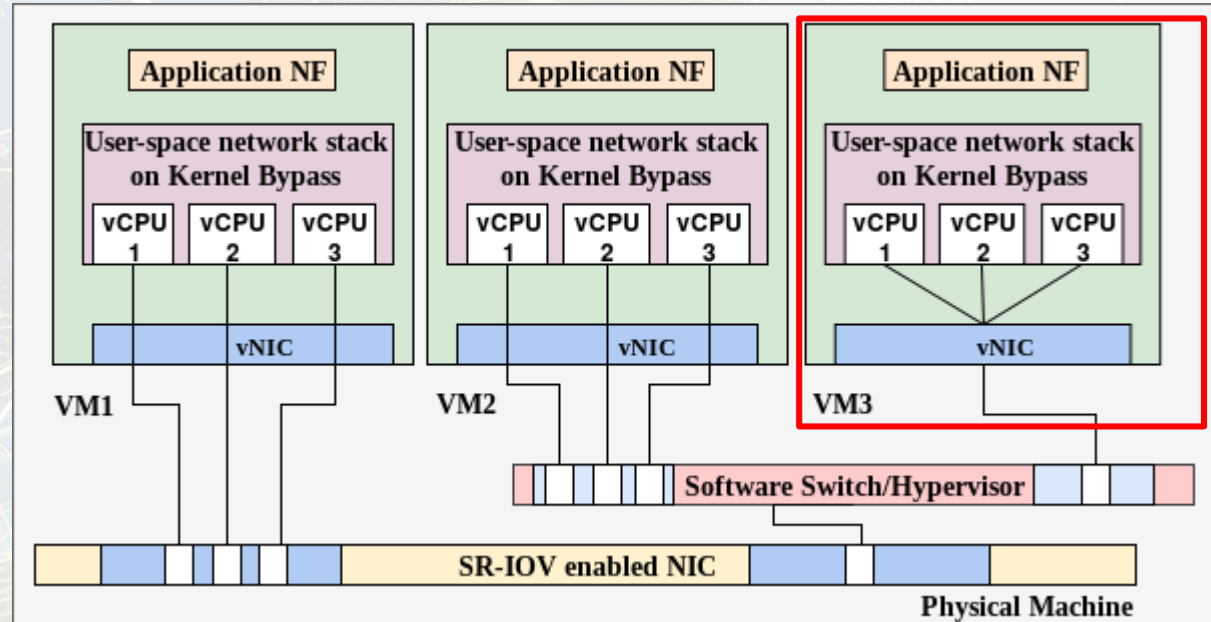


Multi-core VNFs Challenges

- Partitioning of packets- at hardware or software layer?
- Basis for packet distribution: 4 tuple or application semantics

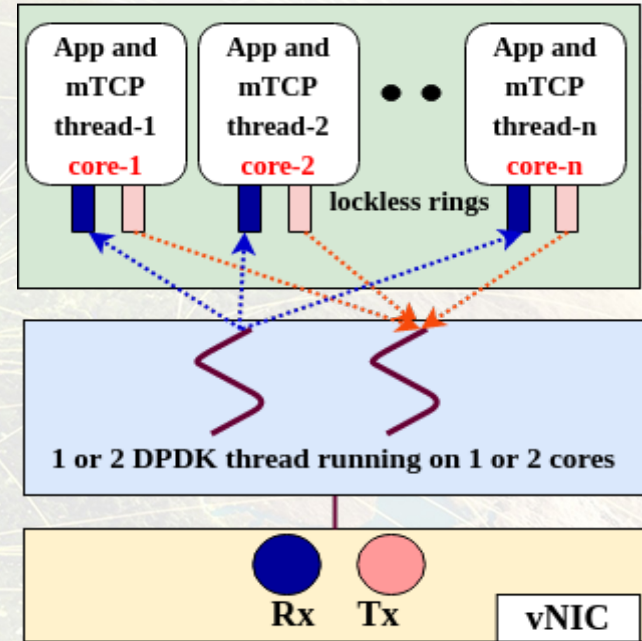
Software layer distribution of packets

- BESS switch
- PMDport to VM



S/W packet distribution on DPDK network stack

- mTCP over DPDK
- Single consumer single producer lockless rings



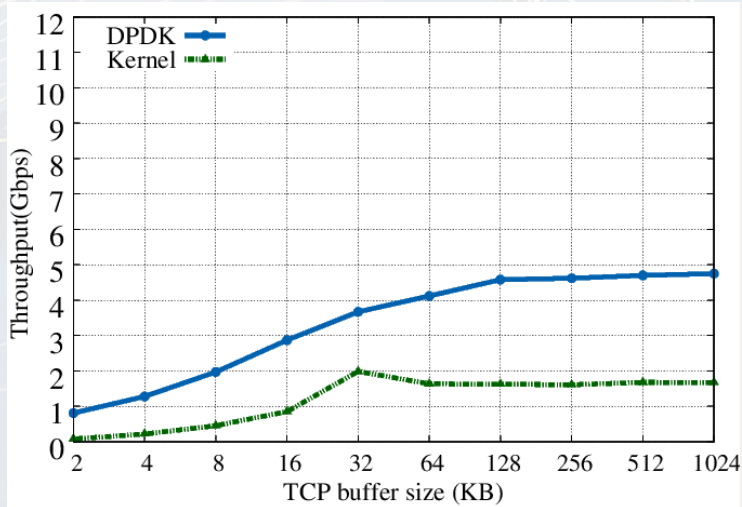
Setup

- 24-core Intel Xeon CPU E5-2670 v3 @ 2.30GHz with 64GB RAM
- 10 Gbps Intel X540 NICs
- OS: Ubuntu 16.04 and kernel 4.8 on both host and VMs

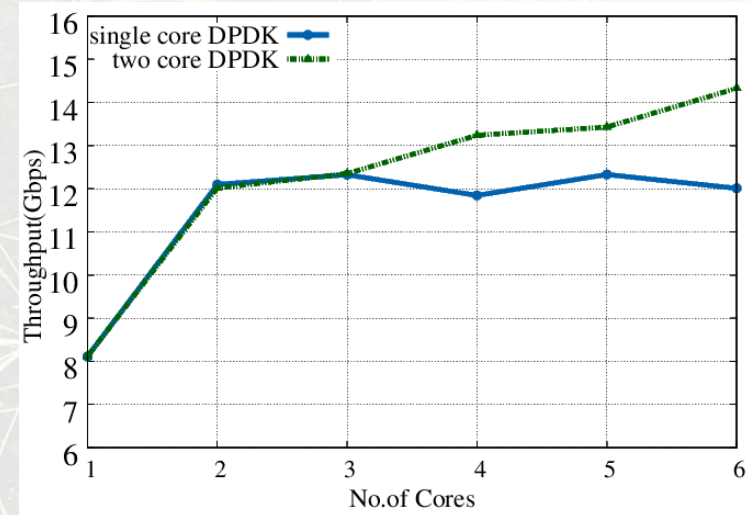
Software vs Hardware Packet Distribution

#Cores	S/W (Gbps)	H/W (Gbps)	S/W (Mbps)	H/W (Mbps)
	Payload=1448 Bytes		Payload=64 Bytes	
2	6.85	9.07	0.27	0.61
3	9.17	9.11	2.26	1.18
4	9.16	9.12	5.13	4.98

Software based packet distribution

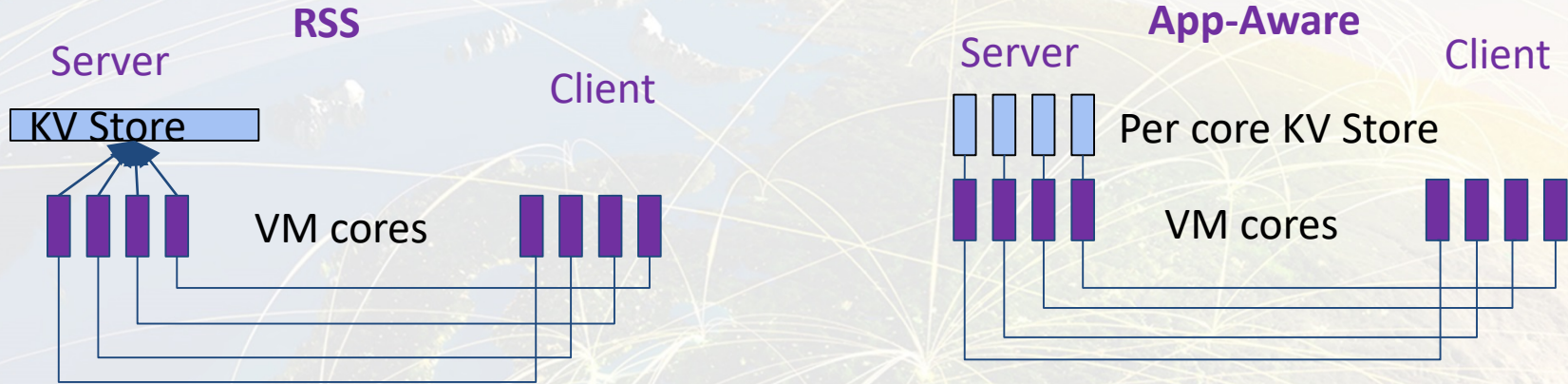


Performance on a single core VM



Scalability of software based packet distribution

RSS vs Application-aware steering



Application Steering



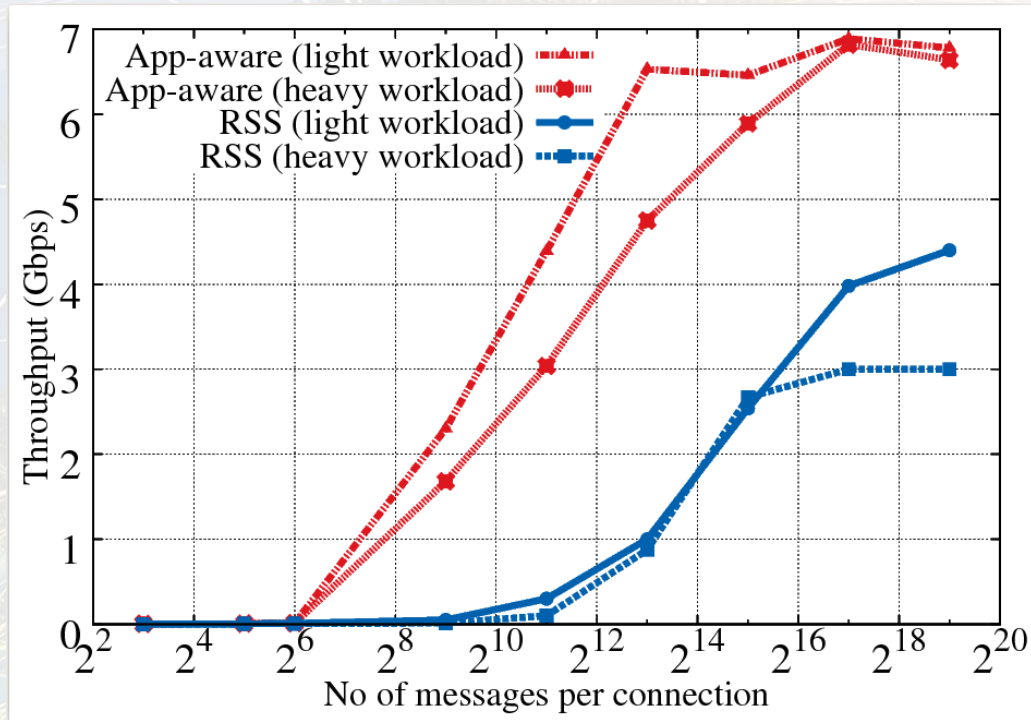
Application Steering



4-tuple	Core

Connection Map

Application aware packet steering vs RSS



Summary

- Evaluation of hardware and software distribution
- Performance evaluation of single hardware queue + software distribution to multiple application cores
- Evaluation of packet steering using TCP 4 tuple and application semantics.



THANK YOU

Application Steering

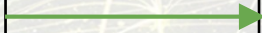


Connection Map

4-tuple	Core
	1

FIN Map

4-tuple	Core
	1



Application Steering



FIN Map

4-tuple	Core
	1

Delete Entry