

Problem Statement for VxLAN Performance Test

draft-liu-nvo3-ps-vxlan-perfomance-00

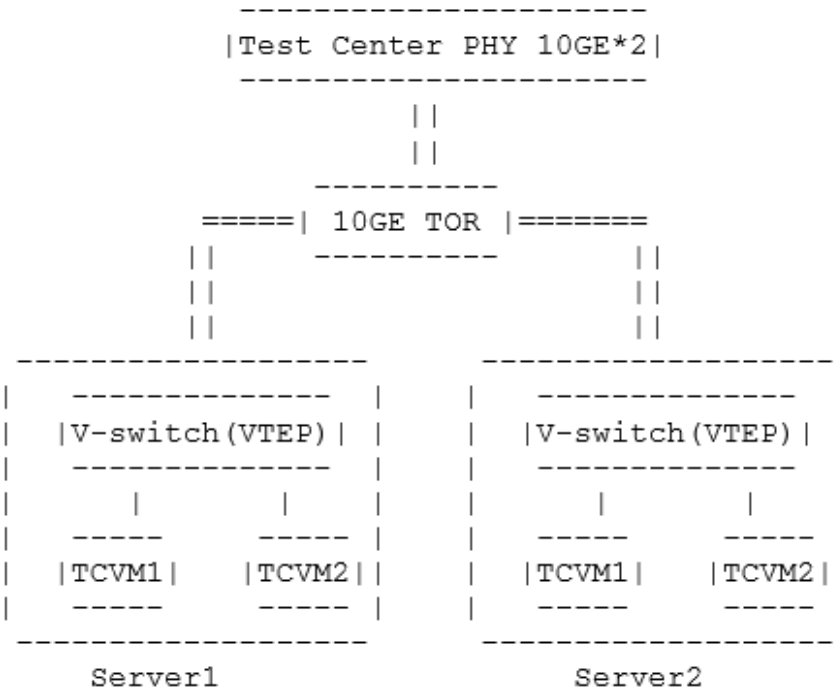
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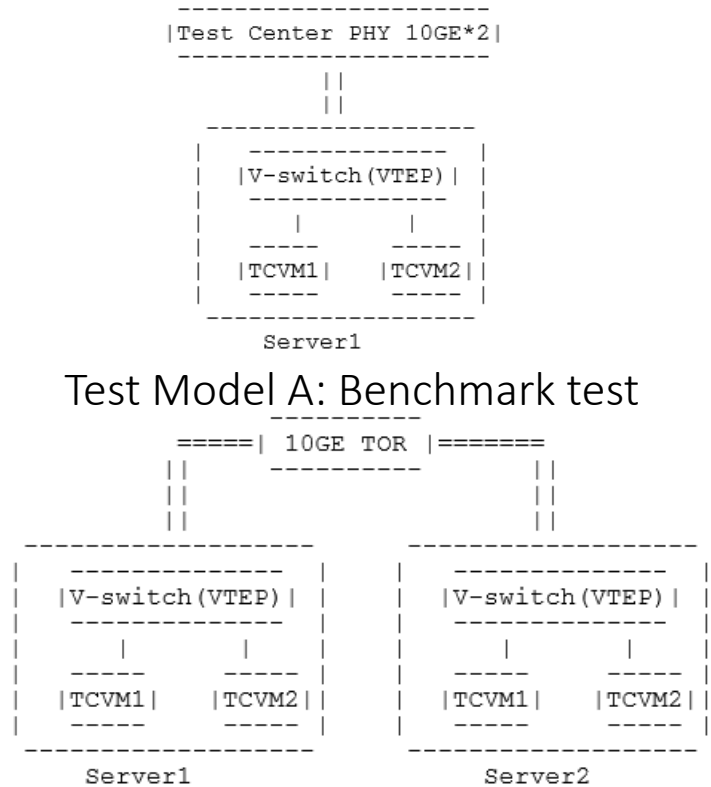
Consideration on VxLAN performance

- VxLAN performance in China Mobile IDC field try.
- DUT(VxLAN and VSwitch) and Virtual tester are on the same platform and share the same resources.
- There is no test methodology for virtual network performance and VxLAN performance.
- Key index in VxLAN performance
 - **CPU:** CPU utilization is very important for VxLAN. However, vCPU can be allocated for VM. But it cannot allocated for hypervisor and VSwitch. We use the test methodology to evaluate the CPU performance for VxLAN.
 - **Memory:** Memory is important to data forwarding.
 - **Latency:** The latency of traffic forwarded between VM to VM across two different physical server/
 - **Throughput:** The traffic load that virtual network can be forward.
 - **Packet-lost:** The packet-lost when the virtual network forward stable.

Test Bed Setup



Basic test topology



Test Model B: E2E VxLAN test

Basic test topology is consists of Test Model A and Test Model B.
Test Model A is connect a server with physical tester to make a benchmark.
Test Model B is connect two server with VxLAN to make performance test.

Test result

Test Model A: Benchmark test

Server 1: CPU E5-2430

Byte	Rate(GE)	Server CPU MHZ	Server Mem	VM CPU	VM Mem
0	0	505	3022	372	695
128	0.46	6085	3021	5836	695
256	0.84	6365	3021	6143	696
512	1.56	6330	3021	6099	696
1024	2.88	5922	3021	5726	696
1518	4.00	5713	3023	5441	696

Server 2: CPU E5-2620

Byte	Rate(GE)	Server CPU MHZ	Server Mem	VM CPU	VM Mem
0	0	505	2900	239	698
128	0.61	5631	2900	5117	698
256	0.94	5726	2896	5157	698
512	2.02	5786	2901	5217	698
1024	4.02	5884	2901	5097	698
1518	5.61	5856	2901	5197	698

Test Model B: VxLAN test

Server 1 with VxLAN: CPU E5-2430

Byte	Rate(GE)	Server CPU MHZ	Server Mem	VM CPU	VM Mem
0	0	515	3042	374	696
128	0.46	6395	3040	5748	696
256	0.84	6517	3042	5923	696
512	1.56	6668	3041	5857	696
1024	2.88	6280	3043	5506	696
1450	4.00	6233	3045	5309	696

Server 2: CPU E5-2620

Byte	Rate(GE)	Server CPU MHZ	Server Mem	VM CPU	VM Mem
0	0	450	2905	239	698
128	0.46	6203	2905	5897	698
256	0.84	5937	2906	5797	698
512	1.56	5993	2909	5737	698
1024	2.88	5710	2912	5697	698
1450	4.00	5863	2902	5697	698

Problem statement

1. VxLAN Performance Issues:

- CPU:
VxLAN function resided in VSwitch increases physical CPU usage. The table below shows the increasing percentage of CPU usage after using one VxLAN ID. The average increase is 6.51% in server 1 and 4.07% in server 2. This increase is cost by one VxLAN. We will still evaluate increase in large scale VxLAN scenario.
- Memory:
Memory of both physical server and virtual machine are not sensitive during VxLAN test.
- Packet-loss:
Because virtual network is based on X86 architecture. When vCPU utilizing rate reaches over 90%, there will be about 2% packet-loss. It is different with VxLAN on physical switch that no pack-lost forwarding is a necessary requirement.
- Line-rate
It is well known to us, in virtual network, traffic become unstable as CPU goes overload. Whatever we try, we can't reach line rate using any packet length. Finally, we reach 10Gb using 1518 byte without VxLAN between two server by add 3 pair of TCVM and each TCVM allocated 2 vCPU and 8G memory. While we add VxLAN and decrease 1518 to 1450(in case of fragment), on same network, we can only get 5.6 Gb unstable throughput.

Byte	Server 1	Server 2
0	4.04%	24.65%
128	7.57%	7.26%
256	1.15%	7.59%
512	8.66%	2.41%
1024	4.49%	0.14%
1450	11.61%	1.84%

*AVG	6.51%	4.07%

2.VxLAN Scalable test issues:

VxLAN ID is mapping with vNIC. And can not simulate multi- VxLAN ID from vNIC(just like VLAN test).

Next Step...

Solicit comments and suggestions

THANKS

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