Benchmarking Methodology for Virtualization Network Performance

draft-huang-bmwg-virtual-network-performance-00

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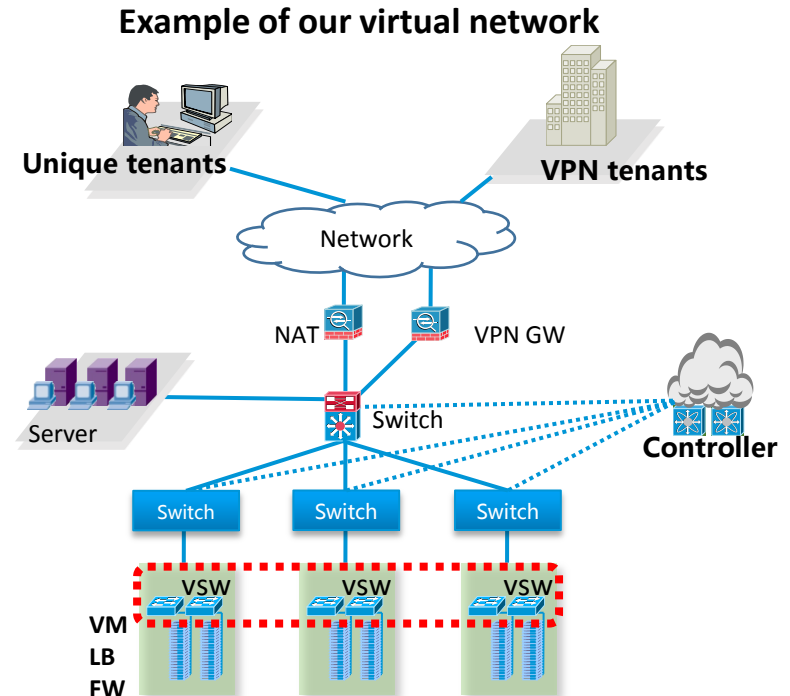Dapeng Liu

Bob Mandeville

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Testing scenario

➤The virtual network has been widely established in IDC.

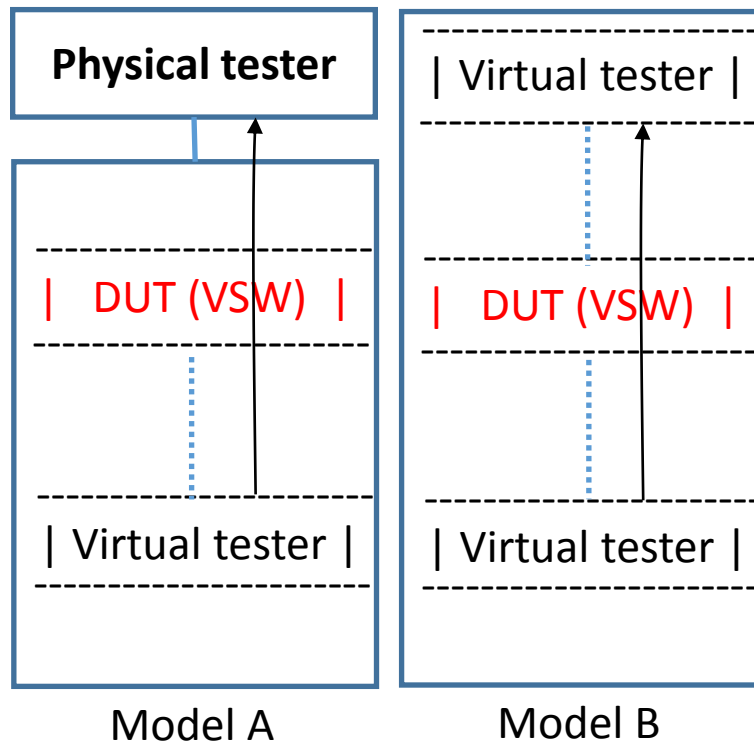➤Performance of virtual network has become a valuable consideration to the IDC managers.

•Considerations for Benchmarking Virtual Network Functions and Their Infrastructure
•Benchmarking Methodology for SDN Controller Performance

➤This draft focuses on <u>a benchmarking methodology for virtualization network performance based on virtual switch as the DUT</u>.

Example of our virtual network

Unique tenants

VPN tenants

Network

NAT   VPN GW

Server   Switch

Controller

Switch   Switch   Switch

VSW   VSW   VSW

VM
LB
FW

Two testing models

➤ Test model A and Test model B (topology and traffic directions)

```
┌────────────────────┐   ------------------------
│  Physical tester   │   | Virtual tester |
└────────────────────┘   ------------------------
┌────────────────────┐   ------------------------
│  ----------------  │   ------------------------
│  |  DUT (VSW)  |   │   |  DUT (VSW)  |
│  ----------------  │   ------------------------
│                    │
│  ----------------  │   ------------------------
│  | Virtual tester|│   | Virtual tester |
│  ----------------  │   ------------------------
└────────────────────┘   ------------------------
        Model A                   Model B
```

●**In Model A,** a physical tester and a virtual tester is used in order to testing the DUT performance through physical NICs.

●**In Model B,** virtual testers are used with the DUT deployed in one server, which tests the DUT performance without the limitation of NICs.

Different bottlenecks relay on each model. But how to find all of the bottlenecks with the comparison of model A and model B?
Is there any other topology to be considered?

Testing parameters

Test preparation-the parameters

Hypervisor Type	VM VNIC Speed	VM Memory CPU Allocation	Frame Size	Throughput
ESXi	1G/10G	512M/1Core	64	
			128	
			256	
			512	
			1024	
			1518	

Figure 1: Sample Calibration Permutation

➢The hypervisor type

➢NIC speed and number

➢CPU type of the server

➢The number of virtual machines

➢VNIC speed and number allocated for the virtual machines

➢CPU allocated for the virtual machines

➢MEM allocated for the virtual machines

Testing indicator——Throughput

➤Key performance indicators listed for virtual network:

1. Throughput under various frame sizes: forwarding performance under various frame sizes is a key performance indicator of interest .
   ① VM used to offer traffic to the DUT
   ② Test the max throughput under one frame size by adjusting testers
   ③ change the frame size to get the max throughput

Frame size (Byte)	Throughput (bps)

Test result format

Give an example of the test result

as the right table =>

```
| Byte| Throughput (Gbps)|
----------------------------
|  0  |         0        |
----------------------------
| 128 |        0.46      |
----------------------------
| 256 |        0.84      |
----------------------------
| 512 |        1.56      |
----------------------------
| 1024|        2.88      |
----------------------------
| 1518|        4.00      |
```

Testing indicator——CPU/MEM

➤Key performance indicators listed for virtual network:

    2. <u>DUT consumption of CPU</u>: Memory consumed by DUT

    3. <u>DUT consumption of MEM</u>: Memory consumed by DUT

    ① VM used to offer the throughput traffic to DUT

    ② Record the CPU/MEM load value of server in shutting down and bypass the DUT

    ③ Calculate the CPU/MEM/latency consumption

Frame size (Byte)	Throughput (bps)	Server CPU (MHz)	VM CPU (MHz)

Frame size (Byte)	Throughput (bps)	Server MEM (MB)	VM MEM (MB)

Test result format
<u>My doubts on that how to evaluate the CPU/MEM accurately?</u>

Testing indicator——Latency

➤Key performance indicators listed for virtual network:

4. <u>Latency readings</u>: Some applications are highly sensitive on latency

Under the max throughput.

Difficulties: Time Synchronization can be a big problem.

<u>Seek for solutions…</u>

5. <u>Other important indicators to be added…?</u>

Next Step…

- VxLAN testing
- Virtual load balance testing
- SDN controller testing

Solicit comments and suggestions…

MANY THANKS

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