Disk IO and Network Benchmark on VMs

Introduction

Disk IO and Network performance are two important parameters to measure. I tested the disk IO performance like read, write, random read, random write and so on both in physical machine and VMs. With IPERF I tested the throughput performance in a single bare machine and VMs running on the hypervisor to get how much performance loss in Virtual machine.

Disk IO Benchmark

Tools: IOZONE

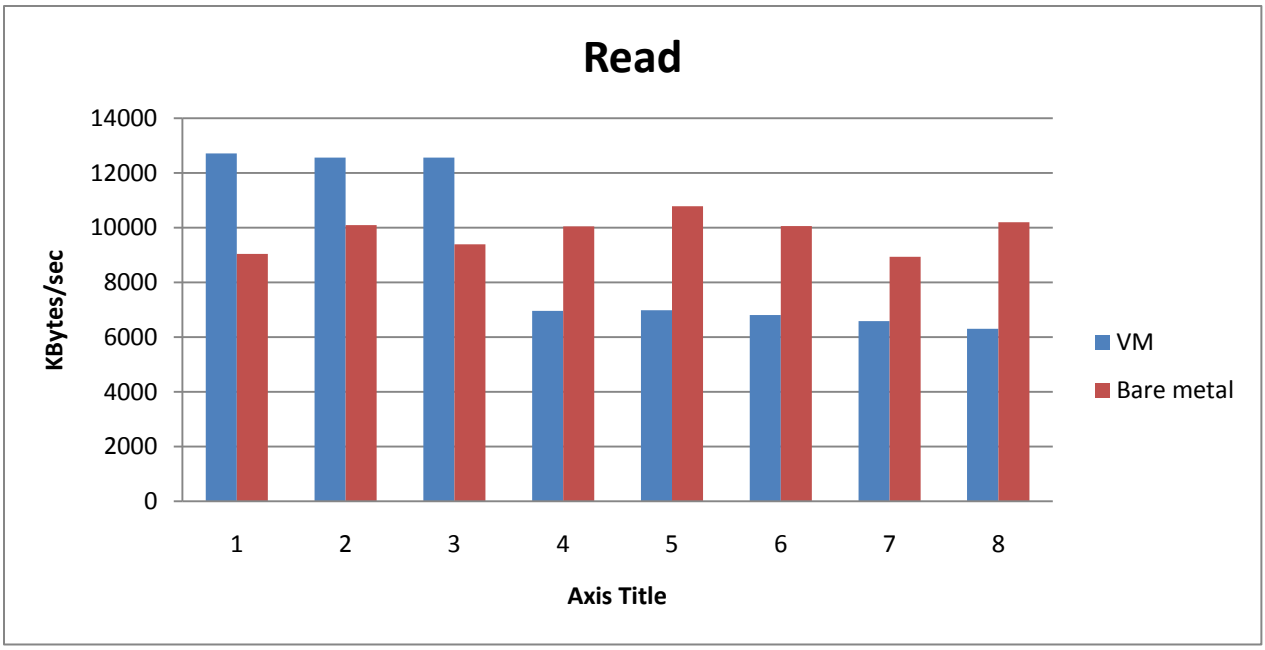
Options: -Mce -I -+r -r 256k -s 8g -f /usr/vice/cache/iozone_$i.dat$$ -i0 -i1 -i2

The test is designed as follow:

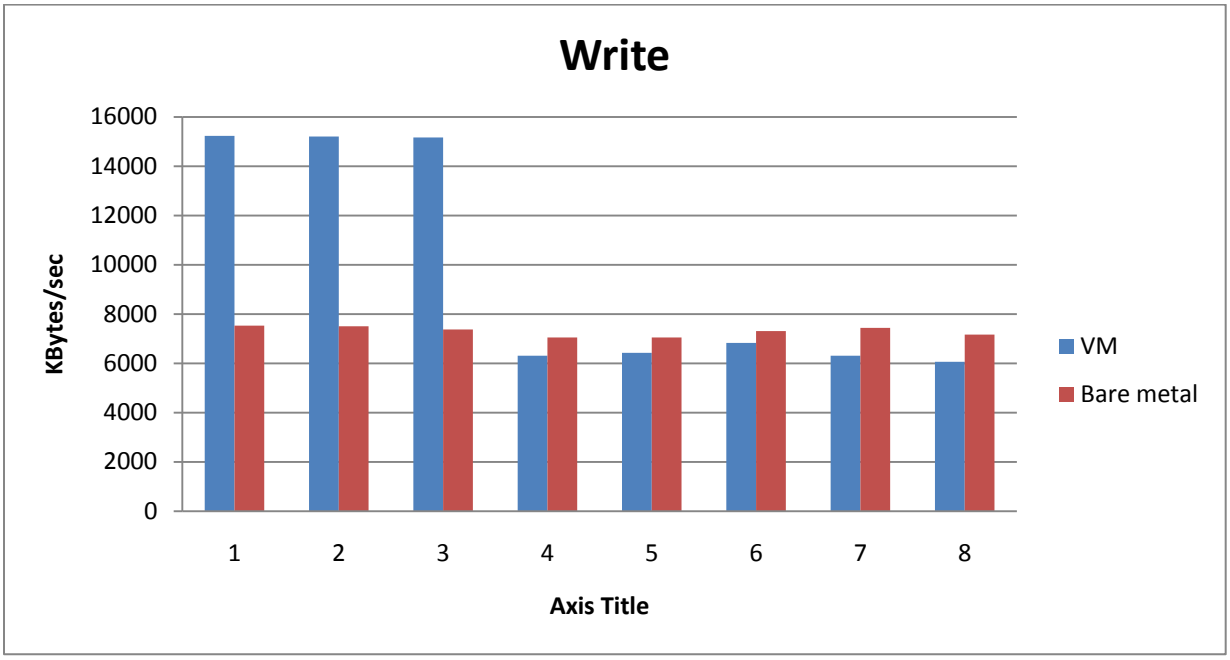
1. Running 8 IOZONE processes in the hypervisor;
2. Start 8 VMs in the hypervisor and run IOZONE test at the same in each VM under Pinning and UnPinning.

Test Result

Compare Read Performance between VMs and physical machine



Compare Write Performance between VMs and physical machine



The test results show that disk read performance loss is much more than write. For Read performance penalty is about 10%. For Write is about 40%. And it's weird there are 3 VMs with two times performance of the bare mental. I have done the same tests several times no matter the CPU pinning or UnPinning and still get the same results.

Network Benchmark

Tools: IPERF 2.0.4

Options: '-p 11522 -w 458742 -t 60 ' means TCP window size is 256KB, the test duration time is 60 secs(default is 10 secs)

Physical Server: lxbsq0910

VM Servers: vmbsq091000~ vmbsq0910037

Client: lxvmpool005

The test is designed as follow:

Part I

1. Set 8 parallel threads running at the same time on the client to test the hypervisor throughput performance;

2. Start 8 VMs running on the hypervisor and make them acted as servers. On the client side, I run 8 threads almost at the same time to connect each server respectively.

Part II

1. running a thread on the client to test the hypervisor throughput performance;
2. Doing 8 rounds separately. First round, start 1 process to connect 1 VM, Second, start 2 processes to connect 2 VMs respectively. Finally, start 8 processes to connect 8 VMs repectively.

Server side command:

iperf -s –p PortNumber -w 458742 -t 60

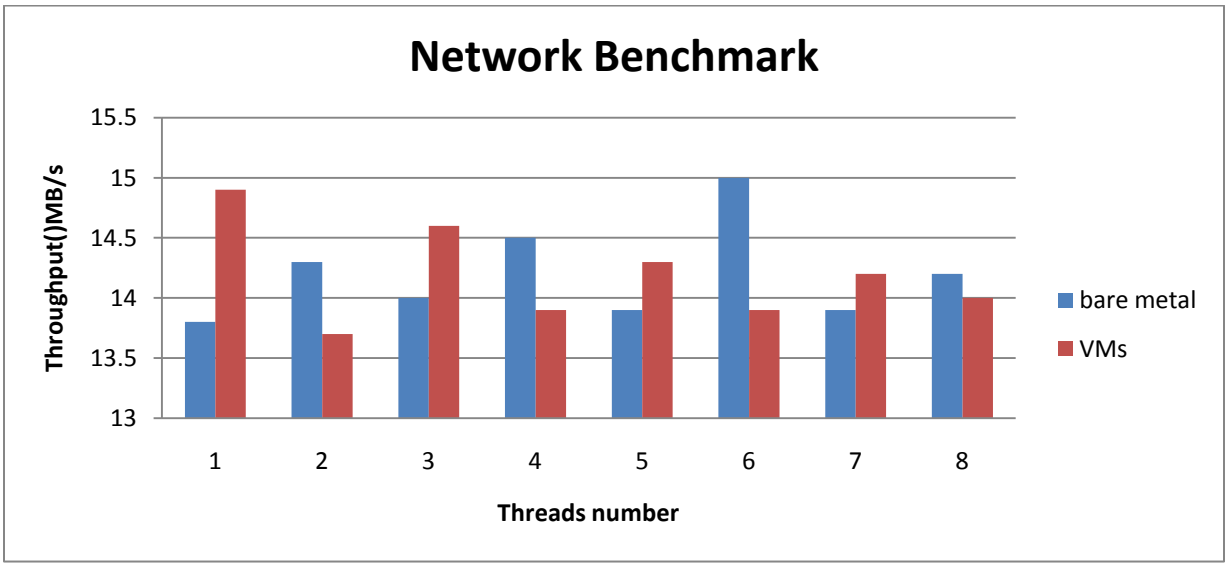
Client side command:

iperf -c ServerIP -p PortNumber -w 458742 -t 60

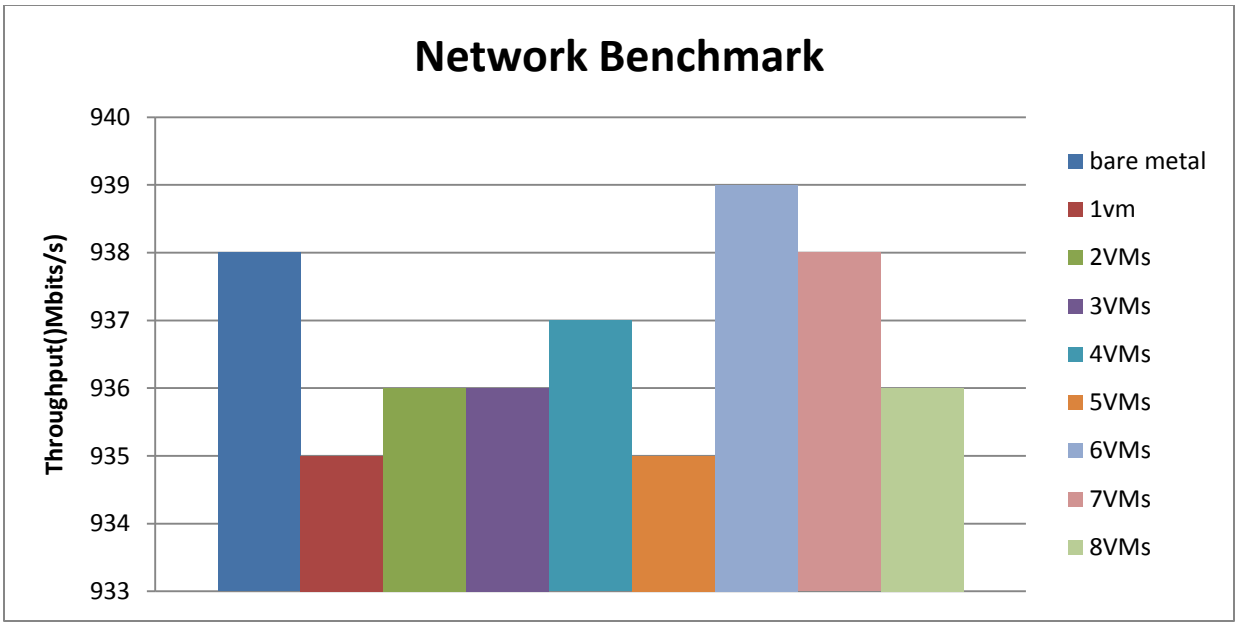
(Port number should be same with the one on server side)

Test Result

Part I



Part II



Conclusion

From the above tests, we may draw a conclusion:

1. For disk IO performance, the write performance penalty is about 10%. While read performance loss is about 40% which is higher than the write one.

2. For network performance penalty in VMs is about 3%, It's really optimistic. And the second picture shows the performance in VMs is nearly equal to the physical machine. What's more, with 4 VMs get better value than the bare one. However, it' s a preliminary test results, we should do more study to investigate and tune some parameters to optimize the network performance using real application.