Operation System Homework #1: System Structure

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Enviroment

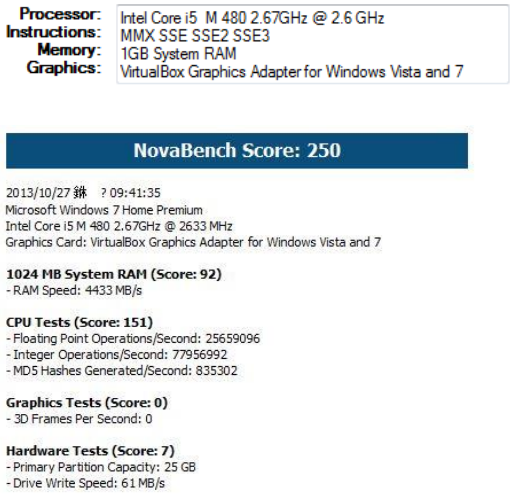
Host Operation System: Microsoft Windows7 x64

Guset Operation System: Microsoft Windows7 x64

CPU benchmark (by NovaBench 3.0.4)

Host

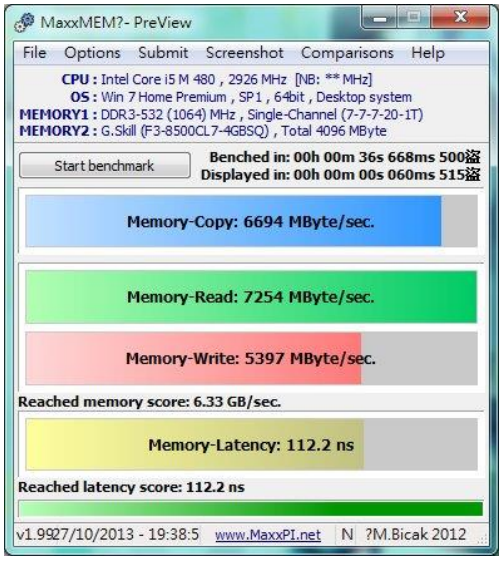
Guest



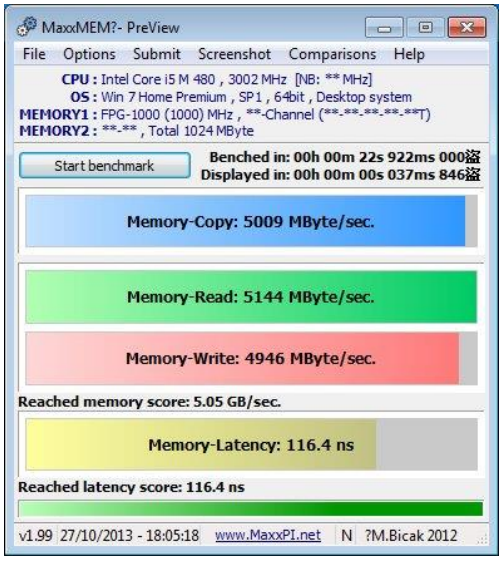
Integer and floating-point operations done in host OS are much faster than in guest OS, but the test results of md5 algorithm between host OS and guest OS is relatively close.

Memory benchmark (by MaxxMEM2 1.99)

Host



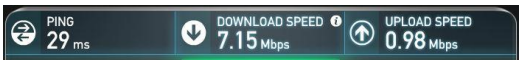
Guest



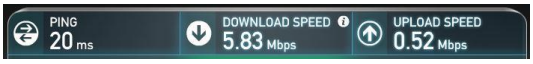
Although RAMs' storage in host OS is four times larger than guest OS, the results of memory-copy/-read/-write speed are not so different.
Since the virtualization technology Second Level Address Translation (e.x. Intel Extended Page Table) translates guesr linear addresses into host physical addresses without the Shadow Page Table done by VM which may reduce RAM efficeiency.

Network Benchmark (by SPEEDTEST)

Host



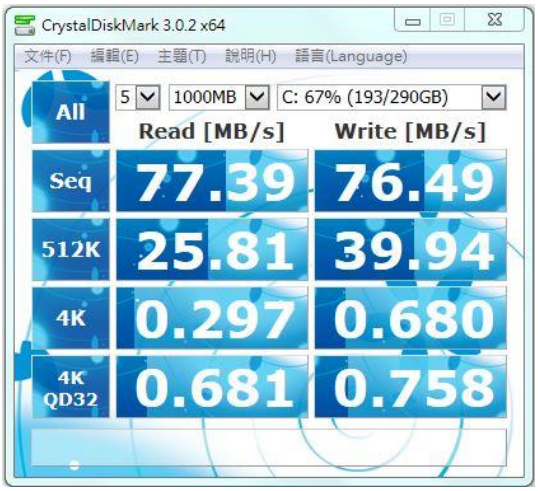
Guest



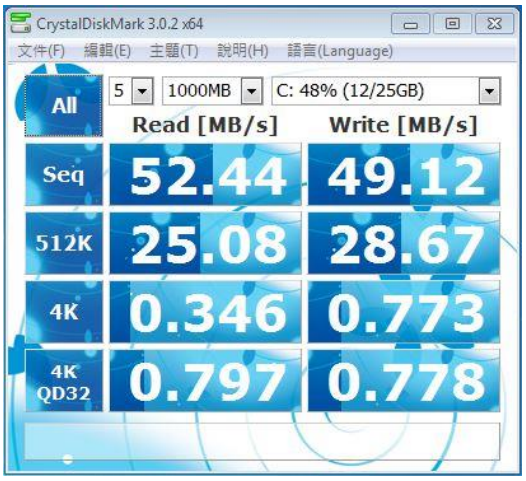
Network speed of guest OS is slower than host OS since it needs to go through VM's NAT.

Disk Benchmark (by CrystalDiskMark 3.0.2)

Host



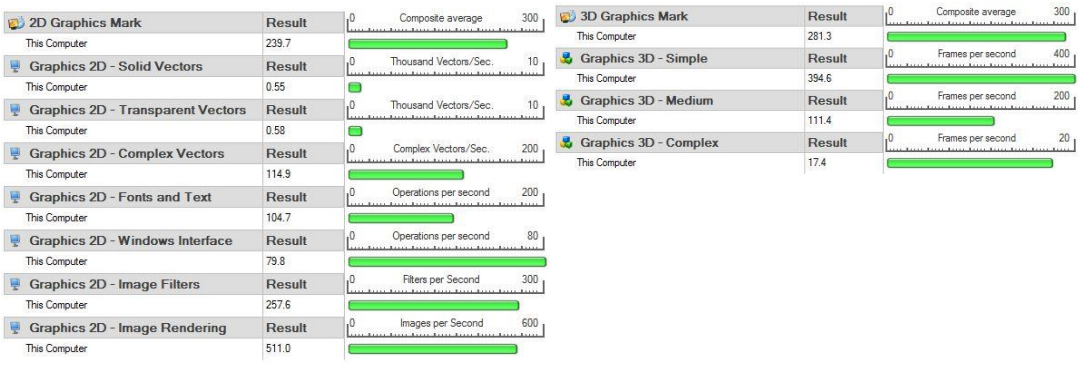
Guest



When the transited data is not so big, the disk I/O performance of host OS and guest OS are quite similar. Since VM can captured the disk I/O requests from the guest, than temporary stored small data in memory, which is much faster than disk.

GPU Benchmark (by Performace Test 7.0)

Host



2D Graphics Mark	Result	0 Composite average 300
This Computer	239.7	
Graphics 2D - Solid Vectors	**Result**	0 Thousand Vectors/Sec. 10
This Computer	0.55	
Graphics 2D - Transparent Vectors	**Result**	0 Thousand Vectors/Sec. 10
This Computer	0.58	
Graphics 2D - Complex Vectors	**Result**	0 Complex Vectors/Sec. 200
This Computer	114.9	
Graphics 2D - Fonts and Text	**Result**	0 Operations per second 200
This Computer	104.7	
Graphics 2D - Windows Interface	**Result**	0 Operations per second 80
This Computer	79.8	
Graphics 2D - Image Filters	**Result**	0 Filters per Second 300
This Computer	257.6	
Graphics 2D - Image Rendering	**Result**	0 Images per Second 600
This Computer	511.0	

3D Graphics Mark	Result	0 Composite average 300
This Computer	281.3	
Graphics 3D - Simple	**Result**	0 Frames per second 400
This Computer	394.6	
Graphics 3D - Medium	**Result**	0 Frames per second 200
This Computer	111.4	
Graphics 3D - Complex	**Result**	0 Frames per second 20
This Computer	17.4	

GPU virtualization is still not stable in Oracle VM VirtualBox, even the lightweighted GPU testing will cause the guest OS rebooting without warning. In fact, during the installation of Guest Additions, it specifies that Direct3D support for guest is experimental.