Understanding the cost of Computing in the Cloud:

The assignment aims to find the break-even point for the cost of computing in private cloud compared to public cloud for following instance type:

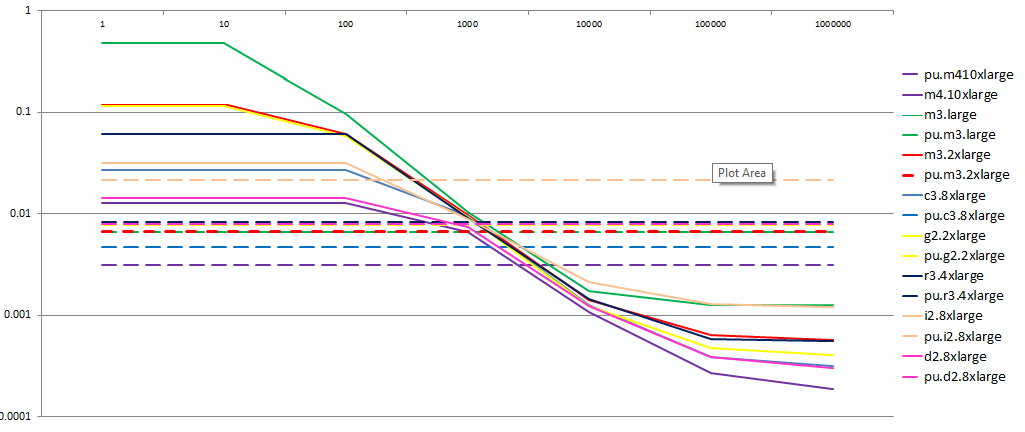
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m4.10xlarge:  Break-up for hardware bought for the instance:   |  |  |  | | --- | --- | --- | | **Device** | **Details** | **calculated Price** | | processor | Intel Xeon E5-2670 v3 Haswell 2.3 GHz 12 x 256KB L2 Cache 30 MB L3 Cache LGA 2011-3 120W BX80644E52670V3 Server Processor | 2784.983333 | | motherboard | ASUS RO RAMPAE I BLACK EDITION LA 2011 Intel 79 SATA 6b/s USB 3.0 Extended AT Intel aming Motherboad+Intel BOXDX79TO LGA 2011 Intel X79 SATA 6Gb/s USB 3.0 ATX Intel Motherboard | 623.99 | | memory | Crucial 96GB (3 x 32GB) 240-Pin DDR3 SDRAM ECC DDR3 1866 (PC3 14900) Server Memory Model CT3K32G3ELSDQ4186D +Black Diamond Memory 64GB (2 x 32GB) 240Pin DDR3 SDRAM ECC Registered DDR3 1066 (PC3 8500) Server Memory Model BD32GX21066MTR26 | 1439.98 | | network Interface Card | Intel X520-DA2 Dual Ports 10 Gigabit Ethernet Converged Network Adapter, PCI Express 2.0 x8, Low Pro꽁쳀le - OEM | 325.99 | | storage | ebs(very small, less price need not be considered) | 0 | |  |  |  | | total cost: | | 5174.943333 | | | | |
| Computing cost/hr /flop:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Gflops | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | $/hr/flops | pu.m410xlarge | % utilization | | 1 | 1 | 0.020833333 | 0 | 5174.943333 | 25 | 0.118720167 | 0.0583395 | 9.589041096 | 9.766100763 | 0.012716277 | 0.003117188 | 407.9407 | | 10 | 1 | 0.020833333 | 0 | 5174.943333 | 25 | 0.118720167 | 0.0583395 | 9.589041096 | 9.766100763 | 0.012716277 | 0.003117188 | 407.9407 | | 100 | 1 | 0.020833333 | 0 | 5174.943333 | 25 | 0.118720167 | 0.0583395 | 9.589041096 | 9.766100763 | 0.012716277 | 0.003117188 | 407.9407 | | 1000 | 2 | 0.041666667 | 1 | 10349.88667 | 7750 | 0.413239422 | 0.1100895 | 9.589041096 | 10.11237002 | 0.006583574 | 0.003117188 | 211.2024 | | 10000 | 14 | 0.291666667 | 1 | 72449.20667 | 8050 | 1.837881431 | 0.1100895 | 9.589041096 | 11.53701203 | 0.001073011 | 0.003117188 | 34.4224 | | 100000 | 131 | 2.729166667 | 7 | 677917.5767 | 57175 | 16.78293554 | 0.4205895 | 9.589041096 | 26.79256614 | 0.000266307 | 0.003117188 | 8.543166 | | 1000000 | 1303 | 27.14583333 | 58 | 6742951.163 | 479175 | 164.8887252 | 3.0598395 | 19.17808219 | 187.1266469 | 0.000186995 | 0.003117188 | 5.998837 |   m3.large:  Break-up for hardware bought for the instance:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | processor | | | Intel Xeon E5-2670 v2 Ivy Bridge-EP 2.5 GHz 25MB L3 Cache LGA 2011 115W BX80635E52670V2 Server Processor | | | | | | | | 155.999 | | | motherboard | | | Intel BOXDX79TO LGA 2011 Intel X79 SATA 6Gb/s USB 3.0 ATX Intel Motherboard | | | | | | | | 249 | | | memory | | | Kingston 8GB 240-Pin DDR3 SDRAM ECC Unbu ered DDR3 1600 Server Memory w/TS Model KVR16E11/8 | | | | | | | | 51.99 | | | network Interface Card | | | SEDNA - PCIE 10/100/1000Mbs Gigabit LAN 68.90adapter ( Intel 82574L chipset ) | | | | | | | | 68.9 | | | storage | | | Crucial M4 32B Mini-SATA (mSATA) MLC Internal Solid State Drive (SSD) CT032M4SSD3 | | | | | | | | 109.99 | | |  | | |  | | | | | | | |  | | | total cost: | | | | | | | | | | | 635.879 | | | Gflops | | instance requried | # of server racks | | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | | $/hr/flops | | pu.m3.large | #VALUE! | | 1 | | 1 | 0.020833333 | | 0 | 635.879 | 25 | 0.015088562 | 0.018828375 | 9.589041096 | 9.622958033 | | 0.481147902 | | 0.00665 | 7235.307 | | 10 | | 1 | 0.020833333 | | 0 | 635.879 | 25 | 0.015088562 | 0.018828375 | 9.589041096 | 9.622958033 | | 0.481147902 | | 0.00665 | 7235.307 | | 100 | | 5 | 0.104166667 | | 1 | 3179.395 | 814.99 | 0.091196005 | 0.032628375 | 9.589041096 | 9.712865475 | | 0.097128655 | | 0.00665 | 1460.581 | | 1000 | | 50 | 1.041666667 | | 2 | 31793.95 | 2629.98 | 0.785934475 | 0.046428375 | 9.589041096 | 10.42140395 | | 0.010421404 | | 0.00665 | 156.7128 | | 10000 | | 500 | 10.41666667 | | 11 | 317939.5 | 20089.89 | 7.717565982 | 0.170628375 | 9.589041096 | 17.47723545 | | 0.001747724 | | 0.00665 | 26.28156 | | 100000 | | 5000 | 104.1666667 | | 105 | 3179395 | 197448.95 | 77.09689384 | 1.467828375 | 47.94520548 | 126.5099277 | | 0.001265099 | | 0.00665 | 19.02405 | | 1000000 | | 50000 | 1041.666667 | | 1042 | 31793950 | 1968969.58 | 770.8429128 | 14.39842838 | 479.4520548 | 1264.693396 | | 0.001264693 | | 0.00665 | 19.01795 | | | | |
| Computing cost/hr /flop  m3.2xlarge:  Break-up for hardware bought for the instance:   |  |  |  | | --- | --- | --- | | processor | Intel Xeon E5-2670 v2 Ivy Bridge-EP 2.5 GHz 25MB L3 Cache LGA 2011 115W BX80635E52670V2 Server Processor | 623.996 | | motherboard | Intel BOXDX79TO LGA 2011 Intel X79 SATA 6Gb/s USB 3.0 ATX Intel Motherboard | 249 | | memory | Kingston 24GB (3 x 8GB) 240-Pin DDR3 SDRAM ECC Registered DDR3 1866 Server Memory Model KVR18R13S4K3/24 +Axiom 6GB (3 x 2GB) 240-Pin DDR3 SDRAM ECC Unbu ered DDR3 1333 (PC3 10600) Server Memory Model SO.D94GB.M20-AX | 269.98 | | network Interface Card | SEDNA - PCIE 10/100/1000Mbs Gigabit LAN 68.90adapter ( Intel 82574L chipset ) | 68.9 | | storage | Intel 320 Series 2.5 80B SATA II MLC Internal Solid State Drive (SSD) SSDSA2CW0803K5 \*2 | 279.98 | |  |  |  | | total cost: | | 1491.856 | | | | |
| Computing cost/hr /flop:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Gflops | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | $/hr/flops | pu.m3.2xlarge | #VALUE! | | 1 | 1 | 0.020833333 | 0 | 1491.856 | 25 | 0.034631416 | 0.02696175 | 9.589041096 | 9.650634261 | 0.120632928 | 0.00665 | 1814.029 | | 10 | 1 | 0.020833333 | 0 | 1491.856 | 25 | 0.034631416 | 0.02696175 | 9.589041096 | 9.650634261 | 0.120632928 | 0.00665 | 1814.029 | | 100 | 2 | 0.041666667 | 1 | 2983.712 | 739.99 | 0.085016027 | 0.04076175 | 9.589041096 | 9.714818873 | 0.060717618 | 0.00665 | 913.0469 | | 1000 | 13 | 0.270833333 | 1 | 19394.128 | 1014.99 | 0.465961598 | 0.04076175 | 9.589041096 | 10.09576444 | 0.009707466 | 0.00665 | 145.9769 | | 10000 | 125 | 2.604166667 | 3 | 186482 | 5194.97 | 4.37618653 | 0.06836175 | 9.589041096 | 14.03358938 | 0.001403359 | 0.00665 | 21.10314 | | 100000 | 1250 | 26.04166667 | 27 | 1864820 | 49879.73 | 43.71460571 | 0.39956175 | 19.17808219 | 63.29224965 | 0.000632922 | 0.00665 | 9.517632 | | 1000000 | 12500 | 260.4166667 | 261 | 18648200 | 492587.39 | 437.0042783 | 3.62876175 | 124.6575342 | 565.2905743 | 0.000565291 | 0.00665 | 8.50061 |   c3.8xlarge:  Break-up for hardware bought for the instance:   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | processor | | | Intel Xeon E5-2680 v2 Ivy Bridge-EP 2.8 GHz 25MB L3 Cache LGA 2011 115W BX80635E52680V2 Server Processor | | | | | | | 2831.984 | | | motherboard | | | Intel BOXDX79TO LGA 2011 Intel X79 SATA 6Gb/s USB 3.0 ATX Intel Motherboard | | | | | | | 249 | | | Memory | | | Crucial 48GB (3 x 16GB) 240-Pin DDR3 SDRAM ECC Registered DDR3 1600 (PC3 12800) Server Memory Model CT3K16G3ERSLD4160B+ Axiom 12GB (3 x 4GB) 240-Pin DDR3 SDRAM ECC Registered DDR3 1333 (PC3 10600) Server Memory Model SO.D98GB.M2R-AX | | | | | | | 478.99 | | | network Interface Card | | | Intel X520-DA2 Dual Ports 10 Gigabit Ethernet Converged Network Adapter, PCI Express 2.0 x8, Low Pro꽁쳀le - OEM | | | | | | | 325.99 | | | Storage | | | Intel 320 Series 2.5 600B SATA II MLC Internal Solid State Drive (SSD) SSDSA2CW600310 +Intel 320 Series 2.5 40B SATA II MLC Internal Solid State Drive (SSD) SSDSA2CT040310 | | | | | | | 199.99 | | |  | | |  | | | | | | |  | | | total cost: | | | | | | | | | | 4085.954 | | | Gflops | | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | | $/hr/flops | | pu.c3.8xlarge | #VALUE! | | 1 | | 1 | 0.020833333 | 0 | 4085.954 | 25 | 0.093857397 | 0.05249175 | 9.589041096 | 9.735390243 | | 0.027163477 | | 0.0046875 | 579.4875 | | 10 | | 1 | 0.020833333 | 0 | 4085.954 | 25 | 0.093857397 | 0.05249175 | 9.589041096 | 9.735390243 | | 0.027163477 | | 0.0046875 | 579.4875 | | 100 | | 1 | 0.020833333 | 0 | 4085.954 | 25 | 0.093857397 | 0.05249175 | 9.589041096 | 9.735390243 | | 0.027163477 | | 0.0046875 | 579.4875 | | 1000 | | 3 | 0.0625 | 1 | 12257.862 | 7775 | 0.457371279 | 0.10424175 | 9.589041096 | 10.15065412 | | 0.009440713 | | 0.0046875 | 201.4019 | | 10000 | | 28 | 0.583333333 | 1 | 114406.712 | 8400 | 2.80380621 | 0.10424175 | 9.589041096 | 12.49708906 | | 0.001245325 | | 0.0046875 | 26.56694 | | 100000 | | 280 | 5.833333333 | 13 | 1144067.12 | 107100 | 28.56545936 | 0.72524175 | 9.589041096 | 38.87974221 | | 0.000387434 | | 0.0046875 | 8.265251 | | 1000000 | | 2791 | 58.14583333 | 123 | 11403897.61 | 1016875 | 283.5792834 | 6.41774175 | 28.76712329 | 318.7641485 | | 0.00031867 | | 0.0046875 | 6.7983 | | | | |
| Computing cost/hr /flop  g2.2xlarge:  Break-up for hardware bought for the instance:   |  |  |  | | --- | --- | --- | | processor | Intel Xeon E5-2670 Sandy Bridge-EP 2.6GHz (3.3GHz Turbo Boost) 20MB L3 Cache LGA 2011 115W BX80621E52670 Server Processor | 287.5 | | motherboard | Intel BOXDX79TO LGA 2011 Intel X79 SATA 6Gb/s USB 3.0 ATX Intel Motherboard | 249 | | memory | compare Axiom 12GB (3 x 4GB) 240-Pin DDR3 SDRAM ECC Registered DDR3 1333 (PC3 10600) Server Memory Model SO.D98GB.M2R-AX+ Refurbished:   HP 2GB 240-Pin DDR3 SDRAM Registered DDR3 1333 (PC3 10600) Memory (Server Memory) Model 500202-061-RF +Axiom 1GB 240-Pin DDR3 SDRAM Unbu ered DDR2 667 (PC2 5300) Server Memory Model 73P4984-A | 215.48 | | network Interface Card | SEDNA - PCIE 10/100/1000Mbs Gigabit LAN 68.90adapter ( Intel 82574L chipset ) | 68.9 | | storage | Kingston SSDNow KC380 60 B 1.8 Internal Solid State Drive | 138.99 | |  |  |  | | total cost: | | 959.87 | | | | |
| Computing cost/hr /flop:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Gflops | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | $/hr/flops | pu.g2.2xlarge | #VALUE! | | 1 | 1 | 0.020833333 | 0 | 959.87 | 25 | 0.022485616 | 0.018569625 | 9.589041096 | 9.630096337 | 0.11574635 | 0.0078125 | 1481.553 | | 10 | 1 | 0.020833333 | 0 | 959.87 | 25 | 0.022485616 | 0.018569625 | 9.589041096 | 9.630096337 | 0.11574635 | 0.0078125 | 1481.553 | | 100 | 2 | 0.041666667 | 1 | 1919.74 | 739.99 | 0.060724429 | 0.032369625 | 9.589041096 | 9.68213515 | 0.058185908 | 0.0078125 | 744.7796 | | 1000 | 13 | 0.270833333 | 1 | 12478.31 | 1014.99 | 0.30806621 | 0.032369625 | 9.589041096 | 9.929476931 | 0.00918036 | 0.0078125 | 117.5086 | | 10000 | 121 | 2.520833333 | 3 | 116144.27 | 5094.97 | 2.768019178 | 0.059969625 | 9.589041096 | 12.4170299 | 0.001233414 | 0.0078125 | 15.7877 | | 100000 | 1202 | 25.04166667 | 26 | 1153763.74 | 47989.74 | 27.43729406 | 0.377369625 | 19.17808219 | 46.99274588 | 0.000469897 | 0.0078125 | 6.014687 | | 1000000 | 12020 | 250.4166667 | 251 | 11537637.4 | 473687.49 | 274.2311619 | 3.482369625 | 124.6575342 | 402.3710657 | 0.000402345 | 0.0078125 | 5.15002 |   r3.4xlarge:  Break-up for hardware bought for the instance: | | | |
| |  |  |  | | --- | --- | --- | | processor | Intel Xeon E5-2670 v2 Ivy Bridge-EP 2.5 GHz 25MB L3 Cache LGA 2011 115W BX80635E52670V2 Server Processor | 1247.992 | | motherboard | ASUS RO RAMPAE I BLACK EDITION LA 2011 Intel 79 SATA 6b/s USB 3.0 Extended AT Intel aming Motherboard | 374.99 | | memory | Crucial 96GB (3 x 32GB) 240-Pin DDR3 SDRAM ECC DDR3 1866 (PC3 14900) Server Memory Model CT3K32G3ELSDQ4186D +Kingston 24GB (3 x 8GB) 240-Pin DDR3 SDRAM ECC Registered DDR3 1866 Server Memory Model KVR18R13S4K3/24 +Refurbished:   HP 2GB 240-Pin DDR3 SDRAM Registered DDR3 1333 (PC3 10600) Memory (Server Memory) Model 500202-061-RF | 1214.47 | | network Interface Card | SEDNA - PCIE 10/100/1000Mbs Gigabit LAN 68.90adapter ( Intel 82574L chipset ) | 68.9 | | storage | Intel 320 Series 2.5 300B SATA II MLC Internal Solid State Drive (SSD) SSDSA2CW3003K5 +ntel 313 Series Hawley Creek SSDMAEXC020G301 mSATA 20GB SATA II SLC Internal Solid State Drive (SSD) | 431.42 | |  |  |  | | total cost: | | 3337.772 |   Computing cost/hr /flop:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Gflops | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | $/hr/flops | pu.r3.4xlarge | #VALUE! | | 1 | 1 | 0.020833333 | 0 | 3337.772 | 25 | 0.076775616 | 0.038778 | 9.589041096 | 9.704594712 | 0.060653717 | 0.0083125 | 729.6688 | | 10 | 1 | 0.020833333 | 0 | 3337.772 | 25 | 0.076775616 | 0.038778 | 9.589041096 | 9.704594712 | 0.060653717 | 0.0083125 | 729.6688 | | 100 | 1 | 0.020833333 | 0 | 3337.772 | 25 | 0.076775616 | 0.038778 | 9.589041096 | 9.704594712 | 0.060653717 | 0.0083125 | 729.6688 | | 1000 | 7 | 0.145833333 | 1 | 23364.404 | 864.99 | 0.553182511 | 0.052578 | 9.589041096 | 10.19480161 | 0.009102501 | 0.0083125 | 109.5038 | | 10000 | 63 | 1.3125 | 2 | 210279.636 | 2954.98 | 4.868370228 | 0.066378 | 9.589041096 | 14.52378932 | 0.001440852 | 0.0083125 | 17.33356 | | 100000 | 625 | 13.02083333 | 14 | 2086107.5 | 25284.86 | 48.20530502 | 0.231978 | 9.589041096 | 58.02632412 | 0.000580263 | 0.0083125 | 6.98061 | | 1000000 | 6250 | 130.2083333 | 131 | 20861075 | 246638.69 | 481.9112715 | 1.846578 | 67.12328767 | 550.8811371 | 0.000550881 | 0.0083125 | 6.627141 |   i2.8xlarge:  Break-up for hardware bought for the instance:   |  |  |  | | --- | --- | --- | | processor | Intel Xeon E5-2670 v2 Ivy Bridge-EP 2.5 GHz 25MB L3 Cache LGA 2011 115W BX80635E52670V2 Server Processor | 2495.984 | | motherboard | ASUS RO RAMPAE I BLACK EDITION LA 2011 Intel 79 SATA 6b/s USB 3.0 Extended AT Intel aming Motherboad\*2 | 749.98 | | memory | Crucial 96GB (3 x 32GB) 240-Pin DDR3 SDRAM ECC DDR3 1866 (PC3 14900) Server Memory Model CT3K32G3ELSDQ4186D +Black Diamond Memory 64GB (2 x 32GB) 240Pin DDR3 SDRAM ECC Registered DDR3 1066 (PC3 8500) Server Memory Model BD32GX21066MTR26 \*2 | 1879.97 | | network Interface Card | Intel X520-DA2 Dual Ports 10 Gigabit Ethernet Converged Network Adapter, PCI Express 2.0 x8, Low Pro꽁쳀le - OEM | 325.99 | | Storage | HP 632506-B21 800 B Internal Solid State Drive \*8 | 10559.6 | |  |  |  | | total cost: | | 16011.524 | | | | |
| Computing cost/hr /flop:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Gflops | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | $/hr/flops | pu.i2.8xlarge | #VALUE! | | 1 | 1 | 0.020833333 | 0 | 16011.524 | 25 | 0.366130685 | 0.07377825 | 9.589041096 | 10.02895003 | 0.031340469 | 0.0213125 | 147.0521 | | 10 | 1 | 0.020833333 | 0 | 16011.524 | 25 | 0.366130685 | 0.07377825 | 9.589041096 | 10.02895003 | 0.031340469 | 0.0213125 | 147.0521 | | 100 | 1 | 0.020833333 | 0 | 16011.524 | 25 | 0.366130685 | 0.07377825 | 9.589041096 | 10.02895003 | 0.031340469 | 0.0213125 | 147.0521 | | 1000 | 4 | 0.083333333 | 1 | 64046.096 | 7800 | 1.640321826 | 0.12552825 | 9.589041096 | 11.35489117 | 0.008871009 | 0.0213125 | 41.6235 | | 10000 | 32 | 0.666666667 | 1 | 512368.768 | 8500 | 11.891981 | 0.12552825 | 9.589041096 | 21.60655035 | 0.002110015 | 0.0213125 | 9.900362 | | 100000 | 313 | 6.520833333 | 15 | 5011607.012 | 123325 | 117.2358907 | 0.85002825 | 9.589041096 | 127.67496 | 0.00127471 | 0.0213125 | 5.981044 | | 1000000 | 3125 | 65.10416667 | 137 | 50036012.5 | 1133025 | 1168.242865 | 7.16352825 | 38.35616438 | 1213.762558 | 0.001213763 | 0.0213125 | 5.695074 |   d2.8xlarge:  Break-up for hardware bought for the instance: | | | |
| Processor | Intel Xeon E5-2670 v3 Haswell 2.3 GHz 12 x 256KB L2 Cache 30 MB L3 Cache LGA 2011-3 120W BX80644E52670V3 Server Processor | 2506.485 |
| Motherboard | ASUS RO RAMPAE I BLACK EDITION LA 2011 Intel 79 SATA 6b/s USB 3.0 Extended AT Intel aming Motherboad\*2 | 749.98 |
| Memory | Crucial 96GB (3 x 32GB) 240-Pin DDR3 SDRAM ECC DDR3 1866 (PC3 14900) Server Memory Model CT3K32G3ELSDQ4186D +Black Diamond Memory 64GB (2 x 32GB) 240Pin DDR3 SDRAM ECC Registered DDR3 1066 (PC3 8500) Server Memory Model BD32GX21066MTR26 \*2 | 1879.97 |
| network Interface Card | Intel X520-DA2 Dual Ports 10 Gigabit Ethernet Converged Network Adapter, PCI Express 2.0 x8, Low Pro꽁쳀le - OEM | 325.99 |
| Storage | WD Black 2TB Performance Desktop Hard Disk Drive - 7200 RPM SATA 6 Gb/s 64MB Cache 3.5 Inch - WD2003FZEX\*24 | 2711.76 |
|  |  |  |
| total cost: | | 8174.185 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gflops | instance requried | # of server racks | # of switchs | hardware instance type cost | server\_rack+switch cost | per hr total hardware cost | per hr power cost | per hr admin cost | per hr total cost | $/hr/flops | pu.d2.8xlarge | #VALUE! |
| 1 | 1 | 0.020833333 | 0 | 8174.185 | 25 | 0.187196005 | 0.10186125 | 9.589041096 | 9.87809835 | 0.01429123 | 0.007986111 | 178.9511 |
| 10 | 1 | 0.020833333 | 0 | 8174.185 | 25 | 0.187196005 | 0.10186125 | 9.589041096 | 9.87809835 | 0.01429123 | 0.007986111 | 178.9511 |
| 100 | 1 | 0.020833333 | 0 | 8174.185 | 25 | 0.187196005 | 0.10186125 | 9.589041096 | 9.87809835 | 0.01429123 | 0.007986111 | 178.9511 |
| 1000 | 2 | 0.041666667 | 1 | 16348.37 | 7750 | 0.550191096 | 0.15361125 | 9.589041096 | 10.29284344 | 0.007445633 | 0.007986111 | 93.23228 |
| 10000 | 15 | 0.3125 | 1 | 122612.775 | 8075 | 2.983739155 | 0.15361125 | 9.589041096 | 12.7263915 | 0.001227468 | 0.007986111 | 15.37004 |
| 100000 | 145 | 3.020833333 | 8 | 1185256.825 | 65225 | 28.54981336 | 0.51586125 | 9.589041096 | 38.6547157 | 0.000385683 | 0.007986111 | 4.829425 |
| 1000000 | 1447 | 30.14583333 | 64 | 11828045.7 | 528975 | 282.1237602 | 3.41386125 | 19.17808219 | 304.7157036 | 0.000304665 | 0.007986111 | 3.814936 |

Assumptions & Cost-calculations:

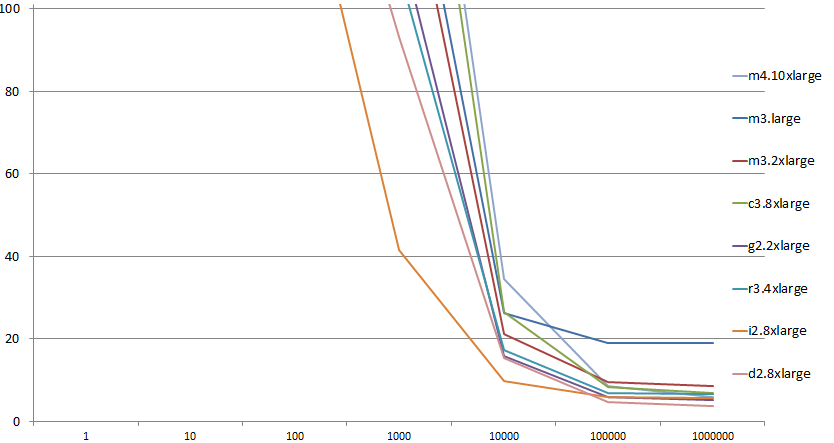
* Processors for all instance-type are specially made for amazon. The cost for processor are calculated on per core basis with reference to purchases. The processors Intel Xenon 2676 V3 is replaced with processors Intel Xenon 2670 V3 with same specifications.
* The hardware cost is divided in two- Instance specific hardware cost and other hardware such as cost for Cooling-server racks & switches (again specific to instance speed). Such hardware is common for all instance type with exception of switches.
* The hardware cost is aromatized for 5 years.
* The cost for power includes the power consumed by hardware + cooling (0.5 \* hardware power) + network for a rate of 11.5 cents with reference to power cost of Illinois state.
* Administrative cost is taken as 7000$ a month (84 K per annum) , where each admin can handle 1000 instances
* All cost are calculate per hour basis

Plot#1:



This graph denotes the cost of public cloud Vs the cost for going private scaling for 1G-1P flops. All straight lines denote the cost of public instances; this is cause the cost is fixed per hour. The curved lines denote the costs private instance. We can see that the cost for private instances is greater than 10X of public instance for small scale, but as the number of instances increases it is cost effective to have private cloud. The nature of the plot is attributed mainly to administrative cost which scales in increments unlike other cost which scale linearly.

Plot#2:



The graphs is plotted for % utilization of private cloud. After the break-even point the cost of computing in private cloud is less. Cost effectiveness & % utilization decreases with increases in number of instances.

Both graphs conclude that public cloud though cost less & reasonable; private cloud is better for larger scales.