# Engineering Workstations Compared

| | | HP Z1 workstation (one 3.5GHz Intel Xeon E3-1280 quad-core CPU [3.9GHz turbo], NVIDIA Quadro 4000M, 16GB RAM) | Lenovo E30 workstation (one 3.2GHz Intel Xeon E3-1230 quad-core CPU [3.6GHz turbo], NVIDIA Quadro 600, 4GB RAM) | | HP Z210 workstation (one 3.36GHz Intel Xeon E3-1245 quad-core CPU [3.7GHz turbo], NVIDIA Quadro 2000, 8GB RAM) | | BOXX 3DBOXX 3970 EXTREME workstation (one 3.4GHz Intel Core i7-2600K quad-core CPU over-clocked to 4.5GHz, NVIDIA Quadro 4000, 8GB RAM) | Dell Precision T1600 workstation (one 3.4GHz Intel Xeon E3-1270 quad-core CPU, NVIDIA Quadro 2000, 4GB RAM) | | HP Z820 workstation (two 3.1GHz Intel Xeon eight-core CPU [3.8GHz turbo], NVIDIA Quadro 5000, 32GB RAM) | BOXX 3DBOXX 8550XTREME workstation (two 3.33GHz Intel Xeon X5680 six-core CPUs over-clocked to 4.2GHz, NVIDIA Quadro 5000, 24GB RAM) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Price as tested | | $5,625 | $1,099 | | $2,269 | | $4,048 | $1,875 | | $9,984 | $11,396 | |
| Date tested | | 6/29/12 | 4/21/12 | | 2/12/12 | | 10/12/11 | 9/11/11 | | 7/16/12 | 3/20/11 | |
| Operating System | | Windows 7 64-bit | Windows XP | Windows 7 64-bit | Windows XP | Windows 7 64-bit | Windows 7 64-bit | Windows XP | Windows 7 64-bit | Windows 7 64-bit | Windows XP | Windows 7 64-bit |
| SPECviewperf | higher | | | | | | | | | | | |
| 3dsmax-04 | | 82.83[1] | 79.01[1] | 77.43[1] | 80.67 | 79.46 | 99.03[1] | 83.61 | 81.72 | 82.08[1] | 95.97 | 95.44[1] |
| catia-02 | | 98.89[1] | 77.80[1] | 77.68[1] | 94.20 | 91.47 | 124.75[1] | 96.38 | 93.28 | 111.43[1] | 120.44 | 121.1[1] |
| ensight-03 | | 90.20[1] | 48.20[1] | 49.27[1] | 75.78 | 73.57 | 109.56[1] | 76.62 | 74.16 | 124.41[1] | 132.41 | 130.13[1] |
| maya-02 | | 330.32[1] | 156.64[1] | 157.63[1] | 291.17 | 270.83 | 399.43[1] | 297.27 | 270.53 | 461.72[1] | 529.89 | 476.95[1] |
| proe-04 | | 97.22[1] | 60.66[1] | 60.79[1] | 88.48 | 84.83 | 120.33[1] | 89.24 | 85.86 | 114.54[1] | 113.84 | 113.24 |
| SW-01 | | 196.11[1] | 94.38[1] | 94.68[1] | 168.06 | 161.45 | 231.44[1] | 169.31 | 160.61[1] | 236.8[1] | 221.31 | 214.06 |
| tcvis-01 | | 62.98[1] | 34.25[1] | 34.22[1] | 56.41 | 54.43 | 79.05[1] | 56.76 | 54.24 | 94.77[1] | 98.58 | 94.17 |
| ugnx-01 | | 44.98[1] | 29.01[1] | 29.16[1] | 43.41 | 42.49 | 65.91[1] | 43.40 | 42.47 | 86.93[1] | 89.32 | 86.90 |
| SPECapc SolidWorks | lower | | | | | | | | | | | |
| Score | seconds | 110.61[1,2] | 127.48[1] | n/a | 110.91 | n/a | n/a | 106.63[1] | n/a | 126.73[1,2] | 106.56[1] | n/a |
| Graphics | seconds | 38.31[1,2] | 48.40[1] | n/a | 35.71 | n/a | n/a | 34.24[1] | n/a | 42.43[1,2] | 35.33[1] | n/a |
| CPU | seconds | 30.52[1,2] | 27.90[1] | n/a | 25.89 | n/a | 26.44[1] | 25.05[1] | n/a | 37.53[1,2] | 25.99[1] | n/a |
| I/O | seconds | 41.32[1,2] | 55.17[1] | n/a | 50.74 | n/a | 47.01[1] | 48.26[1] | n/a | 46.77[1,2] | 46.51[1] | n/a |
| SPECapc SolidWorks | higher | | | | | | | | | | | |
| Score | ratio | 4.46[1,2] | 6.25[1] | n/a | 7.92 | n/a | n/a | 8.04[1] | n/a | 3.84[1,2] | 8.23[1] | n/a |
| Graphics | ratio | 5.06[1,2] | 3.89[1] | n/a | 5.78 | n/a | n/a | 5.74[1] | n/a | 4.58[1,2] | 6.08[1] | n/a |
| CPU | ratio | 4.01[1,2] | 11.57[1] | n/a | 12.46 | n/a | 12.20[1] | 12.88[1] | n/a | 3.26[1,2] | 12.61[1] | n/a |
| I/O | ratio | 3.42[1,2] | 5.74[1] | n/a | 6.24 | n/a | 6.73[1] | 6.56[1] | n/a | 3.03[1,2] | 6.81[1] | n/a |
| Autodesk Render Test | lower | | | | | | | | | | | |
| Time | seconds | 87.92[1] | 85.66[1] | 71.75[1] | 71.66[1] | 62.33[1] | 45.6[1] | 82.2[1] | 60.5[1] | 41.0[1] | 34.0[1] | 19.0[1] |

**Numbers in blue indicate best recorded results. Numbers in red indicate worst recorded results. 1=Hyper-threading enabled. 2= SPECapcSW2007 benchmark. Results are shown separately for single- and dual-socket workstations.**