

## VMmark® 3.1.1 Results

**Server Vendor & Model: Lenovo ThinkSystem SR665**  
**Storage Vendor & Model: Lenovo ThinkSystem DM7100F Storage**  
**Hypervisor: VMware ESXi 7.0 U2, build 17630552**  
**Datacenter Management Software: VMware vCenter 7.0 Build 15952498**

**VMmark 3.1.1 Score =**  
**21.58 @ 24 Tiles**

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 4/256/512
Tested By: Lenovo		Test Date: 04-17-2021
Performance Section <a href="#">Performance</a>	Configuration Section <a href="#">Configuration</a>	Notes Section <a href="#">Notes for Workload</a>

### Performance

	weathervane			weathervaneE			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3584.81	1.00	1.41   0.07	567.44	0.99	1.40   0.84	882.65	1.20	982.73	624.98	1.25	1170.63	443.75	1.28	1283.07	1.14
p1	3572.26	0.99	1.24   0.04	561.62	0.98	0.83   0.36	889.80	1.21	976.28	604.35	1.21	1176.78	437.35	1.26	1294.83	1.12
p2	3562.69	0.99	1.18   0.02	559.61	0.98	0.51   0.15	883.25	1.20	990.00	602.20	1.20	1198.12	416.95	1.20	1330.86	1.11
TILE_1	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3574.76	0.99	1.41   0.06	564.87	0.99	0.73   0.38	807.15	1.10	1289.10	562.58	1.12	1513.46	391.45	1.13	1678.59	1.06
p1	3558.98	0.99	1.38   0.07	561.73	0.98	0.59   0.32	799.75	1.09	1321.55	530.10	1.06	1596.92	379.65	1.09	1785.85	1.04
p2	3542.54	0.98	1.24   0.05	562.38	0.98	0.47   0.16	879.65	1.20	990.75	605.17	1.21	1176.15	419.27	1.21	1294.31	1.11
TILE_2	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3576.57	0.99	1.36   0.05	569.34	1.00	1.36   0.75	869.90	1.18	1025.41	621.02	1.24	1199.72	432.57	1.25	1329.46	1.13
p1	3567.53	0.99	1.24   0.08	567.60	0.99	0.95   0.41	885.83	1.21	971.53	610.38	1.22	1143.34	446.98	1.29	1257.33	1.13
p2	3551.48	0.99	1.26   0.06	566.59	0.99	0.66   0.29	881.42	1.20	988.13	606.67	1.21	1163.05	421.62	1.22	1294.22	1.12
TILE_3	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3565.19	0.99	1.98   0.25	566.32	0.99	1.02   0.43	865.48	1.18	1050.56	608.52	1.22	1246.96	422.35	1.22	1409.33	1.11
p1	3555.66	0.99	2.00   0.19	562.55	0.98	0.62   0.26	866.92	1.18	1053.20	582.62	1.16	1277.43	416.32	1.20	1444.03	1.10
p2	3540.42	0.98	1.97   0.21	560.77	0.98	0.63   0.42	859.20	1.17	1103.54	575.05	1.15	1330.72	392.93	1.13	1492.50	1.08
TILE_4	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3558.33	0.99	2.37   0.48	567.89	0.99	0.93   0.46	885.95	1.21	988.04	621.12	1.24	1183.19	433.85	1.25	1330.45	1.13
p1	3539.34	0.98	2.14   0.45	559.49	0.98	0.80   0.39	895.58	1.22	944.10	609.83	1.22	1143.57	444.62	1.28	1267.03	1.13
p2	3528.76	0.98	2.40   0.37	557.66	0.97	0.69   0.18	890.05	1.21	956.68	607.58	1.21	1154.63	417.88	1.20	1305.41	1.11
TILE_5	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3566.48	0.99	1.70   0.12	564.97	0.99	1.01   0.55	885.23	1.21	982.08	626.33	1.25	1176.82	440.12	1.27	1290.64	1.13

<b>p1</b>	3558.61	0.99	1.54   0.04	562.05	0.98	0.63   0.28	891.52	1.21	963.43	611.00	1.22	1147.38	438.73	1.27	1286.07	1.13
<b>p2</b>	3549.38	0.99	1.66   0.12	561.55	0.98	0.80   0.32	892.77	1.22	961.59	605.52	1.21	1164.72	415.75	1.20	1319.17	1.11
<b>TILE_6</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3564.68	0.99	1.62   0.16	571.87	1.00	1.39   0.91	868.17	1.18	1037.03	610.80	1.22	1245.20	421.20	1.21	1407.02	1.12
<b>p1</b>	3552.32	0.99	1.51   0.05	568.73	0.99	1.16   0.67	879.48	1.20	1018.52	591.35	1.18	1236.59	406.35	1.17	1386.10	1.10
<b>p2</b>	3531.40	0.98	1.62   0.05	562.69	0.98	0.73   0.22	878.30	1.20	1010.13	590.27	1.18	1236.43	422.43	1.22	1399.13	1.11
<b>TILE_7</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3568.29	0.99	1.79   0.22	565.74	0.99	1.07   0.51	869.75	1.18	1036.57	615.85	1.23	1223.60	426.48	1.23	1376.24	1.12
<b>p1</b>	3540.70	0.98	1.61   0.06	561.11	0.98	0.53   0.19	864.35	1.18	1067.00	580.30	1.16	1291.32	395.62	1.14	1466.14	1.08
<b>p2</b>	3526.19	0.98	1.84   0.24	557.86	0.97	0.99   0.54	858.25	1.17	1086.92	575.98	1.15	1328.03	410.20	1.18	1504.62	1.09
<b>TILE_8</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3570.70	0.99	2.39   0.43	566.82	0.99	0.67   0.22	877.75	1.20	1013.17	618.50	1.24	1204.16	429.32	1.24	1342.92	1.12
<b>p1</b>	3560.03	0.99	1.93   0.06	563.88	0.99	0.76   0.29	889.77	1.21	969.62	597.98	1.19	1198.12	408.45	1.18	1361.14	1.11
<b>p2</b>	3537.00	0.98	2.19   0.30	562.49	0.98	0.93   0.47	866.83	1.18	1049.76	591.50	1.18	1240.37	421.12	1.21	1423.98	1.10
<b>TILE_9</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3567.85	0.99	2.26   0.25	566.56	0.99	0.71   0.32	862.60	1.17	1058.95	608.73	1.22	1259.20	424.07	1.22	1393.33	1.11
<b>p1</b>	3549.21	0.99	2.16   0.21	564.69	0.99	0.87   0.39	886.62	1.21	983.46	574.27	1.15	1212.02	411.70	1.19	1351.13	1.10
<b>p2</b>	3526.00	0.98	2.60   0.38	559.25	0.98	0.68   0.21	846.80	1.15	1146.38	589.10	1.18	1369.85	404.48	1.17	1569.10	1.09
<b>TILE_10</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3564.96	0.99	1.73   0.05	563.64	0.99	1.02   0.47	858.33	1.17	1071.80	608.67	1.22	1258.40	438.35	1.26	1396.76	1.12
<b>p1</b>	3545.58	0.99	1.80   0.06	559.72	0.98	0.76   0.44	868.10	1.18	1037.05	578.62	1.16	1277.92	398.18	1.15	1427.19	1.09
<b>p2</b>	3525.18	0.98	2.06   0.17	557.50	0.97	0.68   0.23	854.73	1.16	1072.06	586.15	1.17	1256.06	418.73	1.21	1430.56	1.09
<b>TILE_11</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3564.69	0.99	2.35   0.17	570.49	1.00	1.44   0.82	858.00	1.17	1058.04	607.00	1.21	1254.00	437.70	1.26	1401.93	1.12
<b>p1</b>	3548.37	0.99	2.53   0.44	566.18	0.99	0.63   0.16	862.77	1.17	1064.68	555.17	1.11	1319.84	392.65	1.13	1487.50	1.08
<b>p2</b>	3547.54	0.99	1.59   0.02	565.09	0.99	0.71   0.32	853.35	1.16	1093.90	597.95	1.19	1296.49	410.95	1.18	1479.45	1.10
<b>TILE_12</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3572.46	0.99	1.95   0.12	569.23	0.99	1.02   0.40	867.35	1.18	1034.46	634.15	1.27	1205.82	446.00	1.29	1364.35	1.14
<b>p1</b>	3554.40	0.99	1.89   0.20	564.50	0.99	0.67   0.32	879.80	1.20	1008.50	575.45	1.15	1215.17	402.20	1.16	1402.52	1.09
<b>p2</b>	3543.06	0.98	1.87   0.14	561.51	0.98	0.82   0.31	869.45	1.18	1034.85	613.10	1.22	1235.73	420.90	1.21	1406.96	1.11
<b>TILE_13</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3583.47	1.00	1.71   0.09	571.07	1.00	1.37   0.76	867.38	1.18	1015.80	614.20	1.23	1206.54	449.50	1.30	1341.58	1.13
<b>p1</b>	3573.15	0.99	1.49   0.06	570.26	1.00	1.27   0.70	879.10	1.20	1000.25	596.58	1.19	1200.17	406.10	1.17	1376.68	1.11
<b>p2</b>	3568.17	0.99	1.66   0.13	567.80	0.99	0.74   0.36	868.12	1.18	1038.41	609.77	1.22	1237.52	422.62	1.22	1400.42	1.12
<b>TILE_14</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3559.58	0.99	2.34   0.25	562.83	0.98	0.80   0.35	864.25	1.18	1042.98	610.67	1.22	1222.64	441.48	1.27	1397.69	1.12

<b>p1</b>	3549.79	0.99	2.37   0.20	560.74	0.98	0.76   0.23	872.52	1.19	1030.30	588.25	1.18	1249.89	399.43	1.15	1431.03	1.09
<b>p2</b>	3539.77	0.98	2.29   0.13	558.00	0.98	0.82   0.25	861.50	1.17	1048.38	611.10	1.22	1244.55	420.30	1.21	1413.42	1.11
<b>TILE_15</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3569.26	0.99	2.49   0.34	563.45	0.98	0.74   0.32	865.23	1.18	1045.97	608.20	1.22	1243.35	438.05	1.26	1411.69	1.12
<b>p1</b>	3557.10	0.99	2.39   0.35	563.39	0.98	0.59   0.24	884.52	1.20	978.50	601.23	1.20	1186.22	409.50	1.18	1348.35	1.11
<b>p2</b>	3545.10	0.99	2.50   0.21	559.46	0.98	0.74   0.28	878.73	1.20	995.08	619.92	1.24	1187.53	428.05	1.23	1358.23	1.12
<b>TILE_16</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3570.89	0.99	2.64   0.48	568.82	0.99	0.96   0.41	870.88	1.19	1021.33	618.35	1.24	1208.63	447.93	1.29	1358.13	1.13
<b>p1</b>	3560.37	0.99	2.12   0.19	565.69	0.99	0.76   0.30	877.10	1.19	998.38	597.33	1.19	1216.00	403.32	1.16	1390.24	1.10
<b>p2</b>	3534.49	0.98	2.34   0.22	562.81	0.98	0.63   0.21	871.35	1.19	1023.11	615.08	1.23	1203.11	425.73	1.23	1364.66	1.12
<b>TILE_17</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3563.97	0.99	2.67   0.51	564.82	0.99	0.76   0.34	781.17	1.06	1398.50	542.80	1.08	1667.08	385.00	1.11	1859.58	1.05
<b>p1</b>	3554.11	0.99	2.74   0.63	562.49	0.98	0.72   0.26	853.83	1.16	1092.80	576.35	1.15	1320.49	389.43	1.12	1517.89	1.08
<b>p2</b>	3537.75	0.98	3.17   0.75	557.14	0.97	0.74   0.22	858.73	1.17	1066.23	605.45	1.21	1253.47	417.77	1.20	1431.43	1.10
<b>TILE_18</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3556.85	0.99	2.48   0.46	566.05	0.99	0.75   0.31	854.58	1.16	1088.28	605.92	1.21	1281.23	434.85	1.25	1459.75	1.12
<b>p1</b>	3549.86	0.99	2.22   0.14	562.51	0.98	0.67   0.28	872.62	1.19	1016.88	595.70	1.19	1222.10	403.90	1.16	1402.96	1.10
<b>p2</b>	3545.36	0.99	2.13   0.13	561.56	0.98	0.81   0.32	867.75	1.18	1045.20	612.35	1.22	1239.21	419.52	1.21	1416.56	1.11
<b>TILE_19</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3568.41	0.99	2.24   0.42	570.71	1.00	1.30   0.64	869.92	1.18	1023.31	618.73	1.24	1207.47	443.93	1.28	1383.34	1.13
<b>p1</b>	3553.85	0.99	2.16   0.39	571.11	1.00	1.19   0.68	888.23	1.21	987.71	604.83	1.21	1177.42	407.07	1.17	1376.43	1.11
<b>p2</b>	3541.12	0.98	2.10   0.14	566.67	0.99	0.88   0.34	883.45	1.20	987.31	625.33	1.25	1178.27	430.32	1.24	1337.58	1.13
<b>TILE_20</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3565.51	0.99	2.14   0.13	561.08	0.98	0.82   0.37	886.25	1.21	943.58	601.10	1.20	1008.57	491.52	1.42	1134.20	1.15
<b>p1</b>	3546.01	0.99	2.00   0.10	558.67	0.98	0.69   0.20	886.35	1.21	940.94	661.80	1.32	1030.22	425.82	1.23	1169.37	1.14
<b>p2</b>	3532.07	0.98	2.20   0.19	556.21	0.97	0.96   0.34	870.77	1.19	993.64	611.60	1.22	1079.23	476.95	1.38	1222.10	1.14
<b>TILE_21</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3567.44	0.99	2.13   0.16	571.97	1.00	1.16   0.59	879.50	1.20	1000.84	621.45	1.24	1200.85	444.75	1.28	1370.94	1.14
<b>p1</b>	3553.33	0.99	1.37   0.12	567.78	0.99	0.99   0.53	893.60	1.22	956.40	613.25	1.23	1150.13	395.25	1.14	1332.56	1.11
<b>p2</b>	3529.21	0.98	1.39   0.03	566.35	0.99	0.58   0.31	875.35	1.19	998.95	624.23	1.25	1165.12	454.18	1.31	1307.92	1.14
<b>TILE_22</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3570.84	0.99	2.17   0.18	566.85	0.99	0.85   0.36	879.12	1.20	989.09	622.73	1.24	1179.50	451.98	1.30	1322.58	1.14
<b>p1</b>	3561.69	0.99	1.85   0.13	563.75	0.99	0.52   0.15	893.12	1.22	944.92	594.58	1.19	1128.03	399.23	1.15	1301.52	1.10
<b>p2</b>	3538.00	0.98	2.19   0.20	563.95	0.99	0.80   0.49	863.98	1.18	1043.33	635.80	1.27	1215.81	447.93	1.29	1361.10	1.13
<b>TILE_23</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3564.49	0.99	2.22   0.20	572.60	1.00	1.33   0.75	882.83	1.20	990.99	622.98	1.24	1187.75	431.68	1.24	1342.76	1.13

<b>p1</b>	3552.82	0.99	2.36   0.22	567.46	0.99	1.19   0.52	886.75	1.21	970.17	607.15	1.21	1158.99	416.20	1.20	1313.61	1.11
<b>p2</b>	3548.65	0.99	2.45   0.36	563.61	0.99	0.81   0.32	870.62	1.19	1023.60	617.60	1.23	1197.65	447.82	1.29	1354.69	1.13
<b>p0_score:</b>	26.91															
<b>p1_score:</b>	26.46															
<b>p2_score:</b>	26.67															

<b>Infrastructure_Operations_Scores:</b>	vMotion	SVMotion	XVMotion	Deploy
<b>Completed_Ops_PerHour</b>	28.50	27.00	21.00	10.50
<b>Avg_Seconds_To_Complete</b>	4.86	84.72	104.36	297.20
<b>Failures</b>	0.00	0.00	0.00	0.00
<b>Ratio</b>	1.10	1.50	1.17	1.31
<b>Number_Of_Threads</b>	1	1	1	1

<b>Summary</b>	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p2)
<b>Unreviewed_VMmark3_Applications_Score</b>	26.67	
<b>Unreviewed_VMmark3_Infrastructure_Score</b>	1.26	
<b>Unreviewed_VMmark3_Score</b>	21.58	

## Configuration

<b>Virtualization Software</b>	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0 U2, build 17630552 / 03-09-2021
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server Appliance 7.0 Build 15952498 / 04-02-2020
Supplemental Software	None
<b>Servers</b>	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	2
Server Manufacturer and Model	Lenovo ThinkSystem SR665
Processor Vendor and Model	AMD EPYC 7763

Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.45 / 3.5
Total Sockets/Total Cores/Total Threads	2 Sockets / 128 Cores / 256 Threads
Primary CPU Cache	32 KB I + 32 KB D on chip per core
Secondary CPU Cache	512 KB I+D on chip per core
Other CPU Cache	256 MB I+D on chip per chip, 32 MB shared / 8 cores
BIOS Version	D8E113Z-2.00
Memory Size (in GB, Number of DIMMs)	2048, 32
Memory Type and Speed	64 GB 2Rx4 PC4-3200 MHz RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	None
Disk Controller Vendors and Models	N/A
Total Number of Physical Disks for Hypervisor	Details in Storage notes
Disk Vendors, Models, Capacities, and Speeds	Details in Storage notes
Number of Host Bus Adapters	2
Host Bus Adapter Vendors and Models	ThinkSystem Emulex LPe35002 PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter
Number of Network Controllers	2
Network Controller Vendors and Models	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port OCP Ethernet Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	03-15-2021
BIOS Availability Date (MM-DD-YYYY)	03-15-2021
Software Availability Date (MM-DD-YYYY)	03-18-2021
<b>Network</b>	
Network Switch Vendors and Models	ThinkSystem NE2572 RackSwitch
Network Speed	25 Gbps
<b>Primary Storage</b>	
Storage Category	FC SAN Storage

Storage Vendors, Models, and Firmware Versions	Lenovo ThinkSystem DM7100F Storage
Storage Configuration Summary	<ul style="list-style-type: none"> <li>• Lenovo DB620S 32GB FC Switch</li> <li>• Lenovo ThinkSystem DM7100F Storage <ul style="list-style-type: none"> <li>◦ 2 x Lenovo ThinkSystem DM Series DM7100 Controllers</li> <li>◦ 1 x Lenovo DM Expansion 240S 2U24 SFF</li> <li>◦ 4 x Lenovo ThinkSystem 22.8TB (6x 3.8TB, 2.5", NVMe SSD) Drive Pack for DM7100F</li> <li>◦ 50 x LUNs</li> </ul> </li> </ul>

**Datacenter Management Server**

System Model	Lenovo ThinkSystem SR655
Processor Vendor and Model	AMD EPYC 7502
Processor Speed (GHz)	2.5 GHz
Total Sockets/Total Cores/Total Threads	1 Sockets / 32 Cores / 64 Threads
Memory Size (in GB, Number of DIMMs)	128 GB, 4
Network Controller(s) Vendors and Models	1 x Lenovo ThinkSystem Mellanox ConnectX-4 Lx PCIe 25Gb 2-Port SFP28 Ethernet Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 build 15843807
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	28
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server Appliance 7.0 Build 15952498
Other Hardware	Details in Notes
Other Software	None

**Clients**

Total Number of Virtual Clients / Virtual Client Hosts	25 / 2
System Model(s)	Lenovo ThinkSystem SR655-2S
Processor Vendor(s) and Model(s)	<ul style="list-style-type: none"> <li>• Client1: AMD EPYC 7552</li> <li>• Client2: AMD EPYC 7542</li> </ul>
Processor Speed(s) (GHz)	<ul style="list-style-type: none"> <li>• Client1: 2.2 GHz</li> <li>• Client2: 2.9 GHz</li> </ul>
Total Sockets/Total Cores/Total Threads	<ul style="list-style-type: none"> <li>• Client1: 2 Sockets / 96 Cores / 192 Threads</li> <li>• Client2: 2 Sockets / 64 Cores / 128 Threads</li> </ul>

Memory per Virtual Client Host	1024 GB
Network Controller(s) Vendors and Models	1 x Lenovo ThinkSystem Mellanox ConnectX-4 Lx PCIe 25Gb 2-Port SFP28 Ethernet Adapter
Virtual Client Networking Notes	Details in Other Notes
Virtual Client Storage Notes	Details in Client Notes
Other Hardware	<ul style="list-style-type: none"> <li>• 1 x Lenovo ThinkSystem QLogic ISP2532 PCIe 8Gb 2-Port SFP+ Fibre Channel Adapter</li> <li>• 1 x IBM Storwize V7000</li> <li>• 24 x 800 GB SSD</li> <li>• 4 x LUNs</li> </ul>
Other Software	VMware ESXi 7.0 U2, build 17630552

#### Security Mitigations

Vulnerability	CVE	Exploit Name	Public Vulnerability Name	Mitigated		
				Server Firmware	ESXi	Guest OS
Spectre	2017-5753	Variant 1	Bounds Check Bypass	N/A	Not Vulnerable	Not Vulnerable
Spectre	2017-5715	Variant 2	Branch Target Injection	Not Vulnerable	Not Vulnerable	Not Vulnerable
Meltdown	2017-5754	Variant 3	Rogue Data Cache Load	N/A	Not Vulnerable	Not Vulnerable
Spectre-NG	2018-3640	Variant 3a	Rogue System Register Read	Not Vulnerable	N/A	N/A
Spectre-NG	2018-3639	Variant 4	Speculative Store Bypass	N/A	Not Vulnerable	Not Vulnerable
Foreshadow	2018-3615	Variant 5	L1 Terminal Fault - SGX	N/A	N/A	N/A
Foreshadow-NG	2018-3620	Variant 5	L1 Terminal Fault - OS	N/A	N/A	Not Vulnerable
Foreshadow-NG	2018-3646	Variant 5	L1 Terminal Fault - VMM	N/A	Not Vulnerable	N/A

## Notes for Workload

Template deployed with disk type: Thick Provision Lazy Zeroed

### Virtualization Software Notes

- vSphere DRS Migration Threshold level set to 1
- vSphere DRS Advanced Option AggressiveCPUActive set to 1
- Logging was disabled for all SUT and Client VMs (default is Enabled)
- CDROM & Floppy removed for all DS3, Elastic, Auction, and Standby SUT VMs (default is Enabled)
- CPU and Memory shares set to High for all DS3DB VMs (default is Normal)
- All Memory Reserved for DS3DB VMs (default is Not reserved)
- sched.mem.pin set to TRUE for all DS3DB VMs (default FALSE)
- CPU shares set to Low for all Standby VMs (default is Normal)
- CPU shares set to High for all DS3WebA VMs (default is Normal)

- Third virtual disk removed from DS3DB0 before cloning DS3DB VMs for other tiles.

#### Advanced Settings:

- Numa.LocalityWeightActionAffinity = 0 (default 130)
- Mem.ShareScanGHz = 0 (default 4)
- Cpu.HTWholeCoreThreshold = 0 (default 800)
- UserVars.SuppressShellWarning = 1 (default 0)
- DataMover.HardwareAcceleratedMove = 0 (default 1)

### Server Notes

#### Server BIOS Settings

- Memory Speed set to 2933
- Memory Operating Mode set to Maximum Performance
- NUMA Per Socket set to 1
- L1 Stream HW Prefetcher set to Disable (default Enable)
- L2 Stream HW Prefetcher set to Disable (default Enable)

### Networking Notes

#### vSwitch Configuration

- vSwitch0 on vmnic0 for Management Network, vMotion, and Standby and Deploy VMs
  - MTU 9000 configured on vSwitch0, vmnic0, and vmk0
- vSwitch1 on vmnic2 for all Auction, DS3, and Elastic VMs
  - MTU 9000 configured on vSwitch1 and vmnic2
  - Auction, DS3, and Elastic VMs all had an exclusive portgroup
- Each physical NIC is connected to the switch using 1 port per adapter running at 25 Gbps

### Storage Notes

#### Lenovo ThinkSystem DM7100F Storage

- Physical Configuration
  - Data ONTAP Release 9.7P2
  - 2 x DM7100F Transform Nodes
  - 2 x DM7100F Transform 2-port 32Gb Fibre Channel HBAs
  - Storage Efficiency was disabled across all VMmark3 volumes
  - Each volume was configured with RAID-DP
  - The Lenovo ThinkSystem DM7100F Storage System is VAAI capable and enabled
  - Two types of volumes were exposed to the SUT
    - FC LUNs for the boot volumes
    - NVMe-over-FC namespaces for the VM workload volumes
- Virtual Configuration
  - All LUNs were deployed on 2 Aggregates, with each Aggregate distributed across all 24 3.49TB NVMe SSDs
    - 1 x 10GB Boot LUN exclusive for SUT1 striped across first aggregate
    - 1 x 10GB Boot LUN exclusive for SUT2 striped across second aggregate
    - Each Boot LUN was configured with Round Robin Path Policy (default Most Recently Used)



- Each Boot LUN was configured with an IO Operations Limit 1 (default 1000)
- All NVMe-over-FC namespaces were deployed on 2 Aggregates, with each Aggregate distributed across all 24 NVMe SSDs
  - First Aggregate
    - 24 x 3.49TB NVMe SSDs
    - 12 x 1024GB namespaces striped across disk aggregate, 1 for each DS3DB VM
    - 12 x 1024GB namespaces striped across disk aggregate, 1 for all other VMs except:
      - DS3DB VMs
      - Infrastructure Operations VMs
    - 1 x 1TB namespace striped across disk aggregate for all DS3WebA VMs
    - 1 x 256GB namespace striped across disk aggregate dedicated to XVMotion Infrastructure Operations
  - Second Aggregate
    - 24 x 3.49TB NVMe SSDs
    - 12 x 1024GB namespaces striped across disk aggregate, 1 for each DS3DB VM
    - 12 x 1024GB namespaces striped across disk aggregate, 1 for all other VMs except:
      - DS3DB VMs
      - Infrastructure Operations VMs
    - 1 x 1TB namespace striped across disk aggregate for all Standby VMs
    - 1 x 256GB namespace striped across disk aggregate dedicated to Storage vMotion Infrastructure Operations
    - 1 x 256GB namespace striped across disk aggregate for Deploy Template VM
    - 1 x 256GB namespace striped across disk aggregate, dedicated to Deploy VM Infrastructure Operations

## **Datacenter Management Server Notes**

VMware vCenter Appliance 7.0 was hosted on a Lenovo ThinkSystem SR655 system that was not part of the client or SUT clusters.

## **Operating System Notes**

All SUT hosts were installed using VMware ESXi 7.0 U2 Lenovo custom image (17630552) available at [https://vmware.lenovo.com/content/custom\\_iso/7.0/7.0u2/](https://vmware.lenovo.com/content/custom_iso/7.0/7.0u2/)

## **Software Notes**

None

## **Client Notes**

### Client Host Storage

- VMware ESXi 7.0 U2, build 17630552 was installed on 1 x 50GB LUN on the IBM Fibre Channel Disk on each host.
- All Client VMs including the Prime Client were stored on 2 x 1024GB LUNs.
- All even-numbered Client VMs were stored on the first Client LUN.
- All odd-numbered Client VMs and the Prime Client were stored on the second Client LUN.

### Client VM Distribution:

- Client Host 1: Client VMs 9-23
- Client Host 2: Client VMs 0-8 and the Prime Client

### Client hosts vSwitch configuration

- All client VMs were connected to the same VM Network Portgroup on vSwitch0

- The management interface was connected to vSwitch0

#### Advanced Settings

- UserVars.SuppressShellWarning = 1 (default 0)

#### Other Notes

Changes to VMmark3.properties file:

- TileDelay was set to 5 (default 60)
- ErrorImmediate was set to true (default false)
- ScrubConfigFile was set to true (default false)

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