

## VMmark® 3.1.1 Results

**Server Vendor & Model: Dell EMC PowerEdge R750**  
**Storage Vendor & Model: VMware vSAN 7.0 U2 All Flash**  
**Hypervisor: VMware ESXi 7.0 U2a Build 17867351**  
**Datacenter Management Software: VMware vCenter Server 7.0 U1c Build 17327586**

**VMmark 3.1.1 Score =  
24.48 @ 26 Tiles**

Number of Hosts: 4	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 8/320/640
Tested By: Dell EMC		Test Date: 12-19-2021
<b>Performance Section</b> <a href="#">Performance</a>	<b>Configuration Section</b> <a href="#">Configuration</a>	<b>Notes Section</b> <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	3567.18	0.99	0.81   0.01	563.89	0.99	0.94   0.68	875.98	1.19	898.13	619.02	1.24	1000.74	434.05	1.25	1097.95	1.13
p1	3546.56	0.99	0.77   0.01	559.57	0.98	0.77   0.55	875.92	1.19	888.27	637.75	1.27	1006.64	475.25	1.37	1097.57	1.15
p2	3526.48	0.98	0.78   0.00	555.64	0.97	0.76   0.39	875.75	1.19	882.15	621.38	1.24	1006.48	417.73	1.20	1079.13	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	3576.52	0.99	0.77   0.00	569.11	0.99	0.94   0.60	875.85	1.19	891.06	639.83	1.28	1016.87	452.30	1.30	1115.64	1.14
p1	3569.69	0.99	0.78   0.00	565.24	0.99	0.74   0.40	879.60	1.20	884.58	620.45	1.24	1019.62	454.73	1.31	1103.07	1.14
p2	3558.58	0.99	0.81   0.01	563.11	0.98	0.63   0.31	874.25	1.19	896.69	616.30	1.23	1017.43	432.40	1.25	1120.73	1.12
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	3575.44	0.99	0.70   0.00	562.25	0.98	0.83   0.52	906.52	1.23	818.20	674.80	1.35	902.47	476.40	1.37	1001.12	1.17
p1	3560.19	0.99	0.71   0.00	561.17	0.98	0.80   0.47	917.55	1.25	793.08	645.77	1.29	910.16	476.15	1.37	993.89	1.17
p2	3541.25	0.98	0.71   0.04	557.27	0.97	0.69   0.34	906.88	1.23	809.20	648.80	1.30	899.73	457.00	1.32	990.78	1.15
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	3579.38	0.99	0.69   0.00	569.02	0.99	1.11   0.88	890.45	1.21	837.41	663.52	1.33	926.73	496.10	1.43	988.13	1.18
p1	3571.06	0.99	0.68   0.00	566.12	0.99	0.72   0.48	903.88	1.23	812.67	652.10	1.30	889.15	457.27	1.32	974.93	1.16
p2	3553.57	0.99	0.70   0.00	565.32	0.99	0.57   0.27	888.58	1.21	836.14	664.17	1.33	924.49	474.07	1.37	986.40	1.16
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	3562.21	0.99	1.00   0.01	566.60	0.99	0.63   0.39	896.77	1.22	817.23	663.40	1.33	909.20	500.12	1.44	962.51	1.18
p1	3554.98	0.99	1.03   0.01	567.16	0.99	0.78   0.49	896.90	1.22	819.11	642.83	1.28	908.29	456.57	1.32	987.88	1.15
p2	3543.57	0.98	1.04   0.01	563.76	0.99	0.65   0.29	883.05	1.20	841.36	661.98	1.32	911.49	477.00	1.38	980.18	1.16
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	3578.85	0.99	0.80   0.00	566.09	0.99	1.17   0.79	911.70	1.24	829.27	667.65	1.33	947.15	471.62	1.36	1035.16	1.17

<b>p1</b>	3558.78	0.99	0.81   0.00	560.75	0.98	0.68   0.31	917.62	1.25	809.64	626.33	1.25	934.75	453.60	1.31	1028.44	1.15
<b>p2</b>	3554.02	0.99	0.78   0.00	557.71	0.97	0.58   0.27	904.60	1.23	840.34	681.30	1.36	944.53	492.23	1.42	1037.67	1.18
<b>TILE_6</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>	3566.54	0.99	0.84   0.01	565.51	0.99	0.75   0.49	972.25	1.32	665.05	699.62	1.40	752.77	519.85	1.50	813.33	1.22
<b>p1</b>	3555.66	0.99	0.88   0.01	560.52	0.98	0.62   0.30	970.50	1.32	678.90	697.35	1.39	753.08	496.25	1.43	818.37	1.21
<b>p2</b>	3533.86	0.98	0.94   0.02	557.77	0.97	0.66   0.38	954.50	1.30	708.60	712.05	1.42	786.16	533.90	1.54	843.38	1.22
<b>TILE_7</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>	3577.71	0.99	0.65   0.00	569.30	0.99	1.01   0.78	899.62	1.23	812.85	623.83	1.25	906.78	458.90	1.32	970.17	1.15
<b>p1</b>	3564.72	0.99	0.64   0.00	564.26	0.99	1.00   0.65	904.35	1.23	796.64	677.20	1.35	874.78	488.52	1.41	931.74	1.18
<b>p2</b>	3554.63	0.99	0.64   0.00	558.52	0.98	0.69   0.45	889.50	1.21	843.12	639.98	1.28	926.61	476.05	1.37	991.74	1.15
<b>TILE_8</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>	3565.81	0.99	0.87   0.01	572.10	1.00	1.09   0.80	892.90	1.22	834.64	636.58	1.27	935.22	453.90	1.31	999.05	1.15
<b>p1</b>	3556.94	0.99	0.87   0.01	569.69	1.00	1.22   0.82	892.60	1.22	831.59	663.45	1.33	913.58	479.52	1.38	978.20	1.17
<b>p2</b>	3548.45	0.99	0.87   0.01	561.86	0.98	0.58   0.32	896.20	1.22	823.35	642.02	1.28	912.43	477.10	1.38	980.59	1.16
<b>TILE_9</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>	3577.68	0.99	0.87   0.01	568.83	0.99	1.04   0.71	879.60	1.20	879.95	599.30	1.20	1008.23	420.95	1.21	1076.67	1.11
<b>p1</b>	3551.90	0.99	0.87   0.01	565.21	0.99	0.81   0.42	880.95	1.20	884.06	666.27	1.33	1000.90	479.02	1.38	1083.49	1.17
<b>p2</b>	3539.35	0.98	0.86   0.00	561.20	0.98	0.67   0.28	874.45	1.19	895.43	597.52	1.19	1021.97	437.80	1.26	1089.43	1.12
<b>TILE_10</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>	3582.03	1.00	0.68   0.00	565.44	0.99	0.69   0.41	898.02	1.22	843.52	637.62	1.27	954.01	449.62	1.30	1027.39	1.15
<b>p1</b>	3561.01	0.99	0.74   0.01	564.79	0.99	0.74   0.53	893.85	1.22	850.32	655.92	1.31	965.05	488.88	1.41	1040.29	1.17
<b>p2</b>	3545.83	0.99	0.90   0.18	560.34	0.98	0.60   0.38	890.02	1.21	847.70	631.58	1.26	961.73	447.30	1.29	1045.11	1.14
<b>TILE_11</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>	3577.66	0.99	0.89   0.01	567.26	0.99	0.59   0.38	907.73	1.24	791.02	651.83	1.30	876.29	462.93	1.33	946.55	1.16
<b>p1</b>	3564.72	0.99	0.98   0.01	562.48	0.98	0.70   0.38	910.92	1.24	791.90	652.48	1.30	878.29	485.88	1.40	935.18	1.17
<b>p2</b>	3548.29	0.99	0.94   0.01	556.86	0.97	0.63   0.28	893.08	1.22	808.06	647.33	1.29	884.68	460.00	1.33	960.63	1.15
<b>TILE_12</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>	3582.31	1.00	0.89   0.01	566.19	0.99	0.68   0.41	910.12	1.24	813.80	672.60	1.34	913.15	473.30	1.36	1006.38	1.17
<b>p1</b>	3571.19	0.99	0.85   0.01	562.06	0.98	0.54   0.30	916.12	1.25	797.57	647.95	1.29	914.87	473.35	1.36	1015.70	1.17
<b>p2</b>	3549.68	0.99	0.79   0.00	562.24	0.98	0.62   0.29	915.60	1.25	797.95	651.77	1.30	894.72	459.62	1.33	984.09	1.16
<b>TILE_13</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>	3584.94	1.00	0.90   0.01	565.56	0.99	1.05   0.65	875.83	1.19	907.00	638.10	1.27	1028.33	448.88	1.29	1139.91	1.14
<b>p1</b>	3567.24	0.99	0.90   0.01	563.78	0.99	0.79   0.43	884.05	1.20	888.51	617.15	1.23	1030.46	430.88	1.24	1131.44	1.12
<b>p2</b>	3554.85	0.99	0.88   0.04	566.13	0.99	0.87   0.52	876.83	1.19	902.61	615.50	1.23	1033.27	452.10	1.30	1134.91	1.13
<b>TILE_14</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>	3571.09	0.99	0.86   0.02	563.65	0.99	0.46   0.26	877.58	1.20	871.41	649.52	1.30	966.30	483.55	1.39	1061.09	1.16

<b>p1</b>	3561.02	0.99	0.87   0.01	562.65	0.98	0.68   0.47	889.10	1.21	854.34	631.80	1.26	950.62	445.30	1.28	1043.10	1.14
<b>p2</b>	3546.46	0.99	0.83   0.01	557.75	0.97	0.53   0.29	875.12	1.19	877.14	648.98	1.30	966.19	464.68	1.34	1046.22	1.15
<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>	3575.50	0.99	0.71   0.00	567.04	0.99	0.56   0.31	900.45	1.23	812.60	666.70	1.33	899.78	504.48	1.45	957.10	1.19
<b>p1</b>	3551.91	0.99	0.72   0.00	565.06	0.99	0.90   0.57	916.05	1.25	772.07	641.27	1.28	849.37	448.20	1.29	930.26	1.15
<b>p2</b>	3542.04	0.98	0.67   0.00	563.67	0.99	0.72   0.37	898.02	1.22	814.92	691.77	1.38	893.61	500.85	1.44	960.61	1.19
<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>	3575.89	0.99	0.72   0.00	565.80	0.99	0.71   0.33	950.42	1.29	722.19	679.23	1.36	816.53	502.20	1.45	889.78	1.20
<b>p1</b>	3568.66	0.99	0.82   0.01	560.89	0.98	0.82   0.45	954.27	1.30	713.64	682.05	1.36	803.85	483.12	1.39	873.43	1.19
<b>p2</b>	3554.52	0.99	0.75   0.00	555.98	0.97	0.58   0.24	935.05	1.27	747.68	695.95	1.39	830.17	519.27	1.50	912.94	1.21
<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>	3569.74	0.99	0.82   0.00	568.01	0.99	1.33   0.98	873.00	1.19	892.72	624.95	1.25	993.21	462.12	1.33	1075.52	1.14
<b>p1</b>	3557.64	0.99	0.83   0.01	567.36	0.99	1.37   0.97	876.62	1.19	888.13	629.90	1.26	980.71	442.55	1.28	1077.23	1.13
<b>p2</b>	3544.66	0.99	0.97   0.12	561.16	0.98	0.79   0.45	861.23	1.17	920.74	643.45	1.29	1013.97	460.12	1.33	1086.96	1.14
<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>	3573.23	0.99	0.69   0.00	567.66	0.99	0.89   0.82	896.08	1.22	821.52	646.88	1.29	910.76	459.55	1.33	974.23	1.16
<b>p1</b>	3555.02	0.99	0.68   0.00	565.05	0.99	0.57   0.30	898.77	1.22	822.25	667.70	1.33	906.82	480.70	1.39	974.80	1.17
<b>p2</b>	3544.09	0.99	0.71   0.00	562.08	0.98	0.57   0.43	890.38	1.21	834.64	641.08	1.28	922.00	478.52	1.38	985.67	1.16
<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>	3582.38	1.00	0.65   0.00	565.41	0.99	0.82   0.43	946.83	1.29	718.60	677.67	1.35	805.44	485.07	1.40	859.85	1.19
<b>p1</b>	3565.51	0.99	0.65   0.00	561.26	0.98	0.51   0.26	942.15	1.28	717.65	707.05	1.41	792.30	511.93	1.48	843.83	1.21
<b>p2</b>	3554.04	0.99	0.67   0.00	558.50	0.98	0.59   0.32	933.95	1.27	736.55	676.98	1.35	817.19	478.15	1.38	884.66	1.18
<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>	3577.68	0.99	0.67   0.00	562.31	0.98	0.54   0.30	886.08	1.21	867.01	627.92	1.25	978.07	440.15	1.27	1076.17	1.13
<b>p1</b>	3567.24	0.99	0.69   0.01	560.60	0.98	0.56   0.32	890.75	1.21	850.48	652.67	1.30	960.37	487.12	1.40	1034.44	1.17
<b>p2</b>	3557.78	0.99	0.65   0.00	557.23	0.97	0.79   0.34	890.92	1.21	844.38	629.10	1.26	964.62	447.68	1.29	1046.20	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>	3574.96	0.99	1.03   0.03	566.40	0.99	0.90   0.57	843.83	1.15	986.03	595.30	1.19	1113.20	417.80	1.20	1223.49	1.10
<b>p1</b>	3553.79	0.99	1.06   0.03	564.00	0.99	0.66   0.27	839.42	1.14	1001.42	610.95	1.22	1138.11	453.82	1.31	1237.67	1.12
<b>p2</b>	3536.89	0.98	1.08   0.03	561.46	0.98	0.59   0.33	834.45	1.14	998.10	589.58	1.18	1128.57	396.18	1.14	1225.86	1.08
<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>	3570.96	0.99	0.82   0.01	568.64	0.99	0.60   0.37	882.33	1.20	868.60	649.35	1.30	968.40	462.12	1.33	1059.78	1.15
<b>p1</b>	3565.55	0.99	0.95   0.03	566.58	0.99	0.63   0.34	874.88	1.19	883.62	622.35	1.24	984.70	458.38	1.32	1084.33	1.14
<b>p2</b>	3548.50	0.99	0.94   0.02	565.40	0.99	0.72   0.48	867.33	1.18	897.02	619.42	1.24	997.19	435.52	1.26	1081.79	1.12
<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>	3566.35	0.99	0.62   0.00	566.85	0.99	1.01   0.80	888.70	1.21	845.04	656.48	1.31	947.66	470.43	1.36	1018.43	1.16

<b>p1</b>	3563.15	0.99	0.63   0.00	558.16	0.98	0.57   0.33	900.30	1.23	820.82	639.25	1.28	922.22	472.70	1.36	1005.88	1.16
<b>p2</b>	3541.42	0.98	0.62   0.00	553.86	0.97	0.81   0.43	885.85	1.21	844.94	636.25	1.27	939.73	448.12	1.29	1028.21	1.14
<b>TILE_24</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>	3582.96	1.00	0.80   0.05	566.74	0.99	0.62   0.34	917.50	1.25	783.07	706.12	1.41	865.22	509.27	1.47	950.28	1.21
<b>p1</b>	3566.09	0.99	0.79   0.01	566.87	0.99	0.72   0.41	923.90	1.26	777.18	631.73	1.26	889.00	458.27	1.32	988.61	1.16
<b>p2</b>	3560.28	0.99	0.73   0.01	565.35	0.99	0.68   0.45	917.25	1.25	788.08	674.08	1.35	890.50	483.00	1.39	973.58	1.18
<b>TILE_25</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>	3573.41	0.99	0.73   0.00	570.00	1.00	1.23   0.83	849.88	1.16	979.43	617.83	1.23	1110.18	463.32	1.34	1189.60	1.14
<b>p1</b>	3552.89	0.99	0.73   0.00	561.93	0.98	0.69   0.37	864.90	1.18	932.59	605.05	1.21	1071.95	423.38	1.22	1183.39	1.11
<b>p2</b>	3540.18	0.98	0.73   0.00	557.54	0.97	0.61   0.38	850.02	1.16	978.45	620.05	1.24	1106.73	440.70	1.27	1194.03	1.12
<b>p0_score:</b>	30.17															
<b>p1_score:</b>	30.11															
<b>p2_score:</b>	29.92															

<b>Infrastructure_Operations_Scores:</b>	vMotion	SVMotion	XVMotion	Deploy
<b>Completed_Ops_PerHour</b>	55.00	42.00	36.00	12.00
<b>Avg_Seconds_To_Complete</b>	9.64	138.95	152.88	554.59
<b>Failures</b>	0.00	0.00	0.00	0.00
<b>Ratio</b>	2.12	2.33	2.00	1.50
<b>Number_Of_Threads</b>	2	2	2	2

<b>Summary</b>	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
<b>Unreviewed_VMmark3_Applications_Score</b>	30.11	
<b>Unreviewed_VMmark3_Infrastructure_Score</b>	1.96	
<b>Unreviewed_VMmark3_Score</b>	24.48	

## Configuration

<b>Virtualization Software</b>	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0 U2a Build 17867351 / 04-29-2021
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 7.0 U1c Build 17327586 / 12-17-2020

Supplemental Software	None
<b>Servers</b>	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	4
Server Manufacturer and Model	Dell EMC PowerEdge R750
Processor Vendor and Model	Intel Xeon Platinum 8380
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.3 / 3.4
Total Sockets/Total Cores/Total Threads	2 Sockets / 80 Cores / 160 Threads
Primary CPU Cache	32KB I+48KB D on chip per core
Secondary CPU Cache	1280KB I+D on chip per core
Other CPU Cache	60MB I+D on chip per chip
BIOS Version	1.3.8
Memory Size (in GB, Number of DIMMs)	2048, 32
Memory Type and Speed	64GB 2Rx4 DDR4 3200MHz RDIMM
Disk Subsystem Type	vSAN,FC SAN (see storage notes)
Number of Disk Controllers	1
Disk Controller Vendors and Models	Dell Express Flash PM1725a 6.4TB
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Dell Express Flash PM1725a 6.4TB
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	QLE2692 Dual Port 16Gb FC Adapter
Number of Network Controllers	3
Network Controller Vendors and Models	Broadcom Gigabit Ethernet BCM5720 Mellanox ConnectX-5 EN 25GbE Dual-port Adapter Mellanox ConnectX-6 Dx 100GbE Dual-port Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	05-12-2021
BIOS Availability Date (MM-DD-YYYY)	08-31-2021

Software Availability Date (MM-DD-YYYY)	04-29-2021
<b>Network</b>	
Network Switch Vendors and Models	1xDell PowerConnect 6248 1xDell Force10 S4810 1xDell PowerSwitch S5232F-ON
Network Speed	1x1Gbps for SUT management 2x10Gbps for Client, Standby, DS3, and Auction VMs 2x100Gbps for Elastic VMs,vMotion,vSAN
<b>Primary Storage</b>	
Storage Category	VMware vSAN
Storage Vendors, Models, and Firmware Versions	4xDell EMC PowerEdge R750 servers, with VMware vSAN 7.0 U2
Storage Configuration Summary	VMware vSAN <ul style="list-style-type: none"> <li>• 1 Disk group per host</li> <li>• 1xDell Express Flash NVMe P5600 PCIe 3.2TB SSD for vSAN cache tier</li> <li>• 7xDell Express Flash NVMe P5600 PCIe 3.2TB SSD for vSAN capacity tier</li> </ul>
<b>Datacenter Management Server</b>	
System Model	Dell EMC PowerEdge R740xd
Processor Vendor and Model	Intel Xeon Platinum 8280 CPU
Processor Speed (GHz)	2.70
Total Sockets/Total Cores/Total Threads	2 Sockets / 56 Cores / 112 Threads
Memory Size (in GB, Number of DIMMs)	768, 24
Network Controller(s) Vendors and Models	Intel Ethernet 10G 2P X520 Adapter; Broadcom NetXtreme BCM5720 Gigabit Ethernet
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2a Build 17867351
Virtual Center VM Number of vCPUs	4
Virtual Center VM Virtual Memory (in GB)	19
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 7.0 U1c Build 17327586
Other Hardware	None
Other Software	None
<b>Clients</b>	
Total Number of Virtual Clients / Virtual Client	27 / 3

Hosts	
System Model(s)	3xDell EMC PowerEdge R740xd(Client-Host1,Client-Host2, Client-Host3)
Processor Vendor(s) and Model(s)	Client-Host1: Intel Xeon Platinum 8280 Client-Host2: Intel Xeon Platinum 8280 Client-Host3: Intel Xeon Platinum 8280
Processor Speed(s) (GHz)	Client-Host1: 2.7 GHz Client-Host2: 2.7 GHz Client-Host3: 2.7 GHz
Total Sockets/Total Cores/Total Threads	Client-Host1: 2 Sockets/ 56 Cores/ 112 Threads Client-Host2: 2 Sockets/ 56 Cores/ 112 Threads Client-Host3: 2 Sockets/ 56 Cores/ 112 Threads
Memory per Virtual Client Host	Client-Host1: 768 GB Client-Host2: 768 GB Client-Host3: 768 GB
Network Controller(s) Vendors and Models	Client-Host1: QLogic 57800 10GbE Ethernet Adapter(1 port used for vmnic0),Intel X520 10GbE 2P Adapter(1 port used for vmnic4) Client-Host2: QLogic 57800 10 GbE Adapter(1 port used for vmnic0),Intel X710 10GbE 2P Adapter(1 port used for vmnic4) Client-Host3: Broadcom BCM5720 GbE Ethernet(1 port used for vmnic0), Intel X520 10GbE 2P Adapter(1 port used for vmnic4)
Virtual Client Networking Notes	vSwitch0 on vmnic0 for Management(1Gbps) vSwitch1 on vmnic4 for VMs(10Gbps)
Virtual Client Storage Notes	All Virtual Clients are stored on Dell EMC PowerVault ME4024 FC SAN storage
Other Hardware	None
Other Software	All client hosts used VMware ESXi 7.0 U2a Build 17867351 for operating system.

#### 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	Yes	Yes
Spectre	2017-5715	Variant 2	Branch Target Injection	Yes	Yes	Yes
Meltdown	2017-5754	Variant 3	Rogue Data Cache Load	N/A	Yes	Yes
Spectre-NG	2018-3640	Variant 3a	Rogue System Register Read	Yes	N/A	N/A
Spectre-NG	2018-3639	Variant 4	Speculative Store Bypass	N/A	Yes	Yes
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	Yes
Foreshadow-NG	2018-3646	Variant 5	L1 Terminal Fault - VMM	N/A	Yes	N/A

## Notes for Workload

Templates deployed with disk type: Thin

## Virtualization Software Notes

- Logical CPU configuration changed for all multi-CPU VMs except for PrimeClient to 1 socket with multiple cores (default single core per socket)
- CPU and Memory shares set to high for all DS3DB,ElasticDB and ElasticLB VMs (default normal)
- CDROM removed from all VMs except for PrimeClient, client, and template VMs.
- All memory reserved for DS3DB VMs (default non-reserved)
- Added sched.mem.lpage.enable1GPage to TRUE for all DS3DB VMs (default normal)
- CPU shares set to low for all Standby VMs (default normal)
- vSphere DRS Migration Threshold set to Fully Automated level 1

#### Advanced Settings:

- Cpu.CreditAgePeriod = 1000 (default 3000)
- Cpu.HTWholeCoreThreshold = 0 (default 800)
- DataMover.HardwareAcceleratedInit = 0 (default 1)
- DataMover.HardwareAcceleratedMove = 0 (default 1)
- Disk.IdleCredit = 64 (default 32)
- Disk.ReqCallThreshold = 1 (default 8)
- Mem.CtlMaxPercent = 0 (default 65)
- Mem.ShareScanGHz = 0 (default 4)
- Misc.TimerMaxHardPeriod = 4000 (default 500000)
- Net.MaxNetifTxQueueLen = 1000 (default 2000)
- Net.MaxPortRxQueueLen = 160 (default 80)
- Numa.LTermFairnessInterval = 0 (default 5)
- Numa.MigImbalanceThreshold = 57 (default 10)
- Numa.PageMigEnable = 0 (default 1)
- Numa.RebalancePeriod = 6000 (default 2000)
- Numa.SwapLoadEnable = 0 (default 1)
- Numa.SwapLocalityEnable = 0 (default 1)
- Power.CpuPolicy = High Performance (default Balanced)
- VMFS3.HardwareAcceleratedLocking = 0 (default 1)
- VMkernel.Boot.hyperthreadingMitigation = true (default false)
- UserVars.HostClientCEIPOptIn= 1(default 0)

#### Server Notes

##### Server BIOS Settings:

- Hardware Prefetcher = Disabled (default Enabled)
- DCU Streamer Prefetcher = Disabled (default Enabled)
- DCU IP Prefetcher = Disabled (default Enabled)
- LLC Dead Line Alloc = Disabled (default Enabled)
- LLC Prefetch = Enabled (default Disabled)

#### Networking Notes

##### vSwitch Configuration:

- vSwitch0 for Service Console on vmnic0 at 1Gbps
- vSwitch0 used for PrimeClient, template, and deploy VMs.

- vSwitch1 for Client and PrimeClient VMs on vmnic4 at 10Gbps, Standby and DS3\*0-DS3\*12 on vmnic6 at 10Gbps
  - MTU 9000 (default 1500)
- vSwitch2 for Auction and DS3\*13-DS3\*25 Workload VMs on vmnic7 at 10Gbps
  - MTU 9000 (default 1500)
- Distributed Virtual Switch DSwitch for vMotion and Elastic\*12 through Elastic\*25 Workload VMs on vmnic8 at 100Gbps
  - MTU 9000 (default 1500)
- Distributed Virtual Switch DSwitch1 for vSAN traffic and Elastic\*0 through Elastic\*11 Workload VMs on vmnic9 at 100Gbps
  - MTU 9000 (default 1500)

## Storage Notes

Host OS installed on Dell Express Flash PM1725a 6.4TB PCIe SSD  
VMware vSAN(Primary Storage)

- VMware vSAN 7.0 U2
- Capacity: 81.48TB
- Cache: 11.64TB
- Hardware Configuration:
  - Each host had one disk group. Each disk group used:
    - Caching drive: 1xExpress Flash NVMe P5600 PCIe SSD SFF
    - Capacity drive: 7xExpress Flash NVMe P5600 PCIe SSD SFF
    - SUT vSAN datastore was used for all SUT VMs and template VMs

Dell EMC PowerVault ME4024 Array (Secondary Storage) First Dell EMC PowerVault ME4024 configured with redundant controllers with Fiber Channel connectivity:

- Hardware details:
  - 24 x SAMSUNG Model MZILT3T8HBLS0D3 3.8 TB SSD
  - 2 x ME4024 Storage Controllers(hardware version 8.1, firmware version GTS280R10-10)
- RAID Configuration:
  - Deploy, Deploy1, svMotion, svMotion1 LUNs configured as RAID10
    - Deploy, Deploy1 : configured for deploy operations
    - svMotion, svMotion1 : configured for svMotion and xvMotion infrastructure operations

Second Dell EMC PowerVault ME4024 configured with redundant controllers with Fiber Channel connectivity:

- Hardware details:
  - 10 x Toshiba Model KPM5XRUG3T84 3.8 TB SSD
  - 2 x ME4024 Storage Controllers(hardware version 8.1, firmware version GTS280R10-10)
- RAID Configuration:
  - LUN3, LUN4, Deploy and svMotion are configured as RAID10
    - LUN3: not used
    - LUN4: Client VMs for tiles 0-25; VMware vCenter Server, PrimeClient

## Datacenter Management Server Notes

None

## Operating System Notes

SUT hosts used Dell customized ESXi 7.0 U2 ISO (VMware-VMvisor-Installer-7.0.0.update02-17867351.x86\_64-DellEMC\_Customized-A04.iso) for OS installation.

## Software Notes

None

## Client Notes

The Client VMs were distributed across the client hosts as follows:

- Client-Host1: Client6,Client21,Client12,Client23,Client14,Client8,Client11,Client4,Client22
- Client-Host2: VMware vCenter Server,Prime Client,Client24,Client1,Client25,Client18,Client3,Client7,Client5
- Client-Host3: Client13,Client9,Client15,Client20,Client10,Client17,Client19,Client16,Client2,Client0

Client host advanced settings :

- /adv/UserVars/HostClientCEIPOptIn = "1" ,(default value = 0)(Client-Host1)
- /adv/UserVars/HostClientCEIPOptIn = "1" ,(default value = 0)(Client-Host2)
- /adv/UserVars/HostClientCEIPOptIn = "1" ,(default value = 0)(Client-Host3)

Client host vSwitch settings:

- vSwitch1 on all client hosts had MTU set to 9000(default 1500)

## Other Notes

Changes to VMmark3.properties file :

- TileDelay = 30 (default: 60)

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