VMmark® 3.1.1 Results

Server Vendor & Model: Dell PowerEdge R7615 **Storage Vendor & Model: Dell PowerMax 8000** **Hypervisor: VMware ESXi 8.0 GA, Build 20513097** **Datacenter Management Software: VMware vCenter Server 8.0 GA, Build 20519528**	**VMmark 3.1.1 Server and Storage PPKW Score = 7.4908 @ 21 Tiles**

Number of Hosts: 2	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 2/192/384**
Tested By: Dell Technologies	**Test Date: 03-01-2023**	

Performance Section	**Configuration Section**	**Notes Section**
Performance	Configuration	Notes for Workload

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	3573.57	0.99	2.25 | 0.14	565.72	0.99	0.88 | 0.43	953.75	1.30	785.52	661.48	1.32	932.62	482.73	1.39	1050.64	1.19
p1	3560.08	0.99	2.27 | 0.11	563.04	0.98	0.56 | 0.33	953.00	1.30	797.13	663.80	1.33	937.80	458.18	1.32	1071.49	1.17
p2	3541.61	0.98	2.49 | 0.13	562.43	0.98	0.50 | 0.35	944.83	1.29	815.82	676.30	1.35	973.00	497.32	1.43	1083.37	1.19
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	3574.64	0.99	0.79 | 0.00	564.20	0.99	0.49 | 0.05	1028.10	1.40	600.61	730.02	1.46	705.40	513.90	1.48	780.95	1.24
p1	3560.72	0.99	0.83 | 0.01	563.34	0.98	0.38 | 0.07	1029.10	1.40	601.48	730.65	1.46	701.45	543.98	1.57	772.64	1.26
p2	3541.64	0.98	0.80 | 0.00	561.22	0.98	0.44 | 0.08	1020.42	1.39	613.87	731.50	1.46	709.97	538.25	1.55	786.95	1.25
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	3562.12	0.99	2.20 | 0.12	568.60	0.99	0.59 | 0.20	955.40	1.30	785.73	662.77	1.32	936.97	454.77	1.31	1077.64	1.17
p1	3558.76	0.99	2.36 | 0.10	563.58	0.98	0.47 | 0.13	944.92	1.29	800.92	687.55	1.37	934.12	482.23	1.39	1044.63	1.19
p2	3547.37	0.99	2.31 | 0.10	565.08	0.99	0.56 | 0.17	942.88	1.28	812.49	652.12	1.30	977.11	474.02	1.37	1090.10	1.17
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	3574.91	0.99	0.80 | 0.00	569.01	0.99	0.70 | 0.20	1025.22	1.40	607.88	726.10	1.45	713.33	488.75	1.41	804.87	1.23
p1	3564.53	0.99	0.83 | 0.00	565.42	0.99	0.42 | 0.06	1017.08	1.39	623.04	754.12	1.51	711.44	561.73	1.62	797.82	1.27
p2	3538.03	0.98	0.78 | 0.00	559.91	0.98	0.37 | 0.14	1021.80	1.39	616.10	699.38	1.40	716.50	512.38	1.48	800.36	1.23
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	3577.43	0.99	2.11 | 0.09	566.95	0.99	0.53 | 0.16	949.75	1.29	792.25	663.62	1.33	945.17	458.70	1.32	1072.27	1.17
p1	3555.81	0.99	2.37 | 0.12	563.01	0.98	0.52 | 0.20	943.60	1.28	802.72	682.35	1.36	947.03	505.12	1.46	1038.13	1.20
p2	3542.31	0.98	2.45 | 0.15	557.62	0.97	0.44 | 0.09	956.70	1.30	773.38	668.33	1.34	923.91	459.70	1.33	1053.41	1.17
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	3580.36	1.00	0.84 | 0.01	569.80	1.00	0.67 | 0.20	1029.90	1.40	600.12	729.38	1.46	702.97	518.17	1.49	782.65	1.25

p1	3560.40	0.99	0.77 | 0.00	568.78	0.99	0.54 | 0.20	1022.20	1.39	611.37	753.95	1.51	705.37	561.95	1.62	778.59	1.27
p2	3540.35	0.98	0.82 | 0.01	560.84	0.98	0.33 | 0.06	1022.48	1.39	612.10	705.23	1.41	718.62	490.80	1.42	801.17	1.22
TILE_6	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3557.54	0.99	2.07 | 0.10	563.40	0.98	0.66 | 0.30	953.30	1.30	778.42	693.08	1.38	902.53	489.45	1.41	1009.03	1.20
p1	3552.09	0.99	2.40 | 0.13	561.54	0.98	0.52 | 0.23	960.02	1.31	764.45	668.48	1.34	908.49	491.20	1.42	1009.38	1.19
p2	3538.64	0.98	2.31 | 0.13	559.43	0.98	0.63 | 0.24	948.42	1.29	793.73	663.42	1.33	940.82	458.93	1.32	1056.57	1.17
TILE_7	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3570.87	0.99	0.81 | 0.00	567.09	0.99	0.45 | 0.01	1016.08	1.38	620.22	755.45	1.51	708.69	536.88	1.55	790.60	1.26
p1	3556.60	0.99	0.81 | 0.00	563.21	0.98	0.34 | 0.03	1024.05	1.39	615.24	722.60	1.44	726.19	536.75	1.55	795.43	1.25
p2	3548.69	0.99	0.82 | 0.01	561.49	0.98	0.38 | 0.03	1021.05	1.39	611.57	729.92	1.46	712.78	513.08	1.48	797.92	1.24
TILE_8	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.78	0.99	2.24 | 0.12	564.33	0.99	0.45 | 0.08	946.02	1.29	790.99	685.30	1.37	924.84	508.00	1.46	1025.67	1.20
p1	3549.99	0.99	2.45 | 0.15	559.87	0.98	0.54 | 0.15	956.50	1.30	784.68	662.83	1.32	939.51	454.48	1.31	1076.88	1.17
p2	3532.61	0.98	2.42 | 0.12	557.13	0.97	0.55 | 0.22	949.40	1.29	795.22	688.62	1.38	917.99	487.02	1.40	1030.04	1.19
TILE_9	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3566.43	0.99	0.82 | 0.00	568.27	0.99	0.46 | 0.06	1013.48	1.38	633.44	749.75	1.50	727.65	557.15	1.61	803.09	1.27
p1	3547.23	0.99	0.82 | 0.01	568.20	0.99	0.40 | 0.10	1031.78	1.41	602.46	733.30	1.47	705.33	491.30	1.42	787.63	1.23
p2	3531.15	0.98	0.77 | 0.01	565.51	0.99	0.33 | 0.02	1019.08	1.39	625.27	749.98	1.50	716.83	558.23	1.61	795.03	1.27
TILE_10	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.65	0.99	2.50 | 0.13	563.64	0.99	0.65 | 0.33	949.67	1.29	782.10	660.85	1.32	932.16	483.27	1.39	1037.93	1.18
p1	3557.75	0.99	2.33 | 0.14	561.11	0.98	0.44 | 0.04	958.40	1.31	777.03	667.62	1.33	915.39	463.27	1.34	1038.65	1.18
p2	3546.62	0.99	2.38 | 0.12	558.14	0.98	0.52 | 0.12	943.62	1.29	810.27	678.48	1.36	947.11	499.57	1.44	1062.97	1.19
TILE_11	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3578.08	0.99	0.86 | 0.01	569.64	1.00	0.41 | 0.07	1028.75	1.40	593.68	734.40	1.47	694.89	541.92	1.56	768.86	1.26
p1	3561.05	0.99	0.81 | 0.00	563.21	0.98	0.36 | 0.03	1029.12	1.40	597.53	731.42	1.46	694.21	514.73	1.48	776.97	1.24
p2	3537.96	0.98	0.83 | 0.00	561.72	0.98	0.40 | 0.04	1022.62	1.39	613.54	753.83	1.51	710.91	561.35	1.62	780.17	1.27
TILE_12	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3581.80	1.00	2.24 | 0.10	571.16	1.00	0.83 | 0.34	959.10	1.31	769.96	664.35	1.33	919.91	464.00	1.34	1042.70	1.18
p1	3561.29	0.99	2.52 | 0.12	569.80	1.00	0.83 | 0.51	945.02	1.29	806.40	685.17	1.37	939.79	479.23	1.38	1050.27	1.19
p2	3544.29	0.99	2.60 | 0.17	565.99	0.99	0.66 | 0.33	946.20	1.29	812.13	653.83	1.31	975.29	474.65	1.37	1105.08	1.18
TILE_13	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3580.59	1.00	0.87 | 0.01	571.24	1.00	0.68 | 0.22	1022.67	1.39	614.73	724.67	1.45	722.22	507.27	1.46	814.84	1.24
p1	3557.65	0.99	0.84 | 0.01	564.78	0.99	0.45 | 0.11	1027.47	1.40	609.45	756.25	1.51	700.69	540.20	1.56	769.46	1.26
p2	3544.10	0.99	0.83 | 0.01	561.17	0.98	0.40 | 0.10	1024.28	1.39	613.45	726.65	1.45	720.89	535.23	1.54	801.64	1.25
TILE_14	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3574.32	0.99	2.22 | 0.10	561.58	0.98	0.49 | 0.15	958.80	1.31	774.02	646.27	1.29	906.67	462.98	1.33	1037.90	1.17

p1	3552.80	0.99	2.39 | 0.16	559.76	0.98	0.68 | 0.29	941.83	1.28	814.70	682.00	1.36	950.10	499.90	1.44	1060.58	1.19
p2	3536.02	0.98	2.51 | 0.13	554.11	0.97	0.47 | 0.11	951.38	1.30	796.21	656.05	1.31	947.94	454.88	1.31	1082.79	1.16
TILE_15	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.72	0.99	0.79 | 0.00	568.76	0.99	0.47 | 0.05	1036.00	1.41	596.03	718.62	1.44	742.96	505.25	1.46	823.55	1.24
p1	3559.03	0.99	0.77 | 0.00	564.98	0.99	0.31 | 0.05	1018.70	1.39	622.22	732.62	1.46	755.14	548.33	1.58	828.32	1.26
p2	3544.81	0.99	0.80 | 0.01	565.32	0.99	0.41 | 0.04	1033.22	1.41	594.77	718.00	1.43	736.20	508.23	1.47	810.17	1.24
TILE_16	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3575.05	0.99	2.18 | 0.08	568.83	0.99	0.89 | 0.41	956.30	1.30	765.16	647.48	1.29	970.54	468.77	1.35	1087.19	1.18
p1	3564.69	0.99	2.44 | 0.15	564.85	0.99	0.66 | 0.25	965.95	1.32	745.26	647.58	1.29	968.93	474.05	1.37	1059.88	1.18
p2	3547.42	0.99	2.35 | 0.13	557.09	0.97	0.41 | 0.02	964.35	1.31	760.40	644.48	1.29	981.91	449.07	1.29	1104.25	1.16
TILE_17	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3579.11	0.99	0.78 | 0.00	565.48	0.99	0.54 | 0.16	1022.62	1.39	610.84	737.80	1.47	746.04	527.08	1.52	820.62	1.25
p1	3565.36	0.99	0.82 | 0.01	556.40	0.97	0.36 | 0.01	1024.12	1.39	601.47	717.08	1.43	747.43	526.80	1.52	815.35	1.24
p2	3545.74	0.99	0.83 | 0.01	554.78	0.97	0.37 | 0.03	1032.72	1.41	596.47	718.65	1.44	736.42	508.35	1.47	816.87	1.23
TILE_18	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3565.55	0.99	2.24 | 0.11	524.52	0.92	0.47 | 0.06	949.83	1.29	788.55	687.20	1.37	995.98	487.75	1.41	1107.51	1.18
p1	3548.64	0.99	2.43 | 0.17	508.68	0.89	0.58 | 0.07	959.92	1.31	760.38	623.27	1.25	994.43	444.55	1.28	1122.78	1.13
p2	3531.03	0.98	2.25 | 0.09	505.51	0.88	0.65 | 0.08	958.10	1.30	770.28	666.52	1.33	987.67	472.77	1.36	1085.22	1.15
TILE_19	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3566.28	0.99	0.81 | 0.00	571.95	1.00	0.60 | 0.09	1022.05	1.39	611.64	739.75	1.48	742.81	551.00	1.59	810.40	1.26
p1	3552.74	0.99	0.81 | 0.00	573.77	1.00	0.50 | 0.10	1036.53	1.41	580.28	723.80	1.45	724.34	507.30	1.46	806.61	1.24
p2	3539.55	0.98	0.78 | 0.01	569.23	0.99	0.45 | 0.21	1028.42	1.40	602.33	744.23	1.49	743.19	528.33	1.52	820.93	1.25
TILE_20	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3569.32	0.99	2.27 | 0.12	561.31	0.98	0.57 | 0.29	966.67	1.32	743.39	648.88	1.30	972.26	470.77	1.36	1083.04	1.18
p1	3556.73	0.99	2.42 | 0.17	555.49	0.97	0.56 | 0.17	968.20	1.32	746.07	645.50	1.29	981.60	447.25	1.29	1092.99	1.16
p2	3538.56	0.98	2.62 | 0.18	551.56	0.96	0.46 | 0.12	947.23	1.29	792.09	659.85	1.32	1011.09	483.20	1.39	1121.80	1.18

p0_score:	25.51
p1_score:	25.48
p2_score:	25.35

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	28.50	27.00	22.00	12.50
Avg_Seconds_To_Complete	5.77	73.84	91.57	248.42
Failures	0.00	0.00	0.00	0.00
Ratio	1.10	1.50	1.22	1.56
Number_Of_Threads	1	1	1	1

PTD_Summary:							
Number_of_PTD_Daemons	3						
Number_of_PTD_Phases	3						
PTD_Phase_Timing	2400secs						
PtdTiming:	ptd0	ptd1	ptd2				
p0	-60	-60	-60				
p1	-60	-60	-60				
p2	-60	-60	-60				
PTD_Results:							
p0	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	EXT_STOR	902.07	206.11	4.58	0.96	2399.00	0.00
ptd1	EXT_STOR	871.31	205.20	4.46	0.95	2399.00	0.00
ptd2	SERVER	982.26	204.17	4.93	0.98	2399.00	0.00
p1	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	EXT_STOR	902.61	206.13	4.58	0.96	2400.00	0.00
ptd1	EXT_STOR	871.46	205.20	4.46	0.95	2400.00	0.00
ptd2	SERVER	982.42	204.19	4.93	0.98	2400.00	0.00
p2	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	EXT_STOR	903.96	206.10	4.59	0.96	2400.00	0.00
ptd1	EXT_STOR	871.92	205.21	4.46	0.95	2400.00	0.00
ptd2	SERVER	982.35	204.18	4.93	0.98	2400.00	0.00

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark3_Avg_Watts	2756.50	
Unreviewed_VMmark3_Applications_Score	25.48	
Unreviewed_VMmark3_Infrastructure_Score	1.33	
Unreviewed_VMmark3_Score	20.65	
Unreviewed_VMmark3_PPKW	7.4908	

Configuration

PTD Configuration	
Number of Power Meters	3
Power Meter Vendors and Models	3x Yokogawa WT210
Power Meter PTD Target(s) (SERVER/EXT_STOR)	EXT_STOR, EXT_STOR, SERVER

Power Meter Connection Type(s) (Eth/GPIB/Serial/USB)	Serial
Power Meter Calibration Date(s) (MM-DD-YYYY)	10-25-2022(S/N:91KA25146 and S/N:91K308586) and 01-19-2023 (S/N:91H648897)
Power Meter Calibration Info (Calibrated By/Duration)	Tescom / one year /91KA25146/91K308586/91H648897
Power Meter(s) Volt/Amp Range	300/ 5
Power Source Voltage/Frequency/Phase	208V / 60Hz / 3-phase
PTD Client Configuration	
Number of Power Meter Clients	1
System Model(s)	PrimeClient,details in client configuration section
Processor Vendor(s) and Model(s)	PrimeClient,details in client configuration section
Processor Speed(s) (GHz)	PrimeClient,details in client configuration section
Total Sockets/Total Cores/Total Threads	PrimeClient,details in client configuration section
Memory Per Power Meter Client	PrimeClient,details in client configuration section
Network Controller(s) Vendors and Models	PrimeClient,details in client configuration section
Operating System, Version, and Service Pack	PrimeClient,details in client configuration section
Other Hardware	3x Future Technology Devices International, LTD FT232 Serial (UART) IC
Other Software	None

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 8.0 GA, Build 20513097 / 10-11-2022
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 8.0 GA, Build 20519528 / 10-11-2022
Supplemental Software	None
Servers	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	2
Server Manufacturer and Model	Dell PowerEdge R7615
Processor Vendor and Model	AMD EPYC 9654P
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.4 / 3.7GHz

Total Sockets/Total Cores/Total Threads	1 Sockets / 96 Cores / 192 Threads
Primary CPU Cache	32 KB (I) + 32 KB (D) on chip per core
Secondary CPU Cache	1 MB (I+D) on chip per core
Other CPU Cache	384 MB (I+D) on chip per chip
BIOS Version	1.1.3
Memory Size (in GB, Number of DIMMs)	1536,12
Memory Type and Speed	128 GB 4Rx4 DDR5 4800MT/s RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	None
Disk Controller Vendors and Models	Not Applicable
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Dell, 1.92 TB PCIe Gen 4 SSD
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	Emulex LPe36002
Number of Network Controllers	1
Network Controller Vendors and Models	1x Intel 100 GbE Dual-port E810-C
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	05-22-2023
BIOS Availability Date (MM-DD-YYYY)	01-20-2023
Software Availability Date (MM-DD-YYYY)	10-11-2022
Network	
Network Switch Vendors and Models	1x Dell PowerSwitch Z9100-ON 100GbE Switch
Network Speed	1 x 100Gbps for vMotion Traffic 1 x 100Gbps for VM traffic
Primary Storage	
Storage Category	FC SAN

Storage Vendors, Models, and Firmware Versions	Dell PowerMax 8000
Storage Configuration Summary	• 1x 20TB LUN for DS3DB VMs • 1x 22TB LUN for AuctionNoSQL VMs • 1x 2TB LUN for AuctionDB VMs • 1x 4TB LUN for AuctionLB VMs • 1x 3TB LUN for ElasticDB VMs • 1x 3TB LUN for ElasticLB VMs • 1x 50TB LUN for all VMs other than the DS3DB,AuctionNoSQL,AuctionDB, AuctionLB, ElasticDB and ElasticLB VMs • 1x 1TB LUN for Deploy operations • 1x 1TB LUN for Storage vMotion and XVmotion operations

Datacenter Management Server	
System Model	Dell PowerEdge R7525
Processor Vendor and Model	AMD EPYC 7763
Processor Speed (GHz)	2.45
Total Sockets/Total Cores/Total Threads	2 Sockets/ 128 Cores/ 256 Threads
Memory Size (in GB, Number of DIMMs)	2048, 32
Network Controller(s) Vendors and Models	2 x Mellanox ConnectX-5 Ex 100 GbE Dual-port
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)	21
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 8.0 GA, Build 20519528
Other Hardware	None
Other Software	None

Clients	
Total Number of Virtual Clients / Virtual Client Hosts	22 / 2
System Model(s)	2x Dell PowerEdge R7525
Processor Vendor(s) and Model(s)	Client-Host1: AMD EPYC 7763 Client-Host2: AMD EPYC 7763
Processor Speed(s) (GHz)	Client-Host1: 2.45 GHz Client-Host2: 2.45 GHz

Total Sockets/Total Cores/Total Threads	Client-Host1: 2 Sockets / 128 Cores / 256 Threads Client-Host2: 2 Sockets / 128 Cores / 256 Threads
Memory per Virtual Client Host	Client-Host1: 2048 GB Client-Host2: 2048 GB
Network Controller(s) Vendors and Models	Client-Host1:1x Mellanox ConnectX-5 Ex 100 GbE Dual-port Client-Host2:1x Mellanox ConnectX-5 Ex 100 GbE Dual-port
Virtual Client Networking Notes	vSwitch0 on vmnic2 for VMs and Management (100Gbps) vSwitch2 on vmnic3 for vMotion (100Gbps)
Virtual Client Storage Notes	All Virtual Clients storage on PowerMax 8000 FC SAN storage and used the same FC storage LUNs as SUT hosts
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	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 Eager

Virtualization Software Notes

- vSphere DRS Migration Threshold level set to 1
- Logical CPU configuration changed for all multi-CPU VMs except for PrimeClient to 1 socket with multiple cores (default: Single core per socket)
- Logging disabled for all VMs except for the template VMs (default: Enabled)
- CPU and Memory shares set to high for all DS3DB, ElasticDB, and ElasticLB VMs (default: Normal)
- CDROM removed from all VMs except for PrimeClient, and template VMs (default: Present)
- All memory reserved for DS3DB VMs (default: Non-reserved)
- sched.mem.pin set to TRUE for all DS3DB VMs (default: FALSE)
- sched.mem.lpage.enable1GPage set to TRUE for all DS3DB VMs (default: FALSE)
- CPU shares set to Low for all Standby VMs (default: Normal)
- Third virtual disk removed from DS3DB0 before cloning DS3DB VMs for other tiles

Advanced Settings

- /adv/Cpu/CreditAgePeriod = "1000"(default 3000)
- /adv/Cpu/HTWholeCoreThreshold = "0"(default 800)
- /adv/DataMover/HardwareAcceleratedInit = "0"(default 1)
- /adv/DataMover/HardwareAcceleratedMove = "0"(default 1)
- /adv/Disk/IdleCredit = "64"(default 32)
- /adv/Disk/ReqCallThreshold = "1"(default 8)
- /adv/Mem/CtlMaxPercent = "0"(default 65)
- /adv/Mem/ShareScanGHz = "0" (default 4)
- /adv/Numa/LocalityWeightActionAffinity = "0"(default 130)
- /adv/Power/CpuPolicy = "High Performance"(default balanced)
- /adv/UserVars/HostClientCEIPOptIn = "1"(default 0)
- /adv/UserVars/SuppressShellWarning = "1"(default 0)
- /adv/VMFS3/HardwareAcceleratedLocking = "0"(default 1)

Server Notes

Server BIOS Settings

- L2 Stream HW Prefetcher = Disabled (default: Enabled)
- L2 Up Down Prefetcher = Disabled (default: Enabled)
- System Profile = Performance (default: Performance Per Watt)

Networking Notes

- vSwitch0 on vmnic2 for Management and VMs (100Gbps)
  - vSwitch0 and vmnic2 MTU set to 9000 (default:1500)
  - vmk0 under portgroup Management Network has MTU set to 9000 (default:1500)
- vSwitch1 on vmnic3 for vMotion (100Gbps)
  - vSwitch1 and vmnic3 MTU set to 9000 (default:1500)
  - vmk1 under portgroup vMotion has MTU set to 9000 (default:1500)

Storage Notes

Host OS installed on 2x900GB(RAID1)WD SSDs
Dell PowerMax 8000

- Number of Directors:2
- Dell PowerMax OS 5978.479.479
- Single Default Storage Resource Pool (SRP) with 2x Disk Groups (factory pre-configured)
  - Disk Group 1 : 9x 750 GB Intel SSDs configured in RAID 5 (7+1) with one spare drive (Usable Capacity 4880.9 GiB)
  - Disk Group 2 : 25x 7.68 TB Samsung NVMe drives in RAID 5 (7+1) with one spare drive (Usable Capacity (150217.6 GiB)
- Usable capacity of SRP is accessed by hosts using thinly provisioned front end devices called TDEVs
- Following User Defined Storage Groups were created using the TDEVs
  - 1x 20TB LUN for DS3DB VMs [EMC Fibre Channel Disk (naa.60000970000197601300533030303246)]

- 1x 22TB LUN for AuctionNoSQL VMs [EMC Fibre Channel Disk (naa.600009700001976013005330303033330)]
- 1x 2TB LUN for AuctionDB VMs [EMC Fibre Channel Disk (naa.600009700001976013005330303033238)]
- 1x 4TB LUN for AuctionLB VMs [EMC Fibre Channel Disk (naa.600009700001976013005330303033331)]
- 1x 3TB LUN for ElasticDB VMs [EMC Fibre Channel Disk (naa.600009700001976013005330303033443)]
- 1x 3TB LUN for ElasticLB VMs [EMC Fibre Channel Disk (naa.600009700001976013005330303033442)]
- 1x 50TB LUN for all VMs other than the DS3DB,AuctionNoSQL,AuctionDB, AuctionLB, ElasticDB and ElasticLB VMs [EMC Fibre Channel Disk (naa.600009700001976013005330303033446)]
- 1x 1TB LUN for Deploy operations [EMC Fibre Channel Disk (naa.600009700001976013005330303033242)]
- 1x 1TB LUN for Storage vMotion and XVmotion operations [EMC Fibre Channel Disk (naa.600009700001976013005330303033241)]
- Round Robin IOPS limit set to 1 for AuctionLB, ElasticLB and ElasticDB LUNs (default:1000)

Emulex LPe36002 HBAs of SUTs were running at 32Gbps

Datacenter Management Server Notes

None

Operating System Notes

SUT hosts used Dell customized ESXi 8.0.0 ISO (VMware-VMvisor-Installer-8.0.0-20513097.x86_64-Dell_Customized-A00) for OS installation.

Software Notes

None

Client Notes

Client BIOS Settings

- L3 cache as NUMA Domain = Enabled (default: Disabled)

Location of Client VMs

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

- Client-Host1: Client0, Client1, Client3, Client5, Client7, Client9, Client11, Client13, Client15, Client17, Client19,VMware vCenter Server
- Client-Host2: Client2, Client4, Client6, Client8, Client10, Client12, Client14, Client16, Client18, Client20, PrimeClient

Client host advanced settings:

- /adv/Cpu/CreditAgePeriod = 1000 (default 3000)
- /adv/Cpu/HTWholeCoreThreshold = 0 (default 800)
- /adv/DataMover/HardwareAcceleratedInit = 0 (default 1)
- /adv/DataMover/HardwareAcceleratedMove = 0 (default 1)
- /adv/Disk/IdleCredit = 64 (default 32)
- /adv/Disk/ReqCallThreshold = 1 (default 8)
- /adv/Mem/CtlMaxPercent = 0 (default 65)
- /adv/Mem/ShareScanGHz = 0 (default 4)

- /adv/Numa/LocalityWeightActionAffinity=0 (default:130)
- /adv/Numa/LTermFairnessInterval = 0 (default 5)
- /adv/Numa/PageMigEnable = 0 (default 1)
- /adv/Numa/RebalanceEnable = 0 (default 1)
- /adv/Numa/RebalancePeriod = 60000 (default 2000)
- /adv/Numa/SwapLoadEnable = 0 (default 1)
- /adv/Numa/SwapLocalityEnable = 0 (default 1)
- /vmkernel/hyperthreadingMitigation = TRUE (default FALSE)
- /adv/Power/CpuPolicy = High Performance (default: balanced)
- /adv/VMFS3/HardwareAcceleratedLocking = 0 (default 1)
- /adv/UserVars/HostClientCEIPOptIn = 1(default:0)
- /adv/UserVars/SuppressShellWarning = 1(default:0)
- /adv/UserVars/HostClientShowOnlyRecentObjects not set on Client-Host1, 0 on Client-Host2 (default 1)

Client host vSwitch settings:

- vSwitch0 on vmnic2 for VMs and Management (100Gbps)
  - vSwitch0 and vmnic2 MTU set to 9000 (default:1500)
- vSwitch2 on vmnic3 for vMotion (100Gbps)
  - vSwitch2 and vmnic3 MTU set to 9000 (default:1500)
- vmk0 under portgroup Management Network has MTU set to 9000 on Client-Host2 (default:1500)

Other Notes

Changes to VMmark3.properties file:

- PTD = true (default:false)
- TileDelay=30 (default:60)
- VCscratchDir=/root/VMmark3/results/scratch (default: /root/VMmark3/samples)
