

Appendix 2: Amulet Hotkey Modular Workstation - Data Center Optimized

(White Paper—VDI Graphics Acceleration on a Dell EMC MX7000 Modular Chassis)

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1 Appendix 2: Amulet Hotkey Modular Workstation - Data Center Optimized

Amulet Hotkey develops unique modular workstation solutions that provide powerful performance and availability, including the Amulet Hotkey CoreModule, which was developed in partnership with Dell Technologies OEM Embedded and Edge Solutions.

This Amulet Hotkey-delivered solution combines the powerful GPU acceleration of the Amulet Hotkey CoreModule with the density and efficiency benefits of the Dell PowerEdge MX modular architecture. The solution is supported by the mission-critical expertise of the Amulet Hotkey Global Support organization.

The Amulet Hotkey modular workstation solution allows professional users to connect to graphics- and compute-intensive applications any time, anywhere, using remote access devices.

The following section provides system configuration information and benchmark results obtained using SPECworkstation 3 and OTOY Octanebench. The SPECworkstation 3 tests compare remote access client scenarios using a commercially available mobile client and an Amulet Hotkey DXZ4 PCoIP zero client. Similar results would be expected if a Dell Wyse 5030 Zero Client or an Amulet Hotkey DXZC PCoIP zero client were used instead of the DXZ4 device.

Table 17: Amulet Hotkey Modular Workstation - system configuration

Hardware component	Workstation	Zero client	Mobile client
System	Dell EMC PowerEdge MX740c	Amulet Hotkey DXZ4 PCoIP Zero Client	Microsoft Surface Book 2
CPU	2 x Intel Xeon Gold 6244 GPU @ 3.6 GHz	Teradici Tera2140	Intel Core i7-8650U @ 1.9 GHz

Hardware component	Workstation	Zero client	Mobile client
Memory	12 x 32 GB 2933MT DIMMs	512 MB DDR3 SDRAM	8 GB 1866 MHz LPDDR
Controller	PERC H730P MX	N/A	Embedded
Capacity SSDs	3 x 1.92 TB MU SSDs (RAID 5)	N/A	256 GB SSD
Boot device	BOSS card	32 MB Flash	N/A
Network	Qlogic 41232 (2 x 25 GE)	Gigabit Ethernet (RJ45)	Gigabit Ethernet (RJ45)
GPU	2 x NVIDIA T4 GPU	N/A	Intel UHD Graphics 620

Note: While the MX740c compute sled is configured for dual 8C CPUs, the SPECWorkstation 3.0.2 test runs were set to use only eight physical cores.

Table 18: Software components

Software component	Workstation	Zero client	Mobile client
Operating system	Windows 10 Enterprise Version 1909	Green Hills ThreadX RTOS	Microsoft Windows 10 Version 1909
Remote Access	Teradici Cloud Access Software Plus (CAS+) Graphics Agent Version 20.01	Teradici Tera2 Firmware Version 20.01	Teradici Cloud Access Software Client Version 20.01

SPECworkstation 3 with Remote Access

The SPECworkstation 3 benchmark measures key aspects of workstation performance based on diverse professional applications. The SPECworkstation 3 benchmark introduced in October 2018 includes updates such as:

- Workloads that reflect changes in updated versions of Blender, Handbrake, Python, and Luxrender applications
- GPU-accelerated workloads based on the Luxrender and Caffe applications
- Graphics workloads from the SPECviewperf 13 benchmark, including new viewsets representing Autodesk Maya, PTC Creo, and medical applications

The workstation benchmarks cover both 2K and 4K SPECworkstation tests with three remote access scenarios including:

- No remote access 'baseline'
- Amulet Hotkey DXZ4 PCoIP Zero Client
- Commercially available mobile client

The remote access client devices used in this test were connected to the Amulet Hotkey modular workstation (based on a PowerEdge MX740c compute sled) across a WAN network link with up to 30 ms of network latency.

The following graphs show the results we obtained:

SPECworkstation 3 – 2K Results

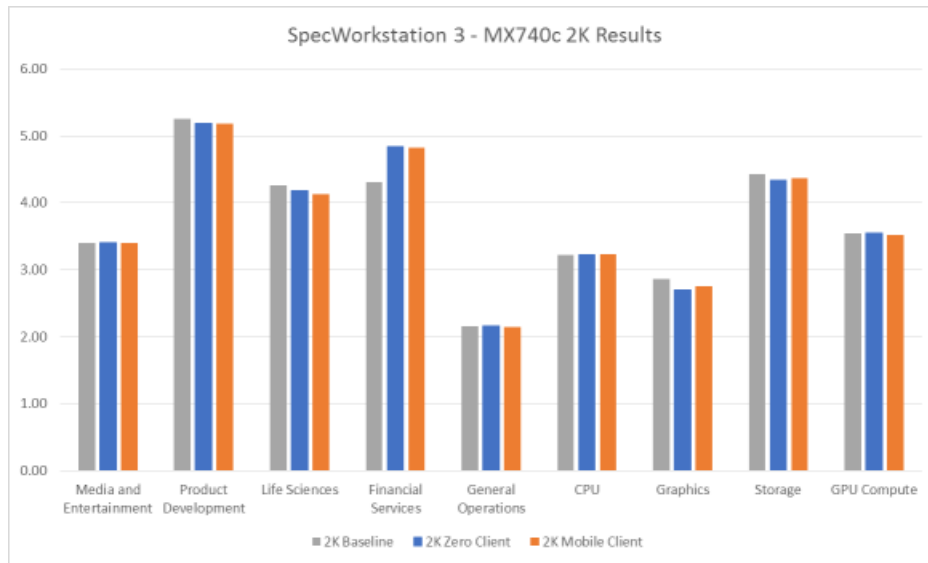


Figure 18. SpecWorkstation 3 2K results

The following table describes the SpecWorkstation 3 2K results:

Table 19: SpecWorkstation 3 2K results

SPECworkstation 3.0.2	2K baseline	2K zero client	2K mobile client
Workstation	MX740c	MX740c	MX740c
Remote Access Software	N/A	Teradici Cloud Access Plus	Teradici Cloud Access Plus
Remote Access Client	No Remote Access	DXZ4 PCoIP Zero Client	Surface Pro PCoIP Software Client
SPECworkstation CPU Configuration	8 core test	8 core test	8 core test
SPECworkstation Render Resolution	1900 x 1060	1900 x 1060	1900 x 1060

SPECworkstation 3.0.2	2K baseline	2K zero client	2K mobile client
Display Resolution	1920 x 1080	1920 x 1080	1920 x 1080
Media and Entertainment	3.40	3.41	3.40
Product Development	5.26	5.19	5.18
Life Sciences	4.26	4.18	4.13
Financial Services	4.31	4.84	4.82
General Operations	2.16	2.16	2.15
CPU	3.22	3.20	3.23
Graphics	2.86	2.70	2.75
Storage	4.43	4.34	4.37
GPU Compute OpenCL	3.55	3.55	3.52

SPECworkstation 3 – 4K Results

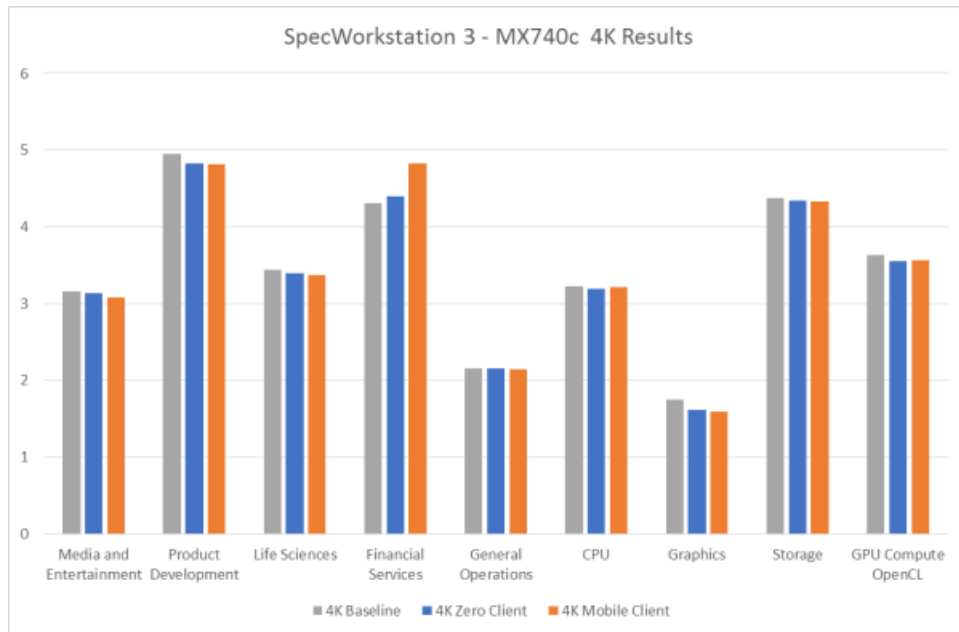


Figure 19. SpecWorkstation 3 4K results

The following table describes the SpecWorkstation 3 4K results:

Table 20: SpecWorkstation 3 4K results

SPECworkstation 3.0.2	4K baseline	4K zero client	4K mobile client
Workstation	MX740c	MX740c	MX740c
Remote Access Software	N/A	Teradici Cloud Access Plus	Teradici Cloud Access Plus
Remote Access Client	No Remote Access	DXZ4 PCoIP Zero Client	Surface Pro PCoIP Software Client
SPECworkstation CPU Configuration	8 core test	8 core test	8 core test

SPECworkstation 3.0.2	4K baseline	4K zero client	4K mobile client
SPECworkstation Render Resolution	3800 x 2120	3800 x 2120	3800 x 2120
Display Resolution	3840 x 2160	3840 x 2160	3840 x 2160
Media and Entertainment	3.16	3.14	3.08
Product Development	4.95	4.83	4.82
Life Sciences	3.44	3.40	3.37
Financial Services	4.31	4.40	4.83
General Operations	2.16	2.15	2.14
CPU	3.23	3.19	3.22
Graphics	1.75	1.62	1.59
Storage	4.38	4.34	4.33
GPU Compute OpenCL	3.63	3.55	3.57

OctaneBench GPU Render Benchmark

The Amulet Hotkey CoreModule with NVIDIA T4 GPUs and PowerEdge MX modular architecture supports graphics-intensive acceleration that enhances the performance-user experience.

The OctaneBench benchmark tool provides GPU and multi-GPU benchmarking using OctaneRender by OTOY, which is a spectrally correct GPU render engine that is designed to deliver quality and speed. OctaneRender incorporates state-of-the-art graphics technologies with machine learning optimizations, out-of-core geometry support, and RTX raytracing GPU hardware acceleration.

The following table shows OctaneBench - MX740c and NVIDIA T4 results:

Table 21: OctaneBench - MX740c and NVIDIA T4 results

OctaneBench v4	GPU	Multi-GPU
Configuration	1 x NVIDIA T4 Score	2 x NVIDIA T4 Score
Total Score	145.20	289.20

Table 22: OctaneBench: Scene and Scores - MX740c and NVIDIA T4

Scene	GPU	Multi-GPU
Configuration	1 x NVIDIA T4 Score	2 x NVIDIA T4 Score
Interior (by Julia Lynen)	87.28	175.99
Interior (by Julia Lynen)	29.89	60.24
Interior (by Julia Lynen)	13.40	26.57
Idea (by Julio Cayetano)	100.20	201.51
Idea (by Julio Cayetano)	28.28	56.26
Idea (by Julio Cayetano)	25.33	50.43
ATV (by Jurgen Aleksejev)	56.90	112.28
ATV (by Jurgen Aleksejev)	21.75	43.20
ATV (by Jurgen Aleksejev)	18.26	36.34
Box (by Enrico Cerica)	96.00	190.69
Box (by Enrico Cerica)	19.09	37.86

Scene	GPU	Multi-GPU
Box (by Enrico Cerica)	19.29	38.42

The Octane Bench benchmark tool can be found at:

<https://render.otoy.com/octanebench/>

Test Result Data

The raw test data results can be found here:

https://resources.amulethotkey.com/download/20200409_Modular_Workstation_Test_Data.pdf