

Supplementary Material for LUISARENDER

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In this supplementary material, we provide a full list of rendering time (in seconds) of LUISARENDER, PBRT-v4, MITSUBA 3, FALCOR, IGNIS, and CYCLES. We run these renderers on different platforms and scene configurations. Seven scenes are included: *Classroom* (1920×1080), *Coffee* (1200×1800), *Dining Room* (1920×1080), *Glass of Water* (1920×1080), *Living Room* (1920×1080), *Spaceship* (1920×1080), and *Staircase* (1080×1920). All scenes are rendered with 1024 samples per pixel. For 8-bounce renderings, *Russian roulette* (RR) is applied after the 2nd bounce and for 16-bounce the 5th bounce.

Fig. 1 visualizes the performance comparison results on RTX-3080Ti and i9-9900K with 16-bounce renderings. For 8-bounce results, please refer to the paper.

We also provide the generated CUDA code (Listing 2, with irrelevant details eliminated) for an example DSL program (Listing 1).

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Fig. 1. Time (in seconds) to render 7 different scenes with different renderers in all combined integrator and spectrum configurations. Solid-colored and striped bars refer to the *mega-kernel* and *wavefront* modes, respectively. All scenes are rendered with 16 bounces and 1024spp. Please refer to the paper for 8-bounce results.

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Classroom</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	77.0
<i>Classroom</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	6.0
<i>Classroom</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	46.8
<i>Classroom</i>	8	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	55.9
<i>Classroom</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	3.5
<i>Classroom</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	5.9
<i>Classroom</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	6.5
<i>Classroom</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	6.8
<i>Classroom</i>	8	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	61.2
<i>Classroom</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	9.9
<i>Classroom</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	11.0
<i>Classroom</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	16.0
<i>Classroom</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	12.7
<i>Classroom</i>	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	1226.7
<i>Classroom</i>	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	346.3
<i>Classroom</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	636.8
<i>Classroom</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	635.2
<i>Classroom</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	595.2
<i>Classroom</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	742.4
<i>Classroom</i>	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	231.3
<i>Classroom</i>	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	114.6
<i>Classroom</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	849.6
<i>Classroom</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	1105.6
<i>Classroom</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	745.6
<i>Classroom</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	2121.6
<i>Classroom</i>	8	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	65.2
<i>Classroom</i>	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	54.4
<i>Classroom</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	9.4
<i>Classroom</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	9.1
<i>Classroom</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	15.3
<i>Classroom</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	10.2
<i>Classroom</i>	8	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	80.4
<i>Classroom</i>	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	91.8
<i>Classroom</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	24.2
<i>Classroom</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	16.2
<i>Classroom</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	38.6
<i>Classroom</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	18.4
<i>Classroom</i>	8	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	407.8
<i>Classroom</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	3391.2
<i>Classroom</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	3919.2
<i>Classroom</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	2937.6
<i>Classroom</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	2113.6
<i>Classroom</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	632.0
<i>Classroom</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	790.4
<i>Classroom</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	271.5
<i>Classroom</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	137.9
<i>Classroom</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	4699.2
<i>Classroom</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	2123.2
<i>Classroom</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	811.2
<i>Classroom</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	2262.4
<i>Classroom</i>	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	102.7
<i>Classroom</i>	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	7.0

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Classroom</i>	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	72.0
<i>Classroom</i>	16	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	76.5
<i>Classroom</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	5.4
<i>Classroom</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	8.7
<i>Classroom</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	8.4
<i>Classroom</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	10.9
<i>Classroom</i>	16	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	74.1
<i>Classroom</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	15.6
<i>Classroom</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	18.9
<i>Classroom</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	24.0
<i>Classroom</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	23.0
<i>Classroom</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	1648.9
<i>Classroom</i>	16	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	509.3
<i>Classroom</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1008.0
<i>Classroom</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	1094.4
<i>Classroom</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	988.8
<i>Classroom</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	1265.6
<i>Classroom</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	338.2
<i>Classroom</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	198.0
<i>Classroom</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	1267.2
<i>Classroom</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	1896.0
<i>Classroom</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	1164.8
<i>Classroom</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	3422.4
<i>Classroom</i>	16	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	91.7
<i>Classroom</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	67.6
<i>Classroom</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	12.5
<i>Classroom</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	12.6
<i>Classroom</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	20.2
<i>Classroom</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	15.1
<i>Classroom</i>	16	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	103.7
<i>Classroom</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	139.4
<i>Classroom</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	34.3
<i>Classroom</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	26.1
<i>Classroom</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	54.9
<i>Classroom</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	31.6
<i>Classroom</i>	16	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	594.6
<i>Classroom</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	4712.0
<i>Classroom</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	5501.6
<i>Classroom</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	3889.6
<i>Classroom</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	3393.6
<i>Classroom</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	1017.6
<i>Classroom</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	1302.4
<i>Classroom</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	401.2
<i>Classroom</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	201.2
<i>Classroom</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	6358.4
<i>Classroom</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	3102.4
<i>Classroom</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	1220.8
<i>Classroom</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	3558.4
<i>Coffee</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	26.3
<i>Coffee</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	4.2
<i>Coffee</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	17.7
<i>Coffee</i>	8	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	19.6

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
Coffee	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	1.7
Coffee	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	3.0
Coffee	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	3.2
Coffee	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	4.2
Coffee	8	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	26.1
Coffee	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	5.6
Coffee	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	5.2
Coffee	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	6.3
Coffee	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	6.6
Coffee	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	526.3
Coffee	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	142.9
Coffee	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	251.2
Coffee	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	324.8
Coffee	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	292.8
Coffee	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	483.2
Coffee	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	68.5
Coffee	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	41.6
Coffee	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	374.4
Coffee	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	624.0
Coffee	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	374.4
Coffee	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1192.0
Coffee	8	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	22.0
Coffee	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	47.6
Coffee	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	5.7
Coffee	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	5.4
Coffee	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	6.3
Coffee	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	6.9
Coffee	8	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	32.0
Coffee	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	75.1
Coffee	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	15.2
Coffee	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	8.5
Coffee	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	17.5
Coffee	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	10.4
Coffee	8	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	164.3
Coffee	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	2692.8
Coffee	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	2988.8
Coffee	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1337.6
Coffee	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1169.6
Coffee	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	318.4
Coffee	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	481.6
Coffee	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	76.7
Coffee	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	43.1
Coffee	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1086.4
Coffee	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1056.0
Coffee	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	371.2
Coffee	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1225.6
Coffee	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	28.7
Coffee	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	5.6
Coffee	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	28.9
Coffee	16	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	27.9
Coffee	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	2.3
Coffee	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	3.9

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Coffee</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	4.1
<i>Coffee</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	5.9
<i>Coffee</i>	16	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	37.6
<i>Coffee</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	8.4
<i>Coffee</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	6.8
<i>Coffee</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	8.6
<i>Coffee</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	9.3
<i>Coffee</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	553.1
<i>Coffee</i>	16	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	170.3
<i>Coffee</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	313.6
<i>Coffee</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	404.8
<i>Coffee</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	355.2
<i>Coffee</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	612.8
<i>Coffee</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	99.3
<i>Coffee</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	56.5
<i>Coffee</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	457.6
<i>Coffee</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	761.6
<i>Coffee</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	448.0
<i>Coffee</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1476.8
<i>Coffee</i>	16	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	31.3
<i>Coffee</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	61.2
<i>Coffee</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	6.3
<i>Coffee</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	6.4
<i>Coffee</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	7.2
<i>Coffee</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	8.8
<i>Coffee</i>	16	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	45.1
<i>Coffee</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	92.2
<i>Coffee</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	18.1
<i>Coffee</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	10.3
<i>Coffee</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	21.0
<i>Coffee</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	13.7
<i>Coffee</i>	16	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	195.5
<i>Coffee</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	2837.6
<i>Coffee</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	3219.2
<i>Coffee</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1584.0
<i>Coffee</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1350.4
<i>Coffee</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	379.2
<i>Coffee</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	609.6
<i>Coffee</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	110.5
<i>Coffee</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	60.7
<i>Coffee</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1233.6
<i>Coffee</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1233.6
<i>Coffee</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	443.2
<i>Coffee</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1502.4
<i>Dining Room</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	43.9
<i>Dining Room</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	4.2
<i>Dining Room</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	20.8
<i>Dining Room</i>	8	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	24.9
<i>Dining Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	1.9
<i>Dining Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	3.2
<i>Dining Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	3.4
<i>Dining Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	4.2

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
Dining Room	8	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	29.1
Dining Room	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	3.8
Dining Room	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	5.8
Dining Room	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	6.6
Dining Room	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	7.0
Dining Room	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	889.3
Dining Room	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	213.6
Dining Room	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	276.8
Dining Room	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	342.4
Dining Room	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	323.2
Dining Room	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	443.2
Dining Room	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	88.5
Dining Room	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	52.0
Dining Room	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	331.2
Dining Room	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	604.8
Dining Room	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	331.2
Dining Room	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1184.0
Dining Room	8	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	31.5
Dining Room	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	35.7
Dining Room	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	5.1
Dining Room	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	5.7
Dining Room	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	6.3
Dining Room	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	6.7
Dining Room	8	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	38.6
Dining Room	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	68.7
Dining Room	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	13.8
Dining Room	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	9.1
Dining Room	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	18.5
Dining Room	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	10.6
Dining Room	8	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	245.2
Dining Room	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	2636.0
Dining Room	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	2966.4
Dining Room	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1558.4
Dining Room	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1412.8
Dining Room	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	348.8
Dining Room	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	475.2
Dining Room	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	100.5
Dining Room	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	58.1
Dining Room	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1240.0
Dining Room	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1203.2
Dining Room	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	347.2
Dining Room	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1220.8
Dining Room	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	51.9
Dining Room	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	5.8
Dining Room	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	58.0
Dining Room	16	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	40.6
Dining Room	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	3.4
Dining Room	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	6.9
Dining Room	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	6.0
Dining Room	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	9.0
Dining Room	16	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	49.2
Dining Room	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	8.0

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Dining Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	13.4
<i>Dining Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	13.5
<i>Dining Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	15.9
<i>Dining Room</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	905.3
<i>Dining Room</i>	16	RGB	i9-9900K	mitsuba 3	LLVM	Mega-kernel	436.5
<i>Dining Room</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	620.8
<i>Dining Room</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	768.0
<i>Dining Room</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	696.0
<i>Dining Room</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	960.0
<i>Dining Room</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	206.2
<i>Dining Room</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	133.8
<i>Dining Room</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	729.6
<i>Dining Room</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	1342.4
<i>Dining Room</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	704.0
<i>Dining Room</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	2945.6
<i>Dining Room</i>	16	Spectral	RTX-3080Ti	mitsuba 3	CUDA	Mega-kernel	48.0
<i>Dining Room</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	44.4
<i>Dining Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	7.0
<i>Dining Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	9.9
<i>Dining Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	9.9
<i>Dining Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	11.9
<i>Dining Room</i>	16	Spectral	RTX-2080Ti	mitsuba 3	CUDA	Mega-kernel	61.3
<i>Dining Room</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	124.1
<i>Dining Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	21.8
<i>Dining Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	17.9
<i>Dining Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	31.8
<i>Dining Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	21.2
<i>Dining Room</i>	16	Spectral	i9-9900K	mitsuba 3	LLVM	Mega-kernel	494.3
<i>Dining Room</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	5047.2
<i>Dining Room</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	5820.8
<i>Dining Room</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	2940.8
<i>Dining Room</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	2742.4
<i>Dining Room</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	723.2
<i>Dining Room</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	1000.0
<i>Dining Room</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	231.8
<i>Dining Room</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	137.8
<i>Dining Room</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	2310.4
<i>Dining Room</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	2412.8
<i>Dining Room</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	724.8
<i>Dining Room</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	2985.6
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	20.2
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	2.8
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	14.2
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	mitsuba 3	CUDA	Mega-kernel	17.6
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	1.8
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	3.1
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	3.5
<i>Glass of Water</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	6.4
<i>Glass of Water</i>	8	RGB	RTX-2080Ti	mitsuba 3	CUDA	Mega-kernel	24.4
<i>Glass of Water</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	4.9
<i>Glass of Water</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	5.9
<i>Glass of Water</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	7.8

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Glass of Water</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	10.9
<i>Glass of Water</i>	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	407.5
<i>Glass of Water</i>	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	146.6
<i>Glass of Water</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	224.0
<i>Glass of Water</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	316.8
<i>Glass of Water</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	286.4
<i>Glass of Water</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	427.2
<i>Glass of Water</i>	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	62.9
<i>Glass of Water</i>	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	40.8
<i>Glass of Water</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	348.8
<i>Glass of Water</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	633.6
<i>Glass of Water</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	339.2
<i>Glass of Water</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1217.6
<i>Glass of Water</i>	8	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	23.7
<i>Glass of Water</i>	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	38.9
<i>Glass of Water</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	6.9
<i>Glass of Water</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	5.6
<i>Glass of Water</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	8.3
<i>Glass of Water</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	9.6
<i>Glass of Water</i>	8	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	32.3
<i>Glass of Water</i>	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	61.1
<i>Glass of Water</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	16.8
<i>Glass of Water</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	9.5
<i>Glass of Water</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	21.4
<i>Glass of Water</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	15.6
<i>Glass of Water</i>	8	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	190.3
<i>Glass of Water</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	2012.0
<i>Glass of Water</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	2605.6
<i>Glass of Water</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	956.8
<i>Glass of Water</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	897.6
<i>Glass of Water</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	308.8
<i>Glass of Water</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	457.6
<i>Glass of Water</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	66.4
<i>Glass of Water</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	43.1
<i>Glass of Water</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	841.6
<i>Glass of Water</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	926.4
<i>Glass of Water</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	368.0
<i>Glass of Water</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1238.4
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	26.0
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	4.0
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	26.8
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	26.3
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	2.5
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	4.3
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	4.9
<i>Glass of Water</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	10.7
<i>Glass of Water</i>	16	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	37.9
<i>Glass of Water</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	8.1
<i>Glass of Water</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	8.5
<i>Glass of Water</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	12.0
<i>Glass of Water</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	18.3
<i>Glass of Water</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	475.2

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Glass of Water</i>	16	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	201.2
<i>Glass of Water</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	302.4
<i>Glass of Water</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	419.2
<i>Glass of Water</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	361.6
<i>Glass of Water</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	576.0
<i>Glass of Water</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	103.2
<i>Glass of Water</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	61.5
<i>Glass of Water</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	456.0
<i>Glass of Water</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	793.6
<i>Glass of Water</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	432.0
<i>Glass of Water</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1539.2
<i>Glass of Water</i>	16	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	33.7
<i>Glass of Water</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	51.8
<i>Glass of Water</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	7.9
<i>Glass of Water</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	6.9
<i>Glass of Water</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	10.0
<i>Glass of Water</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	15.4
<i>Glass of Water</i>	16	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	47.7
<i>Glass of Water</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	80.4
<i>Glass of Water</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	19.6
<i>Glass of Water</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	12.6
<i>Glass of Water</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	27.7
<i>Glass of Water</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	24.1
<i>Glass of Water</i>	16	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	254.5
<i>Glass of Water</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	2464.0
<i>Glass of Water</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	3241.6
<i>Glass of Water</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1161.6
<i>Glass of Water</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1057.6
<i>Glass of Water</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	385.6
<i>Glass of Water</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	606.4
<i>Glass of Water</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	107.7
<i>Glass of Water</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	66.1
<i>Glass of Water</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	990.4
<i>Glass of Water</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1113.6
<i>Glass of Water</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	462.4
<i>Glass of Water</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1563.2
<i>Living Room</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	65.9
<i>Living Room</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	4.9
<i>Living Room</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	29.4
<i>Living Room</i>	8	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	34.6
<i>Living Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	2.2
<i>Living Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	3.8
<i>Living Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	4.7
<i>Living Room</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	5.3
<i>Living Room</i>	8	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	36.8
<i>Living Room</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	5.3
<i>Living Room</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	7.6
<i>Living Room</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	9.6
<i>Living Room</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	9.5
<i>Living Room</i>	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	1393.5
<i>Living Room</i>	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	226.8
<i>Living Room</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	316.8

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Living Room</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	384.0
<i>Living Room</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	376.0
<i>Living Room</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	507.2
<i>Living Room</i>	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	111.0
<i>Living Room</i>	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	56.5
<i>Living Room</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	408.0
<i>Living Room</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	686.4
<i>Living Room</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	408.0
<i>Living Room</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1344.0
<i>Living Room</i>	8	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	44.4
<i>Living Room</i>	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	41.7
<i>Living Room</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	4.5
<i>Living Room</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	6.5
<i>Living Room</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	7.7
<i>Living Room</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	8.0
<i>Living Room</i>	8	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	50.5
<i>Living Room</i>	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	79.7
<i>Living Room</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	14.9
<i>Living Room</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	11.1
<i>Living Room</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	20.6
<i>Living Room</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	13.9
<i>Living Room</i>	8	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	256.1
<i>Living Room</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	2368.8
<i>Living Room</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	2680.8
<i>Living Room</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1188.8
<i>Living Room</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1022.4
<i>Living Room</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	403.2
<i>Living Room</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	539.2
<i>Living Room</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	130.2
<i>Living Room</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	63.4
<i>Living Room</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	894.4
<i>Living Room</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1033.6
<i>Living Room</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	435.2
<i>Living Room</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1417.6
<i>Living Room</i>	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	101.7
<i>Living Room</i>	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	6.3
<i>Living Room</i>	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	64.7
<i>Living Room</i>	16	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	57.6
<i>Living Room</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	3.8
<i>Living Room</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	7.7
<i>Living Room</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	7.3
<i>Living Room</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	10.6
<i>Living Room</i>	16	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	65.1
<i>Living Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	11.0
<i>Living Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	16.9
<i>Living Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	18.6
<i>Living Room</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	20.8
<i>Living Room</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	1977.9
<i>Living Room</i>	16	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	467.2
<i>Living Room</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	689.6
<i>Living Room</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	843.2
<i>Living Room</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	792.0

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Living Room</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	1075.2
<i>Living Room</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	231.8
<i>Living Room</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	143.2
<i>Living Room</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	868.8
<i>Living Room</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	1444.8
<i>Living Room</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	849.6
<i>Living Room</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	3113.6
<i>Living Room</i>	16	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	68.2
<i>Living Room</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	52.6
<i>Living Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	6.7
<i>Living Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	10.8
<i>Living Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	12.3
<i>Living Room</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	14.0
<i>Living Room</i>	16	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	81.1
<i>Living Room</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	128.4
<i>Living Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	24.5
<i>Living Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	22.0
<i>Living Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	35.8
<i>Living Room</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	27.8
<i>Living Room</i>	16	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	503.1
<i>Living Room</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	3973.6
<i>Living Room</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	4649.6
<i>Living Room</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1966.4
<i>Living Room</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1867.2
<i>Living Room</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	825.6
<i>Living Room</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	1105.6
<i>Living Room</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	258.7
<i>Living Room</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	149.6
<i>Living Room</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1540.8
<i>Living Room</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1900.8
<i>Living Room</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	873.6
<i>Living Room</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	3123.2
<i>Spaceship</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	20.5
<i>Spaceship</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	3.9
<i>Spaceship</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	14.2
<i>Spaceship</i>	8	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	15.4
<i>Spaceship</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	1.5
<i>Spaceship</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	2.8
<i>Spaceship</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	2.8
<i>Spaceship</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	3.8
<i>Spaceship</i>	8	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	19.0
<i>Spaceship</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	4.9
<i>Spaceship</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	4.8
<i>Spaceship</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	6.1
<i>Spaceship</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	6.0
<i>Spaceship</i>	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	475.9
<i>Spaceship</i>	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	141.6
<i>Spaceship</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	198.4
<i>Spaceship</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	305.6
<i>Spaceship</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	208.0
<i>Spaceship</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	352.0
<i>Spaceship</i>	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	57.4

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Spaceship</i>	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	41.9
<i>Spaceship</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	265.6
<i>Spaceship</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	587.2
<i>Spaceship</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	241.6
<i>Spaceship</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1033.6
<i>Spaceship</i>	8	Spectral	RTX-3080Ti	mitsuba 3	CUDA	Mega-kernel	22.0
<i>Spaceship</i>	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	38.3
<i>Spaceship</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	6.4
<i>Spaceship</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	5.3
<i>Spaceship</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	7.2
<i>Spaceship</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	6.4
<i>Spaceship</i>	8	Spectral	RTX-2080Ti	mitsuba 3	CUDA	Mega-kernel	26.8
<i>Spaceship</i>	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	71.7
<i>Spaceship</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	16.8
<i>Spaceship</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	8.2
<i>Spaceship</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	20.5
<i>Spaceship</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	9.9
<i>Spaceship</i>	8	Spectral	i9-9900K	mitsuba 3	LLVM	Mega-kernel	169.8
<i>Spaceship</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	1369.6
<i>Spaceship</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	1698.4
<i>Spaceship</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1304.0
<i>Spaceship</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1224.0
<i>Spaceship</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	233.6
<i>Spaceship</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	369.6
<i>Spaceship</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	65.4
<i>Spaceship</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	44.7
<i>Spaceship</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1028.8
<i>Spaceship</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1048.0
<i>Spaceship</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	264.0
<i>Spaceship</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1067.2
<i>Spaceship</i>	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	23.7
<i>Spaceship</i>	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	5.8
<i>Spaceship</i>	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	32.4
<i>Spaceship</i>	16	RGB	RTX-3080Ti	mitsuba 3	CUDA	Mega-kernel	30.8
<i>Spaceship</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	2.4
<i>Spaceship</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	4.4
<i>Spaceship</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	4.5
<i>Spaceship</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	6.1
<i>Spaceship</i>	16	RGB	RTX-2080Ti	mitsuba 3	CUDA	Mega-kernel	38.5
<i>Spaceship</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	9.3
<i>Spaceship</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	8.0
<i>Spaceship</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	11.8
<i>Spaceship</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	10.4
<i>Spaceship</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	517.2
<i>Spaceship</i>	16	RGB	i9-9900K	mitsuba 3	LLVM	Mega-kernel	199.6
<i>Spaceship</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	302.4
<i>Spaceship</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	430.4
<i>Spaceship</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	280.0
<i>Spaceship</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	507.2
<i>Spaceship</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	109.4
<i>Spaceship</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	68.7
<i>Spaceship</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	392.0

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Spaceship</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	804.8
<i>Spaceship</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	329.6
<i>Spaceship</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1457.6
<i>Spaceship</i>	16	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	39.9
<i>Spaceship</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	48.6
<i>Spaceship</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	8.7
<i>Spaceship</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	7.2
<i>Spaceship</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	9.8
<i>Spaceship</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	9.1
<i>Spaceship</i>	16	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	51.9
<i>Spaceship</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	96.0
<i>Spaceship</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	23.3
<i>Spaceship</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	12.0
<i>Spaceship</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	30.8
<i>Spaceship</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	15.0
<i>Spaceship</i>	16	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	240.9
<i>Spaceship</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	1697.6
<i>Spaceship</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	2155.2
<i>Spaceship</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1833.6
<i>Spaceship</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1518.4
<i>Spaceship</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	307.2
<i>Spaceship</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	528.0
<i>Spaceship</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	122.8
<i>Spaceship</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	74.2
<i>Spaceship</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1336.0
<i>Spaceship</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1342.4
<i>Spaceship</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	352.0
<i>Spaceship</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1483.2
<i>Staircase</i>	8	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	85.0
<i>Staircase</i>	8	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	7.0
<i>Staircase</i>	8	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	62.9
<i>Staircase</i>	8	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	59.0
<i>Staircase</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	3.6
<i>Staircase</i>	8	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	5.7
<i>Staircase</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	6.0
<i>Staircase</i>	8	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	7.2
<i>Staircase</i>	8	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	59.7
<i>Staircase</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	8.6
<i>Staircase</i>	8	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	10.3
<i>Staircase</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	13.5
<i>Staircase</i>	8	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	12.0
<i>Staircase</i>	8	RGB	i9-9900K	CYCLES	C++	Mega-kernel	2261.8
<i>Staircase</i>	8	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	279.6
<i>Staircase</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	548.8
<i>Staircase</i>	8	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	564.8
<i>Staircase</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	660.8
<i>Staircase</i>	8	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	747.2
<i>Staircase</i>	8	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	239.1
<i>Staircase</i>	8	RGB	M1 Max	LUISARENDER	Metal	Wavefront	93.6
<i>Staircase</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	744.0
<i>Staircase</i>	8	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	956.8
<i>Staircase</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	715.2

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Staircase</i>	8	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	1808.0
<i>Staircase</i>	8	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	70.1
<i>Staircase</i>	8	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	52.2
<i>Staircase</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	6.3
<i>Staircase</i>	8	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	8.6
<i>Staircase</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	9.7
<i>Staircase</i>	8	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	10.1
<i>Staircase</i>	8	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	75.4
<i>Staircase</i>	8	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	94.6
<i>Staircase</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	18.1
<i>Staircase</i>	8	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	14.5
<i>Staircase</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	27.7
<i>Staircase</i>	8	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	16.5
<i>Staircase</i>	8	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	318.0
<i>Staircase</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	4091.2
<i>Staircase</i>	8	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	4370.4
<i>Staircase</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1558.4
<i>Staircase</i>	8	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	1244.8
<i>Staircase</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	644.8
<i>Staircase</i>	8	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	824.0
<i>Staircase</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	248.1
<i>Staircase</i>	8	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	102.6
<i>Staircase</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	1484.8
<i>Staircase</i>	8	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	1321.6
<i>Staircase</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	716.8
<i>Staircase</i>	8	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	1851.2
<i>Staircase</i>	16	RGB	RTX-3080Ti	CYCLES	CUDA	Wavefront	132.5
<i>Staircase</i>	16	RGB	RTX-3080Ti	FALCOR	DirectX	Mega-kernel	7.9
<i>Staircase</i>	16	RGB	RTX-3080Ti	IGNIS	CUDA	Mega-kernel	108.3
<i>Staircase</i>	16	RGB	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	59.9
<i>Staircase</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	5.4
<i>Staircase</i>	16	RGB	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	9.5
<i>Staircase</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	7.7
<i>Staircase</i>	16	RGB	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	12.1
<i>Staircase</i>	16	RGB	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	67.9
<i>Staircase</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	14.0
<i>Staircase</i>	16	RGB	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	19.8
<i>Staircase</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	21.2
<i>Staircase</i>	16	RGB	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	23.3
<i>Staircase</i>	16	RGB	i9-9900K	CYCLES	C++	Mega-kernel	3064.7
<i>Staircase</i>	16	RGB	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	513.0
<i>Staircase</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Mega-kernel	1083.2
<i>Staircase</i>	16	RGB	i9-9900K	LUISARENDER	ISPC	Wavefront	1201.6
<i>Staircase</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Mega-kernel	1222.4
<i>Staircase</i>	16	RGB	i9-9900K	LUISARENDER	LLVM	Wavefront	1480.0
<i>Staircase</i>	16	RGB	M1 Max	LUISARENDER	Metal	Mega-kernel	388.6
<i>Staircase</i>	16	RGB	M1 Max	LUISARENDER	Metal	Wavefront	203.0
<i>Staircase</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Mega-kernel	1337.6
<i>Staircase</i>	16	RGB	M1 Max	LUISARENDER	ISPC	Wavefront	1827.2
<i>Staircase</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Mega-kernel	1292.8
<i>Staircase</i>	16	RGB	M1 Max	LUISARENDER	LLVM	Wavefront	3585.6
<i>Staircase</i>	16	Spectral	RTX-3080Ti	MITSUBA 3	CUDA	Mega-kernel	72.6

Scene	Bounces	Spectrum	Device	Renderer	Backend	Integrator	Time (s)
<i>Staircase</i>	16	Spectral	RTX-3080Ti	PBRT-v4	CUDA	Wavefront	62.2
<i>Staircase</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Mega-kernel	8.8
<i>Staircase</i>	16	Spectral	RTX-3080Ti	LUISARENDER	DirectX	Wavefront	12.8
<i>Staircase</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Mega-kernel	13.4
<i>Staircase</i>	16	Spectral	RTX-3080Ti	LUISARENDER	CUDA	Wavefront	15.9
<i>Staircase</i>	16	Spectral	RTX-2080Ti	MITSUBA 3	CUDA	Mega-kernel	84.1
<i>Staircase</i>	16	Spectral	RTX-2080Ti	PBRT-v4	CUDA	Wavefront	141.2
<i>Staircase</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Mega-kernel	27.6
<i>Staircase</i>	16	Spectral	RTX-2080Ti	LUISARENDER	DirectX	Wavefront	25.5
<i>Staircase</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Mega-kernel	40.5
<i>Staircase</i>	16	Spectral	RTX-2080Ti	LUISARENDER	CUDA	Wavefront	30.0
<i>Staircase</i>	16	Spectral	i9-9900K	MITSUBA 3	LLVM	Mega-kernel	577.9
<i>Staircase</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Mega-kernel	5903.2
<i>Staircase</i>	16	Spectral	i9-9900K	PBRT-v4	C++	Wavefront	6417.6
<i>Staircase</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Mega-kernel	2361.6
<i>Staircase</i>	16	Spectral	i9-9900K	LUISARENDER	ISPC	Wavefront	2321.6
<i>Staircase</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Mega-kernel	1244.8
<i>Staircase</i>	16	Spectral	i9-9900K	LUISARENDER	LLVM	Wavefront	1585.6
<i>Staircase</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Mega-kernel	394.5
<i>Staircase</i>	16	Spectral	M1 Max	LUISARENDER	Metal	Wavefront	207.5
<i>Staircase</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Mega-kernel	2238.4
<i>Staircase</i>	16	Spectral	M1 Max	LUISARENDER	ISPC	Wavefront	2326.4
<i>Staircase</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Mega-kernel	1270.4
<i>Staircase</i>	16	Spectral	M1 Max	LUISARENDER	LLVM	Wavefront	3668.8


```

1  Callable halton = [(UInt i, UInt b) noexcept {
2      auto f = def(1.0f);
3      auto invB = 1.0f / b;
4      auto r = def(0.0f);
5      $while(i > 0u) {
6          f = f * invB;
7          r = r + f * (i % b);
8          i = i / b;
9      };
10     return r;
11 };
12
13 Callable tea = [(UInt v0, UInt v1) noexcept {
14     auto s0 = def(0u);
15     for (auto n = 0u; n < 4u; n++) {
16         s0 += 0x9e3779b9u;
17         v0 += ((v1 << 4) + 0xa341316cu) ^ (v1 + s0) ^ ((v1 >> 5u) + 0xc8013ea4u);
18         v1 += ((v0 << 4) + 0xad90777du) ^ (v0 + s0) ^ ((v0 >> 5u) + 0x7e95761eu);
19     }
20     return v0;
21 };
22
23 Callable rand = [&](UInt f, UInt2 p) noexcept {
24     auto i = tea(p.x, p.y) + f;
25     auto rx = halton(i, 2u);
26     auto ry = halton(i, 3u);
27     return make_float2(rx, ry);
28 };
29
30 Kernel2D raytracing_kernel = [&](BufferFloat4 image, AccelVar accel, UInt frame) noexcept {
31     auto coord = dispatch_id().xy();
32     auto p = (make_float2(coord) + rand(frame, coord)) /
33             make_float2(dispatch_size().xy()) * 2.0f - 1.0f;
34     auto color = def<float3>(0.3f, 0.5f, 0.7f);
35     auto ray = make_ray(
36         make_float3(p * make_float2(1.0f, -1.0f), 1.0f),
37         make_float3(0.0f, 0.0f, -1.0f));
38     auto hit = accel.trace_closest(ray);
39     $if(!hit->miss()) {
40         constexpr auto red = float3(1.0f, 0.0f, 0.0f);
41         constexpr auto green = float3(0.0f, 1.0f, 0.0f);
42         constexpr auto blue = float3(0.0f, 0.0f, 1.0f);
43         color = hit->interpolate(red, green, blue);
44     };
45     auto old = image.read(coord.y * dispatch_size_x() + coord.x).xyz();
46     auto t = 1.0f / (frame + 1.0f);
47     image.write(coord.y * dispatch_size_x() + coord.x,
48                make_float4(lerp(old, color, t), 1.0f));
49 };

```

Listing 1. Example program in the DSL with some of representative language features.

```

1 // generated code for tea(uint, uint)
2 inline __device__ lc_uint custom_90F90CFB77E98E22(
3     lc_uint v0,
4     lc_uint v1) noexcept {
5     lc_uint v2{};
6     lc_uint v3{};
7     /* other local variable declarations... */
8     lc_uint v69{};
9     lc_uint v70{};
10    v2 = 0u;
11    // the following code corresponds to the user-controlled loop unrolling
12    v3 = (v2 + 2654435769u);
13    v2 = v3;
14    v4 = (v1 >> 5u);
15    v5 = (v4 + 3355524772u);
16    v6 = (v1 + v2);
17    v7 = (v1 << 4);
18    v8 = (v7 + 2738958700u);
19    v9 = (v8 ^ v6);
20    v10 = (v9 ^ v5);
21    v11 = (v0 + v10);
22    v0 = v11;
23    v12 = (v0 >> 5u);
24    v13 = (v12 + 2123724318u);
25    v14 = (v0 + v2);
26    v15 = (v0 << 4);
27    v16 = (v15 + 2911926141u);
28    v17 = (v16 ^ v14);
29    v18 = (v17 ^ v13);
30    v19 = (v1 + v18);
31    v1 = v19;
32    /* ... */
33    v54 = (v2 + 2654435769u);
34    v2 = v54;
35    v55 = (v1 >> 5u);
36    v56 = (v55 + 3355524772u);
37    v57 = (v1 + v2);
38    v58 = (v1 << 4);
39    v59 = (v58 + 2738958700u);
40    v60 = (v59 ^ v57);
41    v61 = (v60 ^ v56);
42    v62 = (v0 + v61);
43    v0 = v62;
44    v63 = (v0 >> 5u);
45    v64 = (v63 + 2123724318u);
46    v65 = (v0 + v2);
47    v66 = (v0 << 4);
48    v67 = (v66 + 2911926141u);
49    v68 = (v67 ^ v65);
50    v69 = (v68 ^ v64);
51    v70 = (v1 + v69);
52    v1 = v70;
53    return v0;
54 }

```

```

55
56 // generated code for halton(uint, uint)
57 inline __device__ lc_float custom_2560AF64A7793363(
58     lc_uint v0,
59     lc_uint v1) noexcept {
60     lc_float v2{};
61     lc_float v3{};
62     /* other local variable declarations... */
63     lc_uint v11{};
64     v2 = 1.0f;
65     v3 = (1.0f / v1);
66     v4 = 0.0f;
67     for (;;) {
68         v5 = (v0 > 0u);
69         v6 = !v5;
70         if (v6) {
71             break;
72         }
73         v7 = (v2 * v3);
74         v2 = v7;
75         v8 = (v0 % v1);
76         v9 = (v2 * v8);
77         v10 = (v4 + v9);
78         v4 = v10;
79         v11 = (v0 / v1);
80         v0 = v11;
81     }
82     return v4;
83 }
84
85 // generated code for rand(uint, uint2)
86 inline __device__ lc_float2 custom_0B02D72468DCA9E4(
87     lc_uint v0,
88     lc_uint2 v1) noexcept {
89     lc_uint v2{};
90     lc_uint v3{};
91     lc_float v4{};
92     lc_float v5{};
93     lc_float2 v6{};
94     v2 = custom_90F90CFB77E98E22(v1.x, v1.y);
95     v3 = (v2 + v0);
96     v4 = custom_2560AF64A7793363(v3, 2u);
97     v5 = custom_2560AF64A7793363(v3, 3u);
98     v6 = lc_make_float2(v4, v5);
99     return v6;
100 }
101
102 // kernel parameters
103 struct alignas(16) Params {
104     alignas(16) lc_float4 *__restrict__ b0{};
105     alignas(16) const LCAccel a1{};
106     alignas(16) lc_uint v2{};
107 };
108
109 extern "C" { __constant__ Params params; }

```

```

110
111 // generated code for raytracing_kernel()
112 extern "C" __global__ void __raygen__rg_3C83DD701C20C51A() {
113     constexpr auto bs = lc_make_uint3(16, 16, 1);
114     const auto ls = lc_rtx_dispatch_size();
115     const auto did = lc_rtx_dispatch_id();
116     auto b0 = params.b0;
117     const auto &a1 = params.a1;
118     const auto &v2 = params.v2;
119     lc_uint3 v4{};
120     /* other local variable declarations... */
121     lc_uint v83{};
122     lc_uint v84{};
123     v4 = did;
124     v5 = lc_make_uint2(v4.x, v4.y);
125     v7 = ls;
126     v8 = lc_make_uint2(v7.x, v7.y);
127     v9 = lc_make_float2(v8);
128     v10 = custom_0B02D72468DCA9E4(v2, v5);
129     v11 = lc_make_float2(v5);
130     v12 = (v11 + v10);
131     v13 = (v12 / v9);
132     v14 = (v13 * 2.0f);
133     v15 = (v14 - 1.0f);
134     v17 = 0u;
135     v16[v17] = 0.3f;
136     v18 = 1u;
137     v16[v18] = 0.5f;
138     v19 = 2u;
139     v16[v19] = 0.7f;
140     v20 = lc_make_float3(0.0f, 0.0f, -1.0f);
141     v21 = lc_make_float3(0.0f, 0.0f, -1.0f);
142     v22 = lc_make_float3(0.0f, 0.0f, -1.0f);
143     v23 = (v15 * lc_make_float2(1.0f, -1.0f));
144     v24 = lc_make_float3(v23, 1.0f);
145     v26 = v24;
146     v27 = v26[0u];
147     v28 = 0u;
148     v25.m0[v28] = v27;
149     v29 = v24;
150     v30 = v29[1u];
151     v31 = 1u;
152     v25.m0[v31] = v30;
153     v32 = v24;
154     v33 = v32[2u];
155     v34 = 2u;
156     v25.m0[v34] = v33;
157     v25.m1 = 0.0f;
158     v35 = lc_make_float3(0.0f, 0.0f, -1.0f);
159     v36 = lc_make_float3(0.0f, 0.0f, -1.0f);
160     v37 = lc_make_float3(0.0f, 0.0f, -1.0f);
161     v38 = lc_make_float3(0.0f, 0.0f, -1.0f);
162     v39 = v38[0u];
163     v40 = 0u;
164     v25.m2[v40] = v39;

```

```

165 v41 = lc_make_float3(0.0f, 0.0f, -1.0f);
166 v42 = lc_make_float3(0.0f, 0.0f, -1.0f);
167 v43 = lc_make_float3(0.0f, 0.0f, -1.0f);
168 v44 = lc_make_float3(0.0f, 0.0f, -1.0f);
169 v45 = v44[1u];
170 v46 = 1u;
171 v25.m2[v46] = v45;
172 v47 = lc_make_float3(0.0f, 0.0f, -1.0f);
173 v48 = lc_make_float3(0.0f, 0.0f, -1.0f);
174 v49 = lc_make_float3(0.0f, 0.0f, -1.0f);
175 v50 = lc_make_float3(0.0f, 0.0f, -1.0f);
176 v51 = v50[2u];
177 v52 = 2u;
178 v25.m2[v52] = v51;
179 v25.m3 = 3.4028235e+38f;
180 v53 = lc_trace_closest(a1, v25);
181 v54 = (v53.m0 == 4294967295u);
182 v55 = !v54;
183 if (v55) {
184     v56 = lc_make_float3(0.0f, 0.0f, 1.0f);
185     v57 = lc_make_float3(0.0f, 0.0f, 1.0f);
186     v58 = lc_make_float3(0.0f, 0.0f, 1.0f);
187     v59 = lc_make_float3(0.0f, 1.0f, 0.0f);
188     v60 = lc_make_float3(0.0f, 1.0f, 0.0f);
189     v61 = lc_make_float3(0.0f, 1.0f, 0.0f);
190     v62 = lc_make_float3(1.0f, 0.0f, 0.0f);
191     v63 = lc_make_float3(1.0f, 0.0f, 0.0f);
192     v64 = lc_make_float3(1.0f, 0.0f, 0.0f);
193     v65 = (v53.m2.y * lc_make_float3(0.0f, 0.0f, 1.0f));
194     v66 = (v53.m2.x * lc_make_float3(0.0f, 1.0f, 0.0f));
195     v67 = (1.0f - v53.m2.x);
196     v68 = (v67 - v53.m2.y);
197     v69 = (v68 * lc_make_float3(1.0f, 0.0f, 0.0f));
198     v70 = (v69 + v66);
199     v71 = (v70 + v65);
200     v16 = v71;
201 }
202 v72 = 1s;
203 v73 = (v5.y * v72.x);
204 v74 = (v73 + v5.x);
205 v75 = lc_buffer_read(b0, v74);
206 v76 = lc_make_float3(v75.x, v75.y, v75.z);
207 v77 = (v2 + 1.0f);
208 v78 = (1.0f / v77);
209 v79 = lc_make_float3(v78);
210 v80 = lc_lerp(v76, v16, v79);
211 v81 = lc_make_float4(v80, 1.0f);
212 v82 = 1s;
213 v83 = (v5.y * v82.x);
214 v84 = (v83 + v5.x);
215 lc_buffer_write(b0, v84, v81);
216 }

```

Listing 2. Generated CUDA code for the DSL program in Listing 1.