Supplementary Material - Screen-space VPL propagation for real-time indirect lighting

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	4 Clusters	8 Clusters	16 Clusters	32 Clusters
Gbuffer	0.34	0.34	0.37	0.34
Misc	0.34	0.50	0.56	0.61
Paraboloid	0.23	0.28	0.95	6.63
Shade	7.13	7.20	7.20	7.20
Total(ms)	8.04	8.32	9.08	14.78

TABLE I
RELATIVE TIME OF EACH SSVP PIPELINE STAGE AS THE NUMBER OF CLUSTERS CHANGE. TIME IS GIVEN IN MILLISECONDS. MISC CORRESPONDS TO THE TIME NEEDED TO GENERATE A SHADOW MAP, TO SAMPLE FIRST-BOUNCE VPLS, TO CLUSTER THOSE VPLS AND TO SAMPLE SECOND-BOUNCE VPLS.

	4 Clusters	8 Clusters	16 Clusters	32 Clusters
Gbuffer	1.38	1.38	1.35	1.30
Misc	0.34	0.27	0.34	0.37
Paraboloid	1.55	3.03	9.46	73.23
Shade	7.35	7.39	7.25	7.23
Total(ms)	10.62	12.08	18.40	82.11

TABLE II
RELATIVE TIME OF EACH SSVP PIPELINE STAGE AS THE NUMBER OF CLUSTERS CHANGE ON THE SCENE, CONFERENCE ROOM. TIME IS GIVEN IN MILLISECONDS. MISC CORRESPONDS TO THE TIME NEEDED TO GENERATE A SHADOW MAP, TO SAMPLE FIRST-BOUNCE VPLS, TO CLUSTER THOSE VPLS AND TO SAMPLE SECOND-BOUNCE VPLS.

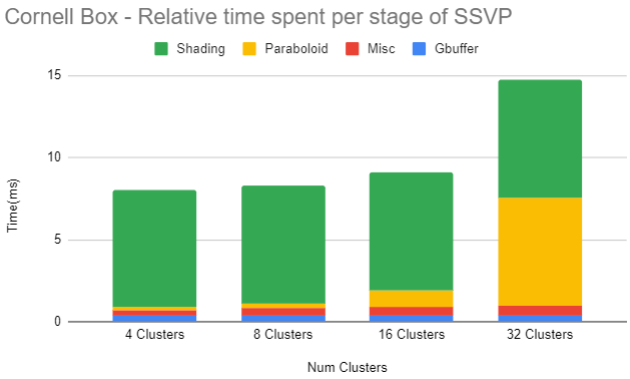


Fig. 1. Average time slices of our algorithm for the Cornell Box scene, running on a viewport with 1920x1080 resolution, 4x4 interleaved sampling pattern and multiple cluster configurations. Misc. includes the time to generate a shadow map, to sample first-bounce VPLs with the RSM, to cluster those VPLs, to sample second-bounce VPLs.

I. RESULTS

A. Rendering Performance

To further illustrate the behavior of SSVP, we provide supplementary analysis of the algorithm for the scenes Cornell Box and Conference Room as provided by [1]. All resuls were obtained with the average time in milliseconds (along 120 frames of execution) of each pipeline stage for multiple number of clusters, 256 first-bounce VPLs, 256 second-bounce VPLs, under a resolution of 1080p and a 4x4 interleaved shading pattern. Cornell Box performance metrics are presented in Table I, the plots for each time budget and total time of the GPU pipeline can be seen in Figure 1 and Figure 2 respectively. Conference Room results are shown in Table II, Figure 3 and Figure 4 present the performance plots.

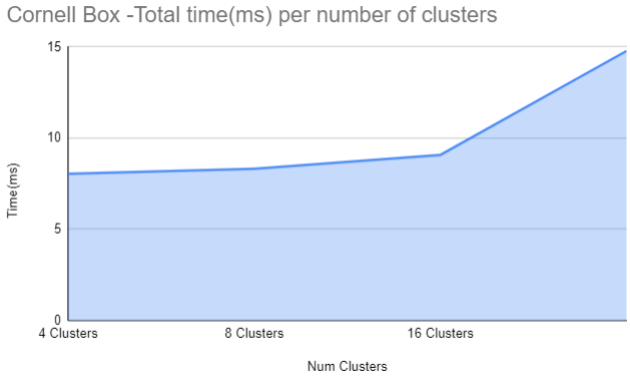


Fig. 2. Total time of the GPU pipeline in milliseconds for multiple cluster configurations on the scene, Cornell Box.

B. Visual Quality

Figure 5 provides a visual comparison between multiple cluster configurations for both single and double bounce lighting on the scene, Cornell Box. The same configuration

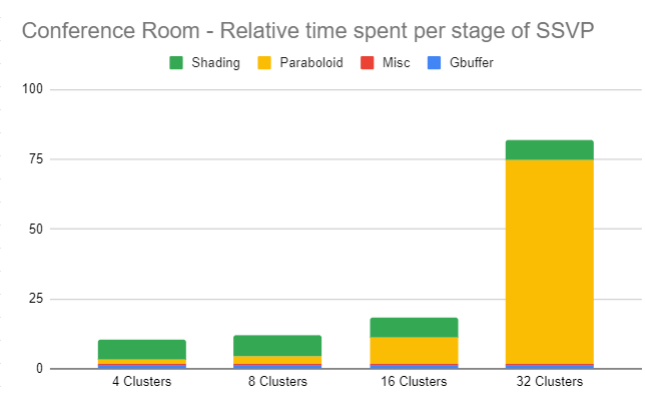


Fig. 3. Average time slices of our algorithm for the Conference Room scene, running on a viewport with 1920x1080 resolution, 4x4 interleaved sampling pattern and multiple cluster configurations. Misc. includes the time to generate a shadow map, to sample first-bounce VPLs with the RSM, to cluster those VPLs, to sample second-bounce VPLs.

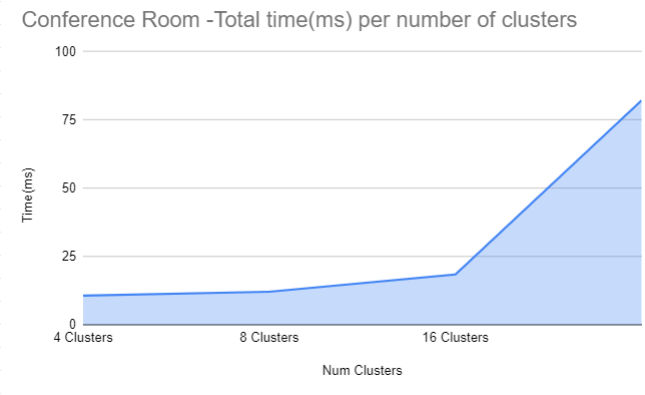
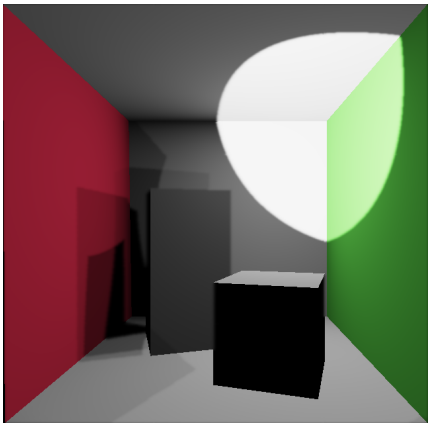


Fig. 4. Total time of the GPU pipeline in milliseconds for multiple cluster configurations on the scene, Conference Room.

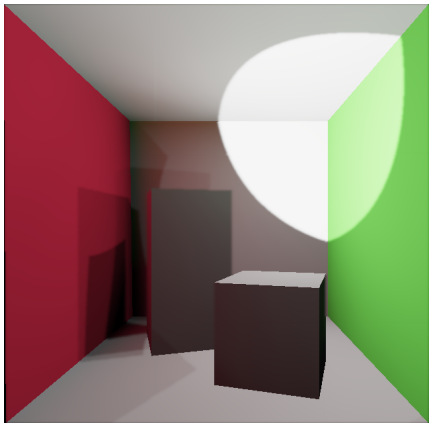
is presented for the Conference Room in Figure 6.The pattern presented in the main document repeats itself here, where less clusters are faster to render but become prone to banding artifacts. As more clusters are introduced in the visibility computations these artifacts tend to attenuate.

REFERENCES

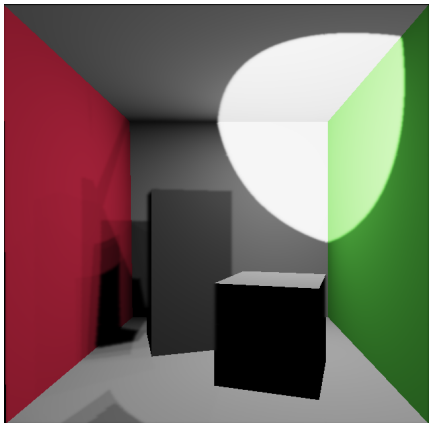
[1] M. McGuire, "Computer graphics archive," July 2017, `https://casual-effects.com/data`. [Online]. Available: https://casual-effects.com/data



(a) 4 clusters, Single-Bounce

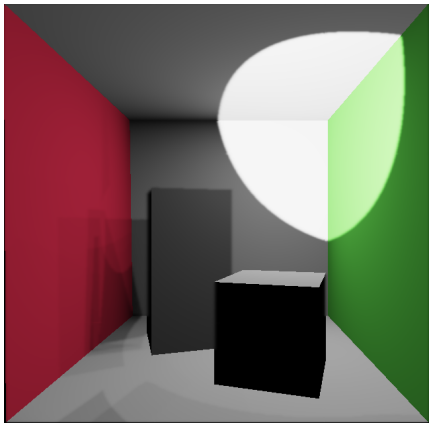


(b) 4 clusters, Double-Bounce

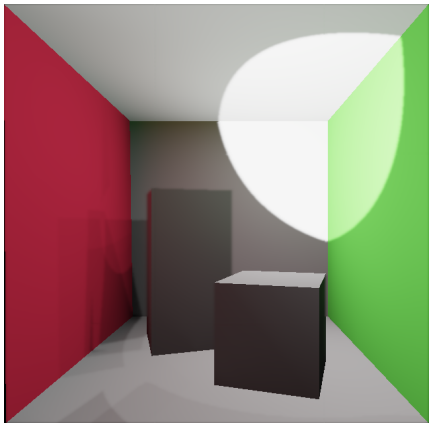


(c) 8 clusters, Single-Bounce

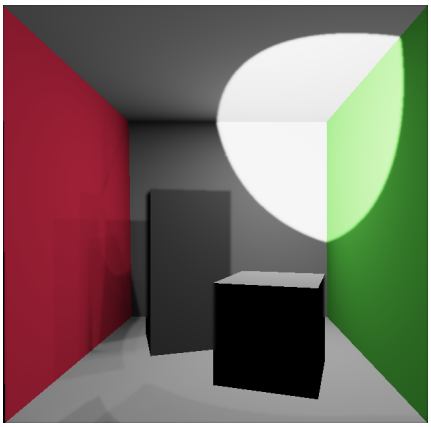
(d) 8 clusters, Double-Bounce



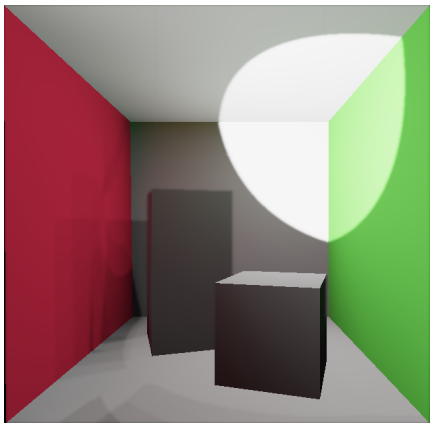
(e) 16 clusters, Single-Bounce



(f) 16 clusters, Double-Bounce



(g) 32 clusters, Single-Bounce



(h) 32 clusters, Double-Bounce

Fig. 5. Visual comparison between multiple cluster configurations from the same viewpoint on the scene Cornell Box. Notice the banding artifacts that arise when less clusters are used, as more clusters are introduced these artifacts tend to disappear.

(a) 4 clusters, Single-Bounce (b) 4 clusters, Double-Bounce (c) 8 clusters, Single-Bounce

(d) 8 clusters, Double-Bounce (e) 16 clusters, Single-Bounce (f) 16 clusters, Double-Bounce

(g) 32 clusters, Single-Bounce (h) 32 clusters, Double-Bounce

Fig. 6. Visual comparison between multiple cluster configurations from the same viewpoint on the scene Conference Room. Dark artifacts can be seen on the ceiling due to uneven lighting in the room.