Analysis Report

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Data

Below is the table containing our findings. All measurements are in seconds, and the data was obtained with a blur radius of 10.

Time (in seconds)

	Image Dimensions			
Processes	**1920x1080**	**2560x1600**	**2880x2560**	**3840x2160**
1	22.05	37.727	72.766	119.575
2	15.132	22.117	48.571	82.787
3	11.386	16.935	25.652	61.476
4	10.087	14.236	39.178	44.997
8	8.036	10.115	29.294	25.074
16	6.759	10.359	10.333	15.974
32	20.91	33.27	54.467	61.469

Speedup

	Image Dimensions			
Processes	**1920x1080**	**2560x1600**	**2880x2560**	**3840x2160**
1	1	1	1	1
2	1.45717684	1.70579192	1.49813675	1.44436929
3	1.93658879	2.22775317	2.83665991	1.94506799
4	2.18598196	2.65011239	1.85731788	2.65739938
8	2.74390244	3.72980722	2.4839899	4.7688841
16	3.26231691	3.64195386	7.04209813	7.4856016
32	1.05451937	1.13396453	1.3359649	1.9452895

Efficiency

	Image Dimensions			
Processes	**1920x1080**	**2560x1600**	**2880x2560**	**3840x2160**
1	1	1	1	1
2	0.72858842	0.85289596	0.74906837	0.72218464
3	0.6455296	0.74258439	0.9455533	0.648356
4	0.54649549	0.6625281	0.46432947	0.66434985
8	0.3429878	0.4662259	0.31049874	0.59611051
16	0.20389481	0.22762212	0.44013113	0.4678501
32	0.03295373	0.03543639	0.0417489	0.0607903

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Discussion

From the data it can be seen that performance improves as the number of processes increases, although, the speedup effect becomes more diminished as each new processor gets added. Efficiency decreases as the number of processors increases for an image. (This means the program is not strongly scalable).

The data obtained with 32 processors is an outlier in every data set. At the time of testing, the server cluster was returning massively slowed down results for any processor count above 17.

The data points for 16 processors and the 2880x2560 and 3840x2160 resolutions were unusually high.

The program is not weakly scaleable because the efficiency doesn’t hold constant when the problem size increases at the same rate as the number of processes. (For example the efficiency between a 1920x1080 image and 2 processors to 2560x1600 and 4 processors.)