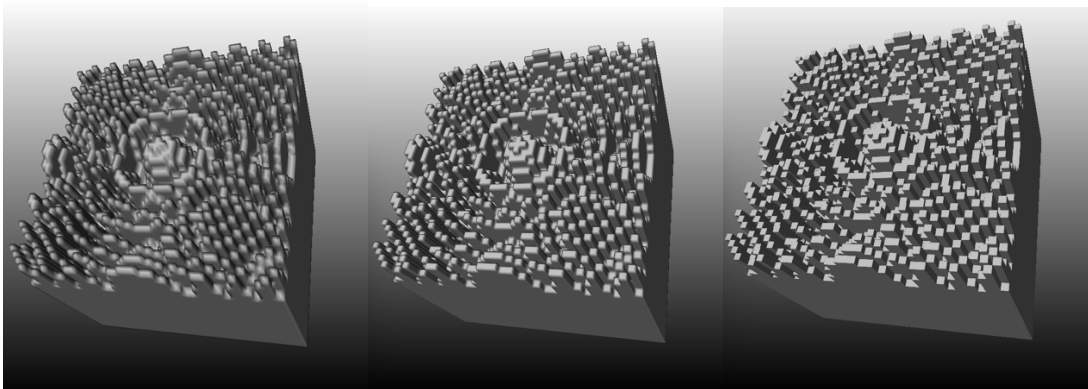Figure 1 Nearest neighbor(X:2 Y:2 Z:1)   (X:5 Y:5 Z:1)   (X:30 Y:30 Z:20)

Rough and blocky, reconstructed as combination of small boxes. Because this method only uses existing value in the nearest neighbor to fill in, the image seems discrete. Therefore, this method is also the fastest during calculation.
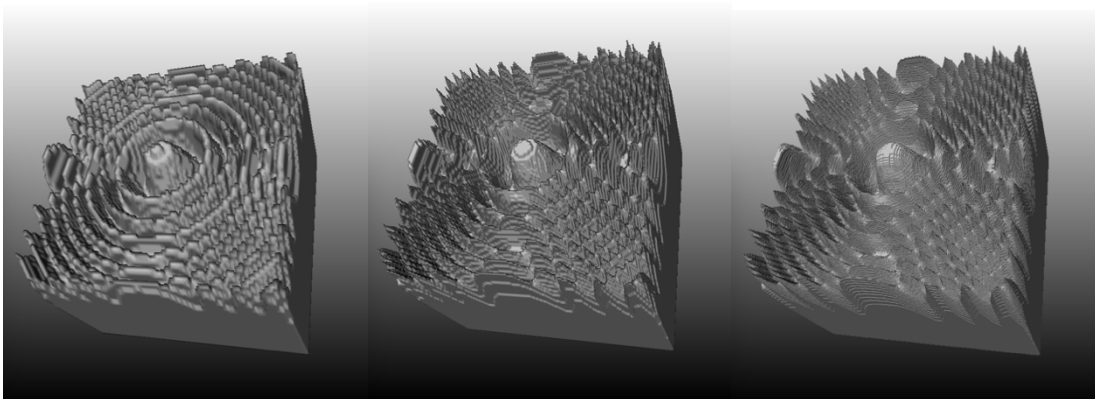

Figure 2 Linear (X:2 Y:2 Z:1)   Linear(X:5 Y:5 Z:2)   3Linear (X:20 Y:20 Z:10)

Linear interpolation result is better than NN, which uses distance to give weight to surrounding point values. This improves image continuity compared with NN, but still has raw details due to lack of smoothness.
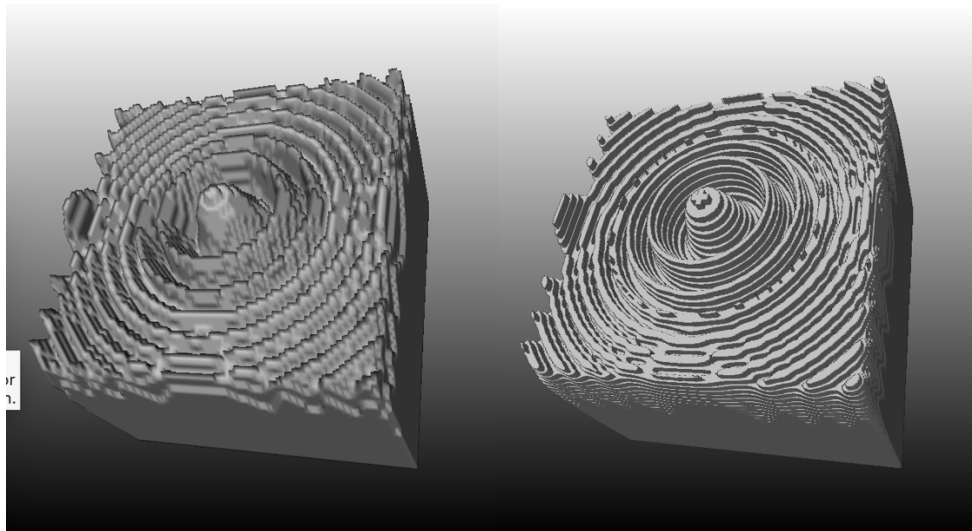
Figure 4 Cubic (X:2 Y:2 Z:1).   Figure 5 Cubic (X:9 Y: 89 Z:1)

Cubic interpolation uses a smooth curve to go throughout the nearest 16 points. So Cubic interpolation result is clearly smoother than Linear and NN interpolation. It doesn't have disjointed appearances. The reconstructed image has fewer peaky points, because it uses higher order fitting curve in reconstruction, and consider more surrounding data points in calculation. Also as a trade-off the computation complexity is higher, it takes about 10 times of the computation time compared with NN filter.

When increasing the resample factors (X,Y,Z), more points on the filtered image are sampled. The output images are likely to converge to the original filtered images. So the typical appearance of each filter is even more obvious.