Faster Image Rendering with Windows Cluster

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Image rendering is one of the applications that are most suited for running in the distributed/parallel type of computing environment. This is due to the fact that 1) high resolution images requiring large computing processes for rendering can be split into many small piece of images, and 2) rendering of thousands of images (using for the creation of animations) can normally be done independently and carried out concurrently.

Visualisation of an engineering simulation study which needs to render the 3D contours on 4,000 surfaces was tested on the Windows Computing Cluster System (WCCS) recently set up in SVU. As the rendering of the 3D contours was done on a large number of surfaces, it was quite time consuming and also required large physical memory available on the computer. The initial rendering of the contour plot on all the 4,000 surfaces required about 57 seconds. When splitting into two parts or rendering two contour plot images with 2,000 surfaces on each concurrently, the time required was halved to about 28 seconds. The following chart shows and compares the time needed to render the contour plot when it is split into two images (on 2,000 surfaces), four images (on 1,000 surfaces) and eight images (on 500 surfaces).

The result indicates that very good performance is experienced when the compute intensive contour plot image rendering is split into small tasks. In the meantime, when using WCCS, the multiple tasks of rendering sub-images can be easily managed to ensure that the tasks are done concurrently to shorten the computing time.

To study the other extreme, the rendering of the contour plot with 8,000 surfaces was also tested on the computer. As the maximum physical memory of the computer is 8GB, which is only half of that needed to load all data of 8,000 surfaces, the rendering took more than 15 minutes to complete! Obviously, it is not practical to use this computer to render the results that may contain even more surfaces.

In conclusion, it can be seen that WCCS is a very powerful platform able to improve the efficiency of image rendering if the work can be split into small tasks running independently. Although WCCS is not the only platform that can be used to shorten the rendering time, it is a very good platform if the users’ current rendering software is running on Windows system.