In this supplementary material, we show another set of results to support our argument in Section 7.2 of the paper.

In Section 7.2, we demonstrate the results of rendering a sequence of Jet-Flame volumes (with dimension 1024×1024×1024) in different image resolutions (256×256, 512×512 and 1024×1024). Here we show the same set of results but use the Jet-Flame volumes with a resolution of 2048×1024×1024 (volumes are duplicated along both the X and Z dimensions). Due to the memory size limit of the experimental GPU, we only maintain two consecutive time steps of the dynamic volumes on the GPU during rendering. Different volume image ratios can be achieved either by changing the projected image resolution or by changing the volume dimension. The results here together with the results in our manuscript demonstrate the performance of different volume image ratios when changing both the image resolution and the volume dimension.

Figure 1 shows the results when rotating the volume around the X, Y and Z axis 180° respectively. Rendering frame rates of different methods in four different image resolutions (256×256, 512×512, 768×768 and 1024×1024) are shown in the figure. In general, similar performance patterns are observed from Figure 1 of this document and the Figure 18 of the manuscript. With the volume image ratio increases (rendered image resolution decreases from 1024×1024 to 256×256), the Warp Marching methods outperform the Macrocell solution and the Standard sampling method. Our explanations to Figure 18 of the paper are also applicable to this set of results.

When rendering the dynamic volumes in the resolution of 2048×1024×1024, the
Figure 1: Results of rotating the Jet-Flame volumes around the X, Y and Z axis 180° respectively. The volumes are in the resolution of 2048×1024×1024. Two consecutive time steps of the volumes are rendered in resolutions of (top-bottom): 256×256, 512×512, 768×768 and 1024×1024. Rendering performances from the six different methods use the left axis, Active Resolution and Active Pixel use the right axis.

The lighter workload leads to a notable crest in results of the Warp Marching methods. However, the crest cannot be found from the Standard sampling strategy.
Figure 2: Results of rotating the dynamic volumes around several arbitrary axes 360° respectively. The Jet-Flame volumes (2048×1024×1024, two consecutive time steps) are rendered in resolutions of (top-bottom): 256×256, 512×512, 768×768 and 1024×1024. Active Pixel and Active Resolution use the right axis, others use the left axis.

Although the workload is lighter in this direction, the poor texture cache and L2 cache performance still leads to low frame rates in the Standard method.

Results of rotating this set of dynamic volumes around several arbitrary axes in different image resolutions are provided in Figure 2. The results demonstrate a consistent trend with what we have shown in the paper (Figure 19 of the paper). In addition, according to the performance patterns across different projected image resolutions (different rows of Figure 2), the Warp Marching methods have a better scalability than the Macrocell solution.