With **Rocky 4**, you can use two or more **Graphic Processing Units** (GPUs) to process your simulations. Before you invest in new hardware, see below for important guidelines and recommendations.

Which GPU cards are recommended for use with Rocky?
Rocky has been tested and verified with all of the following NVIDIA GPU cards:

- **Gaming cards**: GTX 980 , GTX 980 Ti , GTX 1080 , and GTX 1080 Ti
  PROS: Fast for sphere shapes only, inexpensive, can be installed on individual workstations, has video output
  CONS: Slow for non-round shapes

- **Computing workstation cards**: Titan ,Titan Black , Titan Z , Titan V , and Quadro GP100
  PROS: Fast for spheres and non-round shapes, can be installed on individual workstations, has video output
  CONS: More expensive

- **Computing server cards**: Tesla K80 , Tesla P100 , and Tesla V100
  PROS: Fast for sphere and non-round shapes
  CONS: More expensive, must be installed in a server enclosure, no video output

For best results, use only one of the above recommended GPU cards during Rocky processing.

I already have other (non-recommended) NVIDIA GPU cards with at least 4 GB of memory and a CUDA compute capability of at least 2.0. Won't these existing cards work just as well as the recommended ones?
Different GPU cards can have an order of magnitude difference in performance, which is why we have recommended only the cards that will have the best performance on Rocky. Just because Rocky appears to run fine on a non-recommended GPU card does not mean that it is actually helping the processing performance. And if it isn't helping the performance, then there is no point to running your simulations on GPUs.

To see for yourself the huge range of performance differences, visit the links for the two card types below and review the "Processing Power / Double Precision" columns of the spec tables provided:
- Nvidia Tesla: https://en.wikipedia.org/wiki/Nvidia_Tesla
- Nvidea GeForce: https://en.wikipedia.org/wiki/List_of_Nvidia_graphics_processing_units

If I want to run cases using primarily spherical particles, what GPU specifications should I consider? What about when running non-round cases?
- When running non-round cases, choosing a GPU with **double-precision performance** should be your primary focus.
- When running round cases, choosing a GPU with a **higher memory bandwidth** will get you better results in your processing.

Assuming I use a recommended GPU card, how much faster can I expect my simulations to run?
Compared to a CPU with 8 cores, adding even one GTX 980 has been shown to speed-up the processing time 5 fold; add in three P100s and what was once a 3-day simulation can be completed in just over an hour. But it all depends upon what you are simulating, how large your case is, and how much budget you have. See Rocky 4 with Multi-GPU: Which Hardware is Best for You? for benchmarks and speed-up comparisons.