Scientific Computing Infrastructures Exam Questions

June 6, 2018

1 Compulsory Question

Prepare a 5-10 minute overview of your project. You can use slides or do a live demo.

2 Random Choice Question

You can be asked one or two of these questions. They will be chosen at random. Good answers will give further context to the questions and go beyond simply giving a definition.

- Where is a markup language and why is such a language useful?
- What is a scientific computing infrastructure?
- How might a high performance computing infrastructure differ from a cloud computing infrastructure and how might they be similar?
- What is SLURM?
- How do cloud and high performance computing resources differ?
- What is a reasonable password length? What alternatives are there to just passwords for authentication?
- Why is it not a good idea to run intensive jobs on the head node?
- What are BLAS and LAPACK?
- What is a shared memory supercomputer?
- What is a distributed memory supercomputer?
- Why might shared memory programming be easier than distributed memory programming?
• Why might a distributed memory programming style result in more efficient code than a shared memory programming style?
• What is OpenMP? What is OpenMPI?
• What is SPMD?
• What is a data race condition?
• Why might a command line plotting tool like GNUplot be useful for visualizing the results of multiple benchmark runs?
• What is a computer benchmark?
• What is an MD5SUM and why might it be useful to check it when downloading and installing a package?
• What is a computational accelerator and why might you want to use one?
• Summarize the main differences between fog, grid, cloud and high performance computing.
• Why might parallel libraries be useful in scientific computing?
• What is computational fluid dynamics and where may it be useful?
• Where is the cloud application you installed and how might you make it better?
• How can you use what you have learned in this course to improve an organization of interest to you?
• What application of parallel and distributed computing is of most interest to you? What application of parallel and distributed computing do you think will have the greatest impact on society?