NC State SCC Team Final Architectural Proposal

Our final architectural proposal is as follows below.

Hardware Configuration:

1. One head node (NUC)
    a. Intel NUC
    b. 1TB SSD
    c. 8 Gb RAM
    d. Intel i3
2. Two compute nodes
    a. 4x Intel(R) Zeon(R) Gold 6230 per node
    b. 1280GB of RAM per node
    c. 4x NVIDIA Tesla V100 32GB per node
    d. 1TB NVMe SSD per node
    e. 4x 1600W redundant power supplies per node
    f. 1x Cisco UCS C480 ML M5 Server Chassis per node
3. Cisco Catalyst 2960-X Series 28-port Network Switch

Explanation of hardware configuration: We chose the compute node hardware based off of Cisco's recommendations and availability. The NUC was added as a head node due to its small form factor and low power consumption. These result in a cluster that is relatively power efficient, but still powerful when it comes to computation.

Software Used:

All the software that the team will use it is listed below.

1. Warewulf/Lustre
2. Slurm
3. Intel Parallel Studio XE (includes OpenMP and MPI)
4. NVIDIA CUDA
5. GCC
6. Matlab
7. OpenACC

Explanation of Used Software: Using Warewulf/Lustre, we're able to work with all of our nodes at once. Slurm allows us to request a specific number of nodes and cores to use for a particular job, and the other tools (Parallel studio, CUDA, etc.) allow us to take full advantage of the hardware we've been provided with.

If any of the above information is unclear or needs further explanation, please contact Berra Kara, bnkara@ncsu.edu, and Dr. Greg Byrd, gbyrd@ncsu.edu.