Paper Title: From BigDog to BigDawg: Transitioning an HPC Cluster for Sustainability

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1 Summary

1.1 Motivation

Sustainability concerns, such as the need for enhanced security, software updates, and hardware replacement to ensure the long-term viability of the HPC infrastructure at Southern Illinois University Carbondale, were the driving force behind the switch from the BigDog HPC cluster to BigDawg. To improve cluster administration and performance, OpenHPC, SLURM, and Dell hardware were adopted throughout this shift.

1.2 Contribution

The use of OpenHPC and Spack for software management, the smooth transfer to BigDawg, the facilitation of GPU-based Deep Learning with TensorFlow, and the deployment of a dual-cluster system for user migration were all noteworthy contributions.

1.3 Methodology

The methodology involved hardware and software selection, a smooth transfer from BigDog to BigDawg by minimizing work disruptions and confirming compatibility between the old and new systems through staged transition planning.The plan for the transition was created with the intention of preserving the dual-cluster setup while utilizing Spack as the package manager for installing software.

1.4 Conclusion

After some initial difficulties with software administration, the transfer integrated GPU resources for Deep Learning satisfactorily. Researcher usability was improved and the cluster was promoted to XSEDE Level 3 thanks to the seamless transfer made possible by the dual-cluster method, which also met the overall deadline.

2 Limitations

2.1 Resistance to Change: The adoption of the new cluster may be slowed down by resistance to change, particularly if people are used to the old system. This makes it necessary to manage and overcome resistance throughout the transition.

2.2 Compatibility Issues with Legacy Software:During the shift to the new cluster, compatibility problems with legacy software could present difficulties. These could necessitate major alterations and updates to guarantee smooth integration and functionality, which could increase time and resource restrictions.

3 Synthesis

The paper details a smooth transfer from an outdated high-performance computing cluster to a new one, highlighting user classification, meticulous planning and phased implementation, and lessons learned.Future aims include user training, software updates, sustainability, GPU

optimisation, and the replacement of outdated computing nodes all within a budget-friendly framework to accommodate changing research requirements.Further investigation into maximizing GPU utilization and increasing user training can also improve the cluster's performance.It emphasizes the significance of long-term sustainability efforts and offers insightful information about the transition process.Plans for the future include user training programmes, software upgrades, and continuing to employ economical procedures while attending to changing research requirements.