Introduction

Description

The Radiomics Machine Learning Facility currently consists of the MEL computation server along with supporting storage and networking infrastructure.

MEL is a HPE Superdome Flex shared memory/single system image/NUMA computation server with 256 Xeon Gold 6130 CPU cores, 3TB of DDR4 RAM memory, 24TB of NVMe SSD storage, and 16 nVidia Tesla V100 32GB GPU accelerators. The system can be expanded to 1024 CPU cores, 48TB of memory, and 32 GPU accelerators.

History

The HPE Superdome Flex is the most recent version of the SGI Altix UV series of servers which used Intel Xeon E5/E7 processors and the NUMAlink interconnect to provide large shared memory computing. The SGI Altix UV 2000 was capable of scaling to 256 CPU sockets and 16TB of memory in a single system image. The SGI Altix UV servers in turn are descended from the SGI Origin series of servers which used MIPS CPUs and ran the IRIX operating system. The Origin 3000 scaled to 512 CPU sockets and 1TB of memory in a single system image, which was remarkable when it was introduced in 2002.

In 2016, Hewlett-Packard Enterprise (HPE) acquired SGI and merged the SGI Altix UV line with the HPE Superdome line of servers, renaming it the Superdome Flex.

Mission

As a single system image computer, MEL is intended to complement the capabilities of large computing facilities such as the RCC and CRI clusters, and the supercomputers at Argonne. Unlike a distributed memory computing cluster, which is most efficient when used for large batch computations, MEL is optimized for interactive, exploratory computing and can be treated like a personal computer with more CPU cores and memory than would be possible in a desktop configuration. You can run Matlab, Mathematica, IDL, Python, R, etc. without recompilation, modifications, or proprietary extensions, in order to analyze data, test scaling of algorithms, and experiment with new ideas before deploying on a larger facility if necessary. MEL fills a common gap between large computing facilities and researchers’ workstations observed in this 2011 paper from the Department of Energy.

Other academic research institutions which have installations of the Superdome Flex system include Cambridge University’s Center for Theoretical Cosmology (formerly headed by the late Stephen Hawking) and the German Center for Neurodegenerative Diseases (DZNE).

The facility’s primary mission is directed towards machine learning and image analysis. A portion of resources are reserved for other types of scientific research, and accounts are available to any researcher in the Biological Sciences Division.

Please direct requests for accounts and questions about the operation of the facility to <radmlf-admins@cmp-listhost.bsd.uchicago.edu>
If you use the facility in your research, no matter how minor, which is reported at a conference or in a manuscript, please include the following statement:

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Please send a citation of your paper, talk, poster, or abstract; it will be extremely helpful in securing continued funding for the facility.

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