Cray’s HBP-PCP project

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Project Overview

● Objectives
  ● Evaluate non-volatile memories, storage class memory and their access APIs
  ● Study non-standard workloads and their execution / software support

● Next-gen use-cases
  ● In-situ visualisation + neurosimulation
  ● In-transit visualisation
  ● Machine learning + simulation

● Pilot System “JULIA” : installed in Juelich
  ● Variety of compute nodes (KNL, data-nodes, viz nodes)
  ● Intel Omnipath 100Gbit/s network
  ● Memory / storage system : SSD-backed Ceph, incorporating new memories
  ● Data-intensive software stack
  ● Define abstractions and/or software tools to assist with memory usage and transit
Anticipated technology suggested for inclusion in an EsD project

- Tiers of varied memory and storage
- Object store
- Memory abstraction layer

- All are immature, but highly relevant to Exascale

How should this technology be used?

- Do not burden the user more than already!
- Software abstraction is necessary
Are there any pre-or co-requisite items?

- **Desirable**: A simple non-posix open API for IO
- **non-volatile memories are not yet in general release**

Any extra work/interaction?

- **Large amounts of specific technical integration**
- **Need inter-connected projects exploring various memories / APIs**
- **Questions remain**
  - performance implications
  - the precise requirements for and constraints on middleware development
  - relevance of open frameworks such as openStack,
  - implications on resource managers.
What information / actions are needed to best prepare for EsD projects?

- **Clear definition of some driving EsD use-cases**
  - including the data-intensive and mixed workloads.

- **Understanding the data roadmap of target applications (how data sizes will grow over time)**

- **Clear definition of next-generation “usage models”**