

New Hardware Discussion

Introduction

Computing hardware is going through a much more dramatic change than experienced in HEP's recent past.

Some of the changes are

- Compute Resources
 - multicore
 - low power ARM
 - GPGPU
 - Intel MIC
 - FPGA
- I/O via SSD
- High Bandwidth Networks

Possible Discussion Points

- What are the various hardware trends?
 - more CPU cores per box? Is that trend slowing down?
 - Unification of CPU and GPU?
 - External co-processors not scheduled by the OS?
 - Lower memory per core?
 - Storage?
 - Networking?
- How does the new hardware affect how we design software, services and facilities?
 - Do applications need to become explicitly parallel?
 - Do we need to go multi-process?
- How do we optimize the hardware utilization? What metrics do we use?
 - Floating point operations per purchase dollar?
 - CPU instructions retired per Watt?
 - Bytes read into process per second per Watt?
- What is the impact on provisioning and scheduling?
 - Are there new problems when dealing with heterogeneous systems?
 - How can a single resource, e.g. GPU, be shared by multiple processes on the same box?
 - How would VMs or cloud technologies affect such problems?