“Heard at SOS16” and Future Gazing

SOS16

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Heard at SOS16

- Co-design must be driven by science [mission] needs not just by applications requirements
  - Must accept that might need major adjustments to the applications too!

Observations

- All HPC talks need a quote from a famous person …
- We say it's all about the software / the software is the key challenge/ the software is critical to success
  - But hardware is more interesting so we talk about it more?
  - "Future of HPC" funders (e.g. exascale) still focus more on hardware (what happened to the ESC?)

Unanswered questions

- Have evolved from “minimize time to solution”,
  now “minimize energy to solution”,
  but this is really “minimize money to solution [in useful time]”
  - So what about the other stuff that influences money – people, software, pre/post processing – total cost of science, not just cost of the compute run?
- Energy goals mean we need to find more locality
  [data movement is bad]
  - What new locality is there that we haven’t already been chasing for performance reasons?
- What is the difference between DSL, domain libraries, and application frameworks?

Co-design: an opinion …

- The HPC community won't secure any major changes to the next generation of hardware (processors especially)
  - How much influence did we secure over the design of "killer micros"?
  - We focused (eventually) on how to use them and how to integrate them into new kinds of supercomputers

- What we can do is focus on predicting, understanding, and figuring out how to best use the next generation of technology
  - In our application development roadmaps
  - How to integrate components into supercomputer configurations

Predictions

- Machines with peak FLOPS > 1EF will be deployed before 2020
- The power will significantly exceed 20MW (but not 40MW)
- Analytics, games, and mobile consumer technology will have had more influence on the computer technology of 2020 (processors, memory, software standards) than the HPC community
- We will still be putting enormous effort into stretching existing codes onto these platforms (due to validation investment)
- Agile scientists who have accepted major changes in application software as equally as major changes in hardware will be in an advantageous position

END