



HPC Subcommittee Proposal

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Purpose



- Discuss the need for a standing working group on HPC strategy to provide advice on the current and future directions in High Performance Computing important to the SAB.



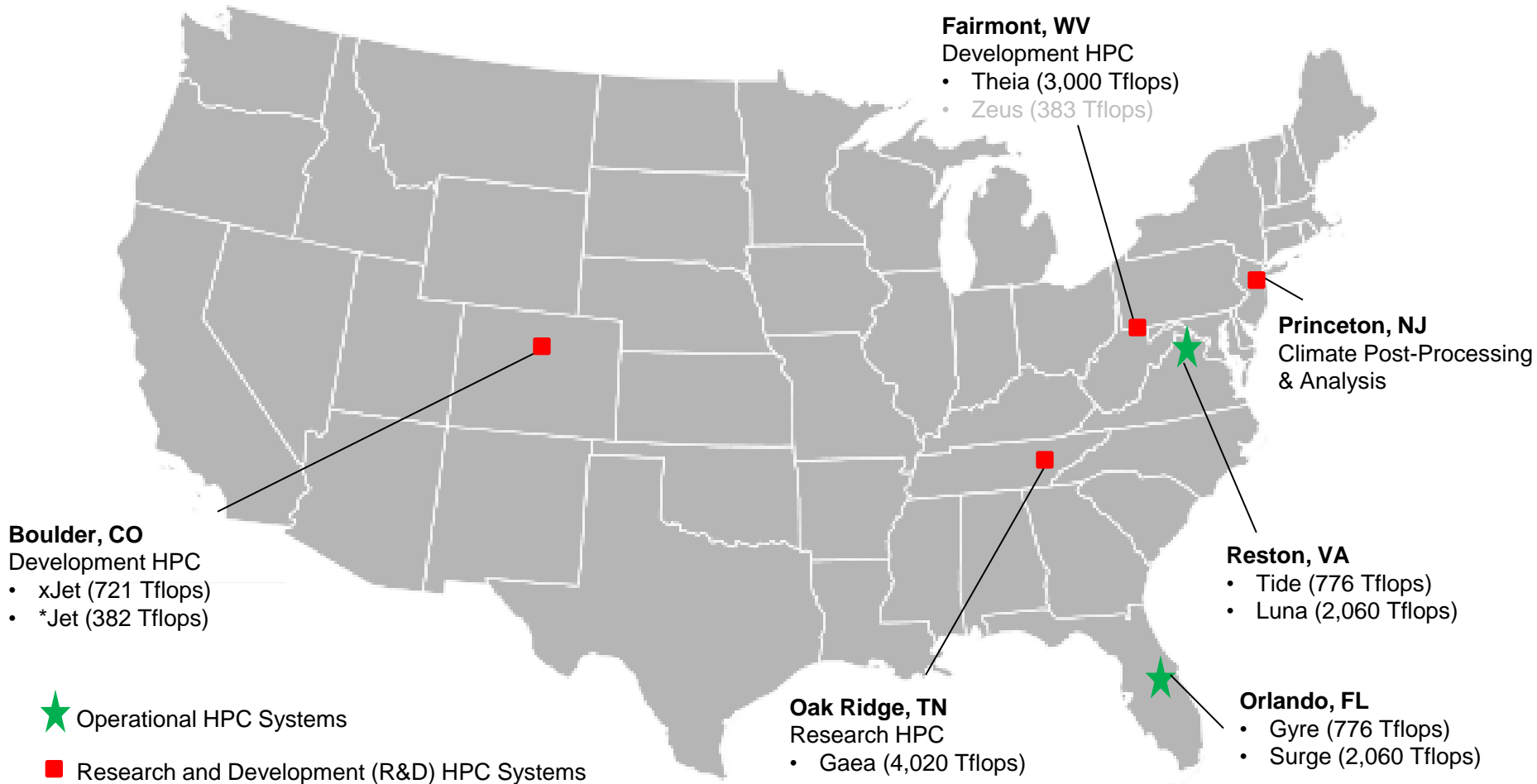
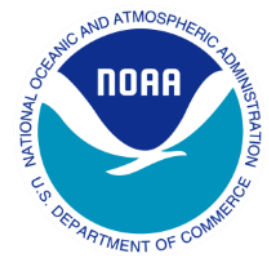
Agenda



- Trends in High Performance Computing
- Proposed Working Group
- Products of the Working Group
- How will this Working Group complements existing advisory groups within NOAA

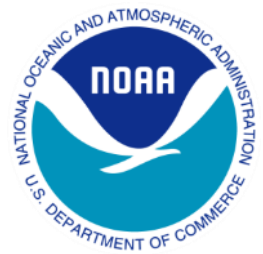


High Performance Computing Locations





Trends in HPC



- The High Performance Computing Industry is presenting NOAA with many challenges in improving our science capacity
 - Traditional processors no longer provide large performance increases from generation to generation
 - Fine Grain/Many Core Architectures
 - Graphics Processing Units, Advanced RISC Machine, Xeon Phi
 - Optimized for a higher degree of parallelism
 - Large number of simple cores geared for high throughput
 - Higher latency and lower performance per process
 - Fine Grain/Many Core Processors are becoming larger competitors in the HPC market and will become even more common as we move into exascale architectures



Trends in HPC



- Fine Grain computing introduces increased complexity
 - Increased requirement for parallelism (1,000's to 1,000,000,000's processes)
 - Increasing size and complexity of HPC systems increases challenges for reliability
- 86 of the Top500 list now use fine grain computing
 - 10 use it primarily
- Other metrological agencies have already begun planning for, and adapting code to, these new architectures



SENA Project

Software Engineering for Novel Architectures



- Prepare codes for future production architecture
 - Must monitor the evolution of these architectures
- Maintain codes in a way that subject matter experts can still work with the code
- Codes should still be viable for current architectures
 - Performance is expected to increase on across new and old architectures
- Develop software engineering expertise within NOAA



Working Group



- To ensure that NOAA is adequately preparing and planning for exascale architectures, the HPC program would like to seek advice from the SAB and a specialized subcommittee comprised of academic, industry, and government experts
- This advice will build on the program's existing roadmap and strategy, improving NOAA's ability to provide increasingly reliable and accurate model results at finer resolution



Working Group Description



- It is envisioned that the subcommittee will be comprised of 12-15 members who are recognized leaders within the HPC and scientific computing community
 - Membership could include:
 - University Partners
 - National Laboratory Staff
 - HPC program staff from other government agencies
 - Foreign government weather agencies
 - NGO
 - Industry
- Quarterly Meetings
- Yearly Face to Face Meeting



Working Group Deliverables



- A yearly report based on NOAA's existing HPC Roadmap
 - Yearly recommendations on technologies that NOAA should be investigating
 - Feedback on NOAA's 5 - 10 year HPC roadmap
 - Yearly advice to the SAB regarding the OCIO's HPC strategic plan



Existing Advisory Groups



- The working group will complement existing modeling advisory committees within NOAA (e.g., UMTF, SAB-CWG, UMAC).
 - The subcommittee will take modeling requirements from these advisory groups to shape the technical and roadmap recommendations to the SAB
 - The SAB's recommendations can be used by the modeling committees to plan for potential future capabilities and capacity
- The SAB's recommendations can also be used by the NOAA HPC Board to provide more accurate planning for NOAA's scientific HPC capacity



Thank You



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