Sandia is seeking production hardening and advanced feature development for an internally developed suite of High Performance Computing (HPC) tools. This suite is comprised of distributed data collection, transport, storage, visualization, and analysis software for use on both Linux HPC clusters and Cray XE6/XK6 platforms. Currently supported interconnects are Infiniband, 10 Gigabit Ethernet, and Gemini. The following must be met:

- Scaling tests to ~100 thousand nodes each with hundreds of metrics collected and stored on sub-second intervals
- Fix bugs and scaling impediments and iterate on testing
- Robustness feature additions
- Implement scalable lightweight secure access protocols in existing software products
- Collaborate on advanced usability feature design as well as perform implementation
- Collaborate on design and perform development work on user interface(s) for scalable distributed flexible information exploration and root cause analysis targeted at both system administrators and general users
- Design and implement new scalable distributed analysis techniques for decision support utilizing all available information both raw and derived
- Note:
    - All development work for this software suite will be performed in the C/C++ programming languages
    - All new features must work over both socket and Remote Direct Memory Access (RDMA) protocols for all available interconnects (currently Infiniband, 10 Gigabit Ethernet, Gemini)

Minimum requirements for bidders

- Demonstrated experience in Linux kernel code development that has been accepted and published in the Linux mainstream kernel distribution.
- Demonstrated expertise in design and implementation of data transport and storage related software that utilizes Remote Direct Memory Access (RDMA) to minimize overhead and maximize performance.
- Demonstrated expertise in high performance networking (both intra cluster and traditional LAN/WAN)
- Demonstrated expertise in design and implementation of scalable HPC system software that has been shown to scale to at least 1000 nodes.
- Minimum of two years' experience in HPC high fidelity data collection, transport, and run-time analysis.
- Minimum of two years' experience programming in the Cray XE6 environment as well as Infiniband connected HPC platforms running Linux.
- Minimum of five years' experience in High Performance Computing (HPC) system administration.
- Demonstrated expertise in data mining and statistical analysis of HPC system logs and numeric system related data for system scales of at least thousands of nodes.

- Demonstrated expertise in statistical and mathematical modeling for large-scale HPC-related fault tolerance and decision support.
- Demonstrated expertise in design and implementation of advanced statistical models in C for the purpose of HPC failure prediction and performance modeling on distributed systems.
- Minimum of four years research and software development experience in HPC resilience and fault tolerance as demonstrated by refereed conference/journal publications.
- Demonstrated proficiency in using debugging tools (e.g. gdb) to debug large scale distributed application codes.
- Demonstrated ability to manage software projects involving multiple stand alone tools that interact over well defined APIs and total over one hundred thousand lines of C/C++ code (not including third party libraries).