

October 19, 2011

TO: ALL POTENTIAL OFFERORS

**SUBJECT: REQUEST FOR INFORMATION – HIGH PERFORMANCE COMPUTER SYSTEM NUMBER FOUR (HPCS-4)**

Pacific Northwest National Laboratory (PNNL) seeks information to begin planning for the replacement of the present high performance computer system (HPCS-3, also known as “Chinook”) which is contained within the Environmental Molecular Sciences Laboratory (EMSL). The next system should distinguish itself from typical FLOPs-oriented HPC systems by having greater than typical RAM per processor core and greater than typical storage bandwidth per processor core.

PNNL envisions that a replacement machine will be a near petascale system with the following general characteristics.

**System Parameters:**

Key Performance Parameter	System Expectations
Peak Floating Point Performance	> 1,200 Teraflops
High Memory Bandwidth To and From the Processing Units within the node	> 35GByte/s
Large Memory	> 4 Gigabytes (GByte) per processing core
High Bandwidth, Low Latency Node-to-Node Communication	Bandwidth: >50Gbit/Sec Latency: 2 micro-sec node-to-node
Large, High-Performance Parallel Global File System	Storage: > 1 Petabyte I/O Bandwidth: 100 GByte/sec

Additionally PNNL requires:

- Scalable Distributed Memory Model supporting MPI and GA/ARMCI
- Ability to overlap communication input and output (I/O) with computation
- One-Sided communications and remote direct memory access (RDMA)
- Integer performance on par with floating point performance.

**Facility Information:**

The facility infrastructure and space will have the following characteristics:

- Approximately 2 MW of power
- 480V AC overhead power connections
- Chilled water supplied below the raised computer floor to rack locations.
  - Current chilled water is approximately 45 degrees Fahrenheit.
  - Pressure drop is between 22 and 28 PSI
  - Approximately 450 tons of cooling is available for the new system
- Rack or component level monitoring system that is able to interface with BACnet
- Existing raised computer floor supports 350#/sf and 1000# point load.

The proposed solution must meet the following requirements:

- Room-Neutral cooling solution (EMSL will only provide water for cooling this system)
- Fit within approximately 75 standard 19-in. rack locations.

In responding to this request for information PNNL requests vendors provide the following facility related information:

- Size and type of chilled water supply and return connections
- Maximum rack weight
- Power conditioning requirement or ride through capabilities of the power supplies.
- Indicate capability of system monitoring to interface with Building Controls systems (BACnet, etc)
- Any power distribution details, options, or requirements
- Configurations for Uninterruptable Power Supply (UPS)
- In the interest of improving Power Usage Effectiveness (PUE), we would like to see data regarding the proposed solution's environmental operating characteristics:
  - Allowable range of water input temperature
  - Allowable range of ambient air temperature
  - Power conditioning requirements
  - Any other information the vendor feels is relevant.

### **Other General Information:**

PNNL is seeking information about products that will have reached general availability by the end of calendar year 2012 and which will meet PNNL's needs in terms of *balanced performance for existing codes*. Additional computational options or features that may improve performance are also of interest. PNNL has created an MSC benchmark suite as a representative sampling of the expected system workload. It is expected that the selected system will perform well on these benchmarks. The current MSC benchmarks can be found at: [http://www.emsl.pnl.gov/capabilities/computing/msc/msc\\_benchmark/](http://www.emsl.pnl.gov/capabilities/computing/msc/msc_benchmark/)

In addition to the general performance of the system PNNL is especially interested in energy efficiency options, including power and cooling methods.

PNNL currently plans to issue a request for proposals in the mid-2012 timeframe and to award a contract by the fourth quarter of 2012. Delivery of the various phases of HPCS-4 is expected to begin during the first quarter of 2013 and the system is expected to be operational within four (4) months of delivery.

The computer system purchase price is not expected to exceed \$12 million, which includes hardware maintenance over a four year period. Funds are not presently available to award this acquisition; however, funding is expected to be available at the time of the award.

### **PNNL DOES NOT INTEND TO AWARD A CONTRACT ON THE BASIS OF THIS REQUEST FOR INFORMATION OR TO OTHERWISE PAY FOR THE INFORMATION SOLICITED.**

PNNL will discuss this RFI with vendors during half-day sessions held in Richland, Washington. If you are interested in furnishing information, please contact PNNL using the contact information at the bottom of this correspondence. PNNL is interested in completing initial market research by December 15, 2011. We look forward to hearing from you.

### **Contact Information:**

#### Technical Questions

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