Procurement and Contracting Services

Request for Proposals
For
High Performance Computing 2020 Refresh

ADDENDUM # 2
RFP L201904

Please mark all proposal submission Envelopes with the following information

Sealed RFP # L201904
Due on May 2, 2019 no later than 2:00pm MST
Revised Schedule of Events
RFP #L201904, High Performance Computing 2020 Refresh
Updates are in Red text

3.3 Schedule of Events. The following is the tentative schedule that will apply to this RFP, but may change in accordance with the University's needs.

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<tr>
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<tr>
<td>03-18-19</td>
<td>Issuance of RFP</td>
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<tr>
<td>04-01-19</td>
<td>Pre-Proposal Conference Questions/Inquiries due no later than 4:00 PM/MST</td>
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<tr>
<td>04-04-19</td>
<td>Pre-Proposal Conference 9:00 AM MST</td>
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<tr>
<td>TBD</td>
<td>Pre-Proposal Site Visit (upon request, see Section 3.5)</td>
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<td>04-09-19</td>
<td>Final Questions/Inquires due no later than 3:00 PM/MST</td>
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<td>July 2019</td>
<td>Complete Evaluations</td>
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<td>July 2019</td>
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<td>TBD</td>
<td>Receipt of Bonds and Insurance</td>
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<td>Nov 2019</td>
<td>Delivery of Equipment</td>
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<td>Dec 2019</td>
<td>Successful Completion of 28 Day Acceptance Period</td>
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Request for Clarification
University of Arizona Responses in Red

Q1. What does this mean? Storage Evaluation Criteria (see section 5.11)
Initial cost per IOPS and initial cost per MB/s as measured through frontend presentation
A. Performance numbers must be representative of a client interface, not raw numbers for backend block devices or arrays.

Q2. Pricing clarification:
5.4 Detailed Pricing
5.4.1 For general guidance purposes, Compute (5.10), Storage (5.11), and Ethernet Fabric (5.12) solutions should cost no more than: Compute: $2.15M Storage: $1M Ethernet Fabric: $150K

This is in conflict with a previous statement in the RFP of:

3.9.8
For general guidance purposes, Compute (5.10), Storage (5.11), and Ethernet Fabric (5.12) solutions should cost no more than:
Compute: $2M Storage: $1M Ethernet Fabric: $300K

A. This was an oversight, the numbers provided in section 3.9.8 are the correct values.

Q3. Please define acceptance testing.
A. Acceptance testing as described in the relevant sections of the RFP describe the post-delivery tests that must be completed as specified to satisfy the purchase requirements and approve payment.
Q4. **Please define benchmarking/Acceptance testing for 5.10.3**
Are separate benchmarks required for the large memory and/or NVIDIA V100 GPU nodes? Will acceptance testing be the same for these servers?

A. Same acceptance test for all nodes including GPU configurations and large memory configurations.

Q5. **Please define benchmarking/Acceptance testing for 5.10.4**

a) Please clarify how the benchmarks and acceptance testing will be accomplished.
   - Is it expected that HPL will be run continuously for the 28 day uptime acceptance test?
   - Will UofA be running the testing or the vendor(s)?
   - What are the acceptance tests to validate storage performance? Network?

b) Are end users part of the 28 day acceptance test running their workloads?

A. a) No, HPL will not be required to run on all nodes for the full period, but will be run for some portion of the time period. Regardless of load/burn-in testing status, any/all component failures or other problems as outlined will be treated the same.
   - The vendors will be responsible for running the acceptance test HPL runs in order to validate their submitted performance numbers.
   - We plan to use a current version of fio (https://fio.readthedocs.io/en/latest/) to validate storage performance. There are no planned benchmarks for fabric components, only uptime requirements.

b) We will likely not engage end-users during acceptance testing, but systems administrators may run selected software tests of their own as need requires and time permits.

Q7. **Does a vendor have to bid all components (CPU, Storage, Ethernet Fabric) or are individual section responses accepted?**

A. No, respondents may bid any or all sections. If a respondent chooses to bid more than one section, we must have the option of accepting only one.

Q8. **4.51.5 – Will any parts of this cluster store, process, or transmit “Sensitive University Data?” If so, which portions?** This affects the need for encryption for data in flight and at rest. If sensitive data isn’t transmitted nor stored by the components listed in this RFP, does that imply that encryption is not necessary at all? Can UofA clarify this requirement in 4.51.5? Encryption of data in flight is possible, but only if NFS is using v4 with an appropriate infrastructure around authentication.

A. There is no requirement for encryption in flight or at rest for the purposes of this RFP. If your proposal includes such optional capabilities, feel free to indicate as such and include any details as to the methods used and requirements to enable that functionality.

Q9. **5.3 – Furnish and Install.**
The RFP is asking for accountability for a single solution comprised of components potentially to be delivered from separate parties. How does University of Arizona envision coordinating installation should award of the three RFP elements go to separate vendors? Will University of Arizona complete final cabling, network configuration, and validate storage connectivity?

A. Our previous RFP was awarded to three different vendors. Our coordination of those three install processes was effective, we expect to be effective at this again should the situation arise.
Can you clarify what ‘responsibility means?’ For instance if U of Arizona chooses 3 separate vendors for each section, are all 3 responsible, or held accountable to delivery and implementation of the other vendors’ products? Example: Since this HPC works as a solution, not as components – benchmarks, and Acceptability depend upon all of the components. Ultimately who is responsible for the ‘system?’
A. Respondents are only responsible for delivery and implementation of their own products. For this specific example, benchmarks for compute nodes are expected to be run as individual instances on all nodes in the cluster demonstrating performance consistent with the vendor-supplied numbers for a single node. There is no requirement for a full-cluster single-instance HPL run. There should be no need for the high-speed ethernet fabric or storage system to complete HPL runs in this manner.

Q10. 5.10.2.1 - Operating System. As CentOS is an open-source OS offering, this vendor has certified that CentOS 7 works on the proposed platforms, but support for CentOS must come from the open-source community. What is expected from the vendor as far as CentOS support is concerned?
A. We have no expectation of vendor support for the CentOS software platform beyond basic assurance that the CentOS 7 operating system is certified by the vendor as a supported platform for warranty and support purposes.

Q11. 5.9.2 – Power availability: Which 3-Phase power configurations are available? Is 277v supported? Is there any limitation of which voltages, amperages, and plug types are supported?
A. IEC 60309 250V three-phase 60A (460C9W) is the maximum single-plug power spec we can meet. Our current receptacles are Legrand PS460C9W.

Q12. 5.9.4 – Storage Environment.
This section states the storage environment must not exceed 2 racks. Is the 2 rack limit for the initial 2PB or is this to accommodate future capacity up to the anticipated 10PB?
A. Two racks for the initial 2PB. Please include rack-count requirements to meet the 10PB maximum.

May we have a floorplan layout diagram of the datacenter to ensure racks will fit correctly?
A. All relevant room specifications should be available in section 5.9.

Is the plan/preference to have all 8 racks in the same row?
A. No. The 6 compute racks will be contiguous in one row and the 2 storage racks will be contiguous in a different row.

For cable length planning, how high are the cable trays above the floor?
A. Eight feet from floor tile to the cable tray

Q13. 5.9.5.2 – Density. Is this raw or usable storage?
A. Usable storage

Q14. 5.9.6. – Cooling.
Is on-chip cooling with heat exchangers contained within the racks acceptable?
A. If the installation, including all necessary equipment for this heat-exchange configuration, meets our 40 core per rack unit requirement and the total installed size of all racks does not exceed the 6 total rack requirement, then yes.
Given condensation issues at 47F supply water, would it be acceptable to include a CDU unit with appropriate flex hosing to connect to the building water supply to accommodate condensate free, and allow full room neutral cooling to occur via the doors?

A. There will be no special exceptions or considerations for CDUs, meaning the total solution must fit within the 6 total rack requirement, but your configuration may include them if you wish. CDU footprint either in-rack or out-of-rack will be considered for the purposes of meeting the 40 core per rack unit requirement.

Q15. 5.10.2.3 – Please define the desired ratio of compute nodes to large memory nodes to GPU nodes. What quantity or percentage of each compute node type do you require for the $2.15M budget?
A. The numbers provided in section 5.4.1 were incorrect, see Q2 in this Addendum. Proposals should include only CPU nodes in the system configuration as-bid. Proposals should additionally include a bill of materials and pricing for a node configuration providing a minimum of 3TB of RAM as well as a bill of materials and pricing for a node configuration capable of hosting a single NVIDIA GPU with individual prices for V100, T4 and T8 model GPUs, as available.

Q16. Would it be acceptable to offer single core speeds of 2.1Ghz per CPU Core or higher with turbo above 2.3Ghz?
A. No, the base frequency of all processors must be no less than 2.3GHz.

Q17. 5.10.2.2.2 Would you consider 4.8GB/Core?
A. In considering this number we recognize the significance in terms of the technological constraints we’ve imposed via other requirements and as such agree to accept configurations specifying 4.8GB/core at minimum.

Q18. 5.10.2.3 – Please define the number of GPU processors to be contained within a GPU node, as well as the desired connection between them. PCIe/PLX? NVLink?
A. 1 GPU per node, PCIe

For the NVIDIA V100 GPU Notes, how many GPU’s do you require per server?
A. 1 V100 per node

Do you require the same X86_64 processor in the standard Compute node, the Large Memory Workload node, and the GPU node?
A. Standard compute nodes and GPU compute nodes should use the same model processor. Due to the additional constraints imposed by the large memory requirement, a different model may be used for the Large Memory configuration with the core density of such nodes being no lower than 10c/RU.

Q19. Section 5.10.2.2.2 Large Memory Node/Workload
The RFP states: Section 5.10.2.2.2 “All proposed compute systems must include a minimum of 5GB/core of uniformly sized ECC memory DIMMs.”
For the large memory workload requirement is it acceptable to use Optane DC Persistent Memory and consistent sized DRAM dims to offer 3TB of contiguous memory?
A. No, large memory configurations should use standard DIMMs only.

Q20. 5.10.2.4.3 – Can UA clarify this requirement around storage? The 25gbps port must support RoCE, but is there an expectation that the transport for storage be RDMA?
A. No, the storage transport is not required to support RDMA.
Q21. **5.10.2.6 – Utility nodes.** Unless there is a preference for a different number of nodes, we would assume 2 head nodes, 2 login nodes. Are other utility nodes desired/required? Visualization nodes? Anything else? What quantity of each is preferred?
A. Unless otherwise necessary for the operation of your configuration, a single head node for acceptance test provisioning activities may be reserved. It is not necessary to designate any nodes as login nodes. No other utility nodes are required.

Do you require HA pair of Head Nodes?
A. No.

Do you require the same warranty on head nodes as the rest of the cluster, or mission critical warranty on head nodes?
A. All nodes in the configuration should have the same warranty.

Do you require “login” node(s) to isolate your users from doing compilation and job submission from the head node(s)?
A. We do not require any nodes designated specifically as login nodes.

If so, do you require more than 1, if so, please specify amount.
A. We do not require any nodes designated specifically as login nodes.

Can you provide specifications preferences for the head node?
A. We do not require a specially configured head node.

Q22. **5.10.5 Compute System Installation**
System acceptance relies on the network fabric being integral to the compute and storage success. Assuming not one vendor is chosen for the entire solution: How does UofA expect to coordinate the installation and configuration? What goes in first and how will UofA validate what is working if multiple vendors are doing each part individually?
A. System acceptance requires that single-node benchmarks are completed on all nodes individually and those nodes all reach the performance specified for a single node. In addition the nodes must meet the uptime requirements as specified in 5.10.4.1. Neither the storage system nor the high-speed ethernet fabric should be required to complete those activities.

Is it acceptable for vendors to submit a separate proposal that encompasses compute, storage, and networking but only valid if purchased together?
A. No, all bids must allow for any one section to be taken individually.

Q23. **5.10.4.2**
Regarding liquidated damages penalties, assuming a multi-vendor provided solution how will UofA determine which vendor is responsible for the downtime?
A. Our uptime requirements are specific to the hardware platform provided by the vendor. As such we do not allow for one to impact the other. Uptime in this context implies only that the component device be operational in the most basic sense with no failed components. For example, if a compute node can be booted from the internal hard drive and is otherwise hardware operational, it is considered up. If a storage system can be accessed via some management interface internal to itself, it is up.
The Storage requirements refer to U of A site http://rc.arizona.edu/hpc-htc/computing-systems but this link provides a “Not Found” message. Please provide the correct link to the existing HPC environment for verification that the proposed storage can support this environment.  
A. Corrected link https://docs.hpc.arizona.edu/display/UAHPC/Compute+Resources

Can you provide typical file sizes that will be saved on the storage?  
A. Our filesystem stores a wide range of files sizes. Our average file is less than 4KB.

The RFP calls for tiering capability - should all of the initial 2PB usable be in a single tier?  
A. We do not require any tiering capability. If a solution is leveraging tiering, details about that tiering should be provided as specified in 5.11.1.13. We do not have a working-set size estimate, so solutions leveraging tiering should provide no less than 2PB of space that will meet the performance requirements as specified.

If not, how should the tiers be split?  
A. See answer above.

Q24. **5.11.1.1** - Can UofA clarify the performance goals in section 5.11.1.[1-2] and 5.11.3.1.[1-2] around which file sizes and IO patterns (sequential or random) are necessary to meet these IOPs and throughput goals? If random, then over what storage address space, ie random in a 1MB file or in 1PB?  
A. The general purpose and broad-access nature of our service is such that no trivial generalizations can be drawn that are representative of the reality of our workload. We do not run single-user large-scale job workloads, we run hundreds of simultaneous users with a mix of small to medium jobs exhibiting any number of I/O patterns at once. There is no obvious target to aim at for optimization. Our goal in providing these performance specifications was to use the most general industry standard terms possible to indicate a level of performance required for bids. Taken in whole, respondents should design solutions with the expectation that a majority of several hundred million files and directories ranging in size from bytes to terabytes across a total data set size approaching the specified 2PB minimum could be accessed at any time by any number of the 1000 specified client nodes.

Q25. For the required throughput and IOP’s storage benchmarks, how many clients are expected to be leveraged to perform these tests?  
A. A specific client count has not been established. It will likely be more than 10 and less than 100.

Q26. **5.11.1.2** – Bandwidth. Does this mean that the benchmark application running the sequential IO test will be sending 4KB blocks to the storage? And, what benchmark application will be used and how will that application be configured?  
A. We plan to use a current version of fio (https://fio.readthedocs.io/en/latest/) to validate storage performance. It will be configured to perform tests that meet the specifications as provided in 5.11.3.

Q27. **5.11.1.5** – Capacity and Performance. What is the minimum acceptable size of the added capacity and performance?  
A. There is no minimum acceptable size. The intent of this item is to indicate that the 2PB initial configuration must be able to scale to the 10PB maximum required capacity as well as provide the ability to increase the front-end performance of the system as necessary to accommodate future growth.
Q28. **5.11.1.12 – Native OS Support.** Specifically, Linux any distribution or do you desire a specific distribution?
   A. We will be using a mix of CentOS 6 for some existing clients and CentOS 7 for future clients.

Will this all be via NFS or are other access protocols going to be used, i.e. SMB, ftp, etc?
A. Submitted proposals may offer any single protocol that can operate over a standard ethernet fabric. In the case of NAS offerings, NFSv3 is the preferred protocol. If your solution also provides support for other protocols such as those mentioned in addition to NFSv3, please include that information. In the case of parallel file systems, the native protocol must operate over a standard ethernet network.

5.11.2 Pricing - This section is asking for the cost of co-terminated maintenance, this will vary by the number of months left on the original purchase maintenance contract. Since we don't know how many months of maintenance will be required, will a monthly maintenance cost be sufficient?
A. Our intent in this section is to indicate that we expect to be able to make future purchases and additions to the storage system that will be covered by co-terminated maintenance/support with the original purchase rather than independent terms. If you provide a monthly cost, our interpretation will be that we can multiply that cost by any number of months up to the maximum term of the base system contract and arrive at a reasonable total cost estimate.

Q29. **5.11.1.14 – Snapshots.** Does University of Arizona have a max number of snapshots in mind that University of Arizona will ever use?
A. We do not have a maximum number in mind. If your proposal has limits on the number of snapshots, or any other relevant limitations that would impact our use of such features, please include that information in your proposal.

Q30. **5.11.1.15 - Proposed system must support a minimum of 1000 simultaneous clients.**
Concurrent NFS? Please provide specific NFS versions?
A. The preferred, but not required, NFS version for our clients is 3. However, if your proposed solution requires or prefers NFSv4, please provide information explaining the reasons for that requirement and include any pertinent information around recommended client configuration for CentOS 6 and 7 hosts.

Q31. **5.11.1.12 - Solutions should leverage native OS support for clients where possible.**
Will this all be via NFS or are other access protocols going to be used, i.e. SMB, ftp, etc?
A. For NAS based solutions, NFSv3 is the preferred primary protocol for the purposes of this proposal. If your solution also provides support for other protocols such as those mentioned in addition to NFSv3, please include that information.

Q32. **5.11.2 Pricing -** This section is asking for the cost of co-terminated maintenance, this will vary by the number of months left on the original purchase maintenance contract. Since we don't know how many months of maintenance will be required, will a monthly maintenance cost be sufficient?
A. Our intent in this section is to indicate that we expect to be able to make future purchases and additions to the storage system that will be covered by co-terminated maintenance/support with the original purchase rather than independent terms. If you provide a monthly cost, our interpretation will be that we can multiply that cost by any number of months up to the maximum term of the base system contract and arrive at a reasonable total cost estimate.
Q33. **5.11.5 Storage Installation Services**

5.11.5.2 wants all cabling included; does this include cabling to the UA network for client connectivity?

A. No, our intent here is to indicate that all cabling and switching locally required for your product be provided and configured. We will provide cables to connect the storage devices to the upstream network fabric. If your proposed system is not expected to operate with industry standard cables implementing the appropriate interface (e.g. optical or direct-attached QSFP+, QSFP28, etc), then it would be necessary to provide cabling that connects your proprietary port to a QSFP+ 40GbE uplink or QSFP28 100GbE uplink as appropriate.

If yes, please provide the cable lengths required to reach from the storage rack to the UA network switches

A. If your proposed system requires proprietary cabling, the provided cables should be at least 15 meters and no more than 30 meters in length.

Q34. **5.11.5.1** - All responses must include all costs for installation services including unboxing, racking, powering and functional testing. Please provide specifics around functional testing.

A. Functional testing in this context implies the system powers on and all components of the system are online and functional and able to be configured for use. The installation representative is not required to remain on-site for the full acceptance testing period.

Q35. **5.11.5.2 – Service costs.** Are there specific cabling, configuration and labeling requirements? Please provide specifics around full functional integration. Please provide specifics around acceptance testing.

A. There are no specific requirements of this type. See Q34 above for functional testing. See Q5, Q24, Q25 and Q26 for more details around acceptance testing.

Q36. **5.12.1 – Ethernet speeds.** Desired speeds are defined as being 25Gb/s to compute/utility nodes, 100Gb/s to storage nodes, and 40Gb/s to existing campus fabric. Is it allowable (desirable?) that speeds FASTER than defined are proposed?

A. Client connection port requirements are fixed per section 5.10.2.4.1. Storage system port requirements are fixed per section 5.11.1.4. Existing campus fabric ports are fixed as they already exist. With these things in mind, the client-end connections must meet these specifications. However, if your proposed switching hardware, through the application of a breakout-style configuration, can operate with these port speeds, that is acceptable, e.g. a switch featuring all 100GbE physical ports broken out to 4x25GbE for client connections.

Q37. **5.12.2.3 – Switch ports.** The RFP specifies that switch ports to clients must be 25Gb/s. Would the use of breakout or “hydra” cables meet this requirement? For example, breaking out a 100Gb/s port into four 25Gb/s connections? Or is having one switch port connect one node a requirement (or desirable)?

A. “Hydra” style breakout cables are acceptable. Rack unit density is a consideration, so such solutions may be preferable if they achieve better port density.

Q38. **Evaluation criteria.** (Page 14) Can you provide Rack Unit, Power, and Cooling average costs associated for TCO and efficiency calculations?

A. Due to the nature of space allocation and utility billing on our campus, TCO calculations taking them into account are not necessary.

Q39. **5.11 – Storage Specs.** Are all flash solutions required?
A. No, any solution meeting the required specs is acceptable.

Specification 5.11.1.1 - Does this describe the expected real world workload or are these benchmarks to compare solutions? Of just benchmarks can you provide actual workload parameters?
A. The general purpose and broad-access nature of our service is such that no trivial generalizations can be drawn that are representative of the reality of our workload. We run hundreds of simultaneous users with a mix of small to medium jobs exhibiting any number of I/O patterns at once. There is no obvious target to aim at for optimization. Our goal in providing these performance specifications was to use the most general industry standard terms possible to indicate a level of performance required for bids. Taken in whole, respondents should design solutions with the expectation that a majority of several hundred million files and directories ranging in size from bytes to terabytes across a total data set size approaching the specified 2PB minimum could be accessed at any time by any number of the 1000 specified client nodes.

Specification 5.11.1.10 - What type of system is used for user/group mapping and authentication? AD, LDAP, NIS?
A. LDAP

Specification 5.11.1.13 - In regards to tiering, are there specific workload performance, capacity, age, requirements that can be provided for each possible tiers?
A. We do not have data to provide statistics around the metadata of our existing filesystem contents nor do we have an estimate of working set size. Solutions leveraging tiering should provide no less than 2PB of space that will meet the performance requirements as specified.

Additional Questions
Q40. Are there caps on any damages?
A. At this time, there are no caps on damages outside of Section 4.25. Vendors may negotiate caps upon receiving an award from this RFP.

Q41. Questions due date clarification. The website (https://pacs.arizona.edu/rfp-bid_opportunities) states that technical questions / inquiries are due on March 22nd. RFP section 3.3 (p. 5) specifies that pre-proposal questions are due March 22nd. Yet, RFP section 3.7.4 (p. 7) specifies that questions regarding the RFP are due by April 1st.
A. The dates for this RFP have been revised. Please see the beginning of this Addendum for full details. Final call for questions is now April 9, 2019 at 3:00 PM/MST. Questions that result in an additional Addendum will be shared on the University of Arizona website for RFP #L201904 at https://pacs.arizona.edu/rfp-bid_opportunities.

Q42. Can you confirm the last day to submit questions is April 1, 2019?
A. The last day to submit technical questions for RFP #L201904 has been revised to April 9, 2019. Questions related to the submission process or of non-technical nature may be asked through the RFP due date of May 2, 2019.

Q43. 5.7 – The link to the description of the HPC 2015 cluster is broken. (http://rc.arizona.edu/hpc-htc/computing-systems)
A. Revised Link: https://docs.hpc.arizona.edu/display/UAHPC/Compute+Resources

Q44. Appendix A Glossary: There is no definition in the RFP of what the term “scalable unit” means to U of A. Clarification would be helpful, as this term is used a specific way by DoE labs which does not appear to apply to this implementation.
A. Our intent with this terminology is to indicate that any shared infrastructure-type compute solutions must provide us with those costs and the count of standard compute nodes that fill them so we can mathematically derive the practical cost/node. Though these systems may be able to scale one node at a time, we must take the total cost of that shared unit into consideration.

Q45. Will University of Arizona award separate storage / compute?
A. The University will award purchases to the best solutions in each category as determined by our evaluation committee. In our previous RFP cycle in 2015, each of these three sections was awarded to a different vendor respondent.

Q46. How will University of Arizona calculate effective throughout speed from storage to nodes?
A. We plan to use a current version of fio (https://fio.readthedocs.io/en/latest/) to validate storage performance. It will be configured to perform tests that meet the specifications as provided in 5.11.3.

Q47. What is the percentage of real time and historical data?
A. We do not have data to provide statistics around the metadata of our existing filesystem contents nor do we have an estimate of working set size.

Q48. Bidder desires to respond with or through a Business Partner and are there any restrictions?
A. No. The respondent for the purposes of our process will be the entity that submits the bid and all communication during the RFP process must go through that entity.

Q49. Once data reaches a certain point of inactivity and is archived, does the University desire/intend to perform analytics on that archived data at a later date?
A. We currently have no specific plan to assign a cutoff for archive. Assuming this is in regard to section 5.8.2.2, our intent here is to indicate that a proposal may include as additional detail about capabilities for leveraging such functionality during our use of the system.

Q50. Will additional racks be made available to accommodate future growth for the compute and storage?
A. For the purposes of this RFP, all responses should confine themselves to the provided limits of 6 racks per compute bid and 2 racks per storage bid as specified section 5.9. For future expansions, compute and storage vendors will be expected to provide racks matching or equivalent to those sold in the initial purchase for installation with expansion hardware.

Q51. Does the University anticipate purchasing additional scalable units in year 3 or prior?
A. We could not commit to any specific purchasing guarantees over the life of the system. Historically speaking, all of our high performance systems have seen expansion over their life. The amount of expansion varies with normal factors like grant periods for faculty and staff and our own evaluation of the needs of the wider campus community.

Q52. How will the eventual contract be structured? 3 year base and two 1 year options? Or will this be structured as an IDIQ?
A. We anticipate the support and maintenance agreement to result in a three (3) year term with two (2) additional one (1) year options.

Q53. Does the University require guaranteed pricing for the scalable units for the 5 year period of performance?
A. No, as indicated in section 5.10.1, guaranteed pricing is only required for the first year after installation.

Q54. Are any data migrations required or is this to be considered a net new deployment? If yes, please detail.
A. Respondents are not required to provide data migration services or functionality. If such services are available in some capacity and you would like them to be considered as additional features, please include pricing and descriptive information about what capabilities you could provide.

Q55. 3.9.13 references exceptions and Section 6.1 references Exceptions are to be noted as stated in the RFP. Are vendors to supply any exceptions to the Agreement Terms and Conditions at this stage or should they be provided at a later stage in the procurement? Can the University clarify the process and expectations?
A. 3.9.7 Requires that vendors submit exceptions to the terms and conditions as presented in Section 4 of the RFP in the vendor RFP response. Please note Section 2.16 allows vendors to submit their own supplemental terms and conditions that would be negotiated after award has been made, should vendors desire to utilize their own contract language.

Q56. Will the University allow the inclusion of a commercially reasonable vendor limit of liability? Will the University consider limiting the Liquidated Damages instances, and/or allow a reasonable cap on damages?
A. University of Arizona Risk Management and Office of General Counsel will review proposed changes for these areas once an award to the RFP has been made.

Q57. Does a vendor have to bid all components (CPU, Storage, Ethernet Fabric) or are individual section responses accepted?
A. No, respondents may bid any or all sections. If a respondent chooses to bid more than one section, we must have the option of accepting only one.

Q58. Will the University extend the bid response date by one week, given the change in date for the pre-proposal conference?
A. Please see the revised Schedule of Events at the beginning of this Addendum.

Q59. When pondering a “compute solution must meet a minimum density of 40 CPU cores per RU,” is that measured within a CPU chassis, an average of 40 cores/U within a rack, or only where a rack U is populated with a CPU node?
A. For rack units populated with CPU nodes or supporting hardware, the average should be 40 cores per rack unit. Rack units reserved for switching or cable routing purposes are not considered. For the purposes of this calculation, we do consider any server support resources e.g. in-rack CDUs for direct-water-cooling as part of the compute solution and as such those rack units must be considered when calculating the average.

Q60. Is there any minor flexibility to “all proposed compute systems must include a minimum of 5GB/core of uniformly sized ECC memory DIMMs?” A small range of 4.8GB – 5GB per core allows for more CPU options.
A. In considering this number we recognize the significance in terms of the technological constraints we’ve imposed via other requirements and as such agree to accept configurations specifying 4.8GB/core at minimum.

Q61. Please further define user training and system administrator training requirements.
A. These are general terms. If your solution includes some specific complex feature then we expect you to train administrators or users accordingly.

Q62. General guidance was provided for the cost of compute, storage and ethernet with a combined total being $3.3M. If there is excess in any one of the three categories should we increase the total hardware to amount to $3.3M, or should we not exceed the total amount of any given category?
   A. Bids should follow the pricing guidelines per section as specified in section 3.9.8, even in the case where a respondent is bidding multiple sections.

Q63. Depending on the # of cores in the proposed processor and dimm sizes used, a smaller dimm size might fall just below the 5GB/core requirement, but the next larger dimm size almost doubles the requirement and is at a much higher cost. Will you accept slightly less than 5GB/core, ~ 5% less?
   A. In considering this number we recognize the significance in terms of the technological constraints we’ve imposed via other requirements and as such agree to accept configurations specifying 4.8GB/core at minimum.

Q64. Regarding the 300 and 600 client connection requirements mentioned in Sections 5.12.1.1 and 5.12.1.2, if this count exceeds the number of compute nodes, do you still want the bid to include extra network ports that count up to 300/600 client connections as stated, or is there a number of excess ports that you’d like us to configure to?
   A. All bids should conform to the client counts as specified, even if bidding multiple sections.

Q65. Section 5.10.3 says: All benchmarks must be run on a single standard node as defined in 5.10.2.3.4, and Reported benchmarks must be confirmed during acceptance testing as defined in section 5.10.5, it also says in section 5.10.3.1 Required benchmark is HPL (High Performance LINPACK) as run for TOP500 List inclusion.
   B. This does not appear to be a question. Please clarify.

Q66. The remark “as run for TOP50 List inclusion” causes some confusion as to whether the benchmark that must be confirmed during acceptance testing is required on all nodes or a single node? Please clarify.
   A. Acceptance testing requires that all nodes individually run an instance of HPL and all individually meet the vendor-provided value for a single compute node. There is no intent or expectation to run a single-instance cluster-wide performance test.

Q67. The general guidance of costs listed in Section 3.9.8 differ than those specified in Section 5.4, can you clarify which section to use, or re-state what the amounts are?
   A. This was an oversight, the numbers provided in section 3.9.8 are the correct values.

Q68. In section 5.9.4 Footprint (p30) it says that computing environments must not exceed 6 racks. Storage environments must not exceed 2 racks. Please state the desired floorplan for these racks (one row, two rows, etc.).
   A. The 6 compute racks will be contiguous in one row. The 2 storage racks will be contiguous in a different row.

Q69. Will power, water and/or networking cables be carried underground or via overhead trays? If overhead or under floor tray will be used, will they be provided by the University or are we to provide them?
   A. Power connections and networking are overhead. Overhead trays for networking are provided. Water is under-floor.
Q70. Per Section 5.12.6.1 Uptime Acceptance Test (p 46): All fabric components must pass the 28-day acceptance test by providing 100% uptime for 28 consecutive days within 35 days of the start of the acceptance test. Uptime is defined as all fabric components must be available to connect nodes and transfer data. Failures of redundant components are acceptable but need to be resolved during the test. During the acceptance period respondents must report all failures, root cause, and time for resolution. Please define the meaning of “fabric component” as mentioned in Section 5.12.6.1. Per the diagram on pg 50 the only redundant components will be the “Spine/Aggregation Layer” switches. We interpret this to mean that failures of things like switch ports or cables on the node interface sides of the Leaf Switches should not be counted as a failure, please confirm this to be the case.

A. Switch port failures count against fabric uptime. Cable or node failures do not count against fabric uptime.

Q71. In Section 5.9.2 Power it says that Preferred connections are single-phase 30 amps with L6-30P connectors, however 3-phase 30 amps solutions are acceptable. Are 60A 3-phase PDUs also acceptable?

A. IEC 60309 250V three-phase 60A (460C9W) is the maximum single-plug power spec we can meet. Our current receptacles for 3-phase 60A connections are Legrand PS460C9W.

Q72. Do you have a maximum number of PDUs per rack allowed?

A. Maximum power per rack is specified in section 5.9.2. Rack configurations should not exceed those limits, but may utilize the number of PDUs required to power all equipment.

Q73. For Section 5.11.3: Storage Metrics, please ask UA which tool will be used to validate the storage performance and are there existing metrics used with the tool that UA can share with vendors?

A. We plan to use a current version of fio (https://fio.readthedocs.io/en/latest/) to validate storage performance. It will be configured to perform tests that meet the specifications as provided in 5.11.3. Also see Q5, Q24, Q25 and Q26 for more details around acceptance testing.

END OF ADDENDUM