

Exascale R&D RFI-1-KD73-I-31583 Questions

No	Summary Concept	Questions	Answers
1		Is there a preferred submission format for the RFI response (e.g., Word, PDF, etc.)	We prefer that your response to this Request For Information (RFI) consist of a single PDF file, but we will accept a Microsoft Word file as well. We request that your response be organized in sections to show each of our questions listed in Attachment 1 - Exascale Research and Development RFI, in order, immediately followed by your response to that question. We may not read any material after the 50th page.
Conceptual Exascale Program Roadmap			
2		There has been an duality represented in the Exascale roadmap discussions so far by the evolutionary vs. revolutionary models. In the RFI, is there an intent to follow a particular one of the two approaches?	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.
3	Questions about the conceptual exascale roadmap timeline	<p>Please clarify what is the timeline for the RFP process, and when the platform R&D is expected to begin. Are the years in Figure 1 calendar or government fiscal years?</p> <p>On the "Conceptual Exascale Program Roadmap" are the dates Government Fiscal Years or Calendar Years?</p> <p>Exascale Platform R&D looks to be a 7 year program based on the roadmap picture above? Is that correct?</p> <p>Please define the following: When does the "Exascale Platform R&D Program" officially start?</p>	The years in Figure 1 are U.S. government fiscal years. This conceptual timeline assumes the exascale program would begin during the government's fiscal year 2012. Platform R&D would begin in government's fiscal year 2013. However this is only conceptual. The timeline for an RFP process is under discussion within DOE. The R&D and build subcontracts will be multiple year subcontracts. We are interested in hearing industry views on the timeline to achieve the goals identified in Table 1.
Prototypes and Testbeds			
		<p>The conceptual timeline shows a number of testbeds/prototypes in the 2016/2017 timeframe. Can you provide some more description of what these are and what the distinctions between the two are?</p> <p>What is the expectation for the prototypes and testbeds in the 2016 timeframe? Are these expected to be at-scale systems (such as a 200 petaflops system) or are these expected to be small system prototypes (e.g. 1-2 racks)?</p>	One purpose of this RFI is to solicit your ideas on the timing and scale of the prototype and testbed systems that would best lead to an effective exascale system. The terms testbed and prototypes refer to any platform for evaluation or demonstration. We are interested in hearing advice from industry on the need for and the mix of testbeds and prototypes required for the R&D process, that would best lead to an effective exascale system. Please include in your response any information or details related to testbeds/prototypes that you think we should know. However we cannot discuss funding for testbeds and prototypes at this time. This RFI is not concerned with

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4	Questions about the nature of prototypes and testbeds	<p>Define what is meant by “Prototypes and Testbed Systems”</p> <ul style="list-style-type: none"> i. Expectations as to : Scale, Performance, Reliability, etc.? ii. Are these delivered outside of the industry team’s site, or can access be provided on the industry team’s site? iii. Is access shared between the industry team and DOE? iv. What support is required for the prototypes and testbed systems? v. How many of these are required per winner? One for Office of Science and one for NNSA? vi. What money is available for “Prototypes and Testbeds”? vii. Is the money for “Prototypes and Testbeds” separate from the “Exascale Platform R&D” money? viii. How many Exascale Systems are required per winner? One for SC and one for NNSA? ix. What are the limits in how the technologies present in the prototypes/testbeds can differ from the technologies found in the final exascale systems? In other words, is all the revolutionary innovation expected to occur prior to the prototype/testbed availability and then the exascale systems will just be an evolution from that innovation, or is additional revolutionary innovation expected/allowed after the prototypes/testbeds availability timeframe? x. Will the prototypes/testbeds have some form of formal “acceptance criteria” associated with them or are they truly solely intended as experimentation/validation vehicles? xi. What level of system maturity is expected of the prototypes/testbeds (e.g. experimental, qual, production, etc.). 	procuring Exascale systems.
5	Questions about go/no-go decisions	<p>What are the anticipated go/no-go criteria for the prototypes/testbeds and the final system? What process will be used to determine whether the go/no-go criteria are met?</p> <p>Please clarify and refine the go/no go date and install dates for prototypes and full ExaScale systems. How much time is expected to be available between go and install?</p> <p>Explain the “Go/No Go” decision points on the roadmap above.</p> <ul style="list-style-type: none"> a. What is the decision process? b. Implications if any, of a “No Go” to the overall “Exascale Platform R&D” contract for a vendor or team? 	Go/no-go decision points will be identified in the platform R&D contracts where subcontractor will assess milestone results to date. Then the lab-industry partnership will mutually agree to proceed with the next phase of work as originally conceived, renegotiate the next phase of work in light of new information and research results, or, in the event of technical and/or financial roadblocks, stop the work. The dates for the go/no go decisions and the delivery dates of prototype and testbed systems will be negotiated as part of the contract. We are interested in your input on what is the most effective timeframe for prototypes to be deployed and the technology these prototypes would demonstrate.
6		Is it possible that the testbeds / prototypes will have separate procurement funding? Is it dependent on the necessary scale?	Yes, this is possible.

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7		In Figure 1, and page 3, there is a mention of “Application Readiness”. Please describe this process in more detail and the criteria used to define readiness.	Application readiness refers to the process where developers of scientific applications revise their codes in preparation for a new architecture. One purpose of the prototypes and testbeds shown in figure 1 would be to provide a platform to get applications ready for exascale technology.
		Compute Node Architecture	
8	Questions about the definition of a node.	<p>In table 1, the term node is mentioned several times. Can you clarify the definition of a node?</p> <p>Table 1 discusses Node Memory Bandwidth and Node Interconnection Bandwidth, but "node" is not defined. Can a node be defined as a collection of processor cores that share a coherent, shared memory? Is there any requirement for a minimum ratio of memory bandwidth to compute bandwidth within a node?</p> <p>The Table 1 specifies the system node memory and interconnect bandwidths per node. Please clarify what is meant by "node?" I assume that proposals featuring any size computational node would be considered, given that the system level performance reached the 1000 petaflops level that also achieved acceptable memory and interconnect bandwidth. Thus it seems that memory and interconnect bandwidth should be specified in a manner which is dependent on the computational power of the node proposed.</p> <p>Please state acceptable limits of the computational power of a node, if such exists.</p>	The node referred to in Table 1 is a collection of processing and memory elements that that can communicate without going over the system level network. However other architectures are also possible. There is no requirement for a minimum ratio of memory bandwidth to compute bandwidth within a node. We are interested in your ideas for the most effective node, memory, and interconnect architecture for an exascale system that will address DOE's mission needs.
		Memory and Network Requirements	
9	Questions about NVRAM	<p>Memory including NVRAM of 128 petabytes is listed as a target in table 1. Can you please provide more explanation of what is the definition of memory? Does NVRAM address as block transfers, like a solid-state disk, count as memory in this context? How much of this memory do you anticipate will be used for check pointing?</p> <p>What are the anticipated requirements for the split of capacity between DRAM and Non-Volatile RAM?</p>	There is no requirement for the split between DRAM and NVRAM. The intent of the “Memory including NVRAM” goal in Table 1 was to specify “user addressable memory”. The 128 petabytes goal does not include NVRAM used for solid-state disk or any memory reserved for check pointing. We are interested in your ideas for the most effective memory architecture for an exascale system that will address DOE's mission needs.
10	Questions about bandwidth and related specifications	<p>What is the expected ratio of FLOPs to interconnect bandwidth? Are these metrics intended to be bandwidths per node?</p> <p>Please specify the memory bandwidth in a manner that is independent on node computational power (e.g., memory bandwidth per FLOP).</p> <p>Table 1 has a requirement of memory bandwidth per “node” of 4 terabytes/second and total memory capacity of 128 petabytes. Do the requirements allow a hierarchy of memory within a node, the fastest of which supports the 4 terabytes/second requirement, in combination with other memory types that may have a lower interconnect bandwidth?</p>	We are interested in your ideas for the most effective memory architecture for an exascale system that will address DOE's mission needs. Memory bandwidth capabilities and node interconnect capabilities may vary between alternative architectures.

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		Please specify the interconnection bandwidth among the nodes in a manner independent of node computational power (e.g., bisection bandwidth).	
		What are the additional network requirements such as short-message performance or bisection bandwidth of the machine-wide network?	
Technology and Exascale System Goals			
11		Referring to Table 2: Architectural and Technology Challenges, within each category, can E7 prioritize the features listed?	The Architectural and Technology Challenges in Table 2 are exemplary. Today it appears that achieving high performance while managing power consumption is the ubiquitous high level challenge. Your response should reflect the priorities as you see them, consistent with achieving the stated goals.
12		The memory goal (listed in the table in the RFI) for the 2019-2020 Exascale system is 128 petabytes. Do the 128 petabytes encompass the total system memory which includes processor cache, DRAM, Solid State Drives, and rotating media?	The memory goal of 128 petabytes for the 2019-2020 Exascale system does not include processor cache, solid state drives and rotating media.
13		Is phase change memory one of the considered alternatives for memory architecture?	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.
14		In Table 2, within Memory and Storage, "photonic DRAM" is listed. Can you please provide your definition of "photonic DRAM"?	The Architectural and Technology Challenges in Table 2 are exemplary and not an exhaustive list of options. Conceivably DRAM modules might be developed with photonic data interfaces.
15		Are there expectations for new network technologies, from transports to topologies?	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.
16		The power of 20 megawatts includes only compute racks. If we chose to use a custom network, can we exclude the power of that network from the 20 megawatts total?	The 20 megawatts power consumption goal is envisioned to encompass the compute nodes and their communications interconnect.
17		Can you elaborate further on the "to-be-specified applications" for the 300 petaflops performance target? When will these applications be available? What will they be based on? How will performance be specified and verified?	Applications will be come from DOE mission areas. DOE Labs have considerable experience evaluating the performance of applications and will apply that expertise to setting performance metrics. The timeline has not yet been established.
18		What is the definition of application efficiency in the footnote of Table 1 that refers to MTBAI? How does reduction by half for automatic fault recovery factor into the performance targets elsewhere in Table 1?	MTBAI is mean time between application interrupt, where user or administrator action is needed to resume or continue computations. Automated fault recovery capabilities may be used to increase MTBAI by avoiding situations where user or administrator action is required. The goal is that automated fault recovery capabilities will not significantly reduce application efficiency.

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19		To what extent, if at all, is your Exascale RFI interested in hearing proposals around new approaches to the problems presented that require some basic research to validate?	Respondents to this RFI should consider the timeframe that DOE has selected for the deployment of an exascale system.
Data Transfer, Checkpoints and Storage			
20		The RFI mentions nothing about storage systems. Do you expect the RFP to include a storage system solution? If not, will there be additional requirements to support an external storage system (e.g., function shipping to I/O nodes, bandwidth or ports for I/O on the switch fabric, multi-protocol support or gateway nodes)?	We are contemplating storage relative to future Exascale platforms. The purpose of this RFI is to solicit your ideas on approaches, potential solutions, and R&D required, not to advocate, prescribe, or proscribe any particular solution or technology. File systems, I/O, and storage is currently envisioned to be a cross cutting effort, at least in that we desire for common I/O methods to work on all Exascale systems. We expect that file systems, I/O, and storage to not necessarily be provided by the Exascale system vendor, but we are not prescribing a solution that requires different providers. We are favorably disposed to an I/O-Storage architecture that allows for multiple industry players to add value, and solicit your input about how to best accomplish our goal.
21	Questions about file systems	<p>Are there any file system and I/O requirements?</p> <p>Does DOE intend to include the I/O subsystem (e.g., file system and storage hardware, external networking connections) with the compute portion of the system as part of the R&D and later build RFP process? If yes, what performance and capacity targets does the DOE have? If no, how can potential bidders address Exascale challenges associated with resilience (new checkpoint/restart facilities for resilience), file system, hierarchal storage issues?</p>	File systems, I/O, and storage are currently envisioned to be a cross cutting effort, in that we desire for common I/O methods to work on all Exascale systems. We expect that file systems, I/O, and storage to not necessarily be provided by the Exascale system vendor, but we are not prescribing a solution that requires different providers. We are favorably disposed to an I/O-Storage architecture that allows for multiple industry players to add value. The purpose of this RFI is to solicit your input relative to new technologies, ideas, and concepts you might suggest for us. In the past and currently we are not able to productively overlap I/O and computation, so we would be interested in your approaches there, and also how we could optimally deploy and manage attached storage. Those are just examples and your response may address other areas. If you have cogent and relevant thoughts or advice for us relative to these questions you pose, or others, that are directly or indirectly related to this RFI then please do discuss them.
22		Is there interest in a pull model of data transfer and mobility across multiple geo-distributed clusters.	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.

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23		In the Architecture and Technology Challenges to Building Exascale Computers for DOE Missions NVRAM is mentioned as a gap filler for memory and storage traffic. Is there interest in an appliance based, intermediate layer between the compute and I/O nodes, that would accelerate the data traffic for Exascale?	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.
24		Is there interest in using a hypervisor for de-synchronizing the checkpoints?	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.
Analytics			
25		Analytics is not included in the Architecture and Technology Challenges to Building Exascale Computers for DOE Missions. Is there a requirement, interest, desire for further discussion of using analytics appliances for big data streams reduction?	We are interested in your input on technical approaches and solutions that could be developed and utilized in an exascale system that will address DOE's mission needs. The technology is not restricted to the areas mentioned in the RFI or any of the exascale workshop reports.
Software and Programming Models			
26		Page 8 refers to DOE funded software efforts – can you clarify what additional DOE funded software efforts we should be aware of?	DOE funded software efforts include: co-design centers, SciDAC institutes, and other software projects. Descriptions of these efforts can be found on the DOE website.
27		How does DOE expect vendor associations to collaborate and/or work with the DOE Exascale Software Center (ESC) or other DOE sponsored system software development efforts?	We are interested in your ideas for the most effective process for developing software for exascale systems that will address DOE's mission needs.
28		Should there be more than one winning team, what expectations does the DOE have for collaboration between the teams on things like the programming model?	We anticipate working with industry partners to pursue the highest value partnerships. This RFI is an opportunity for you to tell us how you think partnerships and co-design should optimally work to meet the goals of the exascale program. It is a DOE goal that exascale programming models be accepted and standardized by the HPC community.
29		Is resource management and scheduling considered a critical technology for exascale computing?	We are interested in your input on technical approaches and solutions for software for exascale systems.
Cross Cutting R&D			
30	Questions about selection of cross cutting technologies	After getting input from Industry in the RFI, how will DOE facilitate many party discussions on "critical" or Cross-Cut technologies prior to the DOE EI RFP Release? How will the cross cut investments be selected? If there are disagreements between the selected teams about the required features or performance of the cross cut technologies, how will these be resolved?	This issue is under discussion.
Co-Design			

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31		<p>Please provide a consistent definition of co-design that applies everywhere the term is used. For example, sometimes the term is used to mean the design of hardware and software in tandem, but in other cases it appears to mean systems design undertaken collaboratively between Lab partnerships and vendors.</p>	<p>Exascale co-design is the interactive, multi-disciplinary design and development of the exascale computer system with the applications / algorithms that are required to achieve the mission goals. The span of technologies that are integrated include hardware, system software, application software, cross cutting technologies, etc. and may include technologies that are developed by component technology developers, system integrators, laboratory developers and perhaps academic collaborators. For the Co-design process, the application targets are identified up-front (there are now three application codesign centers, but more DOE and NNSA applications will be identified over time). The performance on the target applications on the target machine becomes one of the key criteria for success. For this reason it is incumbent on the vendors to work iteratively with the applications teams to make design trade-offs that maximize application performance and the apps teams to make design changes that better map onto the target machine architecture early in the system design cycle. Incorporating this iterative, bidirectional and cooperative process into the design cycle is hardware/software/applications co-design.</p>
32	<p>Questions about curent and future co-design centers</p>	<p>What co-design centers have been awarded and what is the timeline for additional co-design center award announcements? When will the NNSA co-design centers be announced?</p> <p>Page 8 asks us to describe the approach to working with the co-design centers. There are three such centers, and not all vendors are associated with more than one. Can we assume we can outline other approaches to co-design engagements with DOE?</p>	<p>The initial three DOE/ASCR Exascale Co-Design Centers were announced at the SciDAC Conference in June (see http://events.cels.anl.gov/scidac11/, Daniel Hitchcock's presentation). Additional DOE exascale co-design centers are also anticipated. RFI respondents are encouraged to describe approaches to Co-design engagements that you feel are viable.</p>

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33		<p>Co-design of architectural choices for system designs (software and/or hardware) is mentioned.</p> <p>i. What process will be used to determine co-design projects?</p> <p>ii. Do the co-design projects and participants need to be named in the RFI / RFP response?</p> <p>iii. What process will be used for co-designing systems?</p> <p>Will there be formal project plans, milestones, and dates by which recommendations are required?</p> <p>iv. Does the R&D contract fund the co-design efforts?</p>	<p>"We are interested in how you think co-design should work, particularly what options you see for establishing partnerships, creating efficient process, negotiating plans, funding options, and IP management. Answers to specific questions are below.</p> <p>i. All projects funded under the DOE exascale program are expected to participate in co-design efforts. It is anticipated that this communication will be essential. Some co-design projects are the the recently named exascale co-design centers, others will be the critical, cross-cutting technology projects that are the subject of this RFI, others are yet to be determined.</p> <p>ii. The co-design projects and participants do not need to be named in the RFI response.</p> <p>iii. The process for co-designing exascale platforms will draw from past experiences of the participants, best practices in project and risk management, and other resources. You are free to suggest processes that DOE should consider. Project management tools and documents will be used, for example, to plan, track progress and manage risk.</p> <p>iv. As mentioned above, R&D contracts are anticipated to participate in DOE co-design efforts. But all separately funded DOE exascale projects have roles to play in co-design.</p> <p>v. The CRADA agreement may be a likely starting point for DOE/NNSA collaborative development projects. But there will likely be need for negotiation among all co-design parties."</p>
Available Funds			
34	<p>Questions about the cost goals for the exascale system.</p>	<p>What cost guidelines are there for the Exascale machine? This is important to machine balance (for example) because at an optimistic cost of \$2/GB of DRAM, just 64 Petabytes of DRAM will cost \$128 million.</p> <p>Table 1, Exascale System Goals, in the RFI document, defines the goals for an Exascale System in 2019-2020 around the dimensions of performance, power, and reliability. What is not stated is the product dimension around price. For a system coming out in 2019-2020, with the features defined in Table 1, what is the product price goal?</p>	<p>We are interested in your views of the investments required to reach the goal of fielding an exascale system in 2019-2020 to effectively address DOE's missions. Multiple scenarios may be proposed, e.g., increased technology R&D that yields lower system cost, costs of alternate R&D investments to yield different memory capacities and different system costs.</p>

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35	Questions about the funds available for R&D.	<p>About the money available for “Exascale Platform R&D”</p> <p>i. How much money will be available?</p> <p>ii. How will money be awarded? 1 winner? 2 winners?</p> <p>iii. Will each winner be awarded the same amount?</p> <p>iv. Define what is meant by “co-investments”. Can you provide an example?</p> <p>v. In Attachment 1, 2.1 “fully funded” is used. What does that mean? Does this imply 100% funding?</p> <p>vi. In Attachment 1, “funded” is used. What does that mean? Is this “co-funding”?</p> <p>vii. What kind of “cost share” will be allowed?</p> <p>Ex: Gov’t/Industry = 100%/0% or 70%/30% or 50%/50% or ?</p>	We are interested in your estimation of the costs. The number and amount of awards and the requirements for cost sharing are not specified in this RFI. Contract amounts are subject to negotiations. RFI references to full funding are meant to include both DOE funds provided and your cost sharing. The intent of cost sharing is to fairly allocate risk, investment and benefit among the parties involved.
36		The response to the RFI is expected to include milestones and estimated development costs; although this would likely make sense for the evolutionary model, how could this be anticipated now for the revolutionary approach?	We are interested in your input on costs. In those situations where costs can not be accurately projected, we request that you provide an estimated cost range.
Cost Sharing			
37	Questions about cost sharing requirements and the ownership of intellectual property rights.	<p>What is the process of determining the co-investment between the respondents and the DOE? What criteria will be used? How will this be validated and monitored?</p> <p>What are DOE's expectations in terms of partners cost sharing targets? If partners base product investments that the DOE exascale program will leverage are large relative to the DOE potential investment will those base investments also be also considered and how will that impact the required cost share?</p> <p>How does the DOE intend to handle IP generated in the co-design process? Specifically, will the vendors own the IP which is generated in co-design and then incorporated in their products? Will the vendors be required to include any DOE co-design IP in their products, or will it be entirely the vendors’ decision?</p> <p>Is there an intellectual property agreement preferred for use in co-design efforts or is this negotiated with the co-design parties?</p>	If proposals are solicited, the proposals must reflect the total value of the proposed work. The E7 will evaluate the proposals to ensure that the totality of the work to be done is included in each proposal. Historically if the offeror elects to pursue ownership of its IP, DOE will require the offeror to fund at least 40% of the total value of the proposed work and will rely on the E7's opinion that the proposal reflects the total price of the work. Any resulting subcontract would be issued for 60% of the proposed price. In the area of technical advances arising from the co-design process, the DOE may adopt a policy that is similar to our CRADA IP provisions -- IP developed by Industry collaborators is owned by them; IP that is developed by the National Labs is owned by DOE or NNSA; IP that is jointly developed is jointly owned.
Intellectual Property			
38		Please clarify the level of distribution, within the E7 and DOE, of confidential and proprietary information (as marked in the RFI response).	The RFI responses will be read and evaluated by technical representatives of the seven DOE laboratories and DOE program offices named in the RFI.

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39		The cover letter says, "Unless restricted, information submitted in response to this RFI and subsequently used for procurement purposes may become subject to public disclosure pursuant to the provisions of the "Freedom of Information Act". What exactly is meant by "restricted" -- do you mean information in the RFI, which is marked confidential and proprietary?	Yes. The E7 laboratories are required by their Prime Contracts with the DOE to treat any properly identified "confidential" or "proprietary" information in accordance with its restrictive markings. By marking information as "confidential" or "proprietary" it provides a basis for withholding the information if a Lab or DOE receives a FOIA request.
40		Our solutions are implemented globally and commercialization of the technology requires selling products throughout the world. Will there be any export restrictions placed on IP developed in the course of this program?	Each company will be responsible for conducting its own export control review before commercializing its technology.
41		What will be the process of determining the co-design technologies and what are the expectations on publication of IP developed in a co-design project.	The specifics regarding publications will be addressed in the appropriate funding agreement.
42		Does DOE intend to issue any class waivers? If so, in what technical areas is DOE considering issuing such waivers? Since class waivers are usually initiated by DOE Headquarters, does DOE or the laboratory partnership desire input from industry teams regarding the specific technical areas or projects for which a class waiver would be desirable? Are there any portions of the projects for which class waivers will not be considered by DOE?	Per 10 CFR 784.7, class waivers must be pursued with DOE by the industry or group of firms that wishes to obtain a class waiver.
43		It is assumed that the Industry Members will own the technology that they develop for this program with Licensing Rights back to the Gov't. Correct?	This will depend on the implementing agreement.
Partnerships			
44		Can a company/"Industry Sub" be a member of multiple "Industry Teams"?	Yes.
45		How many Laboratory-Industry Team Partnerships are expected?	The number of Laboratory-Industry team partnerships has not been determined at this time.
46		Will all the Laboratory-Industry Team Partnerships be self-assembled?	We expect industry teams to be self-assembled.
47		In a Laboratory-Industry Team Partnership, who determines the allocation/share of funding to the various Industry Subs that are members of the Industry Team?	The level of funding to the various team members will be determined during contract negotiations.
48		Is the "R&D partnership with the E7 labs" an instance of a co-design relationship or a different type of partner relationship?	The R&D partnership with the E7 is that which is described in the section titled, "Laboratory-Industry Team Partnerships." We would like to hear industry advice on co-design partnerships for Exascale R&D.
49		Are RFP industry teams limited to those specific industry teams that submitted an RFI together?	No.
50		Is there opportunity for responders to have different business roles (i.e., Prime vs. Subcontractor) for R&D vs. system delivery?	Yes.
51		Can one party on an industry team prime the R & D phase and another party on that same industry team prime on the system acquisitions?	Yes.

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52		If one industry team member primes but there is a reasonable mechanism (e.g., including technology transfer) for another of the same industry team to take over the prime role if the original prime cannot or does not deliver against obligations, will DOE/E7 consider the strengths of the “backup prime” when evaluating the proposal? If yes, what prime “transfer mechanisms” would DOE/E7 need or want to see to gain comfort from the existence of a “backup prime”?	At this time there are no restrictions on companies having different roles during different phases of their work." Assignment of a subcontract from one subcontractor to another may be allowed with the approval of the contracting organization and DOE. We cannot comment on the content of future solicitations at this time so cannot currently describe how we will evaluate RFP responses.
Contracting for R&D			
53		<p>Is the contract “guaranteed” for 7 years? What is meant by “Progress Payments against Milestones”?</p> <p>i. Are these lump sum payments at demonstrated completion of milestones? Milestones carry a payable amount? ii. Monthly or Quarterly Payments with dependence on demonstrated forward progress? iii. Other?</p>	Contract durations have not been determined and are subject to negotiation. Progress Payments against milestones would be payments made on demonstrated progress towards specific milestones. Milestones may also carry payments due on demonstration of completion of the Milestone.
54		With respect to E7 governance, E7 will monitor progress/risk and be responsible for payments. What process is envisioned for this? Semi-annually reviews? Other?	For system deployments, it is envisioned that acceptance test processes and procedures will be part of the SOW to ensure that the E7’s functional requirements are met prior to acceptance of the system. For the R&D efforts, progress would likely be measured by milestones being met and regular monthly, quarterly and/or semi-annual progress reviews.
55		<p>When will money will flow to winners?</p> <p>i. After signing of a Contract? ii. If formal start of Exascale Platform R&D Program is (for example) Oct. 2011 but contracts don’t get signed till Oct. 2012, can work prior to Oct. 2012 be billed as part of the contract?</p>	Since the subcontracts will have multi-year periods of performance and because DOE funds E7 contractors annually, subcontracts would generally be issued with funding adequate for the first year of effort. Subcontracts would be funded at least annually for the effort expended in the next period. Costs incurred outside of the term of a subcontract are unallowable and will not be reimbursed.
56		Is the money for the Exascale System(s) separate from the “Exascale Platform R&D” money? Will the Contract for “Exascale Platform R&D” be separate from the contract for delivery of any “Prototype / Exascale System” delivery? That is, can the R&D phase of the program and the systems acquisitions be covered under separate contracts or must they be covered under one large contract?	We are interested in your input on the optimal plan, including whether elements of the program should be combined and the best combinations to make.
57		From a contractual standpoint, does the DOE expect to have a multi-phase R&D effort (with payment milestones), with the prototypes/testbeds and system delivery as contractual options? What is the anticipated approach to contracting?	R&D will be conducted over multiple years and will continue even after the build decisions are rendered. R&D may be performed under fixed price subcontracts with negotiated milestone payments. The R&D and build efforts will be on separate subcontracts. R&D will be non-commercial work and could have IP provisions favorable to the subcontractor if patent waivers and copyright provisions are negotiated with DOE. The build subcontract will be commercial work.

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58		Assuming a 7 year R&D contract, it will be difficult to define explicit milestones many years in the future. What process will be used to make “adjustments” to milestones and the contract?	An R&D roadmap should be part of any formal proposal that will be subject to negotiation. After award, changes in circumstances and rates of progress may result in renegotiation of R&D efforts and corresponding milestone payments.
59		Will the contract be a FAR based agreement or a Technology Investment Agreement (TIA)? If the contract is a TIA will the patent statutes apply?	The Contract will be based upon the E7 Contractor's prime contract with DOE, and FAR based flow-down clauses, as applicable.
60		What will be the term of the contract(s)?	No official start date has been set. The R&D and build subcontracts will be multiple year subcontracts.
61		How does the DOE intend to manage risks associated with reliance on the cross cut technologies? Specifically, will the Laboratories enter into contracts directly to the cross cut technology providers and will the Laboratories therefore play a kind of “general contractor” or "coordination" role?	We cannot speculate on the risk mangement strategies of future solicitations, but we are interested in how you would propose to manage risk in any cross cut technologies you think important.
62		What criteria will be used to evaluate the commercialization of the technology? How will this impact the decision?	FAR 2.101(b)(2) will be used to determine if the equipment meets the definition of a commercial item.
63		How does DOE recommend potential bidders mitigate the potential Organizational Conflict of Interest (OCOI) issues associated with bidding collaborations for joint software development with E7 labs as part of the R&D process? Note that this is a separate issue from collaborating in a co-design process with DOE which does not have OCOI issues because it is required of all potential bidders as part of the RFI/RFP process.	If an Organizaitonal Conflict of Interest is determined to exist, and it cannot be neutralized or avoided by specifically drafted contract clauses, a mitigation plan would be drafted for DOE approval. This plan would include specific, special contract clauses mitigating the OCOI. Please submit your plans in your response, consistent with our overall goals.
Classified Activities			
64		Will the prime subcontractor be required to access DOE classified information? If so, what type of clearances will be required and for about how many employees of the prime subcontractor’s team? Will the classified information be accessed only at DOE sites or will the prime subcontractor be required to hold any classified information?	Typically, subcontractors on projects of this nature will be in laboratory security areas where escorted access is required and classified information may reside. Actual access to classified information is rare. In this instances, the subcontractor must obtain a facility clearance and a Foreign Ownership, Control, or Influence approval from DOE. If access to laboratory security areas is not required, these approvals are not necessary. Equipment placed at DOE sites is subject to their security audit. The E7 Contractors will not acquire supplies and services that are prohibited by any proclamation, executive order, or statute administered by the United States (U.S.) Department of the Treasury, Office of Foreign Assets Control (OFAC) or OFAC’s implementing regulations at 31 CFR Chapter V.
RFP Evaluation Criteria			
65		What can you say at a high level about the evaluation criteria for the RFP responses (proposed system performance, system delivery schedule, corporate risk, co-design model, etc.)? How would you prioritize the criteria in your decision making process?	We cannot comment on the content of future solicitations at this time.

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66		Table 1 specifies goals. How will system performance be evaluated for the RFP responses and later in the program? Will there be mandatory or desired values for specific attributes such as memory bandwidth and size, injection and bisection bandwidth, etc.? What overall performance requirements will there be (peak, Linpack, other)?	We cannot comment on the content of future solicitations at this time.
RFI Footnotes			
67		The link in RFI footnote 5 is not working, http://extremecomputing.labworks.org/hardware/report.stm	There has been a change to the website. Please refer to the Workshops tab at http://extremecomputing.labworks.org/ or to http://science.energy.gov/ascr/news-and-resources/program-documents/