Lessons and feedback of the Santa Fe Meeting

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IESP, a necessary but difficult initiative

Two important words : `Software` and `International`
+ `long term`
+ `multi-disciplinary`
+ `multi-stacks` : Computer Science/Applied math. researchers, end-users (too few), academic/industry, vendors, agencies, service providers (?), editors (?)

Thanks to US DOE/NSF agencies for having launch this project

Thanks to Jack and Pete for managing it

Remark 1: clarify the IESP objective's, expected result's and available resources

Clarify the expected result of IESP (content and format)
⇒Proposition: describe in two pages the expected results of IESP

Clarify the motivation for having a coordination of software R&D for Exascale. Does software R&D needs a vision (or several) of what would be an Exascale system?

Shall the spectrum of Exascale issues addressed by the workshop be reduced? Shall we establish priorities?

Define agenda, objectives and format (template) for each contribution IESP ask to the participants

Remark 1: clarify the IESP objective's, expected result's and available resources

Is IESP interested only on Exascale or does it include Petascale issues as well (this is an important demand of the research community) ?

On which point could we (and are we ready) to coordinate and collaborate in the mid-term, given the current and future responsibilities and duties of the players?

⇒ **Proposition** : identify already existing projects (Japan, US, EU or at national level) in charge of developing Peta/Exascale software (similar to the Pete's list for Open Source software) :

- ❖ Goals : what, what for, for whom and what purpose?
- ❖ Planning
- ❖ Partners
- ❖ Model of development and maintenance (open source, commercial product)

Remark 2: Open source raises many questions

Which organization, working mode to be put in place for guarantying sustainable (developing, deploying, maintaining) open source software at international level?

Does IESP wants to propose general rules for producing and maintaining Open source software, promote best practices?

Is the open-source approach accepted/acceptable for Operators of SuperComputing Centers ? How can we make sure that users are well supported if they need to use open-source software? What is the path (or shall we establish a path) from prototype open-source software to production quality, industry supported software?

How a vendor could integrate an open-source software and assume the related responsibilities for its clients?

Remark 2: Open source raises many questions

Is Open Source the unique answer for Peta/Exascale systems? It makes sense for OS software stack: sharing development, synergies between academia and vendors, …

But what about end-user software environment (pre and post tools as an example)?

Combining the best of the two worlds, Open source and commercial tools?

Proposition: creation of a IESP "transversal" working group dedicated to Open Source

Remark 3: Recommendations and questions as seen by the different players

Agencies

Questions. What is the research community looking for and how the agencies could satisfy it?

Proposed action: put all agencies in a room to discuss what mechanisms could be put in place to ease financing international coordination and collaborations

Reversely, what agencies are looking for and how the research community could satisfy them?

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Remark 3: Recommendations and questions as seen by the different players

Operators of Super Computing Centers

Questions: How resources are mutualized across centers and between users? What organization, what technical solutions? How to make possible the use of such capacities for industrial end-users? Or non-national users?

Proposition: compare views and practices in US (INCITE), EU (national and European scale) and Japan.

Remark 3: Recommendations and questions as seen by the different players

Vendors

Recommendation: reduce the spectrum of issues to be addresses and establish priorities

Questions: What collaboration model should be developed between researchers and vendors' engineers? If we assume that the hardware will experience unavoidable failures, and that none of the hardware and software mechanisms can compensate 100% of failures, what contract model should be established between the vendor and the client?

Remark 3: Recommendations and questions as seen by the different players

Industrial and academic end users

Recommendation: IESP should address applications and enabling technologies: programming languages, solvers, libraries, visualization, integrated simulation platforms

Future IESP workshops should consider having a track discussing about the development of these elements (software components that simulation tools developers use to produce their simulation environment)

Remark 3: Recommendations and questions as seen by the different players

CS and AM Researchers

IESP is a very nice source of exiting problems for researchers

Recommendation: Even if defining the research topics and objectives may take a while, it would be important to find ways to involve researchers immediately, this may be done through international collaborations.

Address enabling technologies: preprocessing tools and data, solvers (ODE/EDA, non-linear, linear algebra, …)

Identify research problems that would, in mid and long terms, lead to software tools that could be integrated in industrial computation schemes. Funding is very important.

Questions: shall we establish more relation with industrial partners (an ecosystem would require a tight connection between researchers and vendors)?

Remark 4: Foster IESP impact and increase the set of communities involved

Some propositions

Award for the Best IESP paper in a top level conference like SC (this would be an outstanding incentive for researchers).

Get back inputs from existing End users workshops

Organize (motivate the organization of) BoF/track (at SC for example), one per large community (Computer Science, Applied math., Climate, BIO, Health, Energy, Aeronautic, Engineering, …) addressing the same set of questions:
- Describe your actual roadmap (2010, 2015, 2020 milestones)
- Describe identified hurdles (scientific, technical, organizational)
- What opportunities raise Peta/Exascale capacities for your community?