

## NumPEX

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Pilots institutions: CEA, CNRS, INRIA

Scientific directors: Mr. Jean-Yves Berthou, Mr. Jérôme Bobin, Mr. Michel Dayde

### Key strengths of the project

The goals of this ambitious proposal are to design and develop software tools for exascale computing machines and to prepare for major applications in important domains of science and industry that fully exploit the capabilities of these machines. This program will help to position France as a very significant player in Europe's goal of hosting an exascale machine by 2024. In sum, this program has the scale and breadth of global scientific ambition that responds to the ANR call for proposals.

The three directors are very experienced and have complementary profiles (from a young outstanding scientist to an experienced manager who has held leadership positions in the private sector, and a former head of a large public research institute).

### Main weaknesses of the project

This program is quite broad and ambitious, all centered around developing the tools needed to run an exascale computing architecture. In that regard, it is very complete and ambitious. However, it would have been a stronger proposal if it would have dived into one or two areas (perhaps one in fundamental research and one from industry) to illustrate how the work of this program would advance the addressing of important questions in industry and academia. Without that, the proposal is rather abstract and technical, without evident significance in its applications. Will it simply be able to answer current questions and handle current large amounts of data faster than current peta-sized computers or will it truly be able to answer questions that current computing architectures cannot?

Similarly, training is clearly a very important of any national project such as this one. However, while the applicants list a number of training activities such as hackathons, MOOCs etc, no further details are provided nor is it evident who will mount such an ambitious training agenda.

### Recommendations and areas for improvement

Overall, the committee was very enthusiastic about this proposal. It aligns with the overall goals of the program-to position France as a leading international player in an area of strategic importance to the country.

Areas for improvement include first, more specificity as noted above regarding possible applications to academia and industry. Second, the proposal includes an important section on training but it is rather vague. Several possible training activities are proposed such as winter/summer schools, MOOCs,

hackathons and coding sessions but no details are provided. In addition, no details are provided as to who will actually deliver on this ambitious training agenda. Third, the committee strongly suggest that the applicants lay out a better map of all they are doing and identify projects not currently funded that would enable exascale computing in a reasonable timescale.

How would ANR funding help to plug gaps as well as bring disparate elements together and train a new generation of outstanding researchers?

With these details built it, the committee believe this project has the potential to be truly transformational.

### General assessment

This is an ambitious but achievable program that would situate France as a leader in the next stage of the evolution of computing power into the exascale era.

The 3 leaders of the proposal are well positioned to take on this project and they have the institutional backing of the key organizations in France to do so.

The committee is very enthusiastic about this proposal and recommends that it be funded.

This summary is the result of the Committee's collective analysis of the project, taking into account the discussions of the Committee during its meetings.