France Grilles International Advisory Committee
Report from the Meeting on April 26,27, 2012

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Overview

The committee was impressed by the progress made by France Grilles in the last year. France Grilles has made strong contributions to the EGI federation, the French Grid has been operated with excellent reliability and availability, and there has been excellent progress on many of the recommendations from 2011.

The committee was also very pleased with the organization of the IAC meeting. The information presented covered France Grilles activity at an appropriate level of detail and the timing allowed for the committee's many questions. All presenters answered questions with a spirit of openness.

The committee would like to thank Renater for hosting the meeting and providing excellent meeting facilities and Geraldine Fettahi and Vincent Breton for impeccable organization and hospitality.

1 France Grilles Strategy

Findings

France Grilles does not have a documented strategy endorsed by the France Grilles Council. Formalization of a strategy has been repeatedly recommended by the IAC. The Director said that the Council had discussed strategy, but had not yet reached the point of being able to endorse a document. An outline was presented of the strategy that France Grilles is pursuing in the absence of formal endorsement.

Comments

The absence of a Council-endorsed strategy is a serious problem. It appears to reflect the absence of a common view among the council members of the role and responsibilities of France Grilles within French science. This in turn leads to the science communities seeing a lack of clarity in what they can expect from France Grilles. The committee believes that the optimum role for France Grilles is that of an

Institute, a lightweight body with a mission to coordinate and stimulate, rather than a service organization, with a large ongoing responsibility for providing resources. This appears to be the *ad hoc* strategy that is currently pursued.

Recommendation

An approved strategy is vital to the success of France Grilles in the support of French science. The Director should make every effort to communicate this need to the Council such that France Grilles has an endorsed strategy before the next IAC meeting.

2 Mandate

Findings

The first element of the current mandate is "Establish a national grid infrastructure for storage and analysis of massive scientific data".

Comments

This mandate appears to focus on resource provision rather than coordinating a science-motivated service to science. It does have the merit of being easy to understand.

Recommendation

The first element of the mandate should be clearly motivated by science.

3 Organization

Findings

The France Grilles organization chart is confusing. For example it was stated in response to questions that the "Executive Board" does not have an executive role. The position and connection of the "Expert on Cloud Computing" box was also revealed to be misleading. The role of the Science Advisory Committee became clear only after some discussion.

Comments

A clearly understandable organization is very valuable. All involved should understand their roles and existing or potential science users should be shown an organization that they can understand, and where their interests are clearly represented. The Web version of the organization chart might benefit from a brief explanatory text linked to each box.

Recommendation

Ensure that the organization chart is a good reflection of how France Grilles is managed and functions.

4 Corporate Identity

Findings

The committee saw indications that France Grilles was not identifying itself clearly to the political and scientific communities who should know of its existence and mission. These indications were typified by the absence of any link to France Grilles from the IdGC web site.

Comments

What, in the commercial world is known as "Corporate Identity" and treated with great seriousness, is just as important for entities with roles in science. For example, the necessary engagements with other entities will be greatly facilitated by their awareness of France Grilles.

Recommendation

Ensure that entities and projects with relationships to France Grilles clearly identify France grilles in their web sites, proposals, and other external-facing documentation.

5 Engagement with Other Grid/Cloud Entities

Findings

The committee heard that France Grilles was involved with two EGI Council task forces.

Within France, it is certain that both regional and science discipline-focused computing infrastructures will be funded in the future.

Comments

The committee endorses engagement with EGI and EGI Council task forces. It is important to contribute in a way that has an impact and to identify this impact.

Within France, if significant new infrastructure is funded without any coordinating involvement of France Grilles, France Grilles will be seen to be marginalized and failing in its mission.

Recommendations (see also 5b)

a) Engage with European and International Grid/Cloud entities, identifying the purposes of the engagements and documenting their outcomes.
b) Be proactive in offering engagement with French regional and science-discipline resources, from their planning stage, to ensure that they become part of France Grilles wherever this would be appropriate.

6 Budget

Findings

To a casual observer, the budget appears to comprise many lines of expenditure some of which appear to be arbitrarily chosen. However, after an in-depth explanation of each item, the committee was able to understand the reasons for each line and concluded that, for example, the requested budget for 2013 was entirely reasonable and was needed to execute the *ad hoc* strategy (in the absence of a Council-endorsed strategy).

Comments

The budget justification should be intelligible without a verbal explanation from the Director. An intelligible budget justification is an important tool in allowing funding bodies and scientists to understand the strategy being pursued by France Grilles and the complementary resources that it will be their responsibility to provide.

Recommendation

Ensure that every budget line is linked to a concise explanation of how this expenditure is required to execute the France Grilles strategy, be it *ad hoc* or formally endorsed.

7 Business Model

Findings

Currently computing resources and user support are being offered free of charge to make the Grid attractive to new user communities. These free resources include both a small fraction of the resources installed for the IN2P3/CEA physics and astronomy programs, plus prototype and "pump-priming" investments made by France Grilles.

Comments

The business model must be driven by the strategy. The committee's comments assume that France Grilles pursues its current *ad hoc* strategy.

Offering services freely and free of charge is a necessary way to attract new communities. It is a poor way to offer intrinsically costly services on an ongoing basis, since this will tend to discourage researchers and institutes from seeking out sustainable funding themselves.

Storage services most strongly demand a robust business model that brings strong incentives to use these resources in a wise and prioritized way.

France Grilles currently invests in hardware, including the renewal of existing hardware and prototyping activities. Apart from potential seed investments, for which a clear process must exist, France Grilles should not invest in hardware centrally but work with the its partners to ensure an appropriate hardware base,

leveraging the "brand" of France Grilles in national and regional competitions for hardware.

The detailed metrics for measuring the success of engagement and seed activities need careful thought, but a good metric for success is that the resource providers become sustainable themselves and do not need France Grilles to fund their hardware. The timing of any transition from free access to resources to being required to contribute needs careful thought.

The conditions that trigger a requirement for a science discipline to contribute resources also need careful consideration. France Grilles should make it clear from the start that their mission is to provide more cost-effective computing for science than can be achieved when regions or science disciplines acquire their own mutually isolated resources. The long-term mission is to enhance cost-effectiveness through integration of these resources, while fully supporting the priority for regional or science discipline exploitation of the integrated resources.

Recommendations

a) Document and publish a clear process that France Grilles will use in requesting and allocating seed funding.
b) Work with funding bodies to establish policies that requestors of new infrastructure funding should discuss their relationship with France Grilles while preparing their proposals.

8 Cost Analysis

Findings

A detailed analysis was presented of the effort needed and spent on "central NGI tasks". The current effort of 6.3 FTEs appears to be sufficient to handle critical tasks but falls well short of the estimated 10.3 FTEs needed to perform all tasks efficiently. The remaining 30 FTEs that perform the complementary operating support at sites was not broken down by task. It was stated that many of these staff had been on temporary contracts funded by EU projects and that they had been successfully transitioned to permanent positions.

Comments

It is very important to understand the details of effort applied to all tasks that finally deliver the successful Grid. This understanding allows modeling of future scenarios, such as Cloud or no Cloud, and is necessary for any quantitative estimate of the benefit to science of France Grilles.

One particular estimate that would be of value is that of the relative cost of delivering the Grid compared with the cost of delivering a set of independent computing center services at each Grid site, based on the current hardware at each site.

Recommendations

a) Work with the sites involved in France Grilles to achieve a transparent and uniform approach to costing all the tasks involved in delivering the Grid.
b) Where possible, benchmark the costs of Grid tasks that lead to a provided service against the cost of a comparable commercial service.

9 Security

Finding

The committee was told that France Grilles had not had a dedicated NGI security officer since the departure of D. Fouossong in September 2011. G. Matthieu had assumed responsibility for security, as part of his duties, in the interim.

Comment

Grid/Cloud computing brings significant real and perceived security risks in beyond those of single-site computing. In addition to immediate losses of computing or data, a security breach could damage the reputation of France Grilles and thus greatly impede the performance of its mission.

Recommendation

Make the appointment of a capable security officer a high priority.

10 User Support and Training

Findings

The IAC recommendation to "Identify two non-HEP communities to each be supported by a dedicated fulltime member of the IdG team" had been implemented. One new hire supports biodiversity and the other supports neurosciences. Both had over five years of experience relevant to the fields they support. The appointments of the new members were too recent to have produced measurable results.

However, difficulties were reported in expanding user support and training in other areas. There was some reliance on volunteers from the operations area whose support effort was not part of the work they were paid to do. The overall situation was summarized by G. Romier as "France Grilles currently does not offer support to users, it is a barrier to the DCI adoption, people vanish after bad user experience."

Comments

The committee strongly supports an increase in user support and training effort. Stimulation activities, such are the hiring of the two support experts, are essential, and the committee was very pleased by this progress. However, such initiatives should not evolve into long-term entitlements. User support and training are essential activities that should be recognized as such by France Grilles' partners in institutions and disciplines.

Grid use could also be stimulated by France Grilles funding partial FTE user support/training efforts from experts already integrated into science communities. However, just as for Grid computing resources, the long-term requirement is that user support becomes a task for which each science discipline takes responsibility.

The committee recognizes that assembling the resources required for optimal user support and training for a growing Grid community will, itself, be a difficult and labor intensive task for the France Grilles leadership.

Recommendations

a) Explore ways to temporarily fund partial FTE user support/training contributions from experts involved in science domains.
b) Engage with the science domains and their funding sources to identify user support/training effort provided by the domains, or obtained by the domains with moral support from France Grilles.

11 Metrics

Findings

The committee heard that France Grilles had responded to the IAC recommendation to collect users' opinions on a regular basis by sending out a questionnaire to community contacts and asking that they seek responses from a few representative users. The response to the questionnaire had been extremely poor and was interpreted by France Grilles management as perhaps reflecting a lack of interest in the possibilities offered by the Grid.

The committee was shown a pie chart showing the number of users from each of eight separate disciplines. Thirty five percent of users were from non-physics communities, about thirty five percent were from experimental HEP and the remaining thirty percent from astrophysics, astroparticle physics, nuclear physics and fusion. The overall picture was little changed between 2010 and 2011.

The committee also heard of:

- a number of proposals for funding that were relevant to France Grilles;
- the establishment over the last three years of university-based hardware installations that had benefitted from France Grilles funding.

Comments

The committee did not believe that the poor response to the questionnaire was evidence of lack of interest. The questionnaire had been sent out a short time before the committee meeting and there had not been time for the insistent cajoling that seems necessary to get a response to any questionnaire into the tens of percent level.

The pie chart showing users was difficult to evaluate in terms of how well Grid usage had penetrated the various communities and how penetration was changing with time. The relatively small (246) number of experimental HEP users was likely

due to a large fraction of "production" usage (in the hands of small teams from each experiment) and a much smaller analysis activity. The similarly small numbers (around 100) users from each of life sciences and other disciplines might, or might not, be explained by the relatively small fractions of scientists from these disciplines that needed significant computing resources.

The committee heard somewhat anecdotal information about the success and failure of funding proposals, and very encouraging, but still anecdotal information about three France-Grilles funded university hardware installations that had gone on to attract funding from other sources.

Recommendations

a) Use polite, friendly, but unrelenting insistence to obtain a much better response rate to future surveys of the user communities.
b) Complement the easily gathered information shown in the user pie chart with more difficult to obtain information about users doing computation, that is suited to the Grid, on non Grid resources.
c) Document the success and failure of funding proposals endorsed by France Grilles.
d) Document metrics relevant to the success (*e.g.* becoming self sustaining) or degree of failure of France Grilles stimulation funding. This includes both funding for university hardware installations, and funding for domain-specific user support/training.

12 Relations with HPC

Findings

The committee heard of both top-down and bottom-up efforts to develop closer relations with the HPC community.

Comments

Good relations with those concerned with the funding and management of HPC facilities are very important. Good relations with the user communities whose needs may span HPC and Grid resources are vital. Developing and maintaining these relationships is made challenging by the (likely persistent) difference between the business models for the provision of HPC and Grid computing.

Recommendations

Continue to make every effort to work together with the HPC community at all levels. Continuing the involvement in co-organizing European HPC users meetings and Grid/Cloud days is very strongly recommended.

13 Operations

Findings

The committee was shown operational metrics such as rising CPU and disk resources, and the very high availability of the production infrastructure in the last year. Work is in progress to deliver other key metrics such as "precisely how loaded is our infrastructure?"

Comments

Operations have been very successful are on a good path for the future.

Recommendations

None (but see the "Cost Analysis" recommendations).

14 Clouds

Findings

The committee heard a dedicated presentation on the France Grilles approach to Cloud technology. The approach involved following closely computer science and EGI developments rather than initiating France-Grilles funded development. It was also noted the name of the Institut des Grilles had been changed to Institut des Grilles et Clouds.

Implementing virtualization, a key component of current Cloud technology, was well underway at CCIN2P3. Virtualization brought operational benefits and was invisible to users.

The committee was told of a large (Euro 240M) investment by the French Government in Cloud infrastructure for government and business use. It was not expected that this Cloud would be appropriate for scientific use.

A pilot Cloud cluster had funded by France Grilles already been installed at CCIN2P3 and France Grilles was requesting funds for a further substantial investment for 2013.

Although the France Grilles Cloud approach was still being developed, a likely direction would be to offer EC2/S3-like services to new Grid/Cloud user communities while allowing HEP and other existing communities to layer existing Grid middleware on top of the Cloud infrastructure. France-Grilles would not attempt to get out ahead of the EGI and WLCG communities.

Comments

Cloud technology can be expected to make the Grid/Cloud infrastructure more accessible to small science groups with bursty resource usage. The Cloud can significantly lower the cost of providing the equivalent of group cluster computing, and at the same time offer the scientists much higher short-term burst usage than they could get from their own cluster.

Cloud technology has several components of which virtualization is currently one. The committee was pleased to see that the France Grilles operation was implementing virtualization as a beneficial technology largely independent of the Cloud concept.

The France-Grilles approach appears broadly correct and appropriate, particularly in keeping in step with EGI progress and in not seeking funding to develop software technology for the France Grilles Cloud. However, test deployments will be a France Grilles responsibility and may be an opportunity to work with computer scientists in exploiting the Grid5000 infrastructure.

The committee agrees that the Euro 240M government Cloud is unlikely to be appropriate for science use. However, the experience gained in construction and operating this Cloud could be very relevant to science.

The France Grilles approach to Cloud computing should be managed to contain costs and steadily improve the services offered to users. Implementation of the recommendations made under "Cost Analysis" should allow quantitative estimation of the costs of the migration towards Clouds.

Recommendation

Using the cost analysis, develop a plan for operations in the next five years that will keep the infrastructure running smoothly while progressively reducing operations costs for stable services and making it possible to offer new services.

15 Processor Architectures

Findings

There was no presentation of issues that will arise from evolutions of processor architectures typified by GPUs and new architectures such as Intel's MIC. In response to questions, the committee was told that these issues had not been addressed up to now.

Comments

Many leading computational scientists are already basing their scientific success on the exploitation of new architectures, often by writing highly architecture-dependent code. The future Grid/Cloud must be able to address the needs of such scientists. This will undoubtedly be a major complicating factor offsetting the simplifications brought by the adoption of Cloud technology.

Recommendation

Make it clear to potential users that France Grilles intends to provide state-of-the-art Grid/Cloud support for new processor architectures. Work with French and European computer science to track relevant developments and to support funding proposals aimed at addressing the Grid/Cloud issues arising from new processor architectures.