

e-FISCAL 2nd Workshop 3-4 July 2012

<http://www.efiscal.eu/2nd-workshop>

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The e-FISCAL project arranged a two-day workshop on 3rd and 4th July in Samos to design, evaluate and improve ICT infrastructure cost assessment approaches. The event was co-located with the Samos Summit on open data and interoperability, which offered good opportunities to immediately present workshop's findings to a broader audience.

The two-day event brought together finance and e-Infrastructure experts, with the first day focused workshop attracting 28 members for intense discussions regarding the state of the art based on the e-FISCAL analysis, high-level presentations from EGI and PRACE initiatives as well as a number of detailed case studies presenting different approaches to cost assessment and optimisation. The second day panel session gathered more than 25 additional participants from the Samos Summit and featured three high-level keynote speeches and a panel discussion on best practices, high-level recommendations and suitable next steps for sustainability and cost assessment approaches in the e-Infrastructure domain.

The discussions during the first day brought up many interesting observations that will serve as starting points for further studies. The list below summarises some of these key points:

- The current state of the art presents a broad range of results with regards to the comparison of dedicated and on-demand infrastructures. For example, there was a factor-of-six difference between the highest and the lowest reported “Cloud/dedicated infrastructure” cost ratios in the literature survey. Possible reasons for these differences were discussed, with variations in the actual service specification, different assumptions about costs to include or exclude and the different metrics used were identified as possible reasons. The whole ecosystem of HPC (Tier 0 to Tier 2) needs to be considered, as far as cost related to performance is concerned. Investing in HPC means also scaling-up the physical infrastructures (computer rooms, cooling systems, power sources etc.) and the decision related to the set up of such systems are based on many parameters (ranging from political to technical).
- The selection of appropriate and useful metrics (besides the de-facto standard units of core hour and MFLOP) was seen as challenging in general. Estimating, maximising and demonstrating a clear impact on research were seen as key sustainability factors for e-Infrastructures. However, the commonly used low-level metrics are not necessarily directly related to application-level performance. On the other hand, selecting a representative set of applications that could be used as a higher-level benchmark was seen as equally challenging – adapting applications to new execution environments is a crucial, labour-intensive task that can have a major impact on the execution speed of the application. This kind of benchmarking approach is thus fairly costly to be used as a metric, and may still not provide accurate estimates for the applications not included in the benchmark set.

- The proportion of personnel effort that could be re-allocated to perform the configuration and adaptation of applications to the Cloud environment and supporting related users (by adopting the outsourced Cloud approaches) is difficult to calculate. In the case of European e-Infrastructures, the issue seems to be further complicated by the large variations in the (reported) staffing levels, even when normalised by the size of the computing centre.
- The difference between (mostly) vertical infrastructures provided by the Cloud offerings of today and the horizontal infrastructures that are needed to support collaborations around the major research infrastructures (RI) was noted as an issue that will make Cloud adoption more challenging – at least until the Cloud market matures enough in terms of interoperability.
- The strengths and weaknesses of the Full Cost Accounting, TCO analysis and the e-FISCAL approaches were discussed in some detail. It was highlighted that the initial e-FISCAL results were quite well aligned with the ones made in the preparatory phases of the EGI initiative, which were based on TCO methodology.

In the conclusion of the first day, the unique nature of the high-end research activities was noted, with the caveat that *not all* of the computational or data management tasks done by *all* of the research teams fall into this category. In fact, there are groups or even individual researchers that are not interested in collaboration, who tend not to be attracted by the community-based HTC/HPC services and their sustainability in general. These individuals or groups are sometimes referred to as “the long tail of science”. The role of the large pool of common e-Infrastructure resources as an enabling factor that makes new research activities possible – e.g. through re-prioritisation or – scheduling of activities – without new budget allocations was noted. This role of common e-Infrastructure as “credit in a bank” was seen as a topic that would require more awareness-raising among the potential new users. Green-IT issues were seen as very well aligned with the economic ones, with maintaining a high-utilisation rate seen as a key factor for addressing both. Approaches to maintaining and even further improving utilisation rates were discussed, such as simplified access to infrastructure, developing the governance practices, building excellent service provider teams, and executing targeted marketing and training exercises for the users.

The second day opened with three keynote presentations illustrating different facets of the e-Infrastructure cost and sustainability challenges. The first presentation was given by Cristina Martinez, presenting the outlook of the European Commission activities on Research Infrastructures towards Horizon2020. Emphasis was put on the impact of e-Infrastructures as an enabling technology beyond achieving scientific excellence into areas such as addressing societal challenges and boosting industrial leadership. The role of the e-Infrastructures as enabling technologies that have an impact beyond the scientific excellence was emphasised. The unified and simplified funding system brought in by the Horizon 2020 should make this effect more prominent and rapid. John Barr from 451 Research presented an industry analyst perspective, highlighting the rapid growth of the market and the importance of creating clear definitions for the key attributes of the Cloud services and their delivery models, for example, making meaningful comparisons where possible. Similarly, analysing application attributes to see which of them are good candidates for Cloud platforms is important, with special emphasis on the data, which represents a service market that is growing faster than the computationally oriented Cloud offerings. In the final keynote, Dana Petcu presented the goals and activities of the e-Infrastructures

Reflection Group (e-IRG) as a policy body. The sustainability, governance and increased impact of the service-oriented paradigm are some of the underlying key issues of the e-IRG's activities. The cost assessment activities and the opportunities provided by the new technologies such as Cloud are thus highly relevant to the policy-level work. In the presentation, these high-level goals and initiatives were also put in the context of the Computer Science Department of the West University of Timisoara, Romania. This example illustrated how relatively abstract high-level recommendations steer the activities on the grass-roots level and what kind of challenges one might face when implementing the policy recommendations.

The final panel was aimed at discovering high-level architectural models as well as concrete next steps towards optimal e-Infrastructure service provision. The discussion uncovered a wide range of possible high-level options, ranging from fully dedicated systems to aggressive Cloud adoption. However, the most likely future scenario seemed to be a hybrid solution where ICT services are provided using a combination of dedicated hardware at the provider's premises and different outsourced solutions. The role of leading-edge infrastructures (such as Exascale initiative or PRACE Tier-0 centres) as training grounds for tomorrow's affordable HPC systems was also noted. The importance of marketing and awareness-raising related to the new opportunities of different e-Infrastructure services was again brought up as one of the concrete proposals to ensure sustainability and broaden the user base of the e-Infrastructure. Improved cost modelling as well as development of metrics that are more relevant to the users, policy makers and funding actors than the standard low-level units – such as core hour – were seen prerequisites for more efficient engagement with both user communities and funding agencies. On more abstract level, the importance of working together and maintaining an analytical approach with regard to hype phenomena were seen as the foundations that allow the e-Infrastructure to focus on the researchers' needs and help them to bring new innovations to the market faster.

In the final summary presented in the Samos Summit closing session, the importance of creation of an open community of financial experts was emphasised. Solving the issues identified in the workshop as well as changes of successfully facing any future sustainability challenges can be greatly ameliorated by this kind of trans-disciplinary community. The e-FISCAL project is going to continue discussions in the future workshops as well as online in a collaboration group to be launched soon. For more information, please get in touch with the project at <http://www.efiscal.eu/contact> .