Enhancing Grid Infrastructures with
Virtualization and Cloud Technologies

Final Review of Dissemination, Collaboration and Standardization Activities

Deliverable D3.4 (V1.1)
29 May 2012

Abstract

This document reviews the dissemination, collaboration and standardization activities of the the StratusLab project at the end of the Project (May 2012) with analysis of success of the activities. Dissemination has continued to be an important focus of the project this year, in particular dissemination of project results in related communities, and training. Many successful collaborations have been pursued with MoUs signed with six other projects and many informal collaborations underway, including commercial collaborations. Standardization efforts have resulted in the adoption of the OGF OCCI standard and continued work on identifying potential new standards for the cloud area.

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1 Executive Summary

This document summarises the dissemination, collaboration and standardization activities in the final year of the StratusLab project, and provides an analysis of the success of these activities.

The project has been well represented at events internationally, with conference booths, invited talks, presentations, panel discussions, posters and tutorials. In particular Stratuslab has participated in EGI events, other events in the e-Infrastructures area and cloud-focused conferences and meetings. Additionally events outside of the e-Infrastructures domain have been targeted.

The website was redesigned to incorporate social media integration, videos, a simpler site structure and improved look and feel. Announcement mailing lists and a user forum have also been used to communicate with users and attempt to create an active user community.

Press-releases and articles have helped to spread awareness of the project and disseminate results. Project results are also disseminated through demonstrations and tutorials with six training events being organised this year. A paper describing an economic analysis of running a private cloud was accepted for the CloudCP Workshop of the EuroSys 2012 conference.

Major dissemination efforts are centered around software releases with a release dissemination plan being created for each. Release announcements have been widely picked up by on-line technical media outlets.

Dissemination activities have been successful with most metrics met and the majority of tasks in the Roadmap for year two achieved. Some weaknesses remain, with traffic to the website not as high as hoped, and the use of the user forum quite low.

The collaboration activity has also progressed well, with several MoUs in place and many more informal collaborations. Collaboration with commercial partners have been particularly fruitful, and project partners have successfully developed commercial products in collaboration with other companies.

In the area of standarization, the project has implemented the OGF OCCI standard, the TCloud Specification and the OVF standard. Discussions on new standards for the cloud area have continued, albeit with few concrete outcomes.

The project has completed the ERINA+ Socio-Economic Impact Self-Assessment. Despite some problems with the tool, the initial results are favourable and StratusLab compares well to other projects.

2 Introduction

2.1 Purpose

The purpose of this report is to review the dissemination, collaboration and standardization activities of the second year of the project. It should be read in conjunction with D3.1 *Initial Plan for Dissemination, Collaboration and Standardization Activities*[9] and D3.2 *Report on Dissemination, Collaboration and Standardization Activities*[10].

2.2 Organization

This document contains two main chapters, *Dissemination* and *Collaboration and Standardization*. Each of these chapters first describes the Aims and Objectives of the activity, before going on to describe the activities undertaken during the project. They go on to include an analysis of the activities, highlighting successful activities and any issues or problems encountered. Finally some conclusions are presented in the *Conclusions* chapter.

3 Dissemination

3.1 Aims and Objectives

From the beginning of the StratusLab project, dissemination has had a high priority with the goal of ensuring visibility of the project and its results across Europe and internationally.

The dissemination effort in StratusLab has several broad aims, outlined originally in D3.1 [9], as follows:

- To raise project awareness
- To inform users and the public about the project results
- To interact with user communities in order to educate them about the project's benefits (in conjunction with WP2)

3.1.1 Target audiences

The StratusLab consortium aims to make the project results known to multiple target audiences including – but not limited to – industry, commercial clients, technology journalists, researchers, students and other technical professionals.

The technical target audience for StratusLab has been split into two broad categories: end-users and systems administrators. The end-users consist of the domain scientists who will use StratusLab in their work; while the system administrators belong to the resource centres which will install the StratusLab distribution, in particular those coming from a background in grid computing (e.g. from National Grid Initiatives and the European Grid Infrastructure).

3.1.2 Dissemination methods

The StratusLab project makes use of a range of methods to meet the dissemination aims and objectives. These include:

- Interaction with related communities to raise awareness
- In print and online
- Publishing, demonstrating and disseminating project results

- Events and talks
- Publicity related to software releases

The project incorporates to the largest extent possible the communication best practices collected by the European Commission and acknowledges the funding from the European Commission through the FP7 programme via the appropriate use of the FP7 logo, EU flag, EC/e-Infrastructures, and the like in all dissemination activities and materials. Scientific publications of the project explicitly acknowledge the European Commission's financial support through the StratusLab project.

3.2 Activity review

This section presents a review of the dissemination activity in the second year of the project in line with the published "Initial Plan for Dissemination, Collaboration and Standardization Activities" (D3.1) [9]. The quarterly reports have documented the project's progress including a more detailed account of its dissemination activities.

3.2.1 Events

StratusLab has been represented at many events internationally. This has included conference booths, invited talks, presentations, panel discussions and posters.

The project has maintained a very visible presence at events of the European Grid Infrastructure (EGI) this year, with project booths, posters, promotional materials as well as dissemination of project results through participation in the cloud computing tracks of these conferences. Project participants also chaired several sessions.

The project has also continued to target other e-Infrastructures events as well as NGI meetings and workshops.

Other important targets for the project are cloud-focused conferences and events and StratusLab members gave keynote speeches, technical presentations and workshops at events such as the CloudScape IV, Cloud Day 2011 and CloudCamp Valencia 2011, as well as larger conferences dedicated to cloud and virtualisation such as SVM11 and ISC Cloud 2011.

Events outside the e-Infrastructures field included FOSDEM, Brussels, Belgium in February 2012, the International Conference on Parallel Computing, Ghent, Belgium, in September 2011 and the International Conference on High Performance Computing & Simulation, Istambul, Turkey, July 2011.

Events and talks for the second year of the project are listed in the relevant Quarterly Reports, and a full list is also maintained on the project website[1].

3.2.2 Online

Deliverable D3.2 described the dissemination activities online during the first year of the project. Since then these activities have been expanded.

[1] http://stratuslab.eu/doku.php/presentations

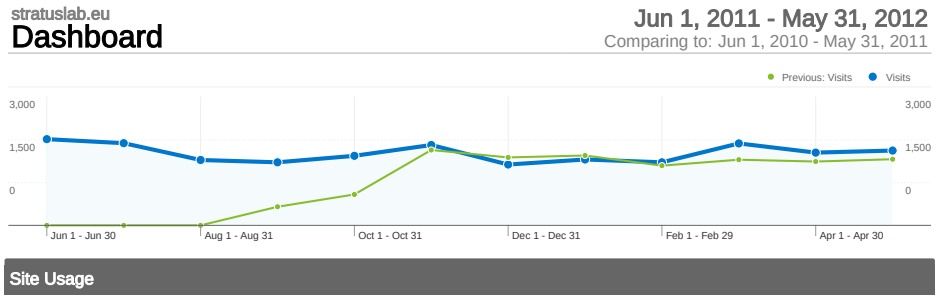

Figure 3.1: *Website visits for Year 2*

A major redesign of the project website[2] was completed in July 2011 and went live to coincide with the release of version 1.0. The site provides general information about the project, along with news and status updates, an archive of public documents and deliverables, links to presentations and other dissemination material, etc.

The redesign included integration with social media such as a Twitter feed allowing Twitter microblogging content to appear on the main page. The StratusLab Twitter feed now has 116 followers.

Project videos have also been created describing the project and software, as well as showing how to use the StratusLab Distribution. These are available on YouTube and are also prominently linked from the StratusLab website. An RSS feed of project news is available[3].

Figure 3.1 shows the number of visits to the website in the second year of the projct.

The project partners maintain several weblogs such as the DSA Research blog [1], the Morfeo Cloud Technologies blog [3], and also publish posts in GridGurus [2] and OGF Thought Leadership Series [4] and these have been used as dissemination tools for the project.

In order to spread awareness of the site website the address ("stratuslab.eu") is included prominently in other project dissemination activities and on dissemination materials, such as t-shirts.

From the beginning of the project an announcements mailing list was created. This list has 73 members and is used to keep subscribers up-to-date with news from the StratusLab project such as new releases.

In Q6 an additional User Announcement mailing list was created to keep in touch with users of the StratusLab reference infrastructure. The list has 47 members, all of whom are users of the reference infrastructure.

A User Forum was also created to provide a discussion area for StratusLab users in the hopes of fostering a community support network. To date the forum

[2] http://www.stratuslab.eu

[3] http://www.stratuslab.eu/feed.php?ns=news

has 16 members. Historical posts on this forum are browsable online[4].

3.2.3 Press

The project has attempted to get coverage through traditional and on-line press by making news releases for major events, and by working with technical journalists to develop articles.

The project released a number of press releases over the period which were widely picked up by online and print media, such as the announcement of the DS-Cloud Ready Pack in March 2012, the *European initiatives strengthen cooperation on cloud computing* in iSGTW in November 2001, and the EGI story *The Grid on a Cloud* in July 2011. A number of French language stories were also published in online technical outlets for that market.

A full list of references to StratusLab in the press is maintained on the project website[5].

3.2.4 Publishing, Demonstrating and Disseminating Results

StratusLab has been publicised at a variety of events throughout the second year of the project.

With the release of the first major production-ready release of the StratusLab Distribution in July 2011, training took on a more important focus within the project. User training was conducted by WP2, but also serves a dissemination purpose in demonstrating the results of the project and the features of the software.

Table 3.1 shows the StratusLab training events this year.

As described in Section 3.2.1, presentations and keynote speeches were also given at a range of high-profile conferences in the e-Infrastructures field and beyond.

Interesting project results such as the Marketplace, Persistent Storage, and the development processes of the project were also disseminated via talks, presentations and posters.

The project also submitted a paper to the *CloudCP 2012: 2nd International Workshop on Cloud Computing Platforms* workshop of the EuroSys 2012 conference describing an economic analysis of running a private cloud versus using Amazon EC2, based on work done by GRNET.

3.2.5 Software Releases

Public releases of the StratusLab distribution provide an opportunity not only to renew contact with existing users, but to further publicise the StratusLab project via release announcements, press-releases, emails and other means.

In July 2011 the first major version of the StratusLab distribution version 1.0 was released. This was followed up by several minor releases throughout the year (versions 1.1, 1.2, 1.3 and 1.4). The project is now preparing to release version 2.0

[4] https://groups.google.com/a/stratuslab.eu/group/user-forum/topics
[5] http://www.stratuslab.eu/doku.php/press

Table 3.1: *Training events in Year two*

Event	Location	Date
StratusLab Training at the EGI Community Forum	Munich, Germany	29 March 2012
StratusLab Tutorial	Orsay, France	17-18 November 2011
StratusLab Tutorial at the ACGRID3 school	Hanoi, Vietnam	1-3 November 2011
StratusLab Tutorial (Description, Slides, and Posters) at the EGI Technical Forum	Lyon, France	22 September 2011
StratusLab training day Joint European DCI Summer School	Budapest, Hungary	15 July 2011
Building Clouds with OpenNebula 2.2 and StratusLab Contrail Summer School	Hyères-Les-Palmiers, France	27 June 2011

before the end of the project.

For each scheduled release an internal dissemination plan is created, with details of the proposed activities to publicise the availability of the new version. The feature set in a particular release informs this plan, for example, the venues chosen to publicise the release may differ depending on whether the new functionality is aimed particularly at users or at administrators.

Typically the release dissemination plan includes a notification to the user communities via the StratusLab Announcements mailing list, news items posted on the StratusLab website, notification in the StratusLab RSS and Twitter feeds and posts on partner blogs. Depending on the significance of the release and the features included, a press-release may also be prepared. Where suitable, release announces are also sent via other mailing lists and fora in which the project members are involved.

Press releases were produced for version 1.0 and also for some of the interim releases containing particularly interesting features and functionality. These were widely picked up by the technical media. A list of references to StratusLab in the press can be found on the project website[6].

[6] http://www.stratuslab.eu/doku.php/press

3.2.6 Dissemination tasks and metrics

Table 3.2 shows the dissemination tasks that were planned for the second year of the project, as outlined in deliverable D3.2[10]. The majority of these have been completed with some still ongoing. In addition to these planned items, StratusLab was present at many more events, a details of which are given in the relevant Quarterly Reports and maintained on the project website[7].

Table 3.3 lists the project's dissemination metrics that will be used to understand the impact of the dissemination activities.

In the next section we provide analysis of each dissemination activity.

3.3 Analysis

At the end of the project visibility of the project outputs is high, particularly among the DCI projects, but also among projects from other areas and commercial entities.

StratusLab has been extremely well represented at a variety of events, as noted in section 3.2.1. All of the events identified in the roadmap of events for year two were attended, along with attendance at a large number of additional events which were identified during the year. Participation in these events generated a lot of interest. Christophe Blanchet of partner CNRS/IBCP won the runner-up prize in the poster competition for his poster "Virtualization of Bioinformatics Applications on Cloud Infrastructures" at the EGI Technical Forum in September 2011.

Some specific events in which the project intended to participate, were not attended. For example, it was intended in year one to demonstrate the StratusLab distribution and seek feedback at trade shows such as VMWorld [6], the Virtualization Conference and Expo [5] and similar commercial events.

Initial plans to participate in industry trade shows were not followed up on, with engagement with commercial partners achieved in other ways during the second year of the project. This included mainly one-on-one meetings between project partners and various companies, and a number of new commercial products have been developed. Examples include the DS-Cloud Ready Pack product developed by partner SixSq in collaboration with Swiss IT Solutions Provider Darest which was announced at the IBM "Le Printemps de la Technologie 2012" conference in Lausanne, Switzerland, and the TCD presentation entitled at a meeting with Intel Academic Research Programme representatives in Dublin in January 2012.

The project has been relatively well covered in the press, in particular iSGTW and other e-ScienceTalk outlets. The release announcements were widely covered within the technical press, and also given some coverage in the mainstream press. The project had hoped to have more coverage in the mainstream press but was unable to achieve this.

The website forms the main public interface of the project. Website visits are, however, at a relatively low level (see Figure 3.1). Regarding search engine ranking, the project is visible under its own name and description (i.e. searching for

[7] http://stratuslab.eu/doku.php/presentations

Table 3.2: *Roadmap of Dissemination Activities for Year 2*

Activity	Date	Description	Status
Website updates	Ongoing	The website content will be continually updated to ensure that the site is informative and interesting to users	Achieved
Website redesign	Q4 2010	A possible website redesign to make it more user-friendly and eye-catching has been proposed	Achieved
Social networking	Q4 2010	Further integration with Microblogging, Social Networking or other tools will be investigated	Achieved
Release version 1.0	Jun 2011	A major dissemination effort is planned for the release of the first production version of the software	Achieved
Contrail Summer School	Jun 27 – 30, 2011	Presentation and hands-on session on OpenNebula	Achieved
HPCS2011	Jul 4 – 8, 2011	Keynote speech featuring StratusLab	Achieved
CloudCamp	Jul 13 2011	Presence at CloudCamp meeting	Achieved
Joint European DCI Summer School	Jul 11-16, 2011	StratusLab training day on cloud computing	Achieved
Parco2011	Aug 30 – Sep 2, 2011	Keynote speech featuring StratusLab	Achieved
EGI Technical Forum 2011	Sep 19-23, 2011	Booth, tutorial and talks on Bioinformatics Appliances, Agile and academic/FP7 projects are planned	Achieved
ISC Cloud2011	Sep 26 – 27	Keynote speech featuring StratusLab	Achieved
Training event	Q4 2011	Several Training events were held during this year, see Table 3.1 for details	Achieved
Release dissemination	Ongoing	Future releases will be accompanied by dissemination efforts targeted based on the features of each release	Achieved
Project weblog	Q3 2011	A project weblog will be set up	Not achieved
StratusLab paper	Q4 2011	A StratusLab paper will be submitted to a major conference	Achieved

Table 3.3: *Dissemination Metrics and Targets*

		Year 1		Year 2	
Metric	Source	Target	Actual	Target	Actual
Number of people on StratusLab announcement lists[1]	Mailer	25	67	75	73
Registered users on StratusLab discussion site	Mailer	50	–	100	16
Number of views of website	Web server	–	12,124 [2]	–	20,271[3]

Notes: [1] Metric has been adapted from "Number of people on StratusLab discussion list". See section 3.2.2 for a discussion of this metric; [2] Visits between 1 June 2010 – 31 May 2011; [3] Visits between 1 June 2011 – 31 May 2012.

'StratusLab' or 'combining grid and cloud') but still not highly visible for more generic terms such as 'open source cloud'.

It was hoped that the User Forum which was created in Q6 would form an active community hub and help create a user support community. Usage of the forum has, however, been quite low despite attempts to increase the visibility by including the link in all announcements and posting it to the existing user announcement lists.

The project has almost reached its target for the number of users on the announcement mailing list, however, this figure fails to take into account the members of the user-announcement list for users of the StratusLab reference infrastructure. The total number of unique members of both lists comes to 115, thus exceeding the projected target for year two.

3.3.1 Results

Project results, including the availability and features of the StratusLab distribution, as well as the Marketplace, and some of the processes of the project have been disseminated, mainly by presentations and keynote speeches at conferences. Demonstrations and Tutorials have also been conducted and these have been very well received.

The project submitted a paper entitled *"Public vs Private Cloud Usage Costs: The StratusLab Case"* analysing the StratusLab's Datacenter cost and comparing it against running in Amazon's EC2 which was accepted to the *CloudCP 2012: 2nd International Workshop on Cloud Computing Platforms* workshop of the EuroSys 2012 conference.

The initial project surveys described in *Review of the Use of Cloud and Virtualization Technologies in Grid Infrastructures* (D2.1)[8] identified a possible weakness in dissemination aimed at commercial entities. This has been addressed by

several of the project partners who have been very active in meeting with potential commercial partners and a number of new commercial products have been produced. The StratusLab consortium considers the exploitation, and in particular commercial exploitation, of the StratusLab Distribution to be a major success of the project. These activities are described in the *Exploitation and Sustainability Final Plan* (D3.5)[7].

3.3.2 Releases

Major dissemination efforts have centred around each software release. The targeting of press-releases and other dissemination materials to the specific user communities based on the feature set of the release appears to be an effective approach to release dissemination.

3.3.3 Other issues

3.3.3.1 Dissemination to the general public

Dissemination to the general public is also important, to raise awareness of the project and for educational purposes. In targeting the general public it is necessary to focus on the economic and societal benefits of the project, its impact on science and research, and how this can be of benefit to the broader community. This is quite a different approach to that taken for dissemination to technical or scientific audiences. Thus far StratusLab has not focussed on dissemination to the general public.

A general StratusLab video has been produced which is aimed largely at technical users and describes the benefits of the StratusLab Distribution. A shorter more user-focussed version of this is in production and this would be aimed more at the non-technical public.

4 Collaboration & Standardization

4.1 Aims and Objectives

A large number of projects, companies, and standards bodies currently focus on cloud and virtualization technologies because of their promise and growing adoption. StratusLab has actively engaged with those entities to ensure that the project's results are well represented, that we are aware of others' advances, and that we drive standardization in a direction consistent with our vision.

StratusLab has established collaborations with several other EU projects, particularly those in the Distributed Computing Infrastructures area, and is continuing to work with these projects to identify common interests, and to avoid duplication of effort.

The project aims to use existing standards where appropriate and also to actively engage with relevant standardization bodies in order to influence developing standards.

4.2 Activity review

The project has both formal and informal collaborations with several other projects and most of these have seen significant progress during the second year. Several external projects are now using and evaluating StratusLab components, and some have indicated willingness to contribute to their development after the project life time. StratusLab has worked with several projects to develop Virtual Appliances containing their software, for example the EGI UMD-1 appliances, the IGE Globus appliances, etc. These are now available via the StratusLab Marketplace.

4.2.1 Memoranda of Understanding

During the second year of the project Memoranda of Understanding (MoU) were signed with four additional projects, adding to the two MoU signed in the first year with EGI and EDGI.

- CYFRONET
- VENUS-C
- IGE

- ERINA+

The MoU with these organisations are available on the project website[1], while progress in line with these MoU is described in the Quarterly Reports for the second year of the project.

4.2.2 Informal Collaborations

Informal collaborations have also continued with several projects including

- EMI
- Contrail
- SIENA
- Mantychore

In particular the project has had a strong collaboration with EMI and SIENA during the second year of the project. EMI has been working with StratusLab to provide feedback on the StratusLab distribution and produce Torque virtual Images. StratusLab has been present at SIENA events and has provided input to their documents.

Again, more detail is provided on these informal collaborations in the Quarterly Reports, and a full list of collaborating projects is maintained on the project website[2].

4.2.3 Commercial Collaborations

Project partners have been successful in developing and bringing to market a number of products based on the StratusLab Distribution in collaboration with their commercial partners. More detail on such activities is given in D3.5 *Exploitation and Sustainability Final Plan*[7] which is due concurrently with this deliverable, and in the Quarterly reports.

4.2.4 Standards and Policy Bodies

StratusLab has continued to engage with standards bodies to drive standardization in a direction consistent with our vision.

4.2.4.1 Use of existing standards

During the second year of the project support was added for the OpenNebula OCCI API based on the OGF OCCI specifications.

Under its MoU with EGI, StratusLab has contributed to the EGI prioritised list of standards by identifying the standards which the project implements or intends to implement.

[1] http://www.stratuslab.eu/doku.php/deliverables
[2] http://www.stratuslab.eu/doku.php/collaborations

StratusLab has also continued to engage with bodies such as SIENA and through them with the US National Institute of Standards and Technology (NIST) about cloud standards. For example, StratusLab gave a presentation in September 2011 to the SIENA Workshop at the EGI Technical Forum describing the project's use of Standards and Interoperability. Similarly, the project provided input to SIENA on how the projects solutions map to the NIST use-cases.

The OVF standard is also supported by the Claudia Service Manager as a service definition language for deploying services on a StratusLab cloud via Claudia.

4.2.4.2 Extension of standards

StratusLab uses the TCloud API of Claudia for service and VM management, based on the VMware VCloud API. This has been sent to the DMTF for standardization.

Preliminary discussions also took place with other organisations around the area of both existing and new standards. For example talks with SARA HPC identified possible areas of future standardisation in the area of network management, while discussions with Contrail included a plan to push for standards for authorisation and accounting.

4.2.5 ERINA+ Impact Self-Assessment

As part of the project's MoU with the ERINA+ project, StratusLab has undertaken to use the ERINA+ Socio-Economic Impact Self-Assessment of e-infrastructure Projects tool to perform an analysis of the impact of the project. The ERINA+ self-assessment methodology provides a way to measure the efficiency and effectiveness of a project, based on information provided about the project's collaborations, the cost-benefit of various project scenarios, the impact and reach of the project's outputs, etc.

ERINA+ have provided a web-based tool to collect this information and analyse it by comparing it to other projects which have completed the assessment.

It should be noted that the results may be somewhat subjective, not all of the activities of a given project will necessarily fit neatly into the categories provided by ERINA+, and it is not always possible to compare like with like across projects.

StratusLab has collected data about a subset of its activities and has input these into the ERINA+ web tool. The initial analysis, which compares StratusLab with five other projects who have also performed the self-assessment, is quite favourable.

The ERINA+ analysis calculates the project's "Efficiency" in terms of their economic net present value (ENPV) (the difference between the discounted total social benefits and costs) and a B/C ratio, i.e. the ratio between discounted economic benefits and costs. These have the potential to be very useful measures, however, they require estimating the benefits of certain project activities in terms of time saved or reduced cost for users. This is not appropriate for all of StratusLab's activities. Nonetheless, the project has attempted to estimate such figures where possible. Technical issues with the ERINA+ tool are currently preventing the calculation of these figures, but we hope that these can be resolved soon.

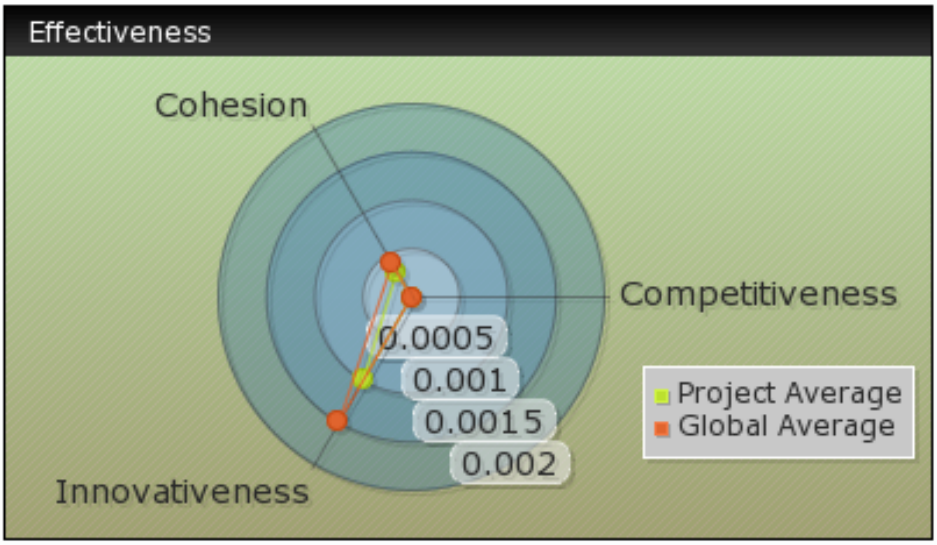

Figure 4.1: *Project Effectiveness (source ERINA+ Self-Assessment tool)*

The analysis also calculates the project's "Effectiveness", in terms of competitiveness, innovativeness and cohesion. The project scores "Good" for each of these factors, and the results in this area are similar to the project average for the other projects who have completed the analysis. A graph of the calculated project effectiveness is given in Figure 4.1.

4.3 Analysis

As the project draws to a close the formal collaborations that are in place will naturally also end. The project's continued existence as an open-source initiative does, however, afford an opportunity to continue many of these collaborations.

In some cases collaborating projects have indicated that they are willing to contribute to the continued development and maintenance of components of the StratusLab Distribution. In particular several projects will take over the maintenance of their own virtual appliances, and EGI may take on a role in developing the Marketplace.

StratusLab has directed some effort in the second year towards becoming more standards compliant and now supports both OCCI and TCloud. They have also helped to drive the formation of new standards such as TCloud, and have been active in standards related groups to help identify the best of the existing cloud standards, as well as gaps which exist and could be targeted for future standardisation. These standardisation activities are likely also to continue after the project life time through the efforts of project partners such as TID and UCM.

The ERINA+ Socio-Economic Impact Self-Assessment of e-infrastructure Projects

shows that the StratusLab project has performed well in terms of the project effectiveness, although problems with the tool have made it impossible to assess the project's efficiency.

5 Conclusions

This document analyses the dissemination, collaboration and standardization activities undertaken by the StratusLab project in year two.

Visibility of the project is high, with many presentations and keynote speeches given by project members. A particular effort has been made to inform related communities such as the DCI projects about the project and its results.

A strong online presence has been created with the project website complemented by microblogging, use of an announce mailing list, a discussion forum and integration of Social Networking tools.

Dissemination activities have centered around the software releases with a release dissemination plan created for each release.

A greater focus on Training this year has resulted in over 150 people being trained in the use of the StratusLab Distribution.

The document also gives an outline of collaboration with related projects. MoUs have been signed with EGI, EDGI, CYFRONET, VENUS-C, IGE and ERINA+, and a number of informal collaborations were also pursued. Some of these collaborations have resulted in agreements for collaborating partners to take on a role in sustaining outputs of the project after the project life time.

Commercial collaborations have also been very successful and have resulted in a number of new commercial products coming to market.

Standardization efforts increased this year, and the OGF OCCI standard was implemented in addition to the TCloud Specification adopted in the first year. The project has continued to drive standards forward in some areas.

At the end of the project the StratusLab project, and the StratusLab Distribution, is very well known not only in the e-Infrastructures and DCI ecosystem, but also among commercial entities and projects outside the DCI area. Several collaborations have produced useful results, and will continue to do so beyond the project life time as collaborating projects take on a role in sustainability of the StratusLab project's outputs.

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[1] DSA Research Blog. http://blog.dsa-research.org/.

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