

COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME

CIP-ICT-PSP-2013-7



SERVICE DISTRIBUTION NETWORK AND TOOLS FOR INTEROPERABLE PROGRAMMABLE, AND UNIFIED PUBLIC CLOUD SERVICES

Deliverable D7.2a

Report on Stakeholders' Evaluation

Workpackage	WP7 – Pilot Services Evaluation and Best Practices Elicitation
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Abstract:	First iteration of the evaluation report, dealing with the internal evaluation from project partners. The deliverable is based on the methodology defined in T7.1 and the corresponding deliverable D7.1 and the outcomes of task T7.2.

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Definitions, Acronyms and Abbreviations

Acronym	Title
API	Application Programming Interface
AWS	Amazon Web Service
BT	British Telecommunications
CIP	Competitiveness and Innovation Framework Programme
CMS	Content Management System
EC	European Commission
eID	Electronic Identities
ERP	Enterprise Resource Planning
EU	European Union
GQM	Goal, Question, Metric
IaaS	Infrastructure as a Service
ICT	Information and Communications Technology
KPI	Key Performance Indicator
PSP	Policy Support Programme
SIG	Special Interest Group
UX	User Experience
VM	Virtual Machine
VPN	Virtual Private Network
WP	Work Package

Table 1: Definitions, Acronyms and Abbreviations

Executive Summary

The current deliverable discusses the first results of the **internal** evaluation by consortium partners, namely technical partners and pilots. D7.2a thus entails the first iteration of the evaluation reports series, starting with the internal evaluation. The deliverable is based on the methodology defined in T7.1/D7.1, from which detailed questionnaires were produced based on the GQM methodology. The questionnaires were uploaded to the LimeSurvey tool, which were later filled in by project partners. This first evaluation effort, besides the focus on the internal evaluation, focuses on the perspectives of the internal stakeholders, namely the pilots and the technical partners. The next iteration of the deliverable D7.2b will focus on the evaluation from the external stakeholders, while there is also deliverable D7.3 that will deal with more details on the technical, financial and techno-economic evaluation of the STRATEGIC framework.

The total number of full responses received for Cloud Application Developers are 3, for Cloud Service Providers 4 and for Technical partners 4. For Pilots and Public Sector Organization the 3 answers received were not fully completed, as not all Pilots had in-depth knowledge to be able to answer all technical and other questions. There were also more partial answers from other partners and in several cases more than one answers from a partner, as this was deemed useful for several technical aspects (such as usability).

The main conclusion from this internal evaluation is that both Technical Partners and Pilots STRATEGIC are overall very satisfied with the functionality of the STRATEGIC platform.

In terms of the technical partners the following points are reported:

- The packaging and “cloudification” of new applications was reported as a well-defined process.
- During the packaging phase, the technical partners have been testing early releases of the workloads and the deployment success rates were reported to be above 90%.
- The technical providers reported that the amount of IaaS providers that are already available on the STRATEGIC platform are more than adequate for the pilots.
- The operating systems supported on the STRATEGIC platform are Linux and Windows.
- Virtually any configuration on the virtual environment provided by the on-boarded IaaS providers can also be supported on the STRATEGIC platform.
- Downtime of the platform during upgrades was minimal.
- Enhanced on-line security services are available on the platform, such as the “BT Intelligent Protection”, providing the necessary application and host security controls for every cloud deployment of workloads, and the upcoming “BT Data Encryption”, which will guarantee that the data of the VM is encrypted.
- Turn-key support for eIDs through the STORK platform.
- Issues were reported on the User Experience (UX) characteristics of the web front end.
- Early on, there had been some issues with the availability of the platform and with the listings of the available workloads, but these were resolved promptly.

- Additional sales channel for Cloud Service Providers with very low OPEX can be achieved.

In terms of the pilots the following points were retrieved from chapter 4:

- Pilots are able to deploy, manage and share their applications using the STRATEGIC platform with ease
- The process of finding a desired application and publishing applications to STRATEGIC was reported to be well-defined
- The management of compute nodes and storage was reported to be very easy both for experienced and novice technical personnel
- The abstraction layer of the STRATEGIC platform gives the ability to the pilot partners to use different underlying infrastructure providers in an easy way.
- In the same wavelength, the pilots appreciated the ability to utilise multiple infrastructure providers ranging from public cloud providers to local/internal private cloud providers in a seamless way
- Pilot partners highlighted also the freedom that the STRATEGIC platform is providing to them by avoiding the lock-in to specific IaaS after an application is deployed for the first time.
- The security characteristics of the STRATEGIC platform were also appreciated, namely The support for cross-border authentication utilizing e-IDs through STORK and the secure data exchange
- The built-in support for security tools that can protect VMs and data at the infrastructure level was also valued, along with the ability to connect through VPNs
- Pilot partners have reported that the STRATEGIC platform will have significant impact in the reduction of their OPEX.

Regarding future plans, updated questionnaires will be employed. The current questionnaires were targeted for internal evaluation from consortium partners. The set of questions was rather long and time-consuming. In order to ease the answering for the external stakeholders, it is expected that changes will be made. The two main changes consist of more concise set of questions (not fully-aware of STRATEGIC) and less "open-ended" questions (free text), which make difficult the analysis and summarisation. Parts of the questions and the questionnaires will be however reused to save time for the development of new set of questions and also during interviews to external partners.

1 Introduction

1.1 Scope and purpose of the document

The main goal of the STRATEGIC project is to facilitate organisations and notably public bodies to leverage the benefits of public cloud services. In work package 7, the objective is to evaluate the results of project by focusing on a mixture of perspectives and stakeholders, in order to improve STRATEGIC framework and also to consolidate best practices based on the results.

D7.2a is the second deliverable of WP7 after D7.1 [2] that was the evaluation methodology, and entails the first iteration of the evaluation report, dealing with the **internal evaluation of STRATEGIC from its project partners**. The deliverable is based on the methodology defined in T7.1, from which detailed questionnaires were produced, that were later filled in by project partners. This first evaluation effort, besides the focus on the internal evaluation, focuses on the **perspectives of the internal stakeholders**, namely the pilots and the technical partners. The next iteration of the deliverable D7.2b will focus on the evaluation from the external stakeholders, while there is also deliverable D7.3 that will deal with more details on the technical, financial and techno-economic evaluation of the STRATEGIC framework.

1.2 Target audiences

As this deliverable is a public document, it is intended for internal and some external project audiences. Internal audience is the consortium partners, while external includes the European Commission services, the STRATEGIC reviewers, the Special Interest Group members (who will contribute substantially to the external evaluation of STRATEGIC. This version may be also relevant to interested external target audiences such as Public Sector Organizations, Cloud Application Developers and Cloud Service Providers, although this is only the first iteration of the evaluation framework.

1.3 Structure of the document

The document consists of five (5) main sections:

- Section 1 is the introduction.
- Section 2 provides a summary of the evaluation framework presented in D7.1
- Section 3 presents the collection process and the summary of inputs collected.
- Section 4 presents the analysis of data received with emphasis on the internal stakeholders, namely the technical partners and the pilots.
- Finally, section 5 summarizes the main conclusions from the analysis, along with the future plans.

2 Evaluation Framework Summary

This section summarises the main points from the Evaluation Methodology (D7.1) that are necessary for the better understanding of this deliverable and so that it becomes self-dependant.

2.1 Stakeholders Groups

There are mainly two stakeholder groups for the evaluation of STRATEGIC: the internal and the external stakeholders. The **internal stakeholders** refer to the members of the consortium, which are categorised into **technical partners** and **pilots** (the municipalities). External stakeholders refer to organisations and people outside of the consortium which may be interested for using STRATEGIC and the consortium can approach for exploitation. However, the STRATEGIC consortium partners also belong to one or more of the external stakeholder types. The stakeholders types include public sector bodies, end users, cloud application developers and cloud service providers. Questionnaires were prepared not only for the internal stakeholder types, but also for the external stakeholder types. Partners were also asked to fill in the latter (depending on the category they self-categorised themselves). The exercise in this deliverable constitutes the first phase of the internal evaluation, while there will be more input in both the internal evaluation (with more details on the evaluation areas), but also the external evaluation. A representative sample of external stakeholders is also being included in the Special Interest Group (SIG) which will help with the external evaluation at this later stage.

2.2 Evaluation Areas

The evaluation areas that will be covered include the technical one, the economic and business one and finally the use cases. The emphasis of this deliverable however, is not to address in details all these areas, rather to **make an evaluation across all the areas, focusing on the perspectives of the internal stakeholders**. In other words, the main points from each stakeholder group will be presented, and for this deliverable, it will be the technical partners and the pilots. It has to be noted that in the pilot questionnaire, the Use Case requirements identified in previous deliverables were included. This is a way to validate also the list of identified requirements, and such an attempt will continue with the upcoming deliverables.

2.2.1 Technical evaluation

The technical evaluation consists of all the technological aspects of the STRATEGIC framework, both functional and non-functional, including performance, compatibility, usability, reliability, maintainability and portability. A detailed analysis of the above and their sub-categories are given in D7.1. The technical evaluation will be mainly done by technical partners.

2.2.2 Economic/business evaluation

The financial and business evaluation consists of the assessment of the financial effectiveness of the STRATEGIC framework, along with the business relevance of the STRATEGIC solutions. This includes not only the platform and its assets, but also the use cases (which for completeness should be also addresses below separately). The economic and business evaluation (and relevant questionnaires) were addressed to all internal stakeholders, both technical and pilots. In this effort, the costing analysis of the Use Cases that was undertaken in parallel, also

provides insights that are useful. This deliverable will only deal with high level business aspects, and more details on financial aspects will be given in D7.3.

2.2.3 Use cases

As the Use Cases are important assets of STRATEGIC, they are also included here separately. The evaluation of the use cases consists of both technical and financial evaluation. For the latter the costing exercise mentioned above is also relevant here. This deliverable will mainly focus on the technical and high-level business aspects of the platform and detailed evaluation of the use cases will take place in D7.3.

2.3 Evaluation Methodology

As elaborated in D7.1 the selected evaluation methodology for STRATEGIC across the different areas (technical and financial/business) was the **Goal/Question/Metric (GQM)** one. In fact, the methodology came up for the technical evaluation and then was also applied for the financial and business one. The principle behind the GQM method is that evaluation and subsequent measurement should be goal-oriented. GQM focuses on defining goals, then refining them into questions and finally data to be collected, and then analysing and interpreting the results. In more detail, the three steps that have to be performed include a) goal formulation, where the conceptual level of the evaluation measurement goals and objectives of the developed platform is defined; b) questions' definition, where several questions are formulated that attempt to quantify and characterize how the goals should be attained and c) metrics' definition, where the quantitative level of acceptable thresholds are concretised.

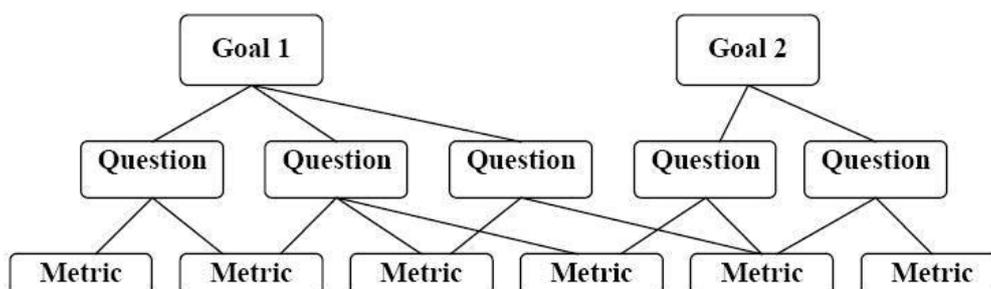


Figure 1: The GQM tree of triples (source: <http://webbook.uqasar.eu/section1/>)

Before selecting the same methodology for the financial and business methodology, it was investigated whether it is suitable and GQM can be also used for the financial/business aspects. The conclusion was that as long as the actual metrics and estimations come up with the necessary data, the GQM methodology can remain the same as with the technical evaluation. In fact, GQM can play the role of facilitator of getting the same input through a series of questions. To make sure that the GQM methodology can be applied also for a financial/business evaluation, a review of literature was made, which revealed relevant publications.

3 Collection Process

This section describes the methodology and tools that have been used in order to collect the data for the stakeholders' evaluation. The evaluation executed and documented in this first version of the deliverable applies specifically to internal stakeholders. For this reason, six (6) different questionnaires, one for each stakeholder type we consider could be part of the internal evaluation has been created. There were thus questionnaires for Technical Partners and Pilots (internal types) and for Cloud Application Providers, Cloud Service Providers, Public Sector Organisations and End Users (external types).

3.1 Methodology Application and Use

In D7.1 a set of GQMs was developed for both the technical and the financial/business aspects. The questions defined in D7.1 were reviewed and separated per stakeholder group. The questions added to the questionnaires were based on ISO 25010 (for the definition of measurement goals) and a set of high-level questions. Based on this separation, an on-line spreadsheet has been created to collect all the questions that define each questionnaire. The questionnaire was able to filtered per stakeholder, which then resulted in the stakeholder views, that were used in the selected questionnaire tool (LimeSurvey).

Name: Technical Partners		Range: A1:C1113	
	A	B	C
1		QUESTIONS	STAKEHOLDER
2		HIGH LEVEL QUESTIONS	
17	0.2.1	What's the status of your Cloud services (in production, in pre-production, testing, not planned)? If not in production, add a short justification.	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
18	0.2.2	Do you believe that Cloud-enabling your services through STRATEGIC will/has contribute(d) positively to your business?	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
19	0.2.3	Will/Has it improve(d) the quality of the offered service?	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
20	0.2.4	How much do you believe your organisation will/has improve(d) its public image?	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
21	0.2.5	Are you interested to make use/to continue to make use of STRATEGIC after the end of the Project?	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
22	0.2.6	What would be necessary for you as service provider to trust STRATEGIC?	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
23	0.2.7	To which extent has the STRATEGIC cloud enabled- services reduced the length and/or cost of the administrative processes associated with the use cases implemented by those services? (Take into account the manual processing and validation of documents, the wait periods, etc.)	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
24	0.2.8	How much would you be willing to pay for services like the STRATEGIC Service Store (marketplace) and in what form (e.g. upfront, monthly subscription, usage-based)	Public Sector Organizations, Cloud Application Providers, Cloud Service Providers
28		TECHNICAL AND TECHNOLOGICAL EVALUATION	
29	1	FUNCTIONAL SUITABILITY	
30	1.1	Functional completeness	
31	1.1.1	Does STRATEGIC platform offer the ability to package applications in a way that allows the automated deployment to the cloud (cloudifying) of applications?	Cloud Application Developers, Technical Partners
32	1.1.1.1	How many applications have you successfully packaged and cloudified on the STRATEGIC Service Store?	Cloud Application Developers, Technical Partners
37	1.1.4	CAMDEN PILOT REQUIREMENTS VALIDATION	
38	1.1.4.1	Does STRATEGIC provide the ability to protect the computing resources with Cloud based security solutions?	Pilots
39	1.1.4.2	Does STRATEGIC provide the ability to use and manage public resources effectively from the Strategic platform?	Pilots

Figure 2: Sample part of the spreadsheet containing all filtered questionnaires and questions

The "per stakeholder-group" questionnaires were then created with LimeSurvey¹. Other candidates considered were Google Forms² and SurveyMonkey³ that are popular tools; however given the experience with the usage of SurveyMonkey for the requirements capture phase, where it was complicated to implement the required logic and for better control of the stored data, we preferred the usage of

¹ <https://www.limesurvey.org/>

² <https://www.google.com/forms/>

³ www.surveymonkey.com/

a privately installed solution, as LimeSurvey is an open source survey tool. The questionnaire platform has been deployed through STRATEGIC Service Store, by SingularLogic in a private Amazon AWS account and is available on the domain <http://surveys.strategic-project.eu>.

LimeSurvey supports all the needed question and answer types that allow the transformation of GQM triples defined for both the technical and the business evaluation to online questions and also allows to define long text answers that are needed for the high level questions.

The installed LimeSurvey allows the easy creation of online questionnaires with appropriate questions per stakeholder group, both for the technical and technological evaluation based on the triples defined in D7.1. The list of the provided questionnaires is provided below. In order to reuse part of the work for the external evaluation, the internal part of the questionnaire was dealt inside the Technical Partners and Pilots questionnaires, but all partners were also asked to fill in other corresponding category (or categories) that they belonged. In other words, each partner may have had to fill in more than one questionnaire (see section 3.2). The questionnaires that have been created are specific for Cloud Application Developers, Cloud Service Providers, End Users, Pilots, Public Sector Organization and Technical Partners and presented in Figure 3 below. However, End Users questionnaire belongs only to the external stakeholders evaluation and will not be further analysed in this document. In the same sense the Pilots and Technical Partners questionnaires have only be used to the internal evaluation of the platform and will not be distributed to external stakeholders.



Figure 3: The list of active STRATEGIC questionnaires

Some information about each questionnaire is provided in the following subsection.

3.1.1 Questionnaires overview

For all the questionnaires used in the evaluation analysis of this deliverable, indicative screenshots of the landing page and some sample questions are provided below, in addition to the URLs that these questionnaires can be found online.

3.1.1.1 Evaluation by usage of the platform

Following questionnaires can be used for both internal and external evaluation as the questions are based on the usage of the STRATEGIC as a platform:

Public Sector Organizations

Public Sector organizations refer to administrators of public bodies that can be internal or external stakeholders and are actually using STRATEGIC as a platform for their organization and STRATEGIC Service Store as end users.

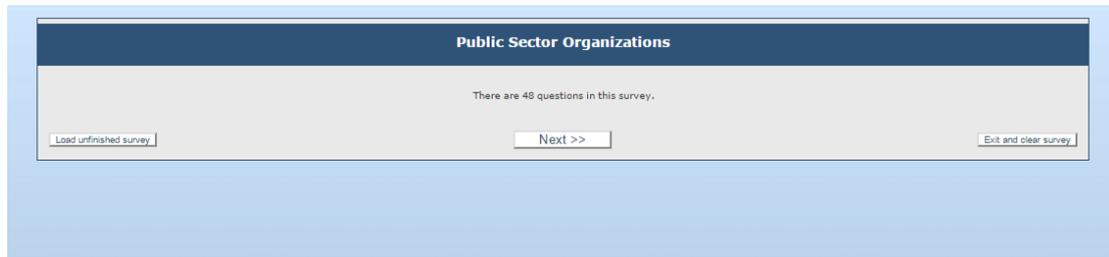


Figure 4: Public Sector Organizations questionnaire welcome page

As shown in Figure 4 public sector organizations questionnaire contains 48 questions. This questionnaire is available online on: <http://ec2-52-18-79-219.eu-west-1.compute.amazonaws.com/index.php?sid=57627&lang=en> and Figure 5 provides a sample of the forms used.

Figure 5: Cloud Service Provider data entry form

Cloud Application Developers

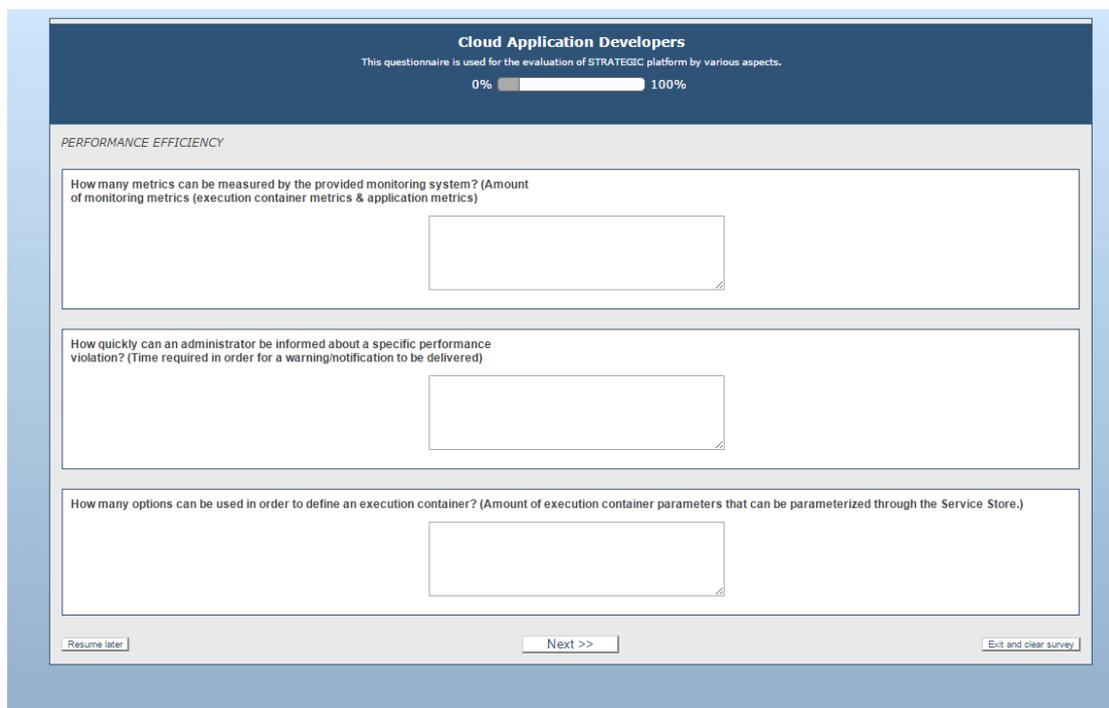
Cloud Applications Developer can be internal or external stakeholders that create their services and publish them to STRATEGIC Service Store.



The screenshot shows the welcome page for the 'Cloud Application Developers' questionnaire. The header is dark blue with the title 'Cloud Application Developers' and a subtitle 'This questionnaire is used for the evaluation of STRATEGIC platform by various aspects.' Below this, a light grey box contains the text: 'Welcome to the STRATEGIC Cloud Application Developers Questionnaire. There are 14 questions in this survey.' At the bottom of the page, there are three buttons: 'Load unfinished survey' on the left, 'Next >>' in the center, and 'Exit and clear survey' on the right.

Figure 6: Cloud Application Developer welcome page

As shown in Figure 6, Cloud Application Developer questionnaire contains 14 questions. This questionnaire is available online on: <http://ec2-52-18-79-219.eu-west-1.compute.amazonaws.com/index.php?sid=93112&lang=en> and Figure 7 provides a sample of the forms used.



The screenshot shows a data entry form for the 'PERFORMANCE EFFICIENCY' section of the questionnaire. The header is dark blue with the title 'Cloud Application Developers' and a subtitle 'This questionnaire is used for the evaluation of STRATEGIC platform by various aspects.' Below this, a progress bar shows '0%' completion. The section title 'PERFORMANCE EFFICIENCY' is in a light grey box. There are three text input fields with the following questions: 'How many metrics can be measured by the provided monitoring system? (Amount of monitoring metrics (execution container metrics & application metrics))', 'How quickly can an administrator be informed about a specific performance violation? (Time required in order for a warning/notification to be delivered)', and 'How many options can be used in order to define an execution container? (Amount of execution container parameters that can be parameterized through the Service Store.)'. At the bottom, there are three buttons: 'Resume later' on the left, 'Next >>' in the center, and 'Exit and clear survey' on the right.

Figure 7: Cloud Application Developers data entry form

Cloud Service Providers

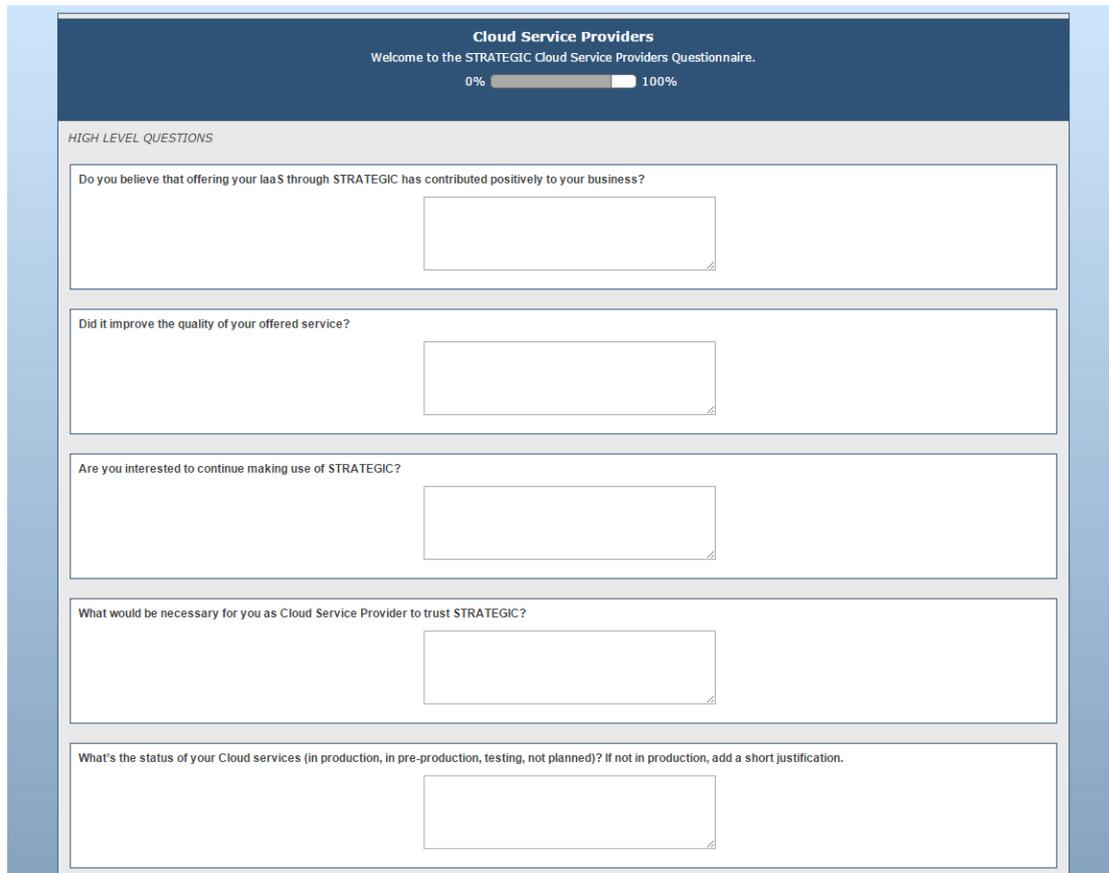
Cloud Applications Developer can be internal or external stakeholders that integrate their IaaS offering to STRATEGIC Service Store.



The screenshot shows the welcome page for the 'Cloud Service Providers' questionnaire. The header is dark blue with the title 'Cloud Service Providers' and a subtitle 'Welcome to the STRATEGIC Cloud Service Providers Questionnaire.' Below this, a light grey box contains the text: 'This questionnaire is used for the evaluation of STRATEGIC platform by various aspects. There are 19 questions in this survey.' At the bottom of the page, there are three buttons: 'Load unfinished survey' on the left, 'Next >>' in the center, and 'Exit and clear survey' on the right.

Figure 8: Cloud Service Provider welcome page

As shown in Figure 8, Cloud Service Provider questionnaire contains 19 questions. This questionnaire is available online on: <http://ec2-52-18-79-219.eu-west-1.compute.amazonaws.com/index.php?sid=21998&lang=en> and Figure 9 provides a sample of the forms used.



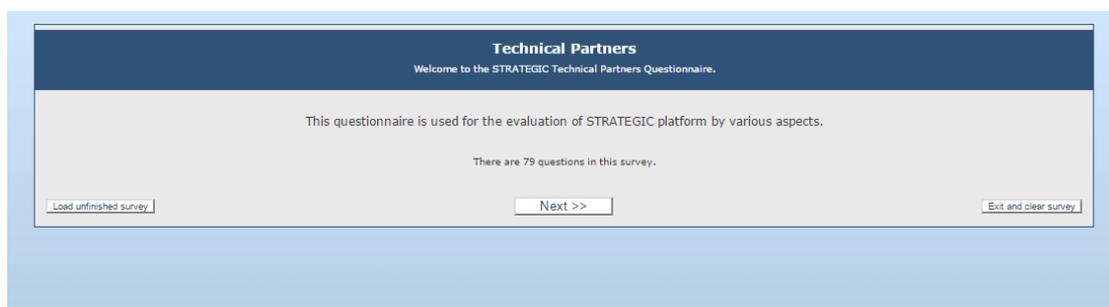
The screenshot shows a web-based questionnaire titled "Cloud Service Providers". At the top, it says "Welcome to the STRATEGIC Cloud Service Providers Questionnaire." and shows a progress bar from 0% to 100%. Below this, the section is labeled "HIGH LEVEL QUESTIONS". There are five questions, each with a text input field:

- Do you believe that offering your IaaS through STRATEGIC has contributed positively to your business?
- Did it improve the quality of your offered service?
- Are you interested to continue making use of STRATEGIC?
- What would be necessary for you as Cloud Service Provider to trust STRATEGIC?
- What's the status of your Cloud services (in production, in pre-production, testing, not planned)? If not in production, add a short justification.

Figure 9: Cloud Service Provider data entry form

Technical Partners:

This questionnaire has been created in order to be answered by all technical partners of the project. It also includes the requirements identified on the deliverable D4.4[6].



The screenshot shows the welcome page for the "Technical Partners" questionnaire. It says "Welcome to the STRATEGIC Technical Partners Questionnaire." and provides the following information:

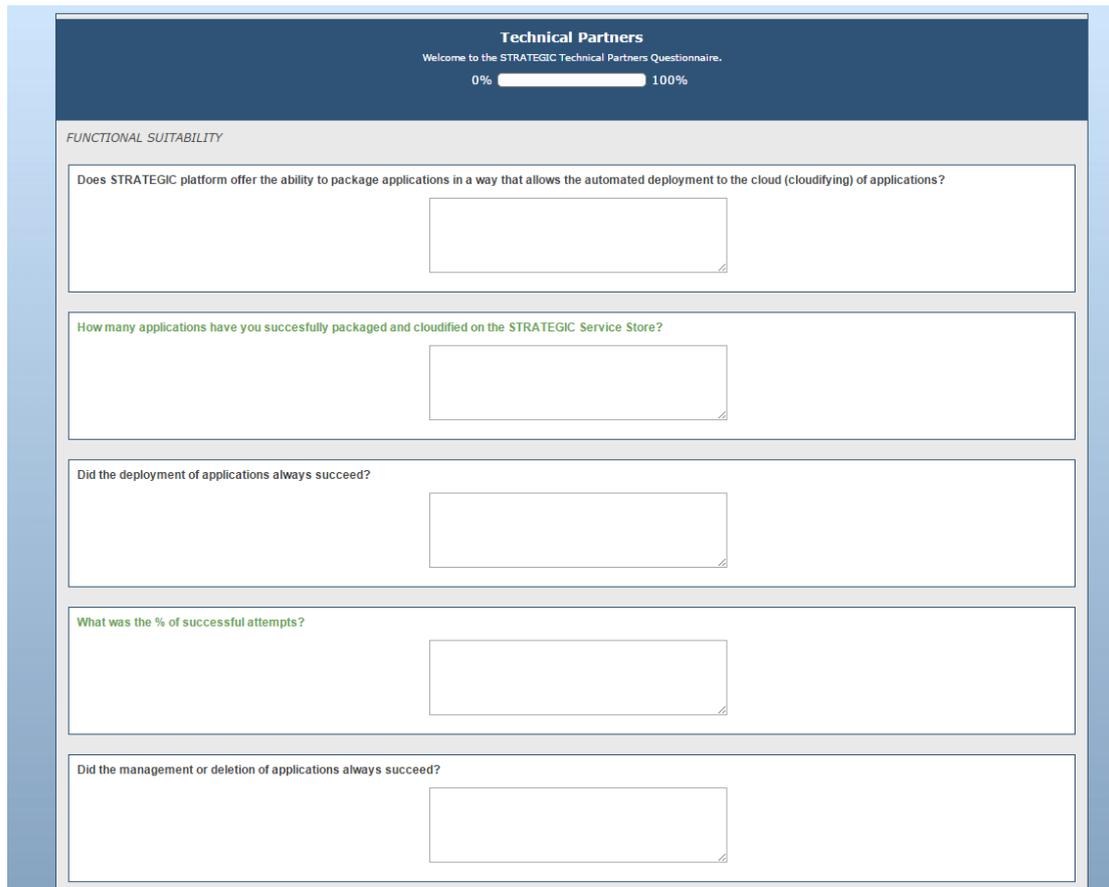
- This questionnaire is used for the evaluation of STRATEGIC platform by various aspects.
- There are 79 questions in this survey.

At the bottom, there are three buttons: "Load unfinished survey", "Next >>", and "Exit and clear survey".

Figure 10: Technical Partners questionnaire welcome page

As shown in Figure 10, Technical Partners questionnaire contains 79 questions. This questionnaire is available online on: <http://ec2-52-18-79-219.eu-west-1.compute.amazonaws.com/index.php?sid=21998&lang=en>

1.compute.amazonaws.com/index.php?sid=69737&lang=en and Figure 11 provides a sample of the forms used.



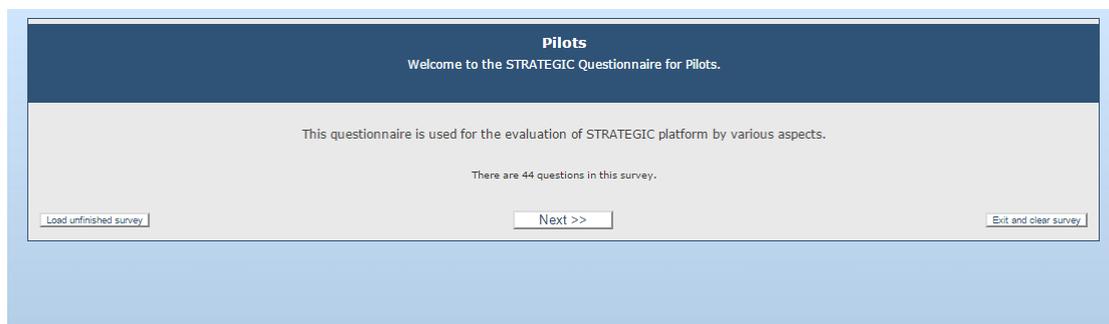
The screenshot shows a web-based data entry form titled "Technical Partners". At the top, it says "Welcome to the STRATEGIC Technical Partners Questionnaire." and shows a progress bar at 0%. The form is divided into sections, with the first section titled "FUNCTIONAL SUITABILITY". It contains five questions, each with a text input field:

- Does STRATEGIC platform offer the ability to package applications in a way that allows the automated deployment to the cloud (cloudifying) of applications?
- How many applications have you successfully packaged and cloudified on the STRATEGIC Service Store?
- Did the deployment of applications always succeed?
- What was the % of successful attempts?
- Did the management or deletion of applications always succeed?

Figure 11: Technical Partners data entry form

Pilot Partners:

This questionnaire has been created in order to be answered by the pilot partners of the project. It includes the requirements identified on the deliverable D4.4[6] and as some of these requirements are pilot specific, some questions could possibly be answered only by specific pilot partners.



The screenshot shows the welcome page for the "Pilots" questionnaire. It features a dark blue header with the title "Pilots" and the text "Welcome to the STRATEGIC Questionnaire for Pilots." Below the header, there is a light gray box containing the following text:

This questionnaire is used for the evaluation of STRATEGIC platform by various aspects.
There are 44 questions in this survey.

At the bottom of the page, there are three buttons: "Load unfinished survey", "Next >>", and "Exit and clear survey".

Figure 12: Pilots questionnaire welcome page

As shown in Figure 12, the «Pilots» questionnaire contains 44 questions. This questionnaire is available online on: <http://ec2-52-18-79-219.eu-west-1.compute.amazonaws.com/index.php?sid=34323&lang=en> and Figure 13 provides a sample of the forms used.

Pilots
Welcome to the STRATEGIC Questionnaire for Pilots.

0% 100%

FINANCIAL AND BUSINESS EVALUATION

How much (in €) do you estimate the total investment done for your service?
Total investment is the amount put by your organization to the project (excluding any EC funding), the sum of investment in physical assets and the payments made. It should be calculated not only as part of the project (until M36 of the project) but also after the end of the project for a period of 3-5 years.

How much (in €) do you estimate the pertinent operating expenses for your service?
Total OPEX is the amount put by your organization for the purposes of the project (excluding any EC funding) and could indicatively include items such as: salaries, fees/rents, utility bills and administrative costs. This should be calculated not only as part of the project (until M36 of the project) but also after the end of the project for a period of 3-5 years.

How much (in €) do you estimate the revenue (net profit) for your service as part of the project (if applicable) and for 3-5 years after the end of the project?
You may calculate the net profit using the following formula: Net profit (€) = sales revenue (€) – total costs (€), sales revenue (€) = price (of asset) * quantity sold, total costs (€) = capital expenditures + ongoing operating expenses + interests, savings realized by usage of service (€) = avoided software/hardware expenses + manpower related savings; (this formula is indicative and not exhaustive).

Resume later Next >> Exit and clear survey

Figure 13: Pilots data entry form

3.2 Dissemination of Main Evaluation Tools

As described above, each partner had to fill in not only the technical partner and pilot questionnaires, but also the one from the corresponding stakeholder group his/her organisation belonged. The on-line questionnaires were shared to the stakeholders with emails and the appropriate persons of each consortium partner filled it in.

	Cloud Application Developer	Cloud Service Provider	End user	Pilot	Public Sector Organization	Technical Partner
SILO	X	X				X
BT		X				X
ATOS	X			X		X

	Cloud Application Developer	Cloud Service Provider	End user	Pilot	Public Sector Organization	Technical Partner
NICPB	X	X				X
URNS						X
CAMDEN				X	X	
MoSG				X	X	
GENOA				X	X	

Table 2: Responsibilities of partners

There was a tele-conference to initially explain the process and go through the questionnaires, and then during the Athens face-to-face meeting (21-22 of January 2016) at SILO premises interviews were used as an additional tool to provide input or clarify any unclear points.

3.3 Issues and Follow-Up Actions

The current questionnaires were targeted to the internal partners, which have advanced knowledge of STRATEGIC and its assets. In addition, the set of questions was rather long and time-consuming. In order to ease the answering for the external stakeholders, it is expected that changes will be made (more concise set of questions and more targeted to persons not fully-aware of STRATEGIC). Although that by using these questionnaires based on the QGM methodology and ISO 25010, the input we received was of very good quality, it is not realistic to deliver these to external stakeholders. In more detail, the changes to be introduced are two-fold. First is to decrease the number of the questions to each stakeholder group, by merging questions or by even removing questions that require much effort from the answerers in order to provide a realistic answer. In any case limit of questions should be restricted to 20-30 questions max.

The second change needed on the questionnaires in order be more suitable for external stakeholders is the usage of closed value lists in greater extend. Although the free text on the answers of the internal stakeholders was intentional in order to capture more details and the opinion of the people answering the questionnaires, this "open-ended questions" approach might not be ideal for external stakeholders. "Open-ended questions" can lead to very broad answers and this is a particular problem in all self-administered questionnaires, where there is no interviewer who could probe and motivate respondents to give more specific answers [5]. Also in this approach answerers are easy to omit answers to questions and this leads to missing data, a fact that we sometimes faced even in the internal evaluation, when it was not combined with personal interviews.

For this reason, the "Closed-ended questions" approach will be used in order to allow external stakeholders to effortlessly provide their answers and the same time we can benefit from the ranged answers that are always easier to analyse

and also for the fact that questionnaires with closed-ended questionnaires have smaller amount of missing (or invalid) data [5].

The existing Open-ended question type questionnaires will be still used for face to face interviews for the rest of the project evaluation duration.

3.4 Summary of Data Collected

As depicted in **Figure 14** where the list of surveys and their status is provided, questionnaires have been answered by a sufficient amount of users.



Status	SID	Survey	Date created	Owner	Access	Anonymized responses	Responses			Tokens available	Response rate
							Full	Partial	Total		
	93112	Cloud Application Developers	08.01.2016	paris (Edit)	Open	No	3	4	7		
	21998	Cloud Service Providers	08.01.2016	paris (Edit)	Open	No	4	2	6		
	98355	End users	08.01.2016	paris (Edit)	Open	No	0	0	0		
	34323	Pilots	08.01.2016	paris (Edit)	Open	No	0	3	3		
	57627	Public Sector Organizations	07.01.2016	paris (Edit)	Open	No	0	3	3		
	69737	Technical Partners	08.01.2016	paris (Edit)	Open	No	4	5	9		

Figure 14: The list of active questionnaires

More specific total number of responses received for Cloud Application Developers are 7, for Cloud Service Providers are 6, for Pilots and Public Sector Organization 3 and for Technical partners 9. Not all responses were fully answered, but as explained in more details in section 3.3, the partial answered responses is an expected situation when using "open-ended questions" on questionnaires.

4 Data Analysis

4.1 Per Stakeholder Group Area

The emphasis in this deliverable is not to address in details all the evaluation areas, rather to make an evaluation across all the areas, focusing on the perspectives of the stakeholders. In other words, the main points from each stakeholder group will be presented, and for this deliverable, it will be the technical partners and the pilots.

4.1.1 Technical partners

The technical partners have been involved in the packaging and “cloudification” of applications for the STRATEGIC pilots. On average each technical partner was responsible for 2 applications (workloads). The applications have been reported to range from simple monolithic web applications to complex three-tier applications involving proxies, web servers and databases. In total, the technical partners have worked on 9 distinct workloads and in the STRATEGIC platform there are available 89 more workloads for third party applications. These applications are categorized in 12 categories: Development Platforms, Collaboration, Developer Tools, STRATEGIC EU project, Big Data, Security Tools, ERP, CMS, Databases, Cloud, Samples, Life Sciences.

The packaging and “cloudification” of new applications was reported as a well-defined and easy to learn process for application developers. Creating more complex workloads for large-scale applications with multiple components and interdependencies requires deeper understanding of the configuration management mechanisms. A new feature that is expected to be made available soon on the STRATEGIC platform is an external API that can be used by ISVs in order to provide added value services that can be horizontally integrated.

During the packaging phase, the technical partners have been testing early releases of the workloads and the deployment success rates were reported to be above 90%. The high rate of successful deployments even during the development phase is a further proof that the “cloudification” process is well-defined and easy for integrators to implement. The success rate for the deployment of the final published workloads was reported to be 100%. Furthermore, all the technical partners reported that there was no single issue found in the lifecycle of any of the published workloads.

The technical providers reported that the amount of IaaS providers that are already available on the STRATEGIC platform are more than adequate for the pilots. Up to now one public IaaS cloud has been used, Amazon Web Services (AWS) and two private IaaS cloud, OpenStack and vCloud. The list of supported IaaS providers includes also Azure, BT Cloud, CloudPlatform, Cytrix CloudStack and HP Cloud⁴. Deployment of the pilot application to all three IaaS clouds has been without any issues and the technical partners have reported that redeployment of an application to different IaaS works flawlessly. On-boarding a new IaaS provider, which uses one of the supported APIs, to the STRATEGIC

⁴ The HP Cloud service has been retired since end of January 2016

platform was reported as a well-defined process that requires no more than one working day.

The operating systems supported on the STRATEGIC platform are Linux and Windows. Virtually any flavour of these operating systems that is supported by the on-boarded IaaS providers, is also supported on the STRATEGIC platform. Similarly, the virtual hardware configurations that are available on the STRATEGIC platform are those registered by the IaaS providers during the on-boarding process. It was reported that currently there are ~30 different virtual hardware configuration across the various IaaS providers that are available today on the STRATEGIC platform.

During the evaluation process by the technical partners it was reported that during the project lifetime the platform has been upgraded a couple of times to support new functionalities required for pilot operations, especially the IceHouse OpenStack API support in order to support IaaS providers that utilize the IceHouse version of OpenStack. Despite this, the downtime of the platform has been minimized by running legacy platforms during upgrades. In addition, there has been a development environment setup to protect and eliminate the possibility of downtimes due to development issues.

Regarding the security mechanism that are available on the platform, the "BT Intelligent Protection" provides the necessary application and host security controls for every cloud deployment of workloads, while the "BT Data Encryption", which it is in the roadmap to be released, will guarantee that the data of the VM is encrypted at the hypervisor level. The "BT Intelligent Protection" can be activated on demand for VMs on supported IaaS Providers. Furthermore, the STRATEGIC platform can utilize VPN connections from the Service Store to the IaaS management API in order to on-board private clouds without requiring that they expose their management services to the Internet.

Another characteristic of the STRATEGIC platform that was reported during the evaluation process was the turn-key support for eIDs through the STORK platform. The users can use Strong Authentication using one of the eIDs accepted in their country of origin, while the applications can utilize the available components in order to establish trust relationships based on digital signatures and to retrieve information (attributes) about the user from external Attribute Authorities. The built-in use of the STORK platform ensures the compatibility with the eIDAS regulation.

Some issues were reported by the technical partners, which were mostly related to the need to further improve the User Experience (UX) characteristics of the web front end. It was also reported that early on, there had been some issues with the availability of the platform and with the listings of the available workloads, but these were resolved promptly.

In the question what they deem as necessary in order to trust the STRATEGIC platform as application developers, three aspects were mentioned: clear financial model, market share and sustainability. All these aspects are being actively worked on in WP8.

From another perspective, the technical partners who are on the side of the cloud service providers reported that offering their IaaS through STRATEGIC platform is expected to contribute positively to their businesses, as it is an additional sales channel with very low OPEX. Key aspects for the success of the STRATEGIC platform from the point of view of the cloud service providers were the quality of

the user experience, the ease of integration and the up-to-date support of new private/public cloud platform.

4.1.2 Pilot partners

All pilot partners have been using the STRATEGIC platform successfully. Within the first 2 years of the project, all the pilot partners have reported that they are able to deploy, manage and share their applications using the STRATEGIC platform with ease. The process of packaging and publishing applications to STRATEGIC was reported to be well-defined and that it provided the added value of having a uniform process that can be applied across their organisations, reducing in this way the overhead that is introduced, while more applications are becoming part of the organisation's portfolio. Furthermore, the reusability of the published applications has been reported to be one of the strong points of the platform, as it gives the ability to the pilot partners to redeploy or share their applications without having any additional overhead.

The management of compute nodes and storage was reported to be very easy both for experienced and novice technical personnel. The abstraction layer that is introduced by the STRATEGIC platform, has been giving the ability to the pilot partners to use different underlying infrastructure providers in a way that was inconceivable before. For example, GENOA and MOSG both reported that during the pilot preparation they have been using a mix of resources on AWS and on the OpenStack Private Cloud installation at SILO, forgetting at times that the utilised compute and storage resources were located on different IaaS clouds. Similarly, CAMDEN, using the STRATEGIC platform, was able to deploy compute and storage resources on the BT Cloud for a Sharepoint Open Data web application without facing any issues.

An important characteristic of the STRATEGIC platform was reported to be the ability to utilise multiple infrastructure providers ranging from being public cloud providers to local/internal private cloud providers in a seamless way. For example, MOSG stated that not all applications have the same regulatory requirements. For some applications, public clouds are a perfect fit, while for other applications regulatory requirements might mandate the use of an internal private cloud operated within a contained environment. The capability of the STRATEGIC platform to apply specific policies regarding the deployment targets of each application is enabling the pilot partners to make the best selection in terms of cost, performance and regulatory compliance. In addition, the pilot partners highlighted also the freedom that the STRATEGIC platform is providing to them by avoiding the lock-in to specific IaaS after an application is deployed for the first time. The support of multiple infrastructure providers under a single platform, combined with the ability to deploy published applications in any of the available IaaS at any time, is a "game-changing" factor regarding life cycle of the deployed applications after their initial production deployment.

The security characteristics of the STRATEGIC platform were another area underlined by the pilot partners. The support for cross-border authentication utilising e-IDs through STORK and the secure data exchange were identified as unique features of the platform that distinguish STRATEGIC from the rest of the market. Taking into consideration the incremental roll-out by the member states of eIDAS compliant electronic services in 2016 and beyond, the built-in support of STORK in the STRATEGIC platform is very important feature. Already two pilot partners, GENOA and MOSG, are actively working on leveraging the e-identification and attribute exchanges capabilities within their pilots, while

CAMDEN has expressed its strong interest in taking advantage of such capabilities in its services.

Another point, which the pilot partners have reported as key for the production operation of services on top of the STRATEGIC platform, was the built-in support for security tools that can protect VMs and data at the infrastructure level. During the discussion with the pilot partners it was mentioned that the average time between a new service being brought to production for public access and having that service scanned for malicious access is measured in minutes. Security monitoring of the production services can be a time-consuming activity, which in many cases experience has shown that is being treated as a "luxury" that is not affordable, especially by public sector organizations that do not have skilled IT personnel in operational security. The security tools that are provided by the STRATEGIC platform can provide a level of protection that is not available in their current infrastructures or cloud providers.

Related to the subject of the security, CAMDEN reported that the ability of the STRATEGIC platform to connect to protected networks through VPN connections, is key for the adoption in the UK and other countries that operated private governmental networks for specific types of services.

The report of the pilot partners at this stage was focused mostly on the functional and operational aspects of the STRATEGIC offering. A financial evaluation is going to be presented in D7.3, but already all the pilot partners have reported that the STRATEGIC platform will have significant impact in the reduction of their OPEX. The same output was derived from the cost analysis exercise that is presented in the D8.3 Annex [4].

5 Conclusions and Future Plans

5.1 Main Conclusions

The main conclusion from this internal evaluation is that both Technical Partners and Pilots STRATEGIC are overall very satisfied with the functionality of the STRATEGIC platform.

In terms of the technical partners the following points were retrieved from chapter 4:

- The packaging and “cloudification” of new applications was reported as a well-defined process and easy to learn even for application developers.
- During the packaging phase, the technical partners have been testing early releases of the workloads and the deployment success rates were reported to be above 90%.
- The technical providers reported that the amount of IaaS providers that are already available on the STRATEGIC platform are more than adequate for the pilots.
- The operating systems supported on the STRATEGIC platform are Linux and Windows. Virtually any flavour of these operating systems that is supported by the on-boarded IaaS providers, can also be supported on the STRATEGIC platform.
- Downtime of the platform during upgrades was minimal.
- Enhanced on-line security services are available on the platform, such as the “BT Intelligent Protection”, providing the necessary application and host security controls for every cloud deployment of workloads, and the upcoming “BT Data Encryption”, which will guarantee that the data of the VM is encrypted.
- Turn-key support for eIDs through the STORK platform.
- Issues were reported on the User Experience (UX) characteristics of the web front end.
- Early on, there had been some issues with the availability of the platform and with the listings of the available workloads, but these were resolved promptly.
- Additional sales channel for Cloud Service Providers with very low OPEX can be achieved.

In terms of the pilots the following points were retrieved from chapter 4:

- Pilots are able to deploy, manage and share their applications using the STRATEGIC platform with ease
- The process of packaging and publishing applications to STRATEGIC was reported to be well-defined
- The management of compute nodes and storage was reported to be very easy both for experienced and novice technical personnel
- The abstraction layer of the STRATEGIC platform gives the ability to the pilot partners to use different underlying infrastructure providers in an easy way.
- In the same wavelength, the pilots appreciated the ability to utilise multiple infrastructure providers ranging from public cloud providers to local/internal private cloud providers in a seamless way

- Pilot partners highlighted also the freedom that the STRATEGIC platform is providing to them by avoiding the lock-in to specific IaaS after an application is deployed for the first time.
- The security characteristics of the STRATEGIC platform were also appreciated, namely The support for cross-border authentication utilising e-IDs through STORK and the secure data exchange
- The built-in support for security tools that can protect VMs and data at the infrastructure level was also valued, along with the ability to connect through VPNs
- Pilot partners have reported that the STRATEGIC platform will have significant impact in the reduction of their OPEX.

5.2 Next Actions/Future Plans

The current questionnaires were targeted for internal evaluation from consortium partners. The set of questions was rather long and time-consuming. In order to ease the answering for the external stakeholders, it is expected that changes will be made. The two main changes consist of more concise set of questions (not fully-aware of STRATEGIC) and less "open-ended" questions (free text), which make difficult the analysis and summarisation. Parts of the questions and the questionnaires will be however reused to save time.

6 References

- [1] STRATEGIC Annex I - "Description of Work", 2014
- [2] STRATEGIC D7.1 Evaluation Methodology, 2015
- [3] STRATEGIC D8.3a Sustainability, Business Marketing and Financial Plan, 2015
- [4] STRATEGIC D8.3a Annex Comparison of pre- and post-STRATEGIC costs, 2016
- [5] Open-ended vs. close-ended questions in web questionnaires. Ursa Reja, Katja Lozar Manfreda, Valentina Hlebec, Vasja Vehovar, 2003
- [6] STRATEGIC D4.4, Integrated STRATEGIC Framework and Cloud Infrastructures, 2015