COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME

CIP-ICT-PSP-2013-7

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

Deliverable D1.5 Public Final Activity Report

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Abstract:	This publishable final activity report covers main aspects of the project: context, STRATEGIC objectives and offering, results and conclusions, including the publishable results of the final plan for using and disseminating the knowledge.

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DECLARATION BY THE PROJECT COORDINATOR

I, as coordinator of this project and in line with my obligations as stated in Article II.2 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate):
  - ☑ has fully achieved its objectives for the period;
  - ☐ has achieved most of its objectives for the period with relatively minor deviations;
  - ☐ has failed to achieve critical objectives and/or is deviating significantly from the schedule.
- The public Website is up to date;
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (chapter 4 of the Final Management Report, D1.6) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organizations and SMEs, have declared to have verified their legal status. Any changes have been reported in the chapter 3 the deliverable D1.6 Final Management Report in accordance with Article II.3.f of the Grant Agreement.

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Definitions, Acronyms and Abbreviations

Acronym	Title
ICT	Information and communications technologies
IT	Information technologies
KPI	Key performance indicator
RC	Review recommendation
WP	Workpackage

Table 1: Definitions, Acronyms and Abbreviations

1 Final publishable summary

STRATEGIC defines a framework of interconnected solutions and services that offer cloud enablement on various infrastructures while offering a set of services related to public bodies.

1.1 Burdens in the public administrations

In the recent years one of the hottest topics in information technology has been the emergence of cloud computing. Cloud Computing is the new technology introducing new economic and social challenges for the ICT sector. Cloud computing can profoundly change the way organizations access and use ICT products and services. Instead of owning and managing ICT products and services, or using a "traditional" outsourcing approach built around dedicated hardware, software, and support services, organizations employing cloud computing services can meet their ICT requirements using a flexible, on-demand, and rapidly scalable model requiring neither ownership on their part, nor provision of dedicated resources by the cloud services provider.

While businesses likely will adopt cloud computing more rapidly than the public sector, there are some notable early moves occurring in government. The economic downturn and the budget cuts lead the Public Administration to find new formulas to boost internal management effectiveness. New IT paradigms make it possible to provide more efficient services. The service provision model in the cloud, or cloud computing, is one of the formulas to reach this goal. One of the most significant cloud computing opportunities for the public sector is the ability to share ICT resources among multiple agencies. While governments have tried hard to create frameworks geared toward shared services, these have not always been successful. Cloud computing offers an easier and less burdensome route to more efficient and effective public sector information management.

Therefore, as regards the Public Administration, the benefits generated by Cloud Computing refer mainly:

- ✓ to the capability of having a larger amount of applications and services conveyed as "commodity" through a pay-per-use model
- ✓ to the ability to move to other Cloud Computing providers at any time, and so benefit from the high flexibility and freedom
- ✓ to the possibility to have simple interfaces

However, migration towards Cloud computing is easier said than done because cloud computing is not without its challenges:

- ✓ Procurement issues: IT budgets are planned well in advance leaving agencies with little flexibility for last minute changes. Selection of vendors/service providers is a long drawn process that strives to minimize the suppliers and procure services at a lower price. Hence, the government runs a risk of being unable to procure IT services from niche service providers that can deliver innovative services at low prices.
- ✓ A service provider residing outside of a government's legal or territorial jurisdiction may put access or security at risk.

- ✓ Open standards and interoperability may not be guaranteed, leading to the risk of vendor lock-in.
- ✓ Data privacy is a concern when using public clouds. This can be addressed by the development of private clouds.
- ✓ Business continuity will continue to be a concern. Cloud computing, however, may also mitigate this risk, as cloud vendors are likely to use more robust and better-maintained computing platforms that provide more redundancy and are less likely to fail

Although these concerns, especially around privacy, security and sovereignty of data, do continue to inhibit adoption, the value proposition of moving to the cloud is too attractive for the governments to ignore. Therefore, cloud computing should be considered as a very attractive strategy for the development of modern digital public administration, considering its cost efficiency.

1.2 STRATEGIC offering and objectives

In this context, STRATEGIC raises with the main objective of easing the adoption of public cloud services by boosting the notion of an innovative marketplace of public cloud services for public bodies and enterprises. STRATEGIC approach for cloud based in marketplace is providing a common platform which hosts a marketplace (namely, the STRATEGIC service store) which demonstrates how to expose services to end consumers, but also, how to create re-usable services to re-apply in multiple-clouds, and different contexts.

STRATEGIC aims to become the first one-stop shop for next generation e-Government services across Europe. The STRATEGIC Service Store acts as a marketplace for developers that want to publish their applications. The STRATEGIC orchestration services help public bodies to manage the entire lifecycle of an application in public, private or hybrid infrastructure. Continuous monitoring and security are inherent features of the platform.

More specifically, the project objectives include the successful deployment the of e-government services on cloud infrastructures through STRATEGIC Service Store and usage of these services by actual users are the main objectives to be achieved during piloting phase of the project. Furthermore, three additional goals have been set in order to demonstrate the added value that STRATEGIC can offer to public bodies. These goals are (a) the porting of services between different cloud providers to avoid the cloud lock-in, (b) the adaptation and localization of services available in marketplace usage from more than one pilot and finally (c) the creation of new services that public bodies could possibly use.

1.3 Technology description

The STRATEGIC Service Store is the entry point for all workload configurations and service deployments of STRATEGIC. The Service Store provides orchestration capabilities to the workloads defined within their application marketplace; in addition STRATEGIC allows associating each service with horizontal security mechanisms (i.e.: data protection, data encryption). At the same time, when a pilot application service is instantiated, monitoring agents are deployed together with the virtual resource instances in order to keep track of the availability and performance information of the service during the whole service lifecycle. Another key enabler for our deployments are the infrastructure providers that after being registered within the Service Store become target working nodes for pilot

deployments. As it was mentioned before in previous STRATEGIC documentation, our approach is not limited to one provider. Several providers can be registered under our STATEGIC multi-tenant environment allowing multi-cloud deployments over various types of IaaS providers.

The main components and systems that enable the operations in the cloud are listed below:

- Service Store

  The Service Store allows injecting control points into the application stack, during the service creation phase, before the final deployment of the resources on top of an Infrastructure Provider. The application as well as the control points can be defined and configured using the STRATEGIC metadata model together with the applications already available in the application catalogue or registering new applications that can be included in the metadata as part of the definition of the cloud workload.

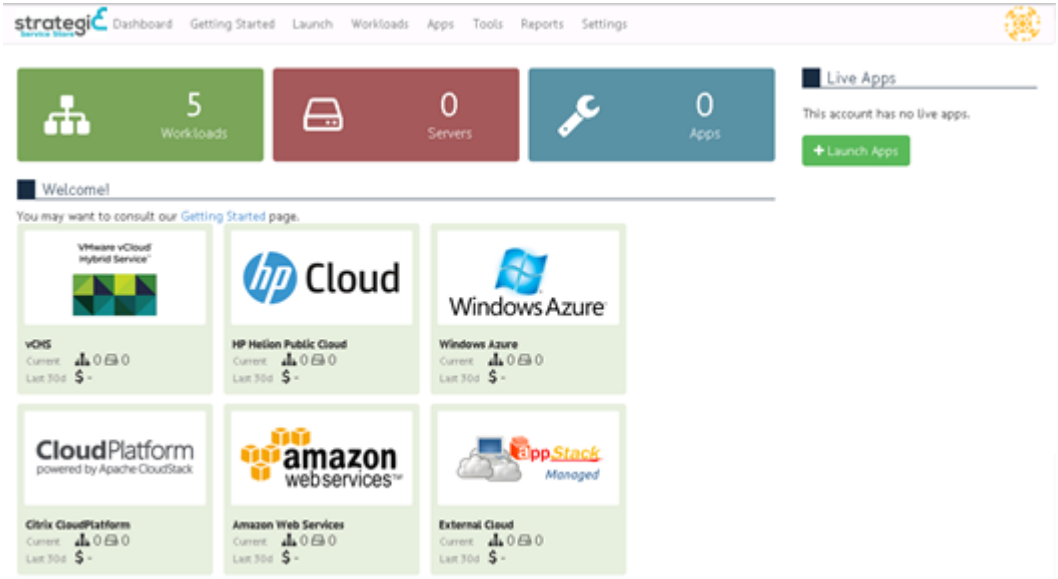

Figure 1: Service Store layout

- Monitoring system

  The monitoring system being used as part of the STRATEGIC is able to collect performance and availability information over various Cloud Service Providers (CSPs) built on top of different infrastructure providers. The backbone of the monitoring system has been configured to automatically retrieve information from the computational resources after the deployment of the aforementioned resources in private or public cloud infrastructure.

- Security mechanisms

  STARTEGIC provides among other mechanisms application and host protection in addition to data encryption of data drives as a service which can be consumed as horizontal services. Cross-border attributes exchange as well as cross-border authentication engine for pilots which is applied at application level through STORK/SEMIRAMIS components.

- IaaS Provider Environment

  Several IaaS environments have been used for the deployment of computing resources each of which might be managed by different cloud computing software (i.e: OpenStack, CloudStack). After being registered in the Services

Store, the resources managed by the cloud computing software become target working nodes for our deployments from the marketplace.

1.3.1 Addressing goals and objectives

As described before, the main objectives of the project is the successful deployment the of e-government services on cloud infrastructures through STRATEGIC Service Store, the porting of services between different cloud providers to avoid the cloud lock-in, the adaptation and localization of services available in marketplace usage from more than one pilot and the creation of new services that public bodies could possibly use.

From the technical perspective all these high-level goals have been achieved as presented in the following subsections.

1.3.1.1 Deployment of e-government services

During the project more than ten (10) e-government services have been deployed for our pilot partners, as will be detailed in section 1.4 that follows. Many of these applications were existing applications of public bodies that have been deployed to cloud infrastructure using STRATEGIC Service Store.

1.3.1.2 Migrating of Services Between Providers

One objective that is difficult to be achieved in the migration of services between providers. For this reason STRATEGIC supports two different migration approaches. The first approach is the Inventory-Based Approach, where the duplicated redeployment to different IaaS providers is based to the ability to replicate the expected environment in a different context, by utilizing appropriate scripts. These different deployment configurations have to be created and tested by the application developer before the e-government service is published to STRATEGIC Service Store.

The second approach is the Binary Image Re-contextualisation that it represents the attempt to create a digital copy of the working solution, and to re-deploy into a new cloud environment. However, this approach also implies difficult engineering challenges such as re-contextualisation of VMs (Virtual Machines), network configuration issues etc. STRATEGIC Service Store allows public bodies to use this approach; however using also external tools is also required. In the cases provided below, the migration of services relies on the Inventory-Based Approach of services that have been prepared in order to support multiple cloud environments through the STRATEGIC Service Store.

The actual achievement of the project all the services of the Genoa and MoSG pilots (8 in total different services) have been migrated to at least two different cloud providers during the project duration. This has been achieved as the e-government services utilized by the use cases have been configured to work properly for both Amazon IaaS and OpenStack when deployed from the STRATEGIC Service Store.

1.3.1.3 Adaptation and Localization

Adaptation and localization of e-government services that are available in the STRATEGIC Service Store is supported and public cloud services can be

configured/adapted through the UI of STRATEGIC Service Store, localized in the terms of integrating a local cloud provider that has been already integrated and then deployed in such a way that satisfies the public bodie needs.

The most typical example in this capability is deployment of the CKAN[1] based Open Data application by both the City of Genoa and the Municipality of Stari Grad. The adaptation process applies to the parameters configuration from the STRATEGIC Service Store during the service provision but also to the post-provision modifications, while localization refers to the deployment of services to the local cloud infrastructure of Genoa and Stari Grad accordingly.

1.3.1.4 Creation of New Services

During the project many new applications have been also created, with pilots along with the support of the technical partners have created 7 new applications. By what is most important is that public bodies adopting STRATEGIC can find a marketplace of more than 80 applications that can be easily deployed and used by their organizations.

1.4 The STRATEGIC success stories

In total, there are 11 pilots use cases selected, planned, developed and executed during the STRATEGIC project. The pilot partners of STRATEGIC consortium are namely the London Borough of Camden, the City of Genoa and the municipality of Stari Grad in Belgrade. For all the use cases, support on piloting and all the preparatory steps were provided by the technical partners participating in STRATEGIC.

Camden	**Camden-1:** Open data initiative for publishing data on the cloud **Camden-2:** Open systems for hosting a publicly available application **Camden-3:** Digital identity and authentication
The City of Genoa	**Genoa-1:** Cloud-enabled service for business activities **Genoa-2:** Cross-border authentication for business activities **Genoa-3:** Cross-border issuance of resident certificate **Genoa-4:** Open data initiative
	Stari-Grad-1: Cloud-enabled certificate issuance service **Stari-Grad-2:** Cross-border issuance of resident certificate **Stari-Grad-3:**

[1] http://ckan.org/

Municipality of Stari-Grad	Cloud-enabled email service **Stari-Grad-4:** Open data initiative

Table 2: List of STRATEGIC use cases

The initial focus was given by each pilot on one or two services, a fact that also allowed the first testing iteration of the STRATEGIC as a platform. This early period was focused on the baseline public cloud services, which served as a basis for piloting the rest services of the STRATEGIC framework. After this initial selection and successful deployment of services, the other remaining services had followed. The separation was also done based on the different complexity of each use case scenario and the e-government services used by it.

1.4.1 London Borough of Camden (UK)

CAMDEN's objective is to develop a scalable solution for delivering open systems in government using public cloud services in line with the Digital Strategy (www.camden.gov.uk/digitalstrategy). In the scope of STRATEGIC, Camden executed three pilot cases with different context but focus on the organization needs.

For the deployment of its pilot applications, the technical team of Camden used the infrastructure offered by BT, the BT Research Cloud. This solution is perfectly suited for CAMDEN as it allowed benefiting from the technical expertise of BT and the integration with Service Store early in the project that allowed deploying the application for piloting usage in a stable environment that supports the security requirements and as it is hosted in UK it also confirms the legal restrictions.

Use Case	Description	Achievements
Camden-1: Camden Open Data Initiative	Publishing the already in production www.camdendata.info over the cloud. The site provides access to datasets allowing users to be able to use the information as they wish – via the open government licence and supporting compliance with Local Government Transparency code	Pilot operations successfully executed, VM transferred during Y1 with help of BT, monitoring agent has been added, most KPIs reached during Y1 of the project
Camden-2: Publish Scheme management workflow system (Tranzact.Net) over the cloud	Publishing and reselling the Camden developed application for managing the blue badge, freedom pass and other associated processes, to other London public bodies. This service also requires compliance with the Public Services Network (PSN) due to the sensitive nature of data	Application developed during Y2, application has been deployed through the STRATEGIC Service Store, Pilot operations successfully executed

Use Case	Description	Achievements
Camden-3: Identity and attribute manager	Re-using work done via Open Identity Exchange (OIX) in the UK represented by Cabinet Office for an alpha project which includes managing identity of a blue badge customer using a UK based IDP and Gov.UK Verify services	Application developed during Y3, application has been deployed through the STRATEGIC Service Store, Pilot operations successfully executed

Table 3: Camden's use cases

All applications currently deployed are using Security as a Service offered on STRATEGIC Service Store. Security as a Service is supported through a subscription mechanism. Also the configuration capabilities of STRATEGIC Service Store have been used for the initialization of applications and also the proper set up of the deployed application in terms of network.

1.4.2 City of Genoa (Italy)

Genoa pilot is contributing with 4 use cases. For the City of Genoa, there was a high interest to create a private cloud infrastructure in their own premises. Although this was not part of the contractual obligations, this was considered an important step towards the adoption of cloud and the successful execution of the pilot scenarios. As the IT literacy of the technical team of GENOA was already high but had not adopted any open source private cloud solutions, the possibility to create such a private IaaS to be used even after the end of the project was of great added value. After initial discussions, it has been decided to create an OpenStack based IaaS, comprised of 4 servers.

Use Case	Description	Achievements
Genoa-1: Cloud enablement service for business activities	City of Genoa provides an Online Services Portal that allows the service for the issuance of registry certificates dematerialized, which can be e-mailed to the applicant and printable for the production of paper certificate.	The service, was implemented and deployed at the SILO's OpenStack-based infrastructure until the half of the third year of the Project, and then in Genoa's IaaS infrastructure
Genoa-2: Cross-border authentication for business activities	An extension of Genoa-1 use case functionalities to Spain citizens by using a STORK-based authentication service (leveraging STORK project results).	Currently, the applications required are deployed in an OpenStack of Genoa and the end-to-end transactions have been tested by real people but using test scenarios

Use Case	Description	Achievements
Genoa-3: Cross-border issuance of Certificate of Residence	Municipality of Genoa in cooperation with Municipality of Stari Grad created services that allow the exchange of citizens' data in a preproduction environment (with no real users data), leveraging SEMIRAMIS project results. This service allows a cross-border certification for residence and exchange of required attributes.	The service, was implemented and deployed at the SILO's OpenStack-based infrastructure until the half of the third year of the Project, and then in Genoa's IaaS infrastructure.
Genoa-4: Open Data	Municipality of Genoa has set up a specific web platform (CKAN) for the publication of the available data, in the manner prescribed by the regulations on Open Data. The paradigm of the Open Data Strategy for the City is also to stimulate the entire municipal organization and its continuous review of working processes for the production and retrieval of complete and correct data.	Genoa's Open Data CKAN cloud service was implemented and hosted on the SILO's cloud infrastructure during the second year of the project and transferred to the AWS hosted cloud during the third year. Genoa also made customization on the CKAN application, not only in terms of added content but also with CSS and template changes. The application has been widely used for testing purposes.

Table 4: Genoa's use cases

All applications currently deployed are using Security as a Service offered on STRATEGIC Service Store. Security as a Service is supported through a subscription mechanism that is documented in deliverable D5.1b [5]. Also the configuration capabilities of STRATEGIC Service Store have been used for the initialization of applications and also the proper set up of the deployed application in terms of network.

Furthermore, Genoa tested the deployment of two additional applications during this period; MediaWiki and Limesurvey. However, these are not used currently on the final IaaS deployment of Genoa.

1.4.3 Municipality of StariGrad, Belgrade (Serbia)

Municipality of Stari Grad had used four scenarios for the evaluation of STRATEGIC. For them it was important to host applications in Serbia due to legislation issues. This initially planned to be achieved by utilizing a cloud provider in Serbia or by creating a private cloud. Unfortunately, a compatible Cloud provider was not found and MoSG decided to invest to a private cloud

infrastructure, although this was not part of the contractual obligations on the project.

Use Case	Description	Achievements
StariGrad-1	Cloudified version of already existing different certificate request services (birth, death, marriage, etc.).	Application developed during Y1. Pilot operations successfully executed
StariGrad-2	Development of the cross-border residence certificate issuance service based on outcomes of the SEMIRAMIS project. Related to Genoa-3 use case.	Based on the initial cross-border application provided by ATOS, configurations and modifications on the code have been done by MoSG and with collaboration of ATOS. The development process of this use case required the development and customization of 2 different components, the Identity Aggregator and Starigrad AuthNProvider that are both deployed in a VM instance
StariGrad-3	Development of the cloud based email service for internal users of MoSG.	Configured and parameterized by MoSG's technical team through the SRATEGIC Service, this application is successfully deployed and evaluated by users from MoSG.
StariGrad-4	CKAN based Open Data cloud service. Development of the Open data sets relevant to MoSG.	After the deployment of the application, initial datasets have been uploaded and further customization has been done

Table 5: Stari Grad's use cases

All applications currently deployed are using Security as a Service offered on STRATEGIC Service Store. Security as a Service is supported through a subscription mechanism. Also the configuration capabilities of STRATEGIC Service Store have been used for the initialization of applications and also the proper set up of the deployed application in terms of network.

1.5 Lessons learned and recommendations

From a **general perspective**, the STRATEGIC framework provides an easy-to-use and flexible offering that already meets the key requirements of most the key stakeholders. More specifically, the support of IaaS providers, the deployment of services and the monitoring of the application are very strong points of the STRATEGIC platform. Moreover, the extension for Security Services is also

another unique offering of the STRATEGIC platform, which manages to provide, strong and seamless security protection without compromising the ease of use. Integrations with eIDs and the support for attribute exchange are aslo strong points of the platform. As eIDAS services are being delivered across the European Member States, these capabilities of the STRATEGIC platform will become more and more attractive. Furthermore, the ability of the STRATEGIC platform to adopt to the regulatory requirements of the public bodies is considered to be a major plus.

All these elements are key technology enablers for public administrations usually not familiarised with those technologies. Therefore, the public bodies, cloud service and application providers we have been engaging with, clearly see the benefits from the use of service like that the STRATEGIC platform and the vast majority of them is willing or is considering of paying for getting such services.

However, the project has allowed the consortium to be aware that there is still room for improvement. The application packaging still remains a daunting task, even though the STRATEGIC platform has taken great leaps in order to make it easier and flexible. On the other hand, the fact that there was no clear pricing model for the STRATEGIC offerings had a negative impact to potential customers of such services. Concerns were voiced both by the pilot partners and by external stakeholders.

Furthermore, the project demonstrated that in many public bodies, like the municipalities involved in STRATEGIC, the migration towards and utilization of cloud services is low on their priority list as there are other non-IT related issues, which are more pressing and prevent them from focusing on a long-term IT strategy. In addition, there is a diverse and complex landscape of public bodies: different sizes, different maturity and with different internal structures and organisations. In this context, marketplace-like solutions, such as the STRATEGIC Service Store, are certainly the way to go.

From the **project inside perspective**, STRATEGIC allowed technical partners to work with pilots in order to achieve a cloud migration experience. The technical partners were able to try application migration, and pilots were allowed to go through the migration and learn from the experience.

The main lesson learnt dealing with Public Administrations of medium-size like the pilot partners is that it is surely preferable, at least when possible, to draft a clear list of complete requirements (both in term of material resources and tasks to be accomplished) in advance. This is easily explained by considering that each task to be accomplished follows an internal processing, which requires time. This list will have saved a lot of time and efforts.

Another STRATEGIC observation was that the technical agenda of the project was decided during the first year of the project. However, during the course of the project technology evolved. The industry introduced containers, and mobility became more prominent, and some major IT companies introduced landmark SaaS solutions which were impacting the IT landscape (e.g. Microsoft Azure, Oracle, SAP, Salesforce, etc.) and therefore the strategy of local governments. It is possible that more technology driven collaboration between the technical partners could have resulted in a better offer for pilots.

Furthermore, the reference implementation of the STATEGIC platform has been carried out using a commercial solution, which provides a strong technology

readiness level to the project; this has been quite positive and allowed the consortium to incorporate the conduction of pilots earlier than expected within the project, but it has also brought some limitations to the consortium partners, which the use of open source solutions would have avoided, for example the usage of an API (originally planned but not yet provided within the commercial solution) to interact with the platform would have substantially helped technical partners to integrate assessment services at platform level.

On another note, the technological solution of moving parts of the runtime (IaaS stacks) in-house to avoid regulatory blockers has turned out to be more of a burden and has consumed more resources than expected and delivered less of perceivable value. From the STRATEGIC partners' view the regulations at the moment are too protective when it comes to usage of cloud services running in a different EU country, which makes it close very difficult to deploy actual applications as part of the cloud project.

Despite these difficulties, the STRATEGIC partners were able to demonstrate different ways to interact with the platform at different levels; horizontal security services have been integrated successfully at platform level through the use of the commercial API, while cross-border tools have been successfully integrated at cloud appliance level incorporated their functionalities within the Service Store. Overall, STRATEGIC has brought very valuable experience in a highly active application migration market. This project has taught the consortium what challenges need overcoming, and what aspects are clearly important.

2 The STRATEGIC consortium

	ATOS Spain SA	Spain
	SingularLogic Anonymos Etairia Pliroforiakon Systimaton & Efarmogon Pliroforikis	Greece
	British Telecommmunications	UK
	National Institute of Chemical Physics and Biophysic	Estonia
	Uranus Computing Limited	UK
	City of Genoa	Italy
	Municipality of Stari Grad	Serbia
	London Borough of Camden	UK

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3 Impact

As already mentioned, the STRATEGIC project aims to deliver a platform that will facilitate the cloud-enabling of legacy applications, reusability of cloud-enabled applications, localization and orchestration of underlying resources. STRATEGIC intends to benefit a wide range of stakeholders. However, the **public bodies** will greatly take advantage of the cloud computing and public cloud services through STRATEGIC, in particular the Service Store marketplace, which will help them to reduce costs and provide better public services. On the other hand, the **cloud application developer** and **cloud solution integrators** will be able to develop and deploy public cloud applications and services for public bodies independently of the underlying provider. This will allow them not only to reduce costs, but also to enhance the quality and the performance. The cloud service providers will be able to offer cloud services to public bodies based on the STRATEGIC framework, increasing so the number of services offered over the same infrastructure, or reducing the existing infrastructure for the same amount of services.

3.1 Immediate impact on Public Administrations

Public bodies can use STRATEGIC if favour of the citizens, as it is a single platform that serves both as a broker between different clouds providers and an orchestrator of re-usable e-government services. STRATEGIC supports the deployment of services into multiple IaaS providers, both private and local, thus helping public bodies to avoid vendor lock-in and the same the possibility to reduce their operational costs. The most appealing and tangible benefits of the STRATEGIC offering for the public bodies seem to be (a) the faster deployment cycles that can be achieved through the STRATEGIC platform as they also lead to reduced time to market; (b) the reduction on the overall costs for operating and using IT resources; (c) the scalability patterns that can be implemented by taking advantage of the elasticity the cloud offers and which is taken to the next level by the multi-cloud capabilities of the STRATEGIC platform; and the ease that the STRATEGIC platform providers for day to day operations, and which has direct impact to both the deployment speed and the operational costs.

More specifically, the primary incentive for an organization/public body to adopt the STRATEGIC platform is to increase the automation though the orchestration capabilities that are offered. Orchestration can be one of those ambiguous concepts in cloud computing, with varying definitions on when cloud capabilities truly advance into the orchestration realm. As public bodies move from managing their virtualized environment, they need to aggregate capabilities for a private cloud to work effectively. The automation of storage, network, performance and provisioning are all aspects handled in most cases by various solutions that have been added on over time as needs increase.

The need to orchestrate really becomes clear when various aspects of cloud management are brought together. The value of an orchestrator-adoption derives from the convergence of multiple hypervisors, need for efficient resource usage, availability, scalability, performance and more. Through the STRATEGIC Service Store the pieces are woven together and can be managed more effectively to ensure smooth and rapid service delivery -- and delivered in a user-friendly catalogue of services easily accessible through a single pane. In essence, STRATEGIC orchestration implies simultaneously speed of automation, ease of integration and clear adoption of best practices.

In addition to rapid service delivery, the benefit of STRATEGIC Service store adoption is that there can be significant cost savings associated with labour and resources by eliminating manual intervention and management of varied IT resources or services. A summary of the STRATEGIC-adoption added-value is listed below:

- Integration of cloud capabilities across heterogeneous environments and infrastructures to simplify, automate and optimize service deployment
- Self-service portal for selection of cloud services, including storage and networking, from a predefined menu of offerings
- Reduced need for intervention to allow lower ratio of administrators to physical and virtual servers
- Automated high-scale provisioning and de-provisioning of resources with policy-based tools to manage virtual machine sprawl by reclaiming resources automatically
- Ability to integrate workflows and approval chains across technology silos to improve collaboration and reduce delays
- Real-time monitoring of physical and virtual cloud resources, as well as usage and accounting chargeback capabilities to track and optimize system usage
- Pre-packaged automation templates and workflows for most common resource types to ease adoption of best practices and minimize transition time
- Ability to create cross-Authentication applications and share them in a re-usable manner through an app-store

In short, many of the capabilities that we associate with cloud computing are in essence elements of orchestration. Using the STRATEGIC framework, public bodies can manage their cloud workloads through a single interface, providing greater efficiency, control and scalability. As cloud environments become more complex and organizations seek greater benefit from their computing resources, the need for sophisticated management solutions that can orchestrate across the entire environment will become ever clearer.

3.2 Immediate impact on Application Developers and IaaS Providers

STRATEGIC is a platform that can benefit **application developers** by two different directions. By publishing applications on STRATEGIC Service Store, developers attract customers on the niche market of public bodies. In the same time developers can also invest into the creation of applications that support cross-border authentication and transactions between European countries

Specifically STRATEGIC offers to Application Developers the opportunity to:

- Increase the market share by attracting public bodies: Providing applications to a marketplace for public bodies can increase the number of possible customers
- Use of STRATEGIC best practices for cross-border applications: Experiences of STRATEGIC consortium for the development of cross-border applications with the usage of STORK and SEMIRAMIS libraries are shared

- Creation of own applications in the STRATEGIC service store: publication and even commercialization by publishing applications to STRATEGIC Service Store

On the other hand, STRATEGIC is a platform that can benefit IaaS providers in the following way:

- Increase their market share by attracting public bodies: Being part of a marketplace for public bodies can increase the number of possible customers
- Integrated Security Mechanisms: Offer increased security to their customers by integrating the advanced security mechanism offered through STRATEGIC Service Store

3.3 Potential impact and future use

The STRATEGIC consortium has defined a clear business plan with value proposition and a flexible business model that fits to different perspectives of the consortium partners. Indeed, the main activities for the market penetration will be done through the large industrial players. BT and ATOS have a considerable presence in the EU market and the necessary channels that ensure transferability and expansion of STRATEGIC in the whole EU region. In a smaller scale, SILO has a very strong presence in Greece, operating also in Cyprus, Romania and Bulgaria where (as shown in its business plan).

The pilots are also a very good success story where new business/markets can arise. The cases of Camden, Stari-Grad and Genoa can benefit the exploitation of STRATEGIC in two ways:

- First, by having initial success stories/references for new customers
- Second, by opening the market in the respective countries (UK, Italy, Serbia).

In addition, the consortium has created a community of stakeholders where they had been informed and "live" through different awareness activities: workshops, webinars, etc. This community will be the primary focus of the first activities for market penetration of the system. The consortium has agreed also to keep STRATEGIC prototype open to potential interested Parties, for 1 more year after the end of the project.

Last, besides the market aspects of the project there are also some best practices and research activities that have been raised during the project implementation. Those reflect new functionalities, services, improvements that will be considered in next releases of STRATEGIC. The consortium hopes that such issues will be solved also by the next projects and stronger collaborations will be built for mutual benefits.

4 STRATEGIC dissemination activities

For the dissemination and the pre-marketing of the project, specific activities have been performed for the dissemination, communication and pre-marketing actions of project. These activities tried to target broad audiences, including all relevant stakeholders such as public bodies, governmental agencies, cloud providers, cloud application developers, cloud-based independent software vendors (ISV), policy makers, citizens and businesses/enterprises (notably users of public cloud services). Moreover, during the last reporting period the dissemination activities focused of the marketing and pre-marketing part in order to reach greater audience and identify more target groups and to promote STRATEGIC as a product to potential customers.

4.1 Project visual identity and dissemination material

A consistent graphic identity allows the target audience to easily identify and recognize the STRATEGIC project. This solid and coherent graphic identity was developed for communicating towards the outside world and was the base for all the essential project material, including the project templates as well as the dissemination material kit. The following table summarizes the different STRATEGIC dissemination materials:

Item	Description
Logo	strategic
Project Presentation	Project presentation, technical presentation and product presentations: http://strategic-project.eu/presentations/
Project Website	http://strategic-platform.eu and http://strategic-project.eu
Press Release	Translated into Serbian and Italian and published in project website: http://strategic-project.eu/Publications
Journalistic Description	Translated into Serbian and Italian: http://strategic-project.eu/Publications
FactSheet	http://strategic-project.eu/Publications
Brochure	

Item	Description	
Poster / Academic Poster		
Newsletter	5 newsletters have been send using MailChimp along with the invitations to webinars.	
Tailored dissemination material for events/webinars		

Item	Description
Videos and webinar recordings	A total of 4 promotional videos and 2 webinar recordings have been produced. http://strategic-project.eu/videos-webinars/
Pilot stories	Promotion of the results of pilot use cases in order to make the usage of Service Store easier to understand. http://strategic-project.eu/pilots/
Blog posts	11 blog posts are available in the project website. http://strategic-project.eu/blog/
Best practices	15 best practices have been provided in the project website. http://strategic-project.eu/guidelines-and-best-practices/

Table 6: Dissemination material

4.2 STRATEGIC events

STRATEGIC consortium has participated in more than 80 international and local dissemination events like meetings, conferences, exhibitions and workshops that had international impact. These include the. DPSP cluster events, the CloudWatch events, NetFuture, MeTTeG 2014, Towards a cloud of public services, the Cloud Forward conference, Digital Infrastructures for Research Conference, among others.

As part of the attempt to engage relevant stakeholders in the project, the consortium organized several training workshops and local events. These workshops were hugely beneficial for reaching public bodies and the same time important for evaluation of the platform. In addition to local workshops an important part of our dissemination and marketing achievements during the last year were the online webinars that demonstrated the platform.

Figure 2: STRATEGIC events

4.3 Liaison with other projects/initiatives

For maximizing dissemination results, STRATEGIC has created synergies with related European funded projects including PaaSPort, Radical, SONNETS, Foodie Project or CLIPS, among others. As STRATEGIC focus on enabling governmental bodies to adopt public cloud services, thus it can be related to e-government projects. Also, liaison of STRATEGIC with other cloud projects is possible as well, as there are project with similar technical findings and common target groups.

Along with the direct contact with some projects, STRATEGIC participates in the DPSP Cluster. DPSP Cluster is an initiative launched by DG-CNECT in April 2015 and it groups together the EU-funded projects researching on Data Protection, Security and Privacy in the Cloud that have joint forces to seek synergies between the projects and create greater impact.

4.4 Publications

Publications to international journals and conferences have been an effective dissemination opportunity. The table below summarize the scientific and non-scientific publications produced by the STRATEGIC partners.

Title	Author	Media	Date	Link
STRATEGIC: opening new horizons in the secure and privacy friendly migration, adaptation, governance and development of public cloud services	K.Kalaboukas, G.Ledakis (SiLO), Nuria Rodriguez (ATOS), F. Karayannis (URNS), I. Livenson (NICPB), J. Daniel (BT)	SCITEPRESS	2014	http://www.scitepress.org/DigitalLibrary/PublicationsDetail.aspx?ID=wRn4XBeSCmw=&t=1
A Cloud Orchestrator for Deploying Public Services on the Cloud – The Case of STRATEGIC Project	G. Ledakis, P.Gouvas, K. Kalaboukas, T.Dimitrakos, G. Ducatel, J. Daniel, N.Rodríguez	Book "Trust Management IX", pp 217-225	2015	http://link.springer.com/chapter/10.1007/978-3-319-18491-3_18
Challenges for trustworthy (multi-)Cloud-based services in the Digital Single Market	N.Rodríguez, A. Pasic, B. Gallego, S. Krenn et al.	Whitepaper on Future challenges for DSM	2016	https://eucloudclusters.files.wordpress.com/2015/05/dpspcluster-whitepaper-v3-1.pdf

Table 7: Scientific publications

Title	Author	Media	Date	Link
Software & Services, Cloud Computing Concertation Meeting, Shaping Europe's future for software, services and cloud, position papers	N.Rodríguez (ATOS)	Cloudwatching booklet	2014	http://www.cloudwatchhub.eu/concertation-position-papers#
STRATEGIC: Boosting the adoption of public cloud services	N.Rodríguez (ATOS)	ePractice portal	2014	http://www.epractice.eu/en/cases/strategic-0
STRATEGIC Project overview	Municipality of Genoa	Intranet Portal	2014	Not available
STRATEGIC Steering Committee meeting in Genoa	Municipality of Genoa	Newsletter of Centro Europe Direct	2014	Newsletter of "Centro Europe Direct

Title	Author	Media	Date	Link
STRATEGIC at a glance	Municipality of Genoa	Smart City Association portal database	2014	Official documents of Smart City Association
STRATEGIC Project - boosting the adoption of public cloud services	Nuria Rodríguez (ATOS)	EC eGOV newsletter	2015	http://ec.europa.eu/information_society/newsroom/cf/dae/itemdetail.cfm?item_id=20905&newsletter=108
Enabling trusted European Cloud	Aljosa Pasic (ATOS)	Website	2015	http://canopy-cloud.com/sites/default/files/ressource/atos_trusted_european_cloud_white_paper_v2.2-min.pdf
Ict per città più integrate, social e sostenibili	Alessandra Risso (Genoa)	Magazine, also available online	2015	http://www.platinum-online.com/marzo-2015-expo/ or http://www.calameo.com/read/003272336c6d35c372706
Whitepaper on future challenges	Aljosa Pasic (ATOS) N.Rodríguez (ATOS)	Website	2016	https://eucloudclusters.wordpress.com/data-protection-security-and-privacy-in-the-cloud/#workshop Whitepaper has been accepted and will be presented on February
New platform helps public services reach for the Cloud	Interview to N.Rodríguez	Cordis	2017	TBD

Table 8: Other publications

4.5 Online presence

The STRATEGIC website was launched on February 2014 and was created with main objective of disseminating the project, thus it focused on the consortium, the objectives and the outcomes of the project, but it also is a core part of the marketing framework, therefore, the website follow a product oriented approach. The URL of the official project webpage is: http://www.strategic-project.eu/www.strategic-project.eu.

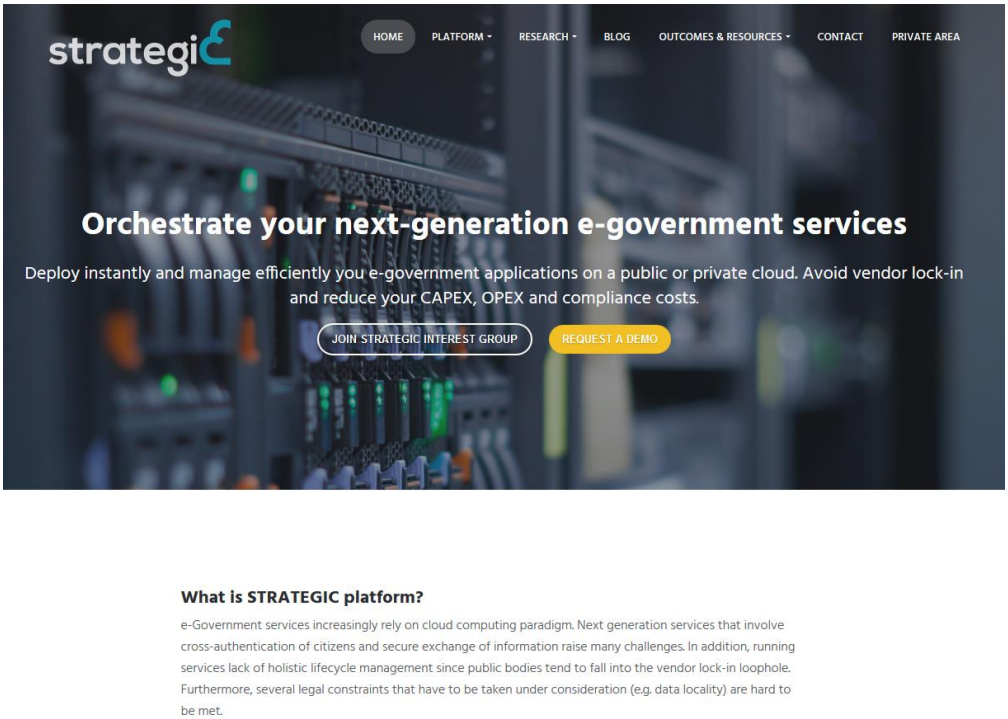

Figure 3: STRATEGIC website home

The social media accounts were also active (Facebook, Twitter, YouTube, LinkedIn, SlideShare), with the Twitter account of the project reaching 238 followers and 141 tweets

4.6 Special Interest Group (SIG)

The STRATEGIC SIG was used to disseminate and discuss the STRATEGIC results and enable the discussion of project issues within a specific group of external experts and to receive valuable input from an external view. The Special Interest Group contacts that were reached multiple times on the project duration and were provided with specific treatment due to their interest on the project outcomes. These people were invited first on all webinars and also on local workshops, and also feedback on the platform was requested.

SIG members are provided with an environment (private area available only for members), which is available through the website of the project. This environment provides privileged and early access to information about STRATEGIC, as well as deliverables, publications submitted by partners, training material and possibly demo usage of the platform. Additionally, specific accounts were created for those SIG members that were interested to test the provided platform.

The SIG Members List includes more than 48 contacts registered to the website.