



Cloud Standards Coordination Phase 2; Identification of Cloud user needs

Reference

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Special Report (SR) has been produced by ETSI Technical Committee Network Technologies (NTECH).

The present document is approved by the NTECH Technical Committee and for publication on the Cloud Standards Coordination website (<http://csc.etsi.org>).

Modal verbs terminology

In the present document **"shall"**, **"shall not"**, **"should"**, **"should not"**, **"may"**, **"need not"**, **"will"**, **"will not"**, **"can"** and **"cannot"** are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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Introduction

Cloud Computing is increasingly used as the platform for ICT infrastructure provisioning, application/systems development and end user support of a wide range of core services and applications for businesses and organizations.

Cloud Computing is drastically changing the way ICT is delivered and used. However, many challenges remain to be tackled. Concerns such as security, vendor lock-in, interoperability and accessibility, service level agreements more oriented towards users are examples of issues that need to be addressed. The survey discussed in the present report aims at collecting information on the respondents' awareness of those concerns.

Standards and certification programs play an important role in terms of increasing the market confidence in Cloud Computing. The promotion of Cloud Computing standards and certification schemes that address current concerns is necessary in order to ensure that both customers/users as well as providers will regard Cloud Computing with the same level of reliability, trust and maturity as traditional ICT.

In February 2015, the Cloud Standards Coordination Phase 2 (CSC-2) was launched by ETSI to address issues left open after the initial Cloud Standards Coordination work was completed at the end of 2013. Cloud Standards Coordination Phase 2 is investigating some specific aspects of the Cloud Computing standardization landscape, in particular from the point of view of the Cloud Computing users (e.g. SMEs, Administrations). It will also generate a new snapshot regarding the state of standards and investigate the interaction and relation between standardization and open source based software and solutions.

The present document presents the results of the web survey conducted in April - September 2015.

1 Scope

The present document presents the results of the web survey conducted in April - September 2015.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Recommendation ITU-T Y.3500: "Information technology - Cloud computing - Overview and vocabulary".

NOTE: Same as [i.5].

- [i.2] Gartner, G00271282: "Budgeting for the SaaS Security Gap", January 28, 2015.

- [i.3] Skyhigh: "Cloud Adoption & Risk Report", Q1 2015.

- [i.4] Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008).

NOTE: See:
http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NA_CE_REV2.

- [i.5] ISO/IEC 17788: "Information technology -- Cloud computing -- Overview and vocabulary".

- [i.6] ISO/IEC 17789: "Information technology -- Cloud computing -- Reference architecture".

- [i.7] Recommendation ITU-T Y.3502: "Information technology - Cloud computing - Reference architecture".

NOTE: Same as [i.6].

- [i.8] ISO/IEC 27001: "Information technology-- Security techniques -- Information security management systems - Requirements".

- [i.9] ISO/IEC 19086-1: "Information technology -- Cloud computing -- Service level agreement (SLA) framework and technology Part 1: Overview and concepts".

- [i.10] ISO/IEC 19941: "Cloud Computing Interoperability & Portability".
- [i.11] ISO/IEC 27018: "Information technology -- Security techniques -- Code of practice for protection of personally identifiable information (PII) in public clouds acting as PII processors".
- [i.12] ETSI SR 003 382: "Cloud Computing Standards and Open Source".
- [i.13] ETSI SR 003 391: "Interoperability and Security in Cloud Computing".
- [i.14] ETSI SR 003 392: "Cloud Computing Standards Maturity Assessment".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AICPA	American Institute of Certified Public Accountants
API	Application Programming Interface
CaaS	Communications as a Service
CAPEX	CAPital EXpenditures
CC	Cloud Computing
CCSL	Cloud Certification Schemes List
CEF	Connecting Europe Facility
CompaaS	Compute as a Service
CRM	Customer Relationship Management
CSA	Cloud Security Alliance
CSC	Cloud Service Customer
CSC-1	Cloud Standards Coordination Phase 1
CSC-2	Cloud Standards Coordination Phase 2
DaaS	Data Storage as a Service
DSI	Digital Service Infrastructure
EGI	European Grid Infrastructure
ENISA	European Union Agency for Network and Information Security
ERP	Enterprise Resource Planning
HR	Human Resources
IaaS	Infrastructure as a Service
IAM	Identity and Access Management
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITIL	Information Technology Infrastructure Library
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardization Sector
NaaS	Network as a Service
NIST	National Institute of Science and Technology
OASIS	Organization for the Advancement of Structured Information Standards
OCCI	Open Cloud Computing Interface
OCF	Open Certification Framework
OGF	Open Grid Forum
PaaS	Platform as a Service
PII	Personally Identifiable Information
SaaS	Software as a Service
SDO	Standards Development Organization
SIG	Special Interest Group
SLA	Service Level Agreement
SME	Small or Medium Enterprise
SOA	Service Oriented Architecture
SSO	Standards Setting Organization
STF	Specialist Task Force (an ETSI structure for internal projects)
WP	Work Package

4 The rationale for the survey

4.1 Survey goals and objectives

The Cloud Standards Coordination project (CSC)

Cloud Standards Coordination Phase 1 (CSC-1) took place in 2013 as a community effort supported by ETSI and primarily addressed the Cloud Computing standards roadmap. In December 2013 the results were publicly presented in a workshop organized by the European Commission (EC), the CSC-1 Final Report being available at: <http://ec.europa.eu/digital-agenda/en/news/cloud-standards-coordination-final-report>

The report provided a maturity assessment "snapshot" on the Cloud Computing standardization landscape at the end of 2013. Important gaps in the Cloud Computing standards landscape were identified such as in the domains of interoperability, security, privacy, service level agreement and regulation, legal and governance aspects.

Cloud Standards Coordination Phase 2

Given the dynamics of the Cloud Computing market and standardization, Cloud Standards Coordination Phase 2 (CSC-2) was launched in February 2015 with the objective of producing an updated version of the "snapshot" of the Cloud Computing standardization landscape.

The main involved stakeholders for the preparation of the CSC-1 snapshot were from the Cloud Computing industry, in particular Cloud Computing providers. On the other hand, CSC-2 aims to better take into account the needs of Cloud Computing customers on their Cloud related requirements and priorities. This has helped CSC-2 to further assess the maturity of Cloud Computing standards and evaluate how standards can support the Cloud Computing customers' priorities.

Cloud Standards Coordination Phase 2 survey

To support these objectives, CSC-2 has created a survey for collecting feedback from the Cloud Computing community in terms of needs, benefits, challenges and areas of concerns regarding the adoption of Cloud Computing. The outcome of the survey will be the primary material for evaluating the perceived maturity of Cloud Computing standards. The results will also help to understand the interest and requirements of Cloud Computing stakeholders regarding certification. The survey is therefore targeting current and future Cloud Customers in the private and public sectors, SMEs as well as large organizations in all vertical sectors. Other stakeholders from the entire Cloud Computing eco-system (e.g. Cloud Computing providers) were also invited to answer.

4.2 Content of the report

Clause 5 of the present document presents the content of the survey, the methodology used for its preparation and distribution, information about the collected feedback as well as lessons learnt through the execution of the survey.

Clause 6 provides details resulting from the analysis of the collected survey feedback allowing to understand the needs of the Cloud Computing community on a more granular scale and to derive main trends and patterns as a result.

Clause 7 highlights conclusions and recommendations from the survey. This includes an identification of the cloud stakeholders' highest priorities leading to possible refinements of the CSC Phase 1 report conclusions.

Clause 8 suggests some areas for further work.

Annex A contains a detailed presentation of the survey results, including charts and tables.

Annex B lists the channels through which the survey has been distributed.

Annex C shows the survey as it has been proposed on the CSC web site (at <http://csc.etsi.org>).

5 Survey presentation

5.1 Survey goal and structure

To create the basis for the analysis, a survey has been designed and conducted from April to September 2015. Even though the survey is targeting a specific set of users (SMEs, etc.), it is also using the input from larger actors. The survey has also been distributed to as many industry sectors as possible, in order to identify any industry specific aspects and concerns that might exist.

The survey comprises **59** questions grouped in **14** pages stretching from general questions regarding the respondent's company and Cloud Computing experience, through increasingly specialized questions regarding Cloud Computing standards, to a final block of questions regarding certification. Taking the entire survey would approximately require 20-30 minutes. Apart from a number of core questions for most questions answers were not mandatory. The individual answers are treated confidentially and only aggregated results will be published.

Per September 25th 2015, at the closure of the web survey, 376 respondents have completed it.

5.2 Survey methodology & main target areas

The survey collects responses to questions such as:

- What are the typical use cases that users want to implement in the short to medium term?
- What are their expectations and perceived concerns that limits the adoption of Cloud Computing?
- What are the assets and possible investments made in Cloud Computing?
- How are they going to deal with existing investments (legacy)?
- Which role are they expecting to play in the Cloud Computing value chain?
- To which extent individual Cloud Computing standards are known and have already been used?
- What support from standards are they expecting?
- What is the significance of certification schemes and what is the intended use?

5.3 Survey distribution

The main target group for the survey is end users in SMEs in the private sector, but any potential and existing cloud customer is welcome to complete the survey.

The survey was launched on March 30th, 2015. A distribution letter has been made available to all organizations that were willing and able to use it for promoting the survey. Over 120 different channels have been contacted to relay the survey and have distributed the survey URL.

A wide range of different distribution channels have been used like:

- European Commission DGs web sites and distribution list (emails, Twitter, etc.).
- Standards Setting Organizations, global, regional or national.
- ETSI membership (750 organizations from various industry sectors).
- Industry Associations (e.g. Eurocloud).
- Public Administrations (across Europe, but predominantly in countries where the experts of the CSC reside).
- LinkedIn® groups.
- Open Source projects.
- European projects (e.g. CloudWatch, Cloud4Europe, CloudingSME).

- Cloudscape.
- European Grid Infrastructure (EGI).

To ensure the largest possible number of answers, the survey has been left open as long as possible, i.e. up to September 25th, the last day of the public commenting phase for the four CSC-2 reports.

A list of contacted individuals and organizations is presented in Annex B.

5.4 Survey achievements and limitations

As pointed out earlier in the present document, the number of responses (376 per 25/09/2015) is deemed sufficient enough in order to identify high-level trends and patterns. The results are also assessed as sufficient in order to do high-level comparisons between CSC -1 and CSC-2. In this respect, it can be argued that the output resulting from the Work Package 1 of STF 486 (the web survey and related activities) is considered successful. As presented in the below sections, responses in many parts of the survey are encouraging in terms of awareness of the importance of standards and certification schemes among many of the survey respondents.

However, the present survey is based on the voluntary contribution of a sample of respondents on which the promoters of the survey had little capacity to anticipate and no control. Only best effort attempts have been made to collect the largest number of answers possible, with the largest possible span of organization sizes, countries, sectors, etc. Therefore, the number of responses may not be significant enough to allow in-depth and conclusive analysis at a detailed level for all of the questions of the survey. Any reader of the present document should therefore be cautious about making any decisive conclusion based on the materials of this report.

Another aspect when assessing the results of the survey that needs to be acknowledged is that the benefits, concerns and challenges chosen by the respondents might vary based on the organization (in terms of size), on the sector (private or public) in which it operates, etc. It is important to keep in mind that some of the issues presented as major in a certain user category might very well be seen as insignificant or even non-existent in another: this may be addressed in some significant cases (see clause 8).

5.5 Other lessons learned

Designing a survey is a complex task. The main objective has been to cover a number of different topics in order to encompass the target areas identified as relevant for the query, while attempting to keep the survey's length and complexity at a minimum. Keeping the questions relevant and unambiguous has been another important task. Depending on the role of the respondent in the Cloud Computing eco-system, the questions might in some circumstance be interpreted differently. To overcome the identified challenges, two important elements have been helpful. The most important element to mitigate the issues identified was the feedback from reviewers of the draft survey text. Another positive element was the existence and use of clear definitions of the roles in Cloud Computing: a significant maturation from the CSC-1 to CSC-2 was recognized in this respect. Where applicable in the survey, the vocabulary provided in the standard "ISO/IEC 17788 [i.5] and Recommendation ITU-T Y.3500 [i.1] has been used.

6 Survey analysis

6.1 Significant findings

General-purpose information regarding respondents' organizations: Respondents are nearly equally representing SME organizations (up to 249 employees) and large organizations (more than 249 employees). The ICT sector is dominating (43 %) followed by Academia and Public Administrations. Some industry sectors are not represented at all.

Benefits and challenges: "Reduction of CAPEX", "improved business agility" and "faster time to market" are seen as the major positive factors for adopting Cloud Computing while compatibility with in-house systems, security, privacy/integrity, are viewed as the most critical challenges with SLA, performance and efficiency, resiliency, vendor or data lock-in and interoperability across vendor solutions ranked among the highest concerns. It can be noted that the lack of Open Source solutions is not seen as a major Cloud Computing challenge (see ETSI SR 003 382 [i.12] for further information on Cloud Computing standards and Open Source solutions).

Adoption and scope: A majority of the respondents (58 % - 2015-06-04)) have already started to adopt Cloud Computing probably reflecting the fact that the respondents are mainly from the ICT sector. It should also be noted that none (0 %) of the respondents stated that they are NOT planning to adopt Cloud Computing. The main usage area for Cloud Computing is IaaS as the most prominent starting point. 40 % of the respondents are playing the role of the Cloud Service Customer in their respective organizations. Regarding the level of resources and support to Cloud Computing, nearly half of respondents claim that they are receiving an adequate support from their ICT team and a third of them have a dedicated cloud support team.

Cloud Computing adoption: preparing your organization: To make the transition to the Cloud in a secure and reliable way some aspects need to be considered and some conditions have to be met; the organization making the leap to the Cloud need to be prepared. Nearly half of respondents claim that efforts related to data categorization (43 %) and data classification (35 %) are on-going in their organizations. Data security awareness and level control is seen as a highly important aspect that needs to be tackled by a majority of the respondents. Regarding software licenses, 37 % of the respondents indicate that negotiations are on-going with the software vendors providing Cloud Computing software & services while 21 % of them mention that no action is deemed necessary (further analysis is needed on this point; it is not entirely clear if answers in this category indicate that actions are not needed or if necessary measures have already been taken).

Cloud Deployment Models and Cloud Service Categories: Private Cloud deployment models clearly dominate followed by Hybrid Cloud and Public Cloud deployments. Concerning Cloud Service Categories, high-availability is seen as the top usage area for IaaS while software development is also seen as the top capability for PaaS. Concerning SaaS, the general data storage type of application is ranked high while specialized applications supporting for example supply chain services, HR, ERP or CRM are less frequently mentioned. Notably, 54 % of the respondents indicate an interest in emerging Cloud Service Categories such as CaaS, NaaS, DaaS and CompaaS.

Cloud computing and standards: Security, privacy and integrity, performance and portability across vendor solutions are ranked high regarding the impact that standards have on the concerns of organizations. In terms of how standards are considered in the organizations of the respondents, 38 % indicate that standards are used while 27 % that they are considered. This shows a promising insight into the value and importance of standards.

In line with the responses regarding impact of standards, interoperability, security, service level agreements, portability and APIs are mentioned as top priorities. The feedback also indicates that recently published standards are now becoming known by a small number of respondents. Examples of standards used or considered are ISO/IEC 17788 [i.5] - Recommendation ITU-T Y.3500 [i.1] - ISO/IEC 17789 [i.6] and Recommendation ITU-T Y.3502 [i.7]. However, the number of answers is too insignificant to claim that the Cloud Computing specific standards are now part of the Cloud strategy for most organizations.

Cloud computing certifications: Almost 75 % of the respondents see certification schemes as a positive way of increasing confidence in Cloud Service Providers. Amongst the cross-cutting aspects, the two (security, privacy and integrity) seen as both most critical for the maturity of cloud computing [Q11] and as aspects where standards are expected to have highest impact [Q34], certifications for these aspects are actually ranked as close to the least important [Q48]. The most important issues for certification are: data storage location (one aspect of privacy), cloud datacentre infrastructure, cloud provisioning process and interoperability/reversibility. A more detailed analysis is found in clause A.11 of the present document. A majority of the respondents are unaware of the Cloud Certification Schemes List (CCSL) defined by ENISA while in this list, the well-known ISO/IEC 27001 [i.8] comes first as a scheme for Cloud certification. A majority of the Cloud Service Customers indicate that they plan to include one of these certification schemes in their Cloud Computing procuring processes. A majority of Cloud Service Providers also plans to certify their Cloud Service offerings.

6.2 Trends and patterns

Based on the responses received, it is possible to make some tentative and high-level analysis. From this analysis, some patterns emerge that will have to be clarified and confirmed by a final analysis made at the conclusion of the survey.

The trends that are assessed as the most significant are presented below.

Security, Integrity and Data Privacy: These topics are seen as major concerns for cloud maturity and for standards impact, although not for certification. This is not a new finding, but the fact that it is still very much present is a clear indication on the perceived challenge ahead for security standards and Cloud certification in particular.

Interoperability and Portability: These areas are ranked high. Concern in this area is most likely linked to the issue of vendor lock-in, the unclear capabilities of individual cloud service offerings ability to move data from one service to another and the lack of portability standards for cross-Cloud scenarios in general.

Moving to the Cloud: There is a high perception from the respondents that the transition to Cloud Computing should be carefully planned and organized, in particular in areas pertinent to data (classification, storage, etc.), processes and security.

Standards: In general, the role of standards is seen as important and there is a growing level of awareness, even in terms of knowledge of the existing set of standards. It is to be noted that, in this perspective, the benefit from standards related to Cloud Computing is seen as more critical than Open Source: this finding is however subject to further analysis. This topic is further explored in ETSI SR 003 382 [i.12].

Certification: A very large majority (over 80 %) of the respondents confirm the role of certification as a very useful way to improve confidence in Cloud Computing. However the selection of Cloud Certification schemes is complex: the Cloud Certification Scheme List (CCSL) is an attempt to make a selection of such schemes but the survey shows that only 31 % of respondents are aware of this list. This is clearly showing a need for increasing the awareness of the Cloud Computing community on CCSL and all the means to have access to a pre-analysed and recommended list of certification schemes.

6.3 Detailed findings

6.3.1 Adoption of Cloud Computing

The web survey clearly indicates which Cloud Computing Service Categories (SaaS, PaaS, IaaS, etc.) and Cloud Computing Deployment Models (Public, Community, Private or Hybrid) are most common in terms of usage; IaaS and provisioning infrastructure as well as general data storage constitute the most popular Service Categories and usage areas where the Private Cloud Deployment Models come out first as the Deployment Model. The adoption of Cloud Computing and Cloud Computing based services continues to grow across Europe.

Studies also show that the use of Cloud Computing services is steadily growing worldwide. In a recent study published by Skyhigh "Cloud Adoption & Risk Report" [i.3], the use of Cloud services continues to increase quite significantly. However, our analysis will point out later that this adoption is not uniform.

Based on how the result of questions related to the adoption and use of Cloud Computing is interpreted, the answers received might show some discrepancies. Consider figure 1:

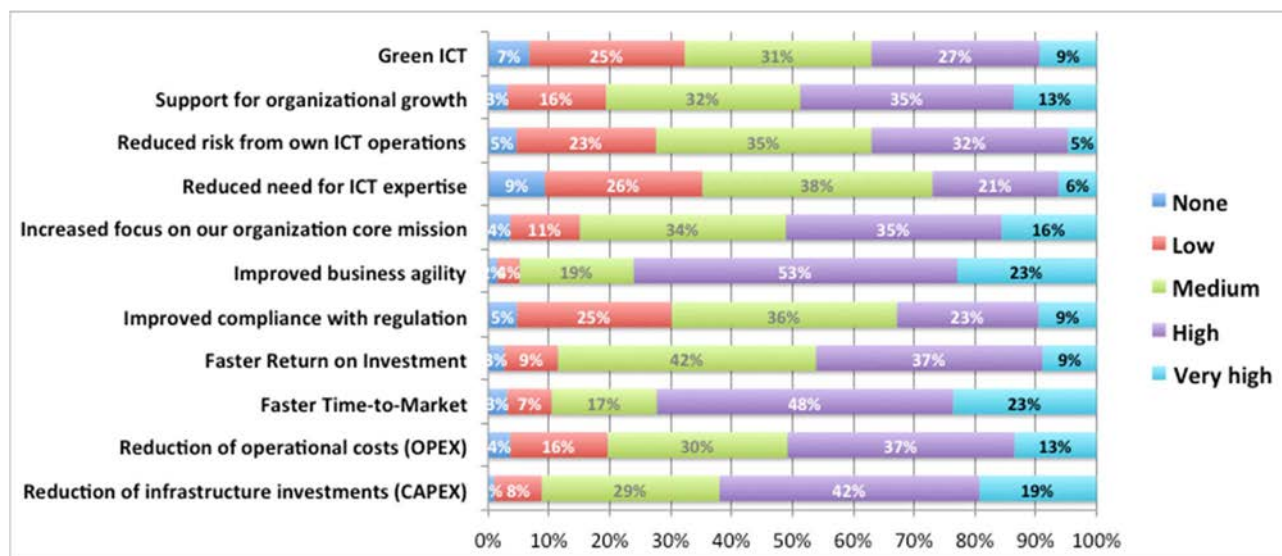


Figure 1: Expectations on potential Cloud Computing benefits (Question 7)

Figure 1 shows a significant interest in using Cloud Computing to improve business agility and to obtain a faster time-to-market for product & services provided. However, when looking at the actual, current usage of Cloud Computing, the full potential of Cloud Computing is still largely unexplored, based on the answers collected through the web survey.

Some particular observations are made below.

Supporting the organization

As mentioned above, using the cloud to add ICT resources is the current main usage areas. Somewhat surprising is the relatively high number of responses that show Cloud Computing as the platform for supporting Business Processes.

Cloud transformation

Among many respondents, there is a significant insight into the need of understanding how data control, classification and taxonomy impact and potentially restrict the move to the Cloud. Security is seen as a major blocker in the migration to the Cloud where data security, integrity and privacy are particular issue areas. Business process alignment and identification is another cloud transformation area that receives attention. In order to make the transition to the Cloud based on the best possible business case, the organization's core and supporting business processes need to be understood before the rationale for Cloud Computing simply will "make sense". Well-controlled and fully aligned processes make the cloud transition easier and will allow the organization to move to the Cloud on the basis of prioritized transition plans. In order to provision and/or use Cloud Computing based services, the preferred architecture is based on SOA (or similar service oriented architecture principles) as 74 % of the respondents have started, are in the progress or have finished the procedure based on that principle. SOA is seen as an important cornerstone in many organizations' enterprise architecture strategy and potentially also an element of the Cloud transition program for many organizations.

Software Licenses

Many organizations are negotiating the terms with independent software vendors regarding using/running software in the Cloud. The responses received suggest that many organizations are either involved in or have completed negotiations pertinent to the new terms related to Cloud usage of software/applications/services. Many organizations are also working on "Ensuring Software Suitability", which entails the activities mentioned above but also to making necessary adjustments to - for example - the enterprise architecture, existing vendor contracts and SLAs, and - again - addressing the concerns and any outstanding work related to data, security, integrity and interoperability between internal, external, on-site and cloud based systems and applications.

"Going all in" with Cloud Computing, tapping into the full benefits of the Public Cloud, e.g. lower cost and a flexible use of Cloud services for instance, will require that the outstanding concerns are fully addressed.

The replies received on the adoption and use of Cloud Computing clearly indicate that Cloud Computing in general remains an "untapped resource". However, the assessment is that the early adopters and those already using Cloud Computing are working towards expanding the use once initial work and necessary remaining efforts are completed.

6.3.2 Interoperability

One of the recurring concerns raised by the web survey respondents concerns "interoperability", or - rather - the lack thereof. For further details on interoperability, see ETSI SR 003 391 [i.13].

Answers to the following questions indicate or support the claim that Interoperability is one of the top concerns among the respondents.

Some highlighted aspects of interoperability include:

- Interoperability is a key success factor to ensure "Increased business agility". Unless a high level of interoperability in solutions internal to the organization as well as interoperability with external stakeholders (collaborators, customers, suppliers, subsidiaries, etc.) is secured, it will be difficult to obtain a high level of business agility.
- Interoperability is also seen as main concern among many of the respondents, both in terms of a general issue for the organization of the respondent and in terms of lack of support for interoperability standards.

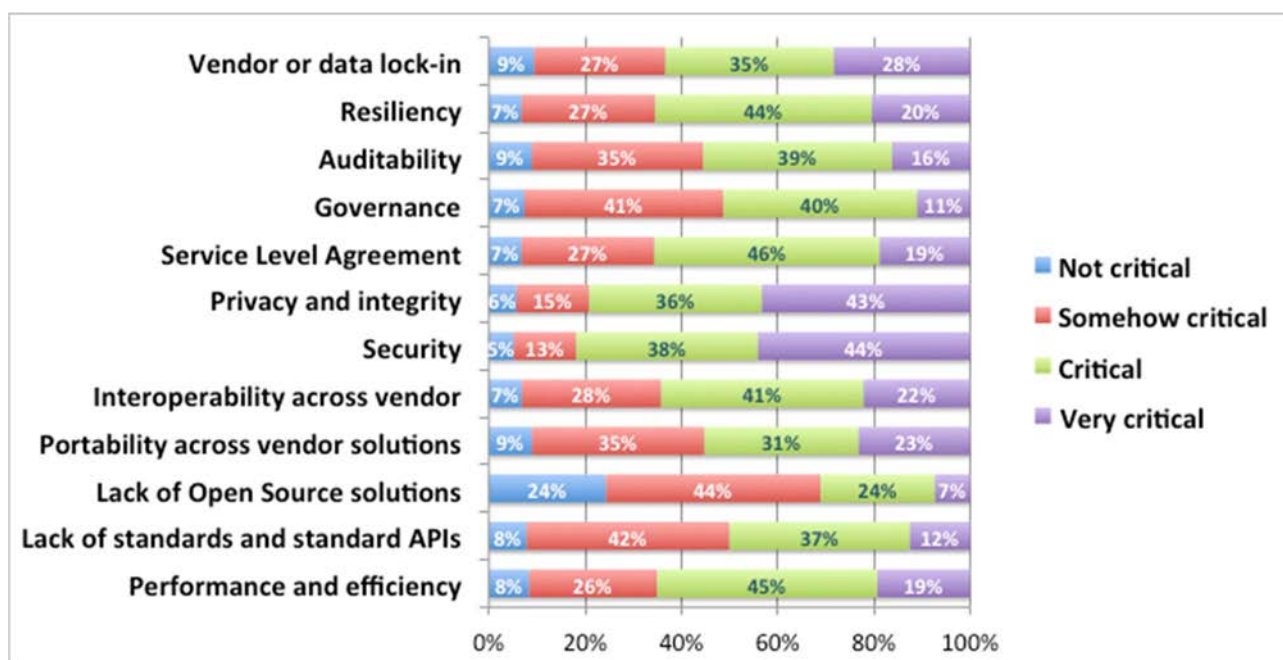


Figure 2: Maturity of Cloud Computing: critical issues (Question 11)

Interoperability (and Portability) across vendor solutions is also seen as a major concern for many organizations, illustrated in figure 2.

The web survey strongly suggests that SDOs providing interoperability standards for Cloud Computing should accelerate their efforts. The ongoing work in ISO/IEC on providing guidance for this domain (ISO/IEC 19041 [i.10]: "Cloud Computing Interoperability & Portability concepts") is an example of an activity that is likely to provide valuable information in this respect.

6.3.3 Security - Privacy and Integrity

"Security" and "Privacy and integrity" are recurring concerns in the web survey. These areas rank high both in terms of aspects seen as important for the respondent and its organization and also when it comes to related standards that are seen as most critical for Cloud Computing. In several questions, security or a particular type of security ("data security") and Privacy and integrity come out at top (please refer to Annex A).

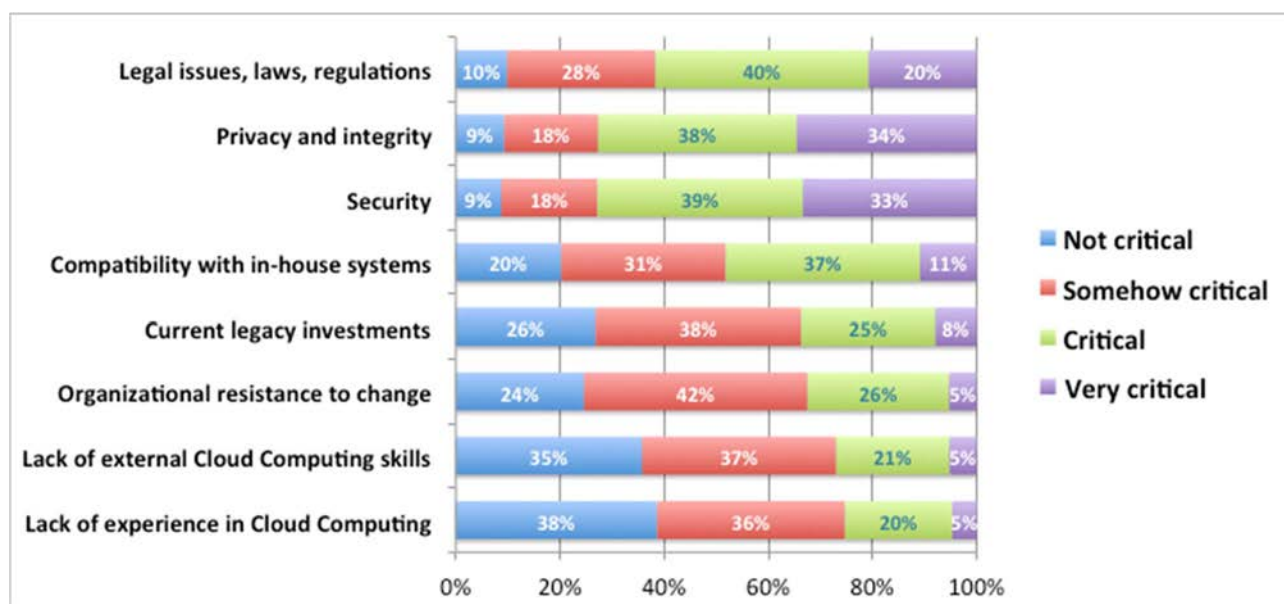


Figure 3: Maturity of your organization: critical challenges (Question 9)

Figure 3 illustrates how "security", "privacy and integrity" are consistently ranked as the highest concerns throughout the web survey for matters other than certification.

Some observations that can be made:

- The use of SaaS for processing sensitive data (incl. personal data) ranks low in terms of usage areas. This observation is consistent with how Security ranks as a concern; the conclusion might be that there is simply not yet sufficient confidence in Cloud Computing for the users to provision and process sensitive data in the cloud computing space. It is recommended to further investigate the reasons (such as security concerns, regulatory, etc.) for the slow adoption of SaaS for sensitive data needs.
- There are different legal barriers across Europe and no up-to-date European Data Protection Regulation yet.
- Among the low number of respondents, ISO/IEC 27001 [i.8] is the standard most known and used.
- "Security" is a complex, slightly ambiguous and imprecise concept. It can be and probably is interpreted in many different ways. Security can for instance map to and concern one or more of the following areas:
 - Data protection (and information classification, data encryption, etc.)
 - Data access
 - Identity management
 - Authorization
 - Authentication
 - Data privacy
 - Data integrity
 - Accessibility
 - Operations

and probably some additional domains/areas. It is likely that "Security" and "Privacy and integrity" are in fact grouped together and seen as a single concern by the respondents.

"Security" in general is without doubt a major concern for most users, customers and providers alike, in particular in a Cloud setting, as the resources typically are shared and the data integrity as a consequence needs additional attention to ensure a retained confidence in the ownership of data aspects. Many users are concerned about "losing the control of data", in many cases probably justifiably so. Unless Security - all relevant aspects of Security related to Cloud Computing - is fully addressed and the users are made aware of available options and existing protocols and standards that can be used to build reliable Cloud Computing offerings, the adoption of Cloud Computing is likely to continue to grow slowly.

It can in this context be noted that a recent study made by the Gartner Group "Budgeting for the SaaS Security Gap" [i.2] indicates that the organizations investing in SaaS are not making the necessary investments to address Cloud Computing Security. Some of key challenges listed by Gartner are the lack of spending on SaaS security and the lack of full knowledge about the new security challenges created when moving to SaaS as the ICT platform. Therefore education and awareness of responsibilities are key factors here.

The conclusions made by Gartner support the case for standards in the Security space. Their report echoes the findings made in the web survey in terms of addressing the Security concerns raised by many respondents of the web survey, and it also confirms the remark above that many users need to obtain a better understanding on Security and its various elements, and how these elements are related and come together to form the necessary level of trust and confidence in Cloud Computing.

The current development of a "Digital Service Infrastructure" and constituent Building Blocks as part of the EC program "Connecting Europe Facility" (CEF) should also be referenced and considered in order to understand the implications on Cloud Computing resulting from the pan-European e-ID and certification solutions now being provisioned.

- The CEF building blocks are provided in order to ensure a reliable and interoperable mechanism for service and information exchange cross-border in the EC. The ongoing work in the Large Scale Pilots (LSPs) STORK and e-SENS is also of interest in this respect and creates input to the DSI and e-ID and certification Building Blocks.

For more information, see https://joinup.ec.europa.eu/community/cef/og_page/catalogue-building-blocks.

6.3.4 Standards

Standards were one of the main aspects of users' needs for which the survey was designed. The first phase of CSC has addressed in particular the evaluation of the maturity of Cloud Computing standards. One of the goals of the survey was to address the needs of users, their expectations vis-à-vis standards and their perception regarding the actual possibility for standards to support their needs.

A number of questions were asked mostly in two ways:

- A set of questions related to standards in general (Questions 34 to 36).
- A detailed (and optional) section with questions specific to some specific Standards (Questions 37 to 46).

Regarding the general questions on standards, an important one was the evaluation of the impact of Cloud Computing standards on the respondents' organization, whose results are summarized in figure 4.

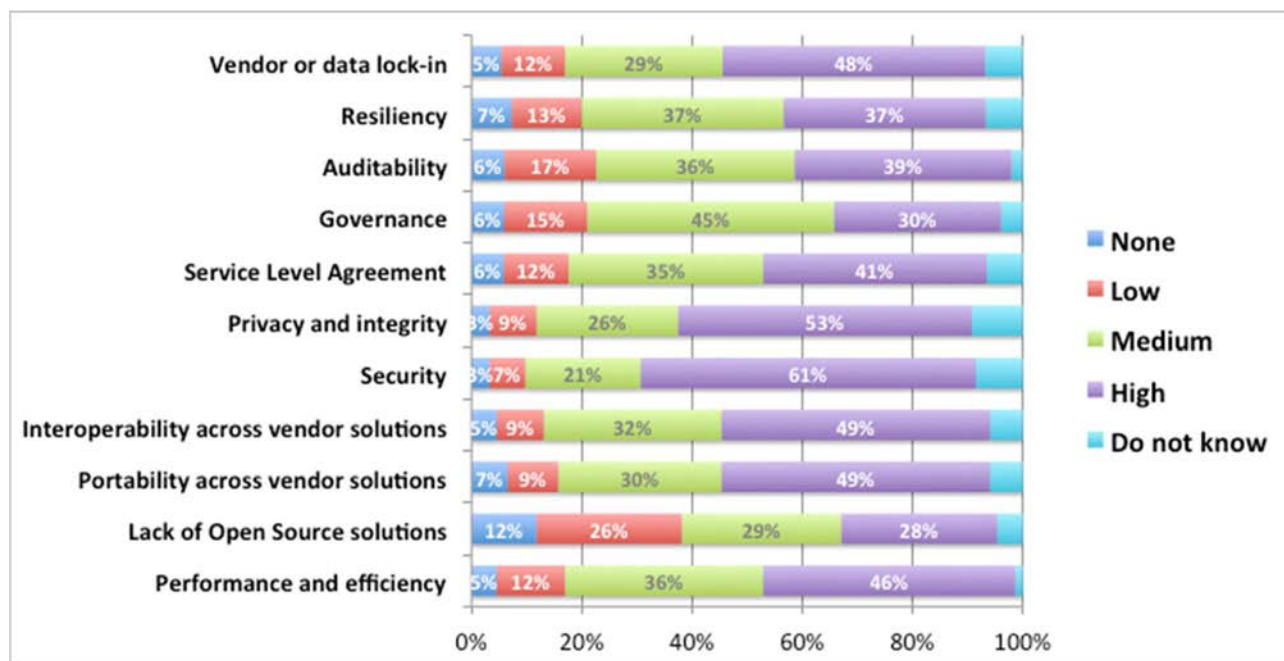


Figure 4: Cloud Computing Standards impact on organization concerns (Question 34)

For most of the domains, the sum of "Medium" and "High" answers is in most case above 75 % with domains where the expectations are particularly high: Security, Interoperability, Privacy and Integrity. The users' concerns regarding these domains are not new, but the level of expected support from standards is very encouraging.

In addition to this, when asked about the actual place of standards in their organization, the respondents are also giving the signal that, in more than 75 % of the cases, standards are "considered" or "used".



Figure 5: To which degree are Cloud Computing Standards considered or used (Question 35)

Regarding the detailed standards proposed for evaluation, the level of knowledge of the respondents can vary significantly, with some examples of standards whose visibility is below what we could have expected. An example is given below with ISO/IEC 27018 [i.11] (related to Code of Practice for PII).

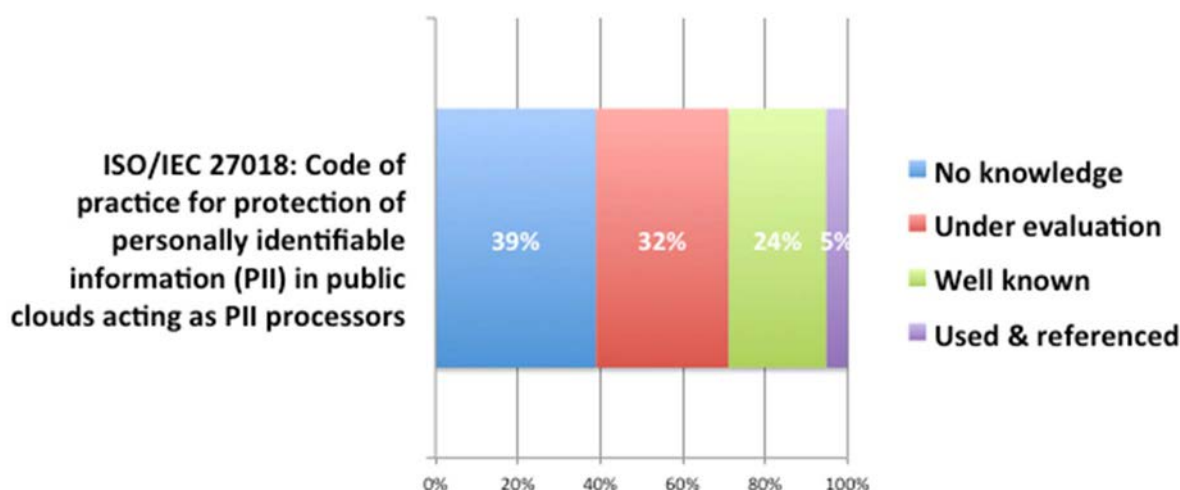


Figure 6: Adoption and use of CC standards: Data protection (Question 40)

One of the recommendations that may stem from this analysis is that Standards Setting Organizations need to intensify their promotion and education efforts towards the Cloud Computing community.

More details will be found in clauses A.9 and A.10.

6.3.5 Certification

The question of trust is central to the adoption of Cloud Computing. Building trust is a complex issue and several ways have been addressed in the survey: preparation of the organization for the adoption of cloud (see clause A.6), use of standards and also certification. They all need to be addressed together.

The first feedback from the respondents on the role of certification is clear: it is a very useful way to improve confidence in Cloud Computing for a very large majority (over 80 %).

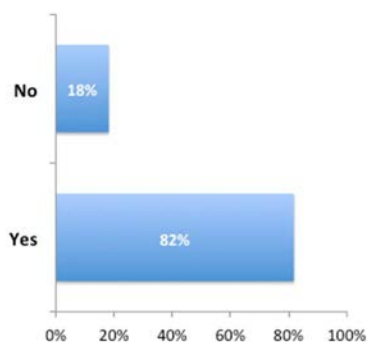


Figure 7: Is Cloud Certification a possibility to improve confidence in Cloud (Question 47)

Once this agreed, then two questions have to be addressed by the organizations:

- 1) the scope of certification; and
- 2) the certification scheme(s) to be used.

Regarding the scope of certification, a list of 12 domains has been proposed with the following results:

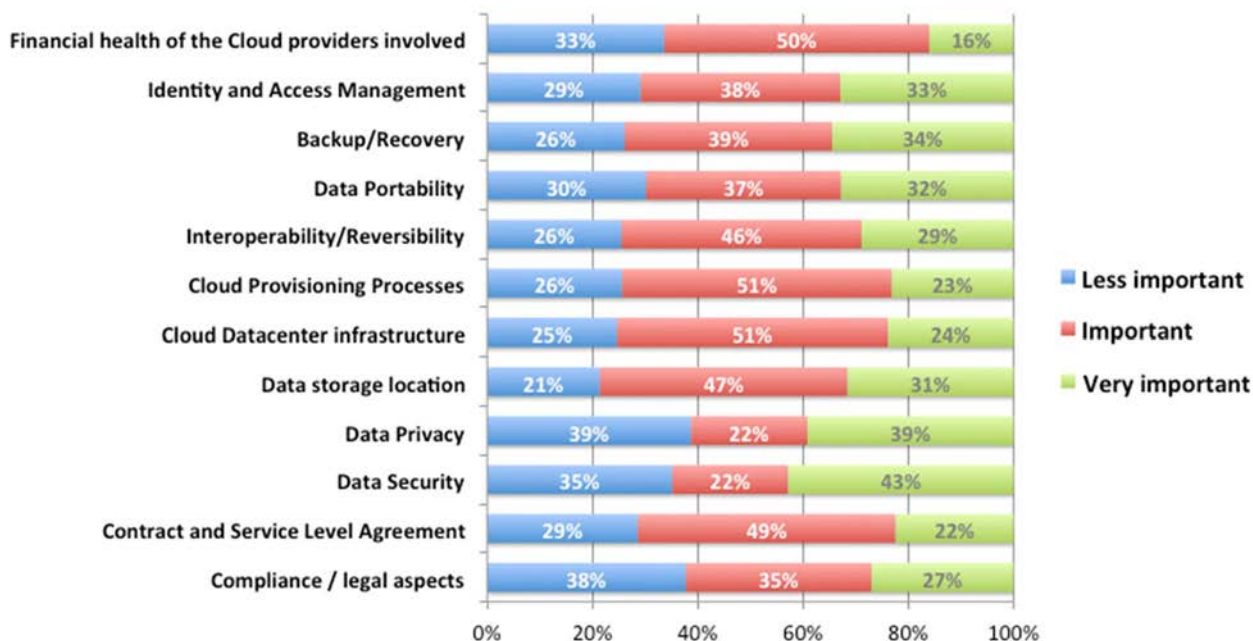


Figure 8: Ranking Cloud Certification areas according to their importance (Question 48)

The number one candidate for certification is Data storage location. This is reflecting the concern already identified in the previous sections of the survey (e.g. adoption of Cloud) on legal and technical support to the protection of the organization's data. Certification is seen as a potential enabler.

The next three domains in the respondents' ranking are regarding technical concerns: Cloud Datacenter infrastructure, Cloud Provisioning processes and Interoperability/Reversibility. Here again the question of data (integrity, reversibility) can be seen as a major concern.

When facing the selection of Cloud Certification schemes, an organization is offered a large set of such schemes. The Cloud Certification Scheme List (CCSL) is an attempt to make a selection of such schemes. The survey shows that only 37 % of respondents are aware of this list.

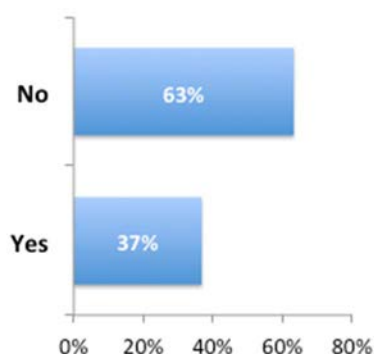


Figure 9: Awareness of CCSL, the Cloud Certification Schemes List (Question 51)

This is clearly showing a need for increasing the awareness of the Cloud Computing community on CCSL and all the means to have access to a pre-analysed and recommended list of certification schemes. However, it is recommended to further study certification schemes, especially to explore whether the ISO 27000 family of certification is deemed sufficient.

This is also confirmed by the analysis of the awareness of some of the schemes of CCSL as shown in figure 10.

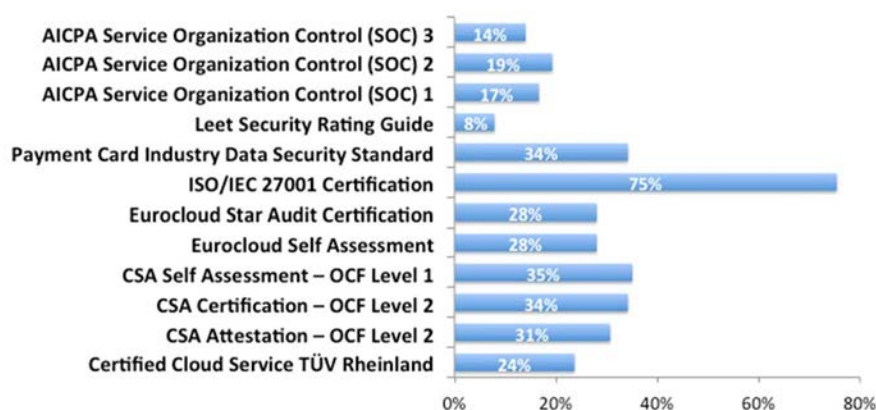


Figure 10: Awareness of some Cloud Certification Schemes listed in CCSL (Question 52)

The first scheme in this list (more than two times notorious than the next one) is ISO/IEC 27001 [i.8]. This is not a Cloud Computing specific scheme but it is also a global worldwide one.

More can be found in clause A.11.

6.4 Impact on other Cloud Standards Coordination Phase 2 reports

The whole scope and work program of Cloud Standards Coordination Phase 2 has been defined with the intention to understand at best the expectations of the users regarding Cloud Computing. From this standpoint, some findings of the survey are directly impacting the other Work Packages of CSC-2 and have been taken into account in the writing of the corresponding reports.

WP2 Open Source and standards

The main finding of the present document regarding Open Source is that Open Source is not seen as a major Cloud Computing challenge. This can be seen in two questions:

- *Q11. Maturity of Cloud Computing: how critical are the following issues for your organization?* The "Lack of Open Source solutions" is seen as critical or very critical only by 31 % of respondent whereas the same figure for "Lack of standards and standards APIs" is 49 %. Further considerations on Open Source solutions are discussed in ETSI SR 003 382 [i.12].

- *Q34. Which impact can Cloud Computing Standards have on your organization's concerns?* It appears that standards have a medium or high impact for about 75 % of respondents.

The WP2 report (ETSI SR 003 382 [i.12]) addresses the relationship between Standards and Open Source. From this standpoint, though the usual way to approach this is to analyse the way Open Source may make use of standards (existing or in development), it is also useful to address the other way round, in particular how standards can contribute to the trust that users organizations may put in Open Source solutions.

WP3 Security, Standards and Certification

A lot of emphasis is put by the survey respondents on the issues of security, and on the role of standards or certification regarding the resolution of security issues. The work of WP3 revolves around strategies to address all this aspects in a coherent manner, and on the recommendations that can be drawn.

In particular, the question of certification is key. Some findings of the survey point to the relative lack of knowledge of the responding organizations on the certification schemes themselves as well as on the best way to use them. A clarification of this question and associated recommendations are a major objective of the WP3 report.

WP4 Standards Maturity Landscape

One of the objectives of the "snapshot 2" is to assess the maturity of the Cloud Computing standardization and to evaluate the process between the "snapshot 1" of Cloud Standards Coordination Phase 1 (available in November 2013) and the "snapshot 2" available in September 2015, almost two years after.

When the 2013 Standards Maturity Assessment ("snapshot 1") results have been published by CSC-1, some gaps had been identified (e.g. security, Service Level Agreement). The persistence of these gaps - at least from the point of view of users' perception - is somehow confirmed by the survey.

A number of standards have been developed in between the two "snapshots". From this standpoint, the list of relevant standards is larger than the one of November 2013. The analysis of the standards from this list has taken into account some of the findings of the survey and paid special attention at least to:

- Security Standards and Certification schemes
- Interoperability and Data Portability standards
- Service-Level-Agreement standards

6.5 Relationship to other activities

Cloud SIG on SLA

The Cloud Special Industry Group on SLA was initiated by the EC to address Cloud Standardization for Service Level Agreement. Several members of this group already contributed to CSC-1. The group was informed about the CSC-2 activities and invited to participate in the survey through their DG CNECT contact.

It should be noted that the group is not currently active after having delivered their Cloud Service Level Agreement Standardization Guidelines to the EC in 2014 and to the ISO SC38/WG3 to be considered in ISO/IEC 19086-1 [i.9].

EuroCIO

CSC-2 has been in permanent contact with EuroCIO since its beginning and has participated and contributed to the two Workshops organized by EuroCIO on Cloud Computing. In 2015, EuroCIO has been tasked by the EC to review the 4 EC strategic actions in support of its Cloud Computing strategy of which CSC-2 is part.

It should be noted that a few questions of the CSC-2 survey questions have been included in the EuroCIO survey in support of their above-mentioned action. The answers collected have given more value to the concerned questions (e.g. on certification).

NIST

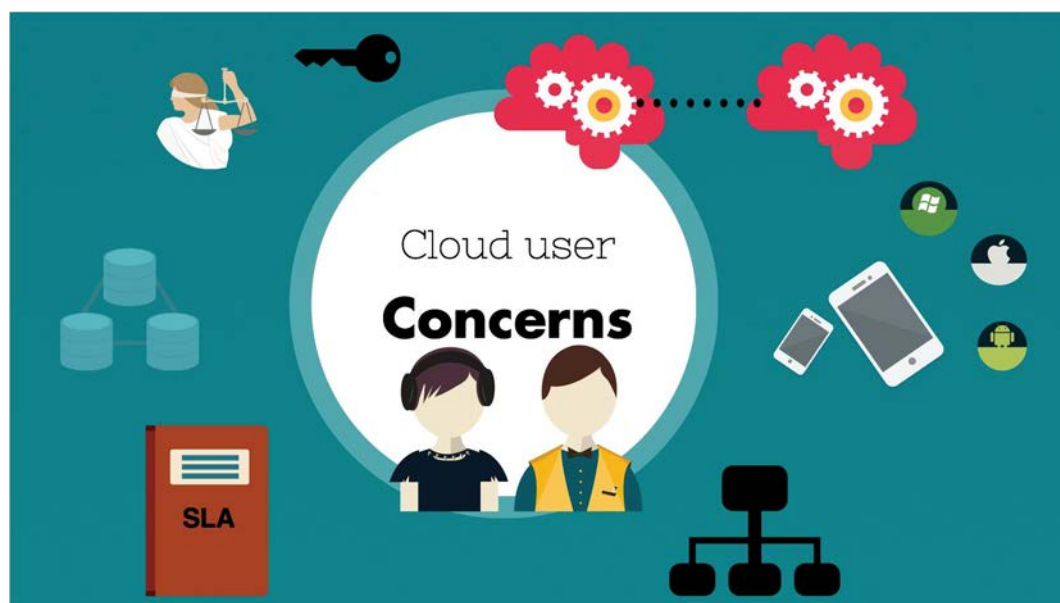
To a large degree, NIST and CSC-2 share a common approach to Cloud Computing standardization: they both have a contribution to the standardization framework (though NIST also contributes to standards whereas CSC-2 does not). From this standpoint, it appeared important to investigate the possible common actions that would result from this situation.

To this extent, after a common meeting, we have understood that the current survey matches well with the 10 recommendations for Cloud Computing that NIST has published in 2011. A contribution of Cloud Standards Coordination Phase 2 on the analysis of the 2011 and 2015 situations has been presented at the NIST Cloud Computing Workshop VIII in July 2015. This presentation is available on the CSC web site in the "Sharing" section at <http://csc.etsi.org/phase2/dissemination.html>.

7 Conclusions and recommendations

The present report indicates that running a web survey on Cloud standards may yield relevant findings even though the number of respondents is limited and the composition of the respondents resulting from the invitation to selected stakeholders is representative of the overall population only to an unknown extent.

The findings made during the analysis of the survey support the continued strive towards closing the identified gaps in terms of support for Cloud Computing standards. It also shows a growing awareness of the importance of standards, in general and for Cloud Computing in particular.



NOTE: Source: CSC phase2

Figure 11: A summary of Cloud Users concerns

Based on the principal areas of concern, illustrated in figure 11, the Cloud Standards Coordination Phase 2 experts have listed some recommendations following the findings in the web survey. These recommendations are listed below:

Collaboration across key Cloud Computing stakeholders

Encourage and increase collaborations across the various relevant initiatives in Europe as well across standards development organizations (formal, de jure and de facto) to avoid and minimize fragmentation and overlap in the Cloud Computing related standardization efforts. During the CSC-2, contacts have been made with the US standardization agency, NIST as well as for example the EuroCIO organization. Both contacts have resulted in follow-up activities that will add further value to the CSC-2 results as well as securing awareness of the CSC work.

Dissemination and marketing

Make sure that Cloud Computing stakeholders (users, customers and providers) are made aware of existing standards and certification programs. The relatively low response and awareness found among the respondents of the web survey strongly suggests that the importance and potential benefits of standards and certification schemes need to be further advocated and marketed by using in the relevant channels through the appropriate EU agencies and also by the SDOs.

Conduct the Cloud Web Survey regularly

Keeping track of the end users perception of Cloud Computing benefits and challenges provides an excellent backdrop for ongoing as well as future efforts to close the identified gaps and address the challenges disclosed by the web survey. The STF 486 experts see the web survey as a good tool to gauge the progress and state-of-affairs in the Cloud Computing space and recommend that the web survey is reopened and run on a regular basis, tentatively on an annually basis.

Security aspects - a key concern

"Security", as a concept, is without doubt a major concern for most users, customers and providers alike, in particular in a Cloud setting, as the resources typically are shared and data integrity confidentiality and availability, as a consequence need additional attention to ensure a retained confidence in the ownership of data. Many users are concerned about "losing the control of data", in many cases probably justifiably so. Unless Security - all relevant aspects of Security related to Cloud Computing - is fully addressed and the users made aware of available options and existing protocols and standards that can be used to build reliable Cloud Computing offerings, the adoption of Cloud Computing is likely to continue to grow slowly. For further details, see ETSI SR 003 391 [i.13].

Certification adds confidence

The analysis supports the provisioning of certification schemes, where certification of vendors and the cross cutting aspects data storage location (one aspect of privacy), cloud datacentre infrastructure, cloud provisioning process and interoperability/reversibility are top priorities. These aspects are general concerns that need to be addressed to accelerate the adoption of Cloud Computing. The CSC-2 will use the results of the web survey as input to the other tasks and work items of the CSC (as described in clauses 6.4 and 6.5).

In summary, the Cloud Standards Coordination Phase 2 experts see the standards coordination effort as well funded and highly relevant. It is recommended that the standards coordination results be thoroughly disseminated and that the industry and Standards Development Organization contacts and collaborations made as part of the Cloud Standards Coordination initiative continue.

8 Areas for further study

Some areas for further study are for instance:

- Specialization of results. In this version of the report, the results for a question are taken globally, on the totality of the respondents. On some questions, a more in-depth analysis may be useful, provided that the number of responses is high enough to keep some relevance. An example of such analysis could be to differentiate the answers by country of the respondent: large differences in the rate of adoption in EU countries (as shown in figure 12) may also be visible in the survey results. The limited time and resources devoted to CSC-2 made this analysis difficult to undertake.



Figure 12: Use of Cloud Computing in enterprises in Europe (source: Eurostat)

- A view that targets SMEs specifically. Slightly more than half of the respondents are from SMEs. Considering that SMEs are a major target of the work of Cloud Standards Coordination Phase 2, an analysis focused on this part of the respondents will be useful, provided the size of the sample is sufficient for drawing conclusions, which will be the case for some but maybe not all of the questions.

- Validation of trends. Some of the trends identified in clause 6.2 may be further validated by additional analysis (possibly by running the survey again after some time). In particular, it might be possible to identify new trends and draw more firm conclusions. An example may be regarding some of the specific standards addressed in questions 38 to 45.
- Issue a new version of the User Survey with a modified structure and presentation of core concepts based on findings made during the creation of the other CSC-2 reports and on the comments received during the review period.

Annex A: Survey Responses and Charts

A.1 Presentation of results

The results of the survey are presented below in the form of charts and comments. They are grouped by clauses that correspond to the division by pages in the on-line survey itself.

The results presented correspond to the situation at **September 25th, 2015** with **376** responses collected. The survey will continue to be available on-line for a certain period of time. More results will be available for the final version of the report.

The complete set of questions as they appear on-line can be found in Annex C.

Each question is introduced by a header that has the following form:

Qn	Text of the question	
		<#answers> answers - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		<i>example:</i> 125 answers - <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

where:

- **Qn** represents Question number n
- <#answers> is the number of answers received for question Qn
- <indicator> represents the view of the experts on the answers. It is a **subjective indication** of how far the results can be interpreted. It can take one of the following forms:

<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	the answers to this question are subject to a reliable interpretation
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	the answers to this question can be used for identifying trends
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	the answers to this question can be used for information
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	the answers to this question are not meant for any interpretation

NOTE: The <#answers> and <indicator> are not correlated: the indicator is based on much more information (and experts' discussion) than just the number of answers.

The typical presentation of the results is:

- The purpose of the question.
- A summary chart with the answers presented by percentage of respondents.
- An interpretation by the experts of some specific points.

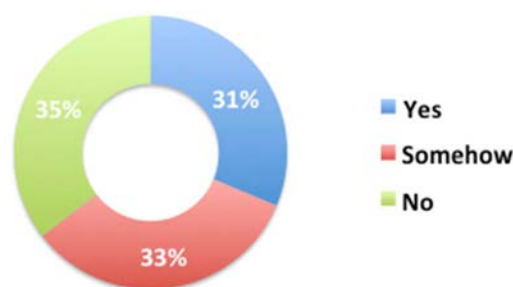
A.2 Background information

This first section of the survey was used for the presentation of the survey together with explanations on the way the results will be stored, distributed and used.

Q1 Are you familiar with Cloud Standards Coordination?

366 answers - ☒ ☒ ☒

Some knowledge of the Cloud Standards Coordination activities (i.e. what is now called Cloud Standards Coordination Phase 1) is considered helpful to better understand the context of the following questions.

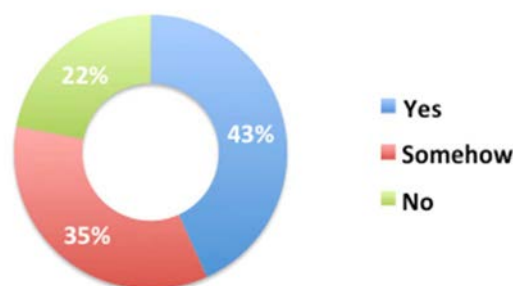


The answers indicate that roughly two third of the respondents have some knowledge of CSC.

Q2 Are you familiar with ETSI?

363 answers - ☒ ☒ ☒

A certain familiarity of the respondents with ETSI is the sign that one could expect that they have a certain affinity with standardization processes and thus may better understand the following questions.



Almost 80 % of the respondents show this familiarity about ETSI.

A.3 General purpose information

Q3 Name of your organization (not mandatory)

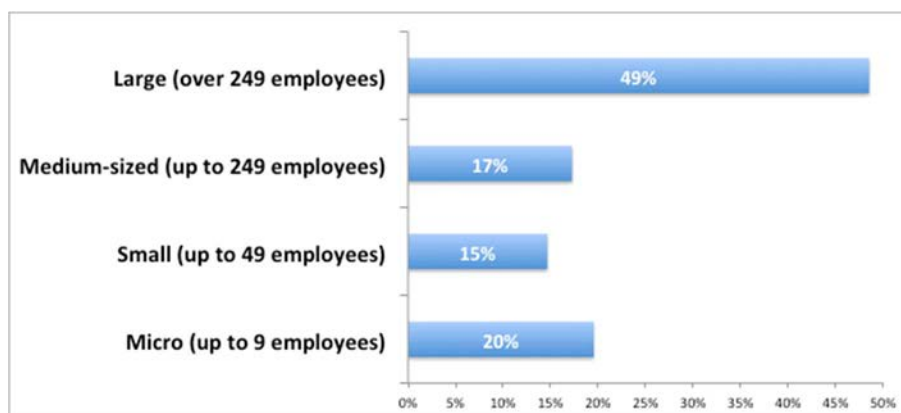
115 answers - ☐ ☐ ☐

Though the survey was anonymous answers to this question would allow the CSC experts to get an impression of the composition of the set of respondents. About 28 % provided the names of their companies. This information is used for internal analysis and is not (as said in the introduction of the on-line survey) meant to be made public.

Q4 Size of your organization

307 answers - [xxx](#)

The motivation for this question is similar to the one for Q3.



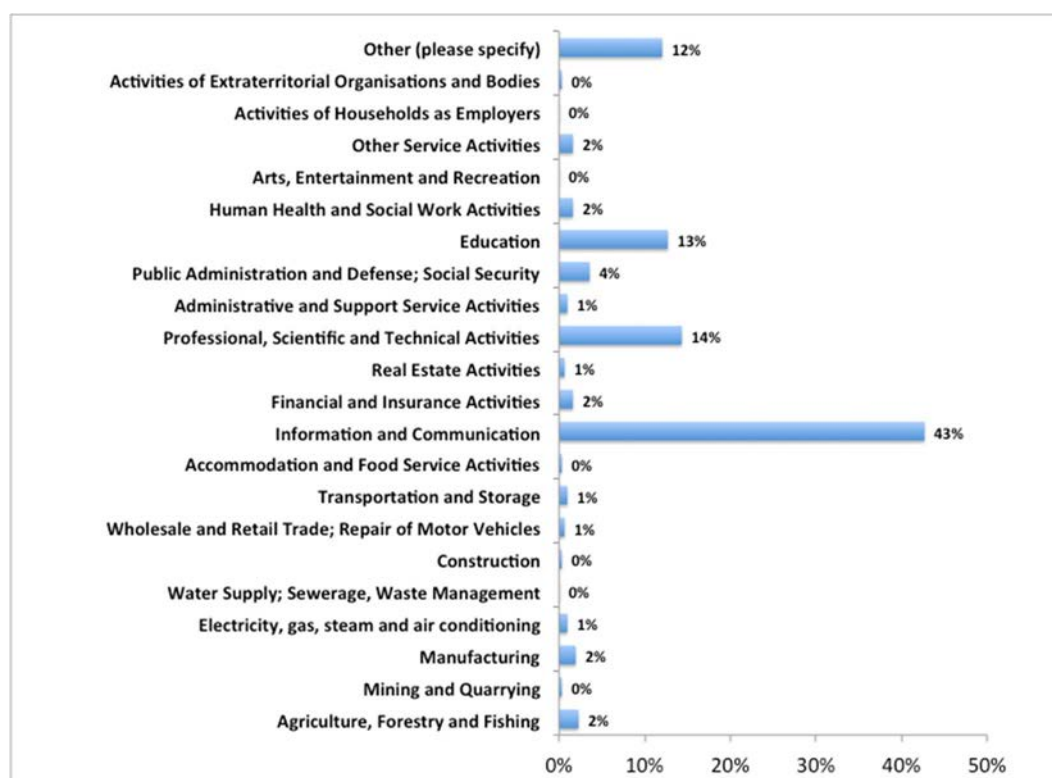
A little more than half of the respondents come from different-sized SMEs, the rest coming from organizations with more than 249 employees (e.g. companies, administrations, etc.).

Q5 Sector in which your organization operates

307 answers - [xxx](#)

This question is intended to show to which extent Cloud computing is used in different economical and societal sectors.

The classification used is based on "Statistical Classification of Economic Activities in the European Community" [i.4].



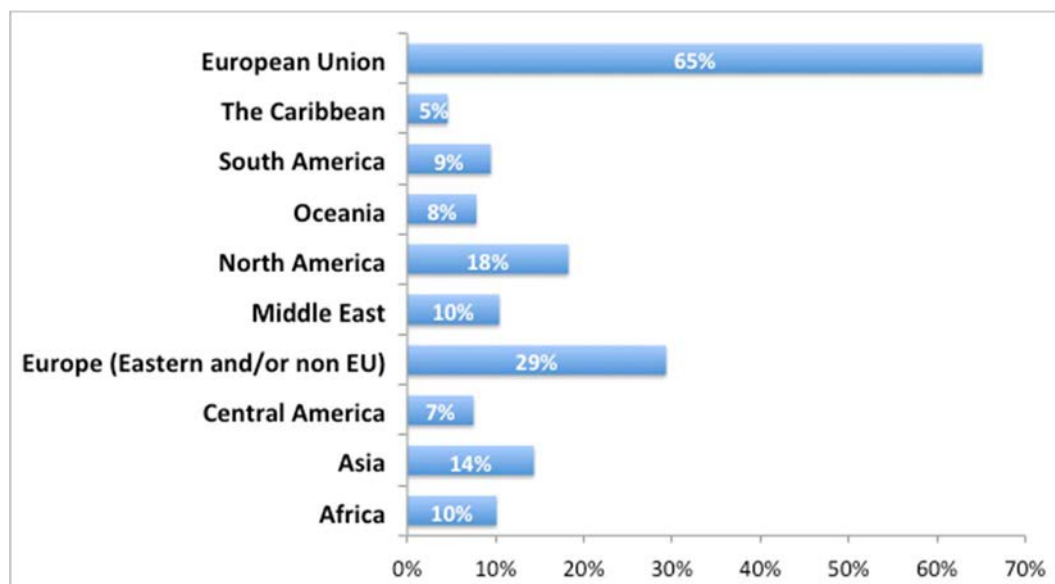
The ICT sector leads with 43 % of responses followed by Professional, Scientific and Technical Activities with 14 % and Education with 13 %. The other sectors remain below 3 %.

Q6 Region/Country in which your organization mainly operates

307 answers - [xxx](#)

The localization of the respondents is an indication of the geographical distribution of the respondents' organizations.

It is to be noted that the total of answers is above 100 %, which shows that some of the answers come from organizations that operate across several of the geographical zones.



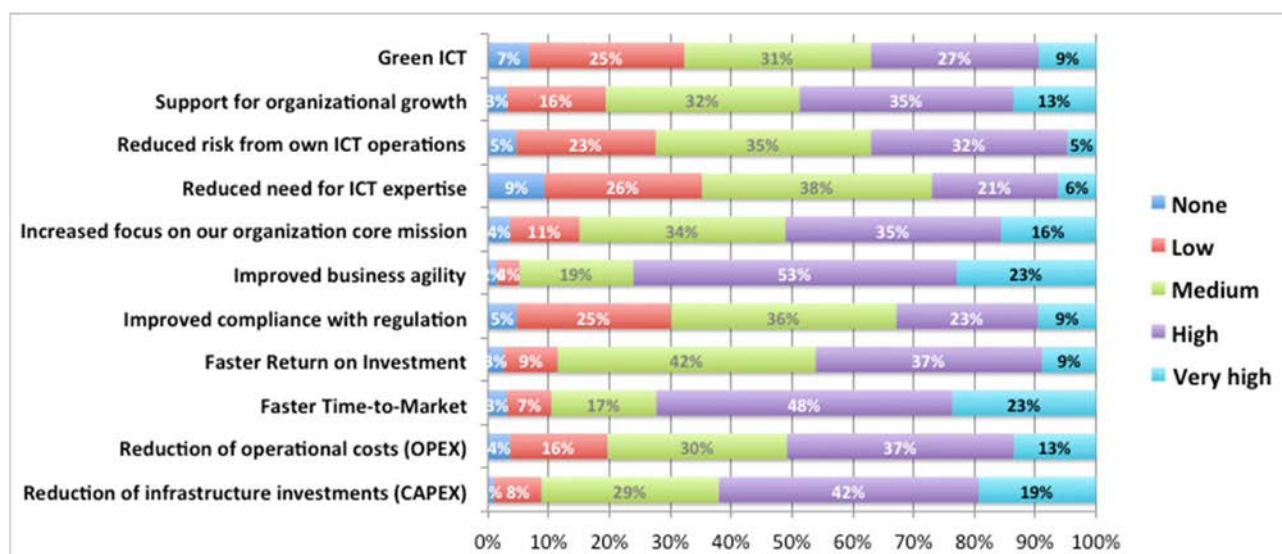
As anticipated, a vast majority of the answers is coming from Europe, be it the European Union or the other European countries. This is in line with our expectations since the study was first targeting the European situation.

A.4 Moving to Cloud Computing: expected benefits and challenges to face

Q7 How high are your expectations on potential Cloud Computing benefits?

193 answers - [xxx](#)

This question intends to evaluate the perception of the respondents on the benefits that their organization is expecting from the adoption of Cloud Computing.



Most criteria received "Medium", "High" and "Very High" ratings of together 70 % or more showing that the expectations in cloud computing benefits are significant. In other terms, the expectations are high.

If the highest expectation is on "Improved business agility", the importance of "Reduction of CAPEX" is also significant: even if it may not be as essential for large organizations, this importance of this factor may be higher for the SMEs that constitute more than half of the respondents.

Q8 If there are other benefits highly expected by your organization, please specify

38 answers - ☒ ☐ ☐

This question was open question and only a few voluntary answers expected. Amongst the answers received:

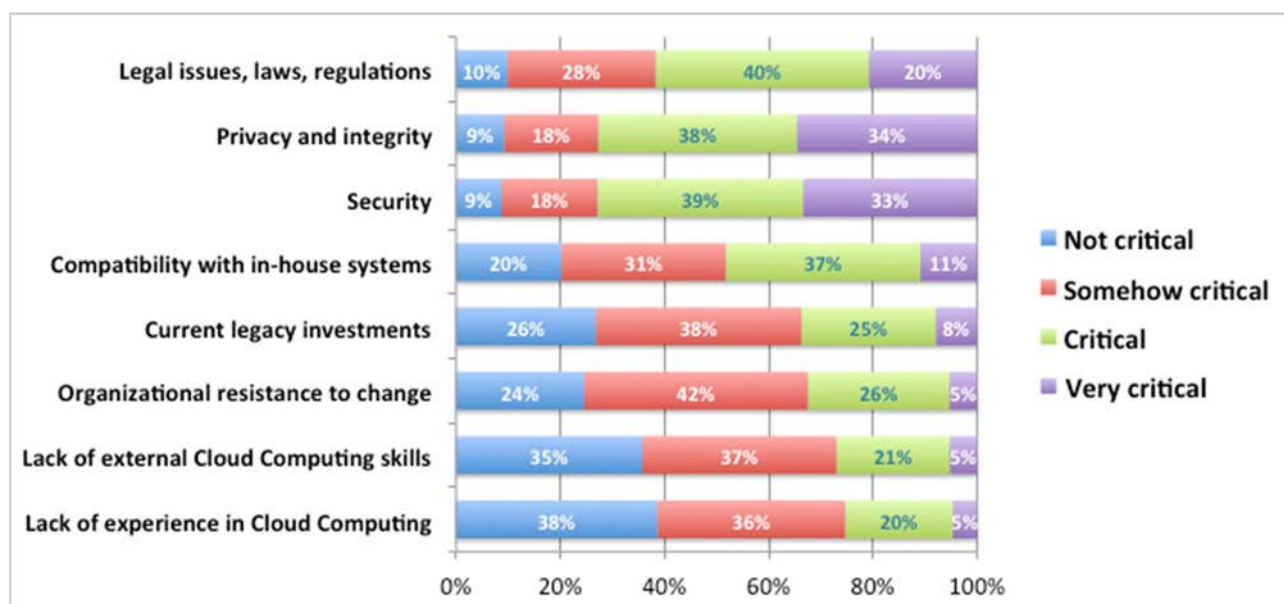
- New business models
- Service opportunities
- Scalability and Cost control
- Joint procurement of resources
- Simplification of ICT processes
- Improved resilience
- ...

In summary, Flexibility, Resource sharing, Business flexibility & innovation, Improved security, Peak demand management are the most significant benefits added by the replies received.

Q9 Maturity of your organization: how critical are the following challenges?

197 answers - ☒ ☒ ☒

This question intends to get a self-assessment by the respondents on the maturity of their organization regarding the challenges it will face if it opts for the adoption of Cloud Computing.



The two major concerns, not surprisingly, are "Security" and "Privacy and integrity". On these two aspects, the profiles of answers are almost identical, thus giving the signal that the respondents do not dissociate both aspects. These issues are still extremely sensitive, despite some progress in the recent years. It is noticeable that Legal issues, laws and regulations (third in the list with 20 %) are also seen as more important than other technical challenges.

Q10 If there are other critical challenges to your organization, please specify

17 answers - ☒ ☐ ☐

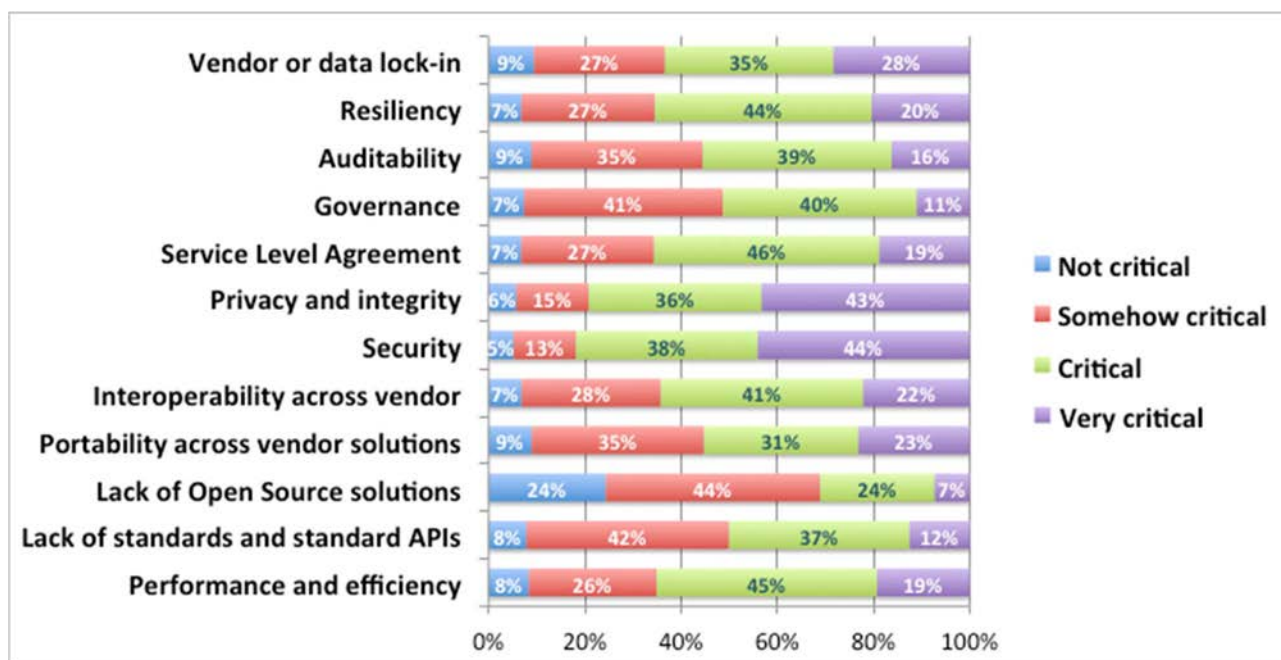
This question was open question and only a few voluntary answers expected. Amongst the answers received:

- Internal governance of Cloud Computing deployment
- Data portability standards; SLA standards; integration standards
- Cultural norms
- Contractual obligations
- Lack of transparency of cloud providers
- "Shadow ICT" is seen as a risk following the proliferation of Cloud Computing - "SaaS sprawl" is increasingly being used as the term for the increased use of Cloud Computing without the retained control of the ICT department. Several respondents raise this as a concern where lack of governance and legal compliance might create difficulties in organizations. Lack of the right knowledge is also brought up as an additional concern.
- ...

Q11 Maturity of Cloud Computing: how critical are the following issues for your organization?

194 answers - ☒ ☒ ☒

This question intends to get a self-assessment by the respondents on the maturity of Cloud Computing itself and how these challenges may impact the adoption of Cloud Computing by their organization.



Not so surprisingly, the majority of respondents identify Security (44 %), Privacy and Integrity (43 %) as most critical challenges well before the other ones. As it was for Q9, this is an indication that these issues are still extremely sensitive, despite some progress in the recent years. It is noticeable that Vendor and data lock-in (third in the list with 28 %) are also seen as a major issue with the Cloud Computing offerings.

Q12 If there are other critical issues with Cloud Computing, please specify

15 answers - ☒ ☐ ☐

This question was open question and only a few voluntary answers expected. Amongst the answers received:

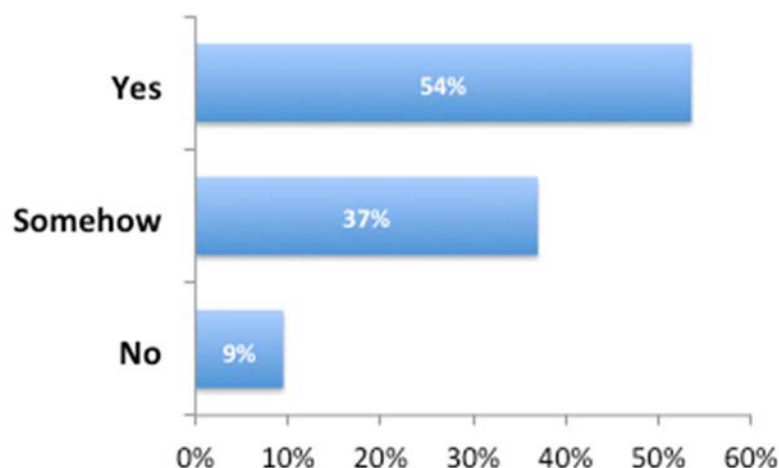
- Business process continuity
- Identity and access management [*CSC experts comment: may be seen as a part of security*]
- Green data centers
- ...

Respondents bring up IAM and Privacy as Cloud Computing concerns but also access to the "topography" of Cloud Service offers based on a standardized profiling (also related to how the SLA is defined).

Q13 Has your organization started to adopt Cloud Computing?

211 answers - ☒ ☒ ☒

The purpose of the question is to evaluate the state of Cloud Computing adoption in the respondents' organizations.



Not surprisingly, a clear majority of the organizations already started adopting Cloud Computing. The fact that none of the respondents indicated that there are no plans for adoption may simply indicate that those who have no such plans are probably not eager to fill this kind of survey.

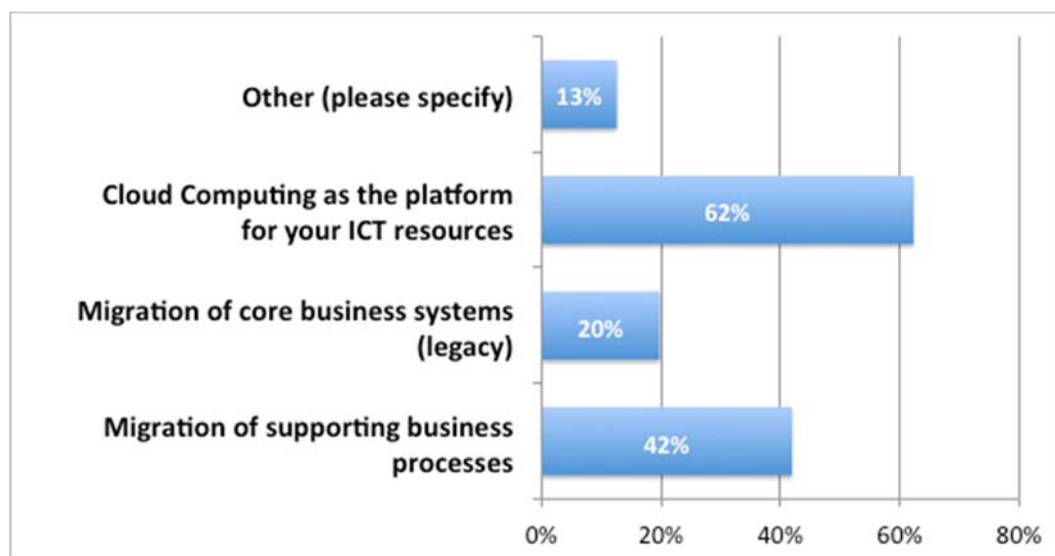
A.5 Adoption of Cloud Computing in your organization

This clause addresses the respondent's organization adoption strategy and intended role for Cloud Computing.

Q14 Scope of your Cloud Computing usage in the near term

167 answers - [☒☒☒](#)

The purpose of the question is to collect the intentions regarding the scope of Cloud Computing for the respondent's organization. It should be noted that the total of answers is greater than 100 %, several choices being possible.

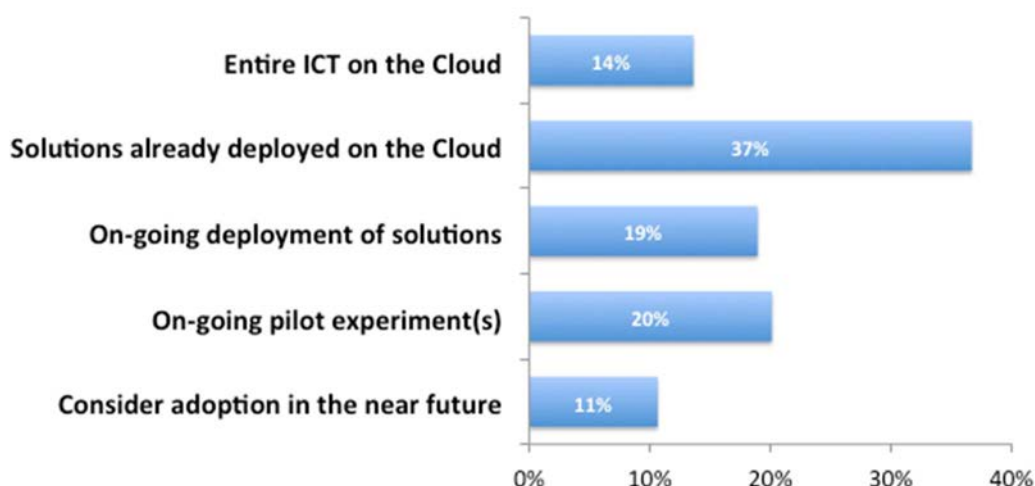


Though the highest figure is regarding Cloud Computing as the ICT platform of choice, the high value of the migration of supporting business processes is an encouraging sign. This is corroborated by the results of clause A.6 on the preparation of the organization for Cloud Computing.

Q15 Stage of Cloud Computing Adoption

169 answers - [☒☒☒](#)

This question addresses the maturity of Cloud Computing adoption for the respondent's organization.

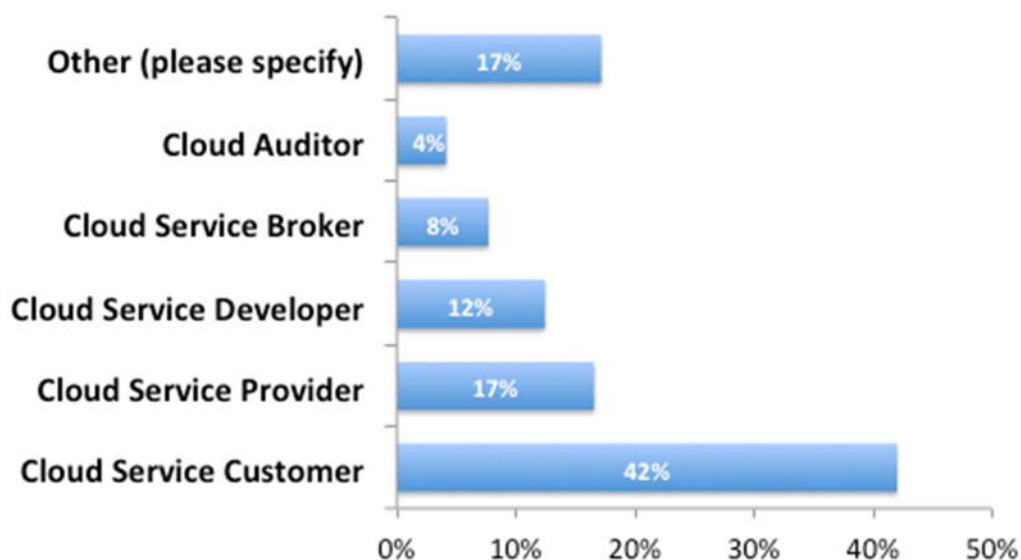


The proportion of respondents' that have not yet services on the Cloud is below one third. It is the sign of a good penetration of Cloud Computing amongst the respondents' organizations. Considering that 43 % of them come from the ICT industry, this does not come as an entire surprise. It may be useful to analyse the answers in more details (what about the non-ICT sectors, what about the SMEs, ...).

Q16 Role of your organization in Cloud Computing

169 answers - [xxx](#)

This question intend to gather the roles of the respondents' organization in Cloud Computing. It is in particular trying to measure the respective importance of Cloud Service Customers (which are to a large extent the target of the study) and Cloud Service Providers (who had been the major force in CSC phase 1).



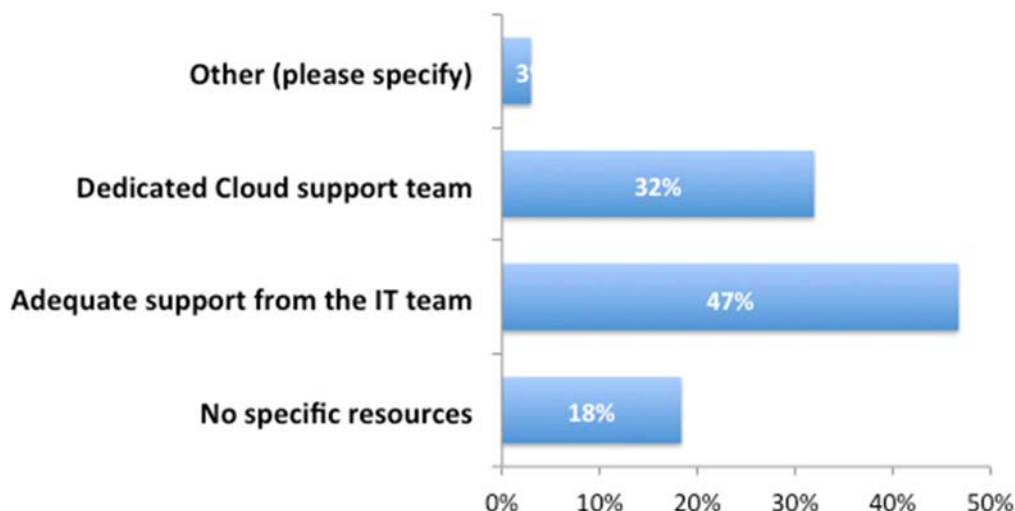
Though the percentage of Cloud Service Provider is low, the total amount of answers related to role involved in the Cloud Services development and deployment (Auditor, Develop, Provider) is only slightly below to the one of the Cloud Service Customers.

The relative importance of Cloud Broker is also to be noted. Since this is a relatively new role, not already very developed in the Cloud Computing industry, there is probably a need to analyse the results in more depth to understand the profile of the corresponding respondents.

Q17 Level of your resources and support to Cloud Computing

169 answers - 

The purpose of the question is to evaluate the amount and adequacy of ICT resources devoted to Cloud Computing in the respondents' organization.



In the vast majority (almost 80 %) of organizations, support of Cloud Computing comes from either a dedicated or an all-purpose ICT support team. In this group, the resources dedicated to Cloud Computing are deemed enough to satisfy the needs. Only a third of them (32 %) have resources specifically dedicated to Cloud.

A.6 Cloud Computing adoption: preparing your organization

Some typical aspects need to be considered and some conditions need to be met in order to make the transition to the Cloud in a secure and reliable way. This is the purpose of this clause.

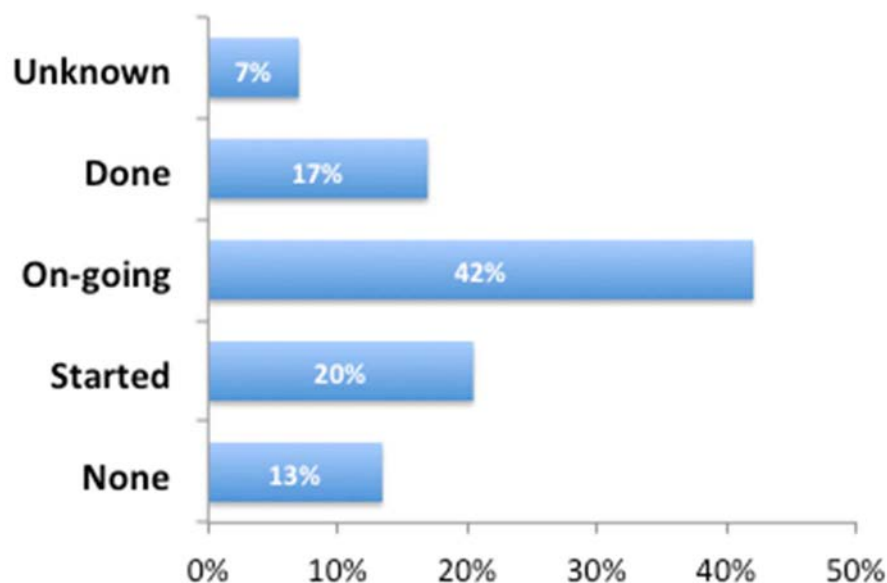
Q18 Data Categorization in your organization

171 answers - 

This question addresses the way "Data Categorization" is handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

Data Categorization describes data on the basis of how it is transferred, processed and used. Examples of Data Categories are customer data/content, derived data, cloud service provider data and account data. Please indicate above where you currently are in this process.



About 80 % of the respondents are aware of data categorization and have at least started the process related to it. Since this is a major enabler to Cloud Computing (and one of the first activities to undertake), this is a very positive signal of progress.

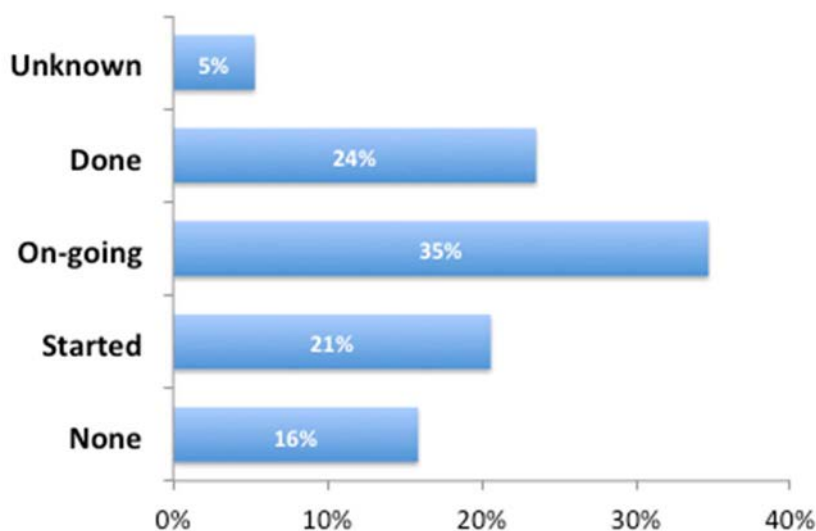
Q19 Data Classification in your organization

170 answers - [xxx](#)

This question addresses the way "Data Classification" is handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

Data Classification typically refers to a way to specify how the information can be shared, from "openly" to "non-disclosed" (secret). Examples of Data Classification taxonomies are: "Public, Internal Use, Confidential and Regulatory Handling". Data Protection levels are associated with examples such as "Ranging from 0 (unrestricted use) to 3 (extreme confidentiality)". They require measures in order to enforce the levels, such as encryption, limited distribution, etc. Please indicate above where you currently are in this process.



As for the previous question, about 80 % of the respondents are aware of data classification and have at least started the process related to it. Here again, this is a very positive signal of progress.

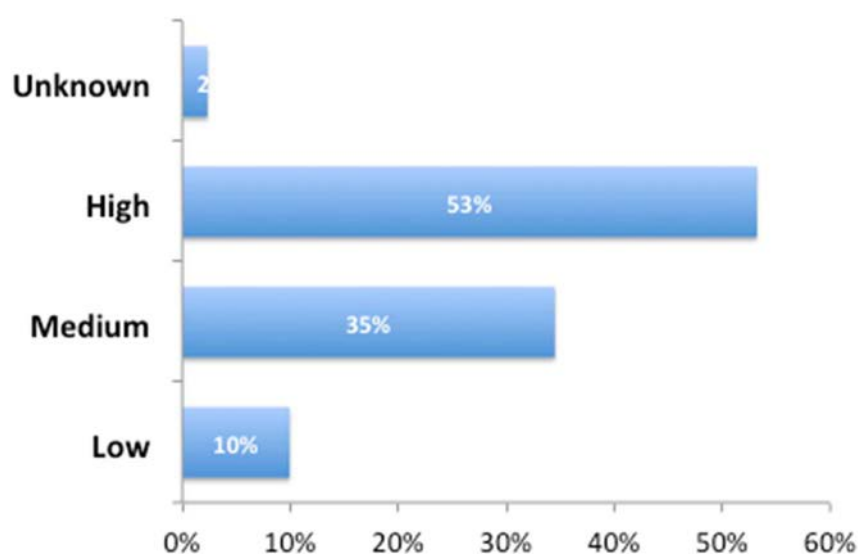
Q20 Data Security in your organization

171 answers - [xxx](#)

This question addresses the way "Data Security" is handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

In order to move securely to the Cloud, many different aspects of Data Security such as information security, information integrity, access and identity management, contingency, and Personally Identifiable Information (PII) have to be addressed and should be well defined and understood. Please state above your organization's level of control and awareness in the data security domain.



The result is encouraging as half the respondents claim a "high" and another third a "medium" data security level within their organizations.

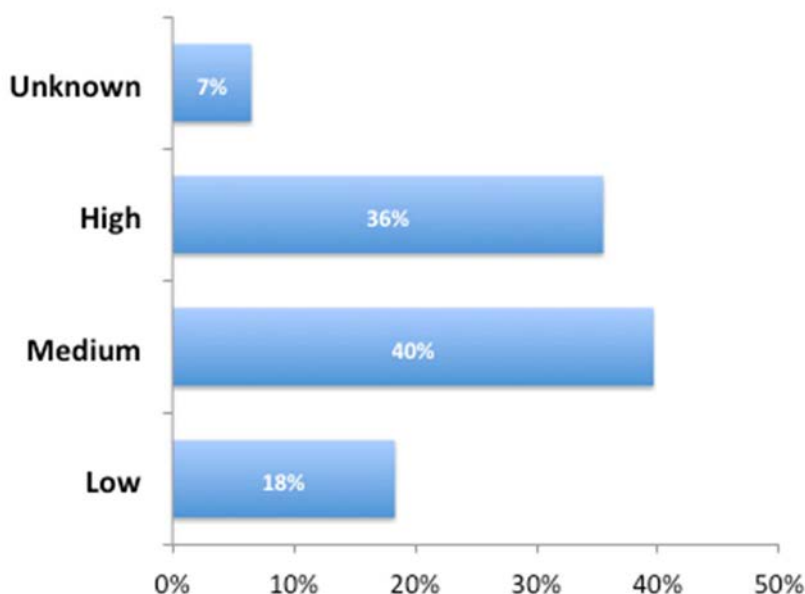
Q21 Business Processes identification, description and alignment in your organization

169 answers - [xxx](#)

This question addresses the way "Business Processes identification, description and alignment" is handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

In order to ensure a transition to the Cloud based on the needs of the organization, it is considered as best practice that the core and supporting processes of the organization be clearly defined and supported, where relevant, by ICT solutions. Well-controlled processes make the transition easier and allow the organization to move to the Cloud on the basis of prioritized transition plans. Please state above your organization's level of business process situation in terms of identification, description and alignment.



Roughly three quarters of the respondents indicate that their organization has a (relatively) well-controlled process underway. However, the proportion of "high" control and awareness is lower than for the previous questions related to handling of data. This may be the sign the task at hand is more complex and overall less advanced. This is in line with the previous findings about "security" as the major concern of organizations.

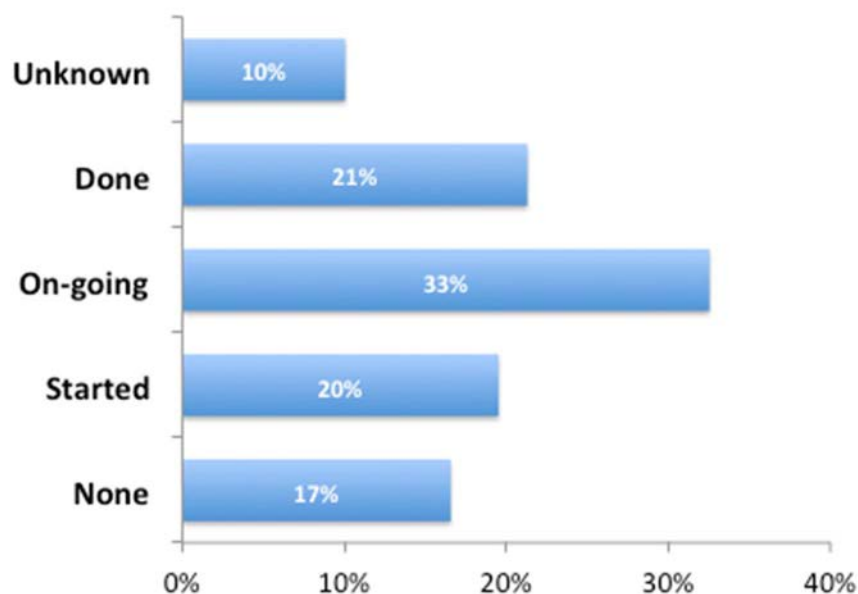
Q22 Service Oriented Architecture in your organization

169 answers - ☒ ☒ ☒

This question addresses the way "Service Oriented Architecture" is handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

Architectures based on loosely coupled services, Service Oriented Architectures (SOA), facilitate the migration to the Cloud. Systems based on SOA may be progressively transitioned to the Cloud, based on priorities and any policies in terms of data distribution or security in place. Please state above your organization's level of service orientation.



About three quarters of the respondents claim that their organization has at least started service oriented procedures. But the proportion of those who consider the work "done" is still low. The reason may be related to the perceived challenge of Business Processes adaptation to Cloud Computing: SOA is one element of the global problem.

Q23 Software Licenses in your organization

171 answers - [xxx](#)

This question addresses the way "Software Licenses" are handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

If your company is working with commercial software, it has typically acquired software licenses that allow using this software on- site. When there is a plan to use this software in the Cloud, your company usually has to negotiate with the independent software vendor about using licenses for running the software in the Cloud. Please indicate above where you currently are in this process.



Only slightly more than half (58 %) of the organizations that use commercial software have started negotiations with their providers on the migration of software licenses into the Cloud. And only one third of them (36 %) have finalized these negotiations. Some significant efforts still need to be done.

Q24 Ensuring Software Suitability in your organization

170 answers - [xxx](#)

This question addresses the way "Software Suitability" is handled in the respondents' organizations in preparation for the adoption of Cloud Computing.

The question is supported by the following text in the survey:

If you plan to use software in the Cloud that you used on-site until now, additional efforts (besides resolving software licensing issues) might be needed. Examples of required efforts are: checking whether the software can be run in the VMs of the Cloud; adapting the software if needed to make use of the selected Cloud platform's features; investigating how to distribute the software across several VMs to maintain or increase performance; evaluating whether all prerequisites for the operation are in place, etc. Please indicate above where you currently are in this process.



Roughly 60 % of the respondents have at least started the software migration with only around 25 % of this group that has already finished. This is another sign of the complexity of the task at hand.

Another 26 % of respondents indicate they have no need to go through this process, which is coherent with the results of the previous question.

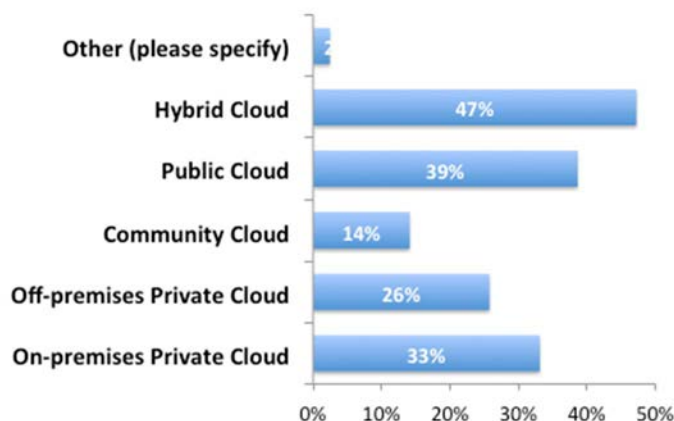
A.7 Cloud Computing: Deployment models and Service categories

The purpose of this survey section is to understand which Deployment models and which Service categories are of major interest to the respondent's organization.

Q25 Which Cloud deployment model seems best fit to your needs?

163 answers - 

The purpose of this question was to investigate the intentions of the respondent regarding different options of Cloud deployment model. Private cloud was split in two different question items.

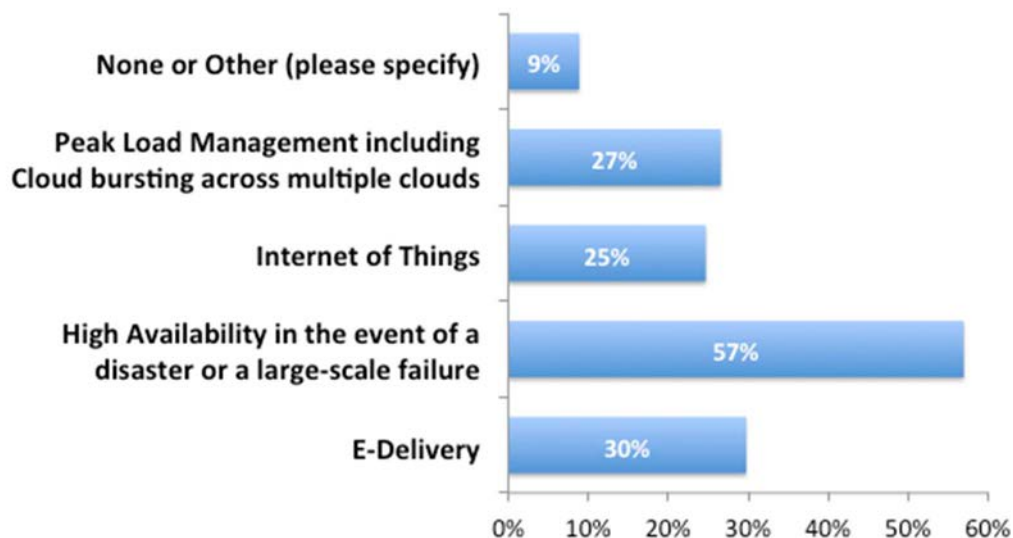


Private Cloud (under its two forms: on-premises and off-premises) is the preferred model. Hybrid and public are not far. The score of Community Cloud can be as low but as well as relatively encouraging for this model.

Q26 Cloud Service Category: IaaS (Infrastructure as a Service)

158 answers - [XX](#)[XX](#)[XX](#)

Four instantiations of IaaS applications are proposed for evaluation.

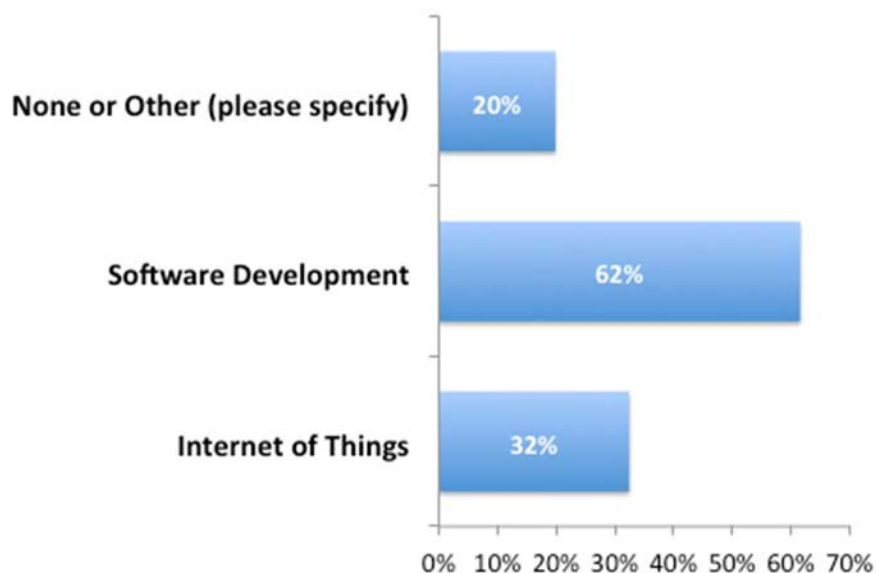


The High-Availability use case is by far the most attractive one.

Q27 Cloud Service Category: PaaS (Platform as a Service)

151 answers - [XX](#)[XX](#)[XX](#)

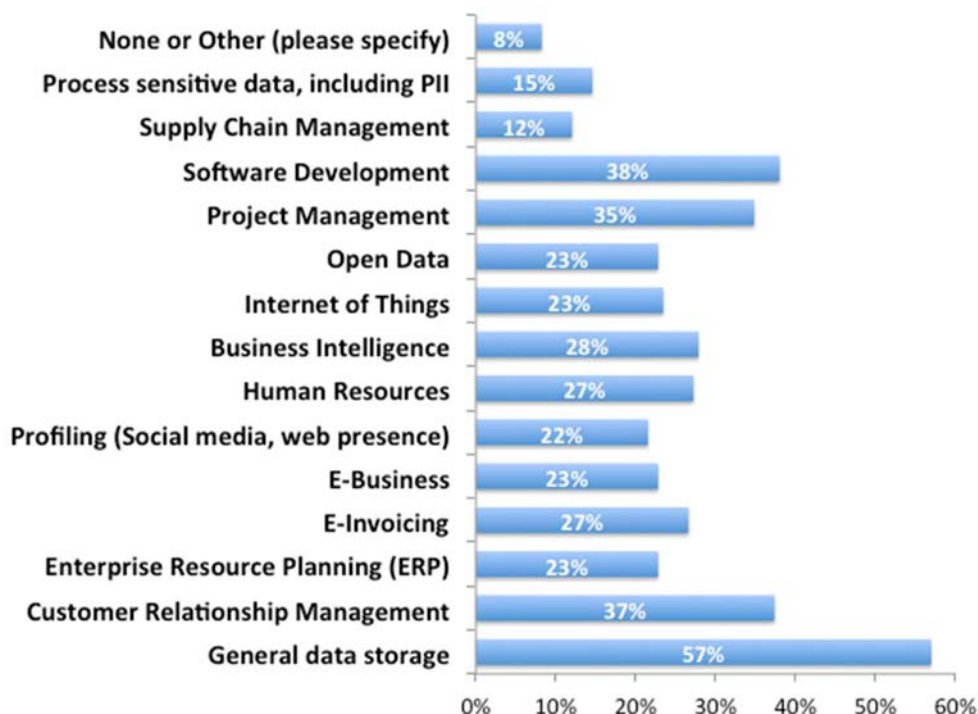
Two instantiations of PaaS applications are proposed for evaluation.



Q28 Cloud Service Category: SaaS (Software as a Service)

158 answers - ☒ ☒ ☒

A large number of instantiations of SaaS applications are proposed for evaluation.



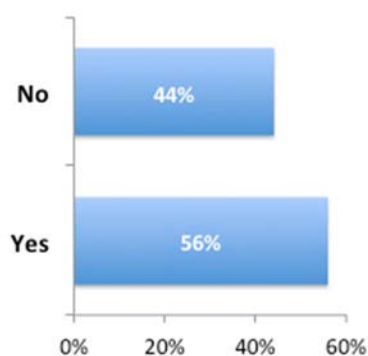
The number candidate is "General data storage" with the other at a distance. On the other side of the scale, the very low score of "Processing sensitive data, including PII" reflects the overwhelming concern about "Security" and "Privacy and Integrity".

Q29 Do you have interest in the emerging categories: CaaS, CompaaS, NaaS, DaaS?

177 answers - ☒ ☒ ☐

This question has a double intention:

- To measure the degree of interest of the respondents for some new Service categories currently emerging (in particular in standardization).
- To skip clause A.8 in case the answer is "No".



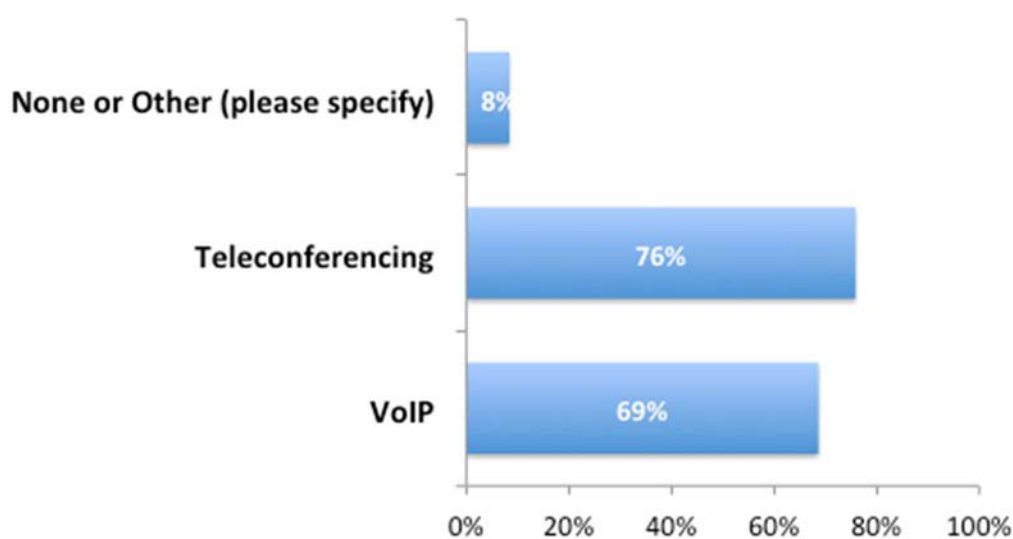
A.8 Emerging Cloud Service Categories

The purpose of this survey section is to understand the respondents' views on new Service categories that are starting to be considered (in particular in standardization). For each of these categories, the question targets some typical instantiations of applications.

Q30 Cloud Service Category: CaaS (Communication as a Service)

83 answers - ☒ ☒ ☐

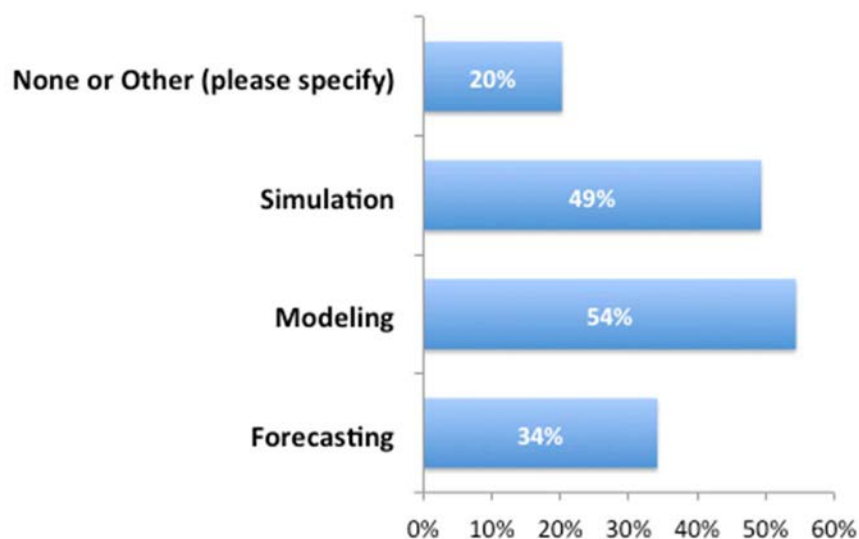
Two specific applications have been evaluated for this new Service category.



Q31 Cloud Service Category: CompaaS (Computing as a Service)

79 answers - ☒ ☒ ☐

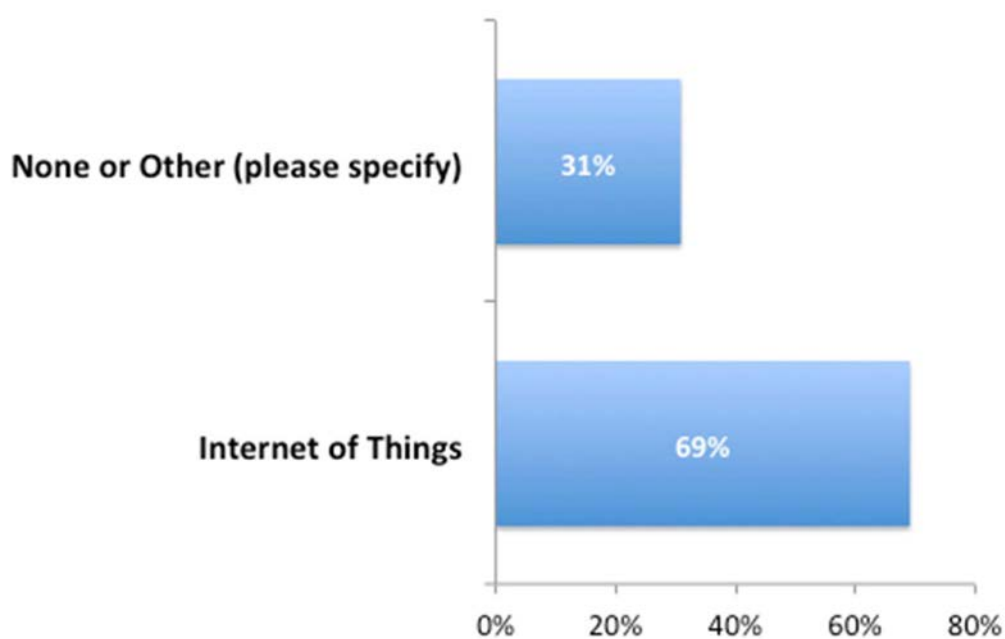
Three specific applications have been evaluated for this new Service category.



Q32 Cloud Service Category: NaaS (Network as a Service)

81 answers - ☒ ☒ ☐

Only one application has been evaluated for this new Service category.

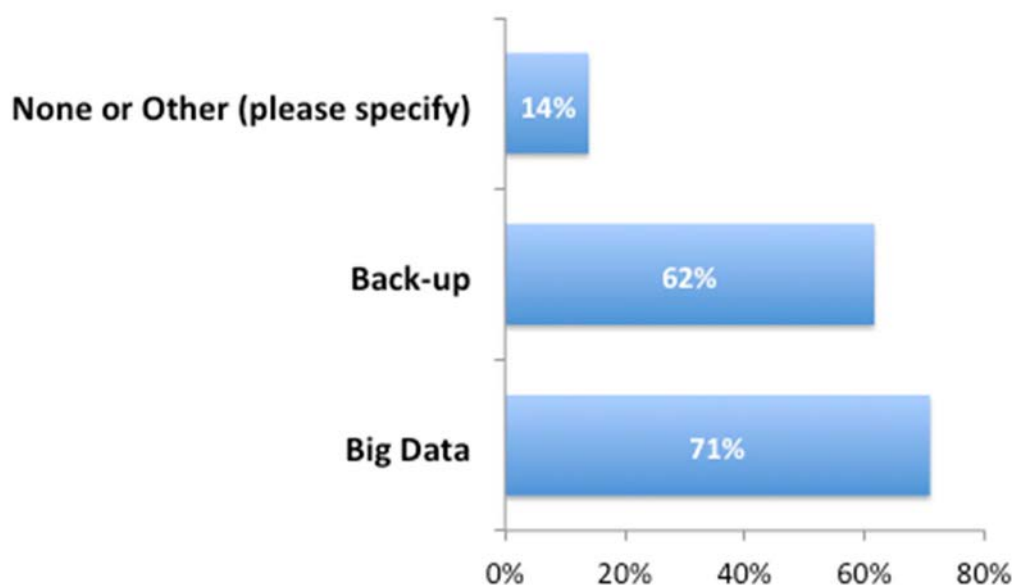


Internet of Things may be seen as a very promising application, and maybe a reason for the interest in this new Service category.

Q33 Cloud Service Category: DsaaS (Storage as a Service)

86 answers - ☒ ☒ ☐

Two specific applications have been evaluated for this new Service category.



Both applications have been receiving significant agreement. Big Data may be seen as the most promising application, and maybe a reason for the interest in this new Service category.

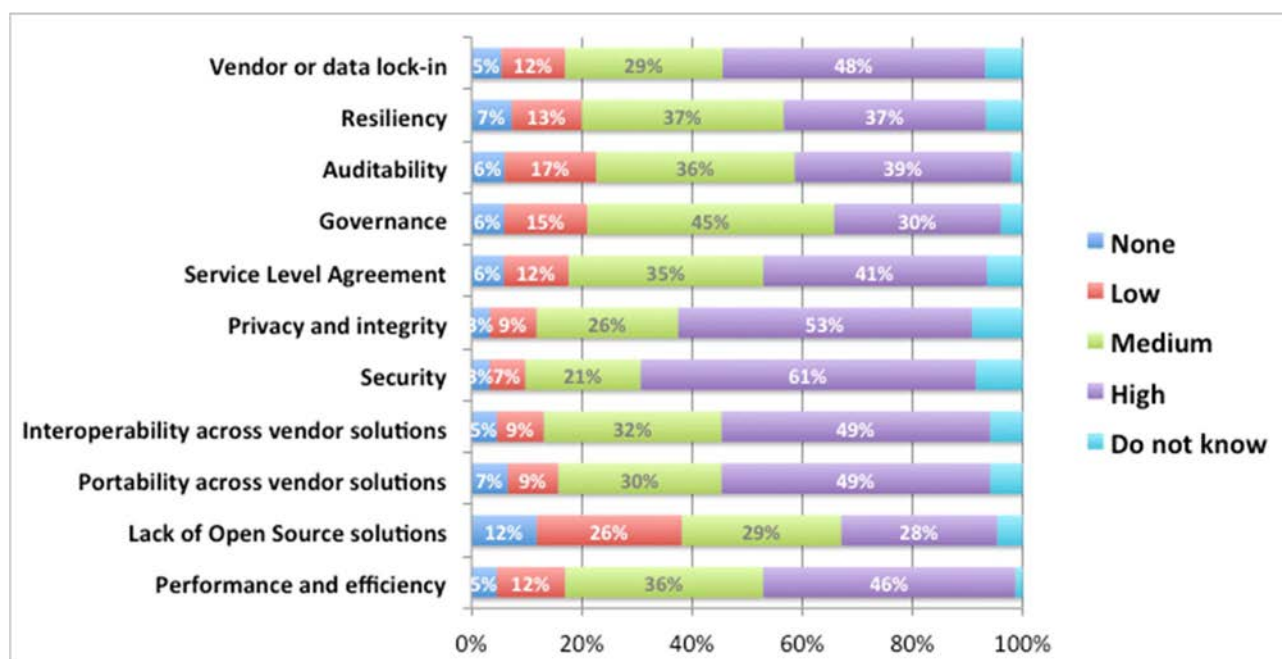
A.9 Cloud Computing and Standards

The purpose of this section is to capture a high-level view on Cloud Computing standards, be it good and/or bad.

Q34 Which impact can Cloud Computing Standards have on your organization's concerns?

153 answers - [\[X\]](#)[\[X\]](#)[\[X\]](#)

The purpose of this question is to measure the support from standardization expected by the respondents' organization when they face some major (business or technical) challenges.

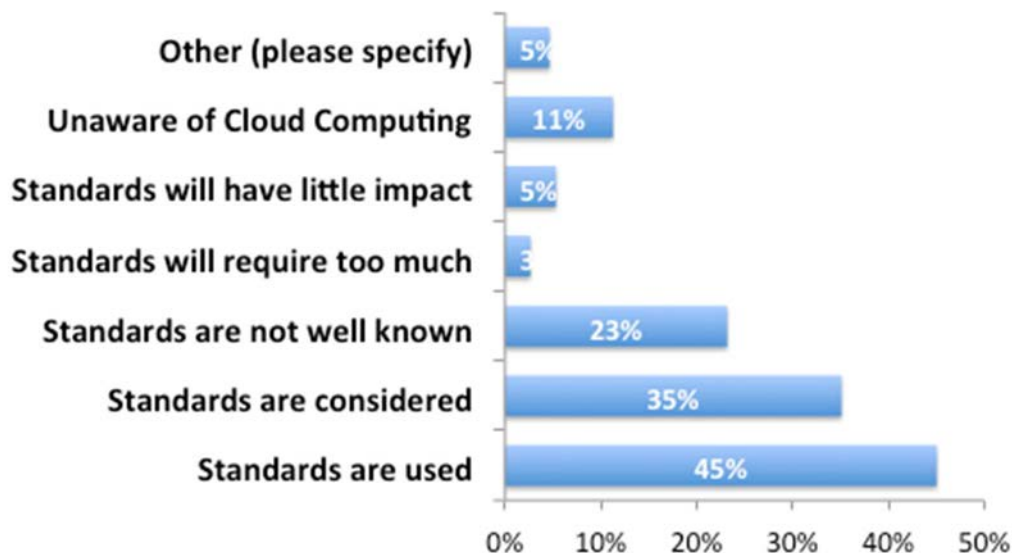


For most of the domains, the sum of "Medium" and "High" answers is in most case above 75%. The top three domains are "Security", "Privacy and integrity" and "Interoperability". This is coherent with the finding in the previous questions related to challenges. The following questions address these expectations towards standards in more details.

Q35 To which degree are Cloud Computing Standards considered or used in your organization?

151 answers - ☒ ☒ ☒

This question intends to measure the degree of investment on standards (from simple knowledge to actual usage).



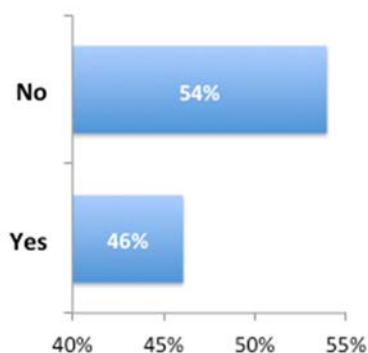
When asked about the actual place of standards in their organization, the respondents are also giving the signal that, in more than 75 % of the cases, standards are "considered" or "used". This shows a concrete investment on standards, together with the expressed need to have a better knowledge.

Q36 Are you willing/able to give feedback in detail on Cloud Computing Standards?

165 answers - ☒ ☒ ☐

This question has a double intention:

- To measure the degree of interest of the respondents for some particular Cloud Computing standards.
- To skip clause A.10 in case the answer is "No".



Not far from half of the respondent seemed interested by detailed feedback on specific standards, which came as a relative surprise. However, it should be noted that the rate of actual answers in clause A.10 is well below the number of respondents that have chosen to visit that part of the survey.

A.10 Cloud Computing Standards: a detailed view

The purpose of this section is to evaluate the respondents' perception of standards gaps and to measure the visibility of some major Cloud Computing standards classified across several technical domains.

Q37 In which domain have you been confronted with the lack of Cloud Computing standards?

62 answers - ☒ ☒ ☐

The purpose of this question is to get the view on the respondents on technical domains of Cloud Computing where they perceive a lack of applicable standards. This question is asked to the respondents that have chosen to provide detailed feedback on specific standards.



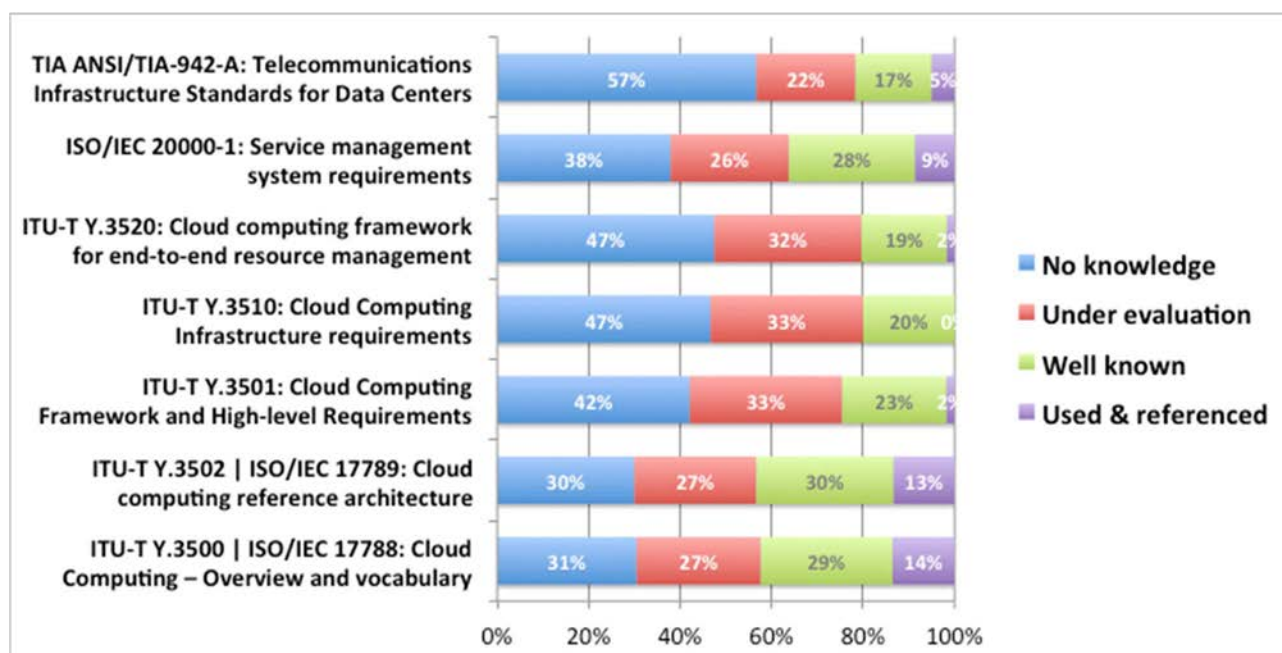
Most of the different domains receive a significant score, with the same usual top ones. The high score of "Service Level Agreement" should be noted: this question receives more attention from a technical standpoint than in the previous questions regarding challenges or adoption of Cloud Computing.

It should also be said that, unfortunately, this question should have been positioned in clause A.9, together with the other global questions on standards. However, this was discovered only once the survey had started and no way to change this was possible without disrupting the collection of information.

Q38 Your organization's adoption and use of CC standards: General purpose

60 answers - ☒ ☒ ☐

A list of "general purpose" standards (e.g. applicable to a large part of the Cloud Computing technical space) is proposed for evaluation of the respondents' knowledge about and, in the best case, usage of these standards.

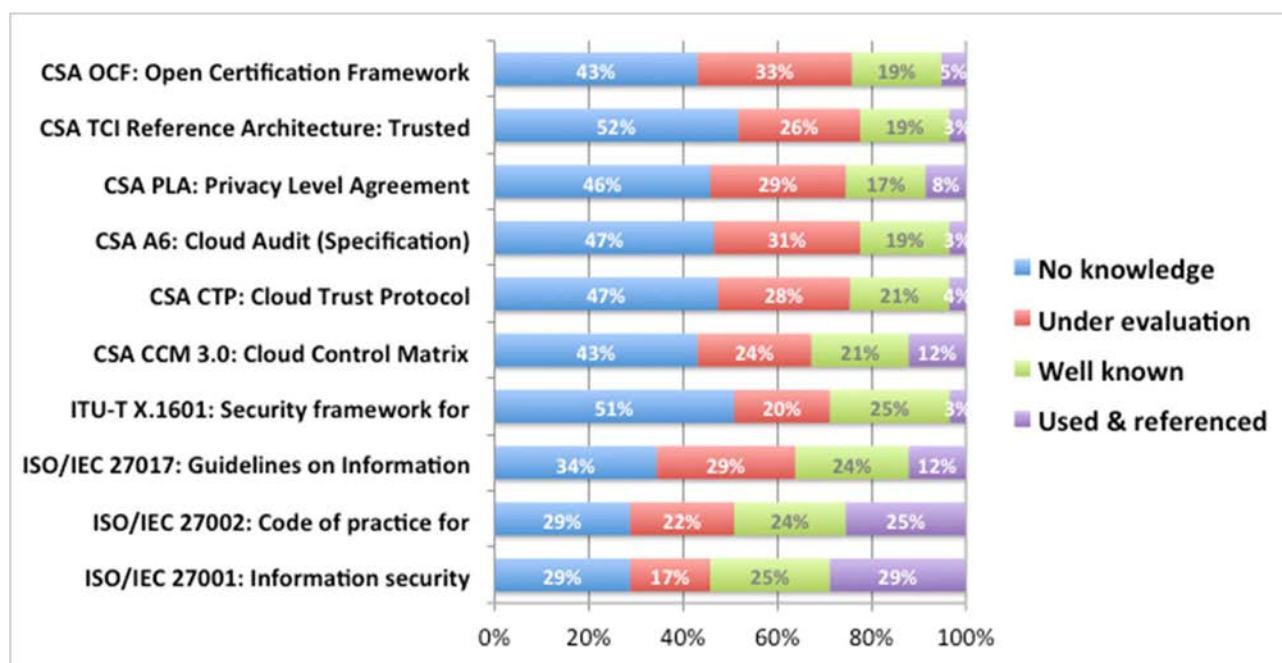


In all cases, the level of knowledge and/or usage on these standards is low. With the exception of the two ISO/IEC standards related to basic elements such as vocabulary and reference architecture, the other ones are largely still in an evaluation phase.

Q39 Your organization's adoption and use of CC standards: Security

59 answers - ☒ ☒ ☐

A list of "security" standards is proposed for evaluation of the respondents' knowledge about and, in the best case, usage of these standards.

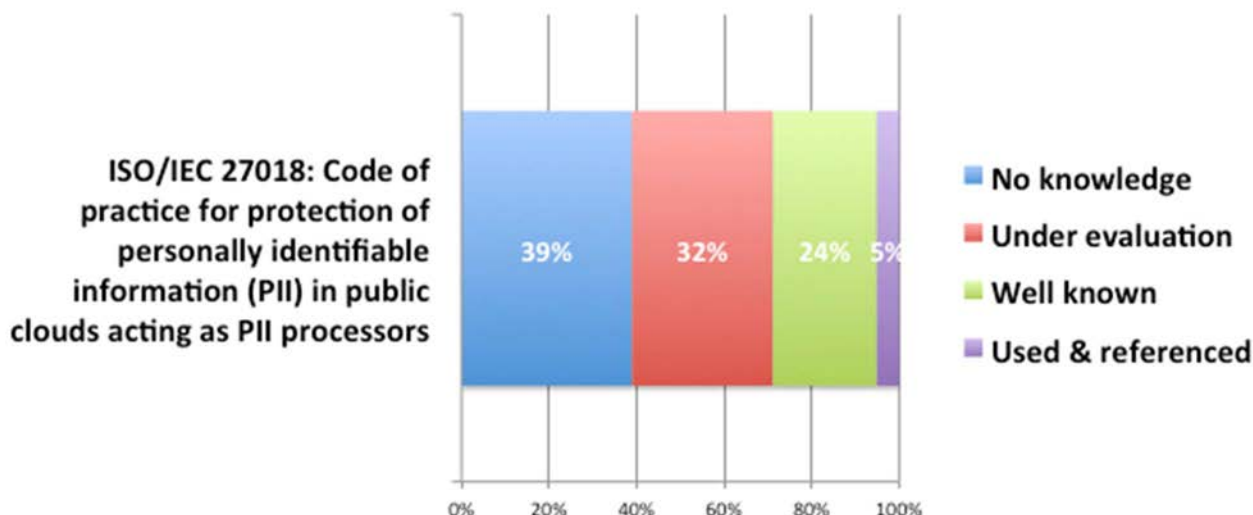


The remarks made for the previous question apply also here.

Q40 Your organization's adoption and use of CC standards: Data protection

59 answers - ☒ ☒ ☐

A list of "data protection" standards (actually limited to one) is proposed for evaluation of the respondents' knowledge about and, in the best case, usage of these standards.

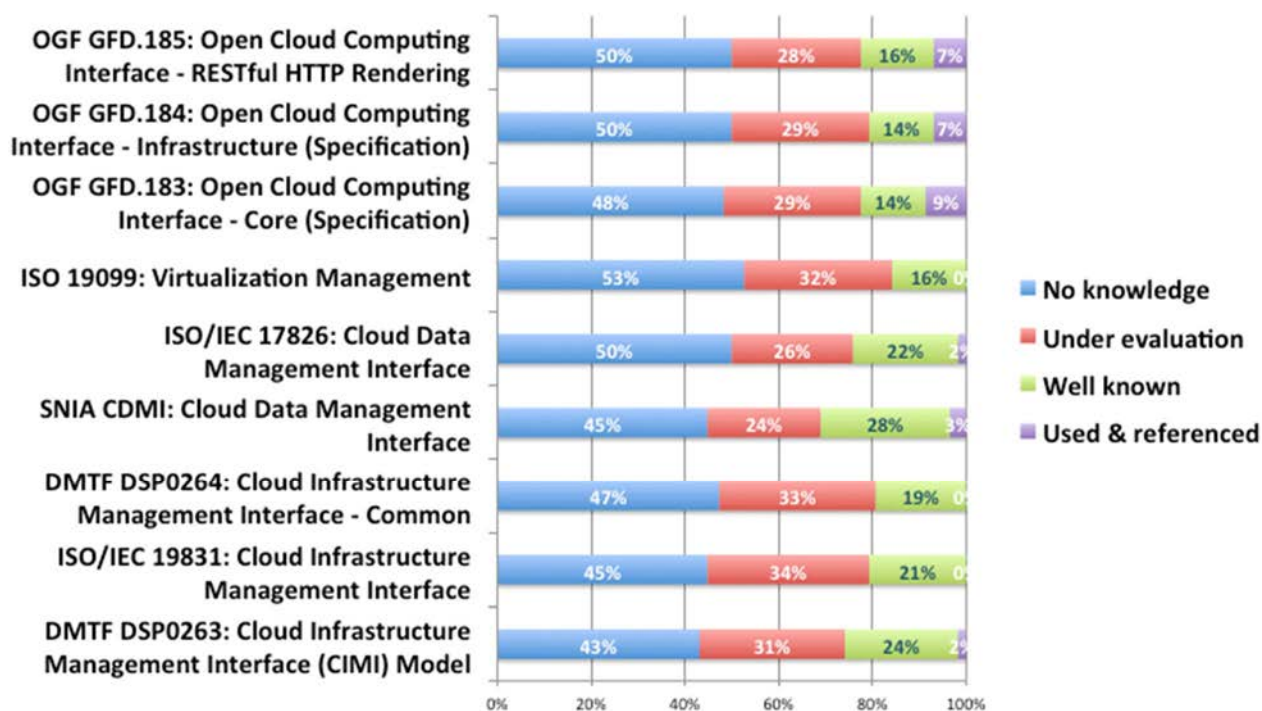


The visibility of ISO/IEC 27018 [i.11] (related to Code of Practice for PII) is below what we could have expected though it addresses a subject of concern and is very much currently at the center of attention. Awareness and uptake of ISO/IEC 27018 [i.11] needs to be monitored.

Q41 Your organization's adoption and use of CC standards: Management

58 answers - ☒ ☒ ☐

A list of "management" standards is proposed for evaluation of the respondents' knowledge about and, in the best case, usage of these standards.

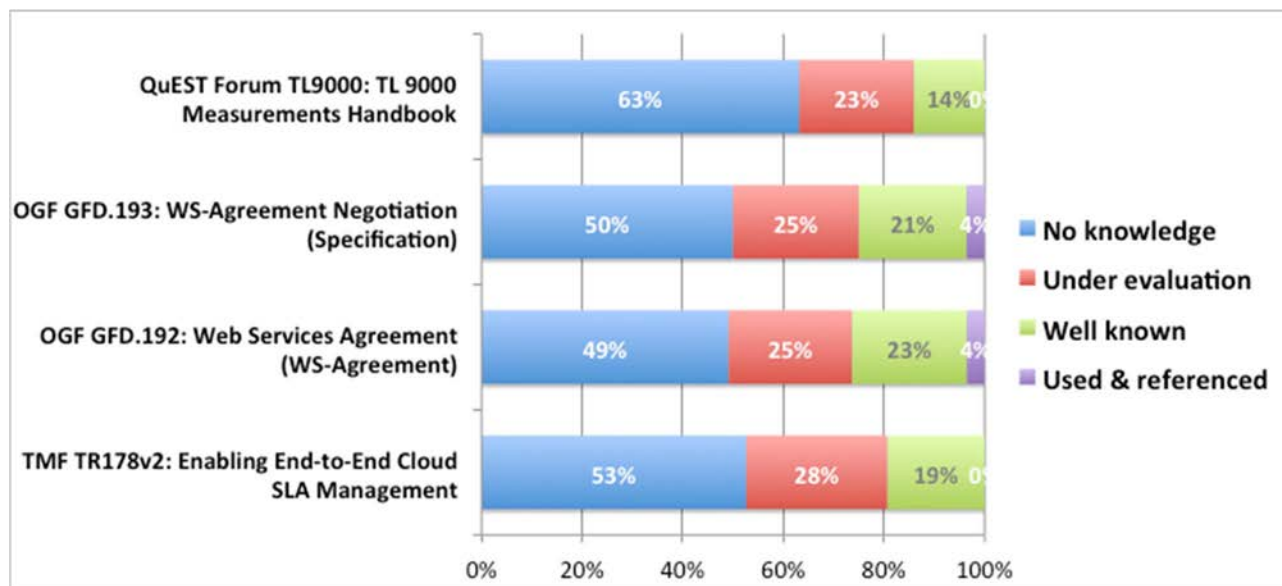


Similar observations can be made than for questions 38 or 39.

Q42 Your organization's adoption and use of CC standards: Service Level Agreement

57 answers - ☒ ☒ ☐

A list of "service level agreement" (SLA) standards is proposed for evaluation of the respondents' knowledge about and, in the best case, usage of these standards.

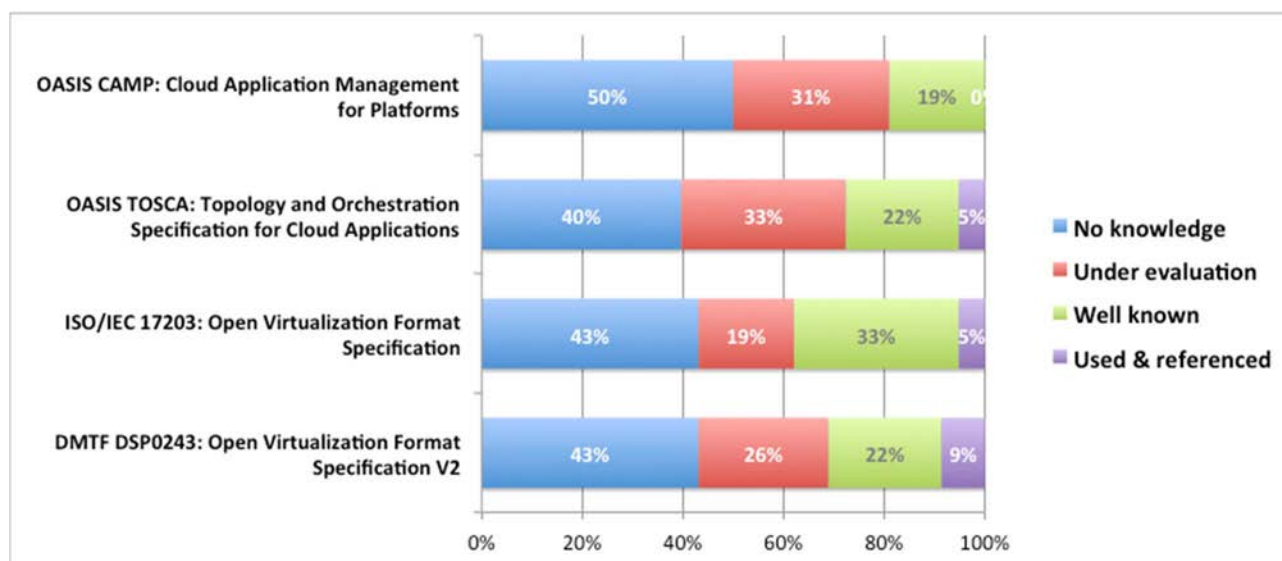


All these standards are not known by the majority of respondents. This has also to be put in perspective with the relatively high figure (65 % as the total of "Critical" and "Very Critical" answers) regarding SLA as a challenge in Q11. It may be seen as the signal that these standards are not perceived as providing a significant answer to the SLA complex question.

Q43 Your organization's adoption and use of CC standards: Portability

58 answers - ☒ ☒ ☐

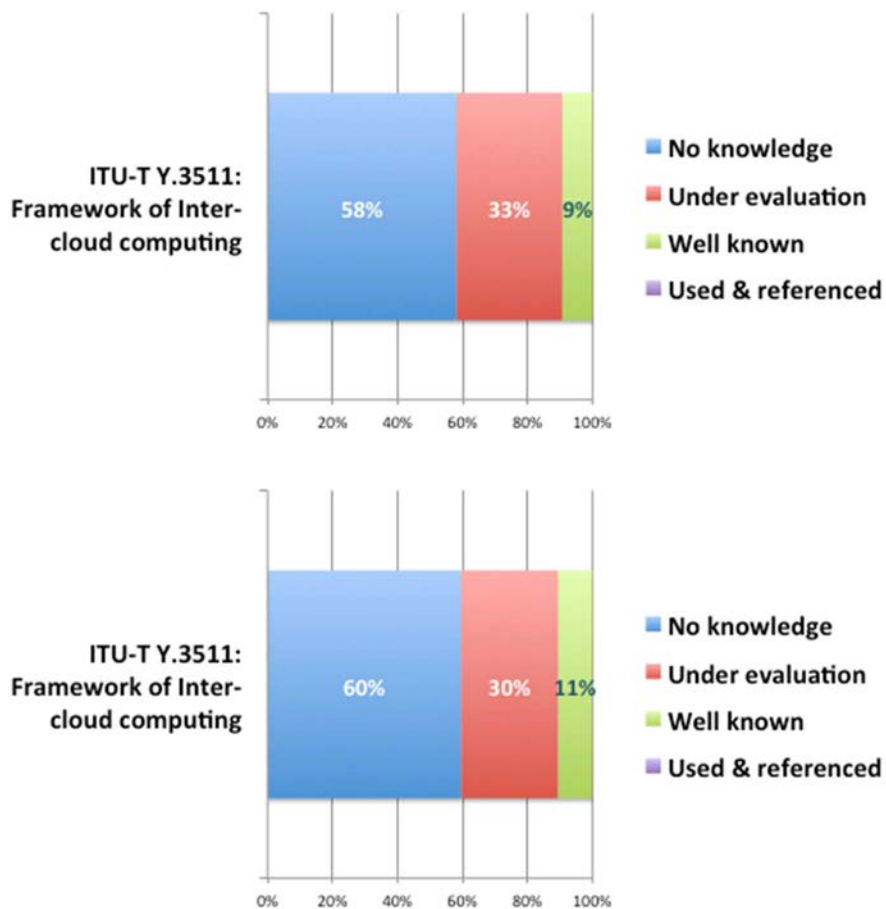
A list of "Portability" standards is proposed for evaluation of the respondents' knowledge about and, in the best case, usage of these standards.



The same pattern of standards visibility applies also for this domain.

Q44 Your organization's adoption and use of CC standards: Multi-cloud, Cloud federation

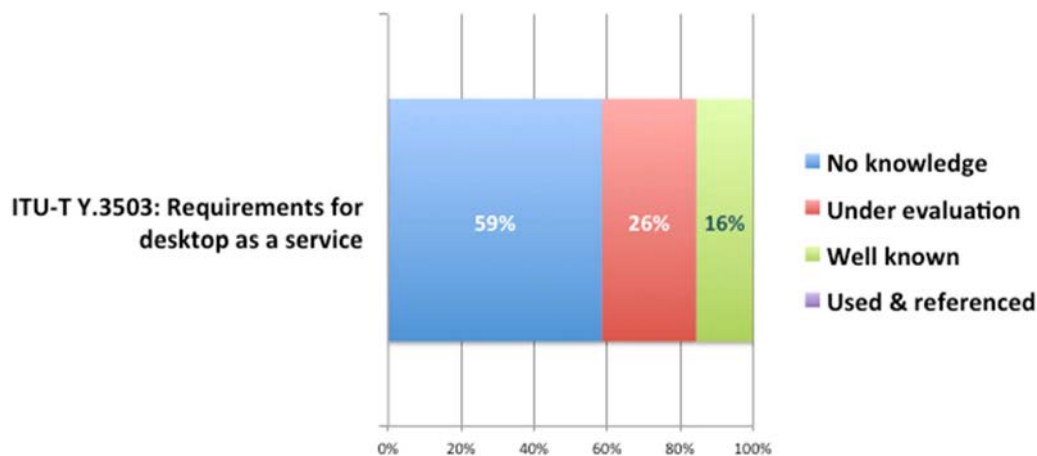
57 answers - ☒ ☒ ☐



The remarks made in Question 40 about ISO/IEC 27018 [i.11] are also largely valid for this ITU-T standard.

Q45 Your organization's adoption and use of CC standards: Application

58 answers - ☒ ☒ ☐



The pattern of standards awareness identified in the previous questions applies also for this domain.

Q46 Any other standard not listed here that your organization knows about and is considering (one or more)?

9 answers - ☒ ☐ ☐

This was an open question. Some of the answers received include:

- De Facto Standards e.g., Apache Delta APIs
- LEET SECURITY rating guide
- This list is far too numerous and too complex. We just need two standards:
 - 1) sufficient security;
 - 2) Compliant with the European laws (Directive 1995)
- ISO/IEC 19086 [i.9] (drafts)

SAML2, CDMI, OCCI and de facto standards such as Apache Delta APIs are mentioned as additional standards that can be applicable in the Cloud Computing space.

A.11 Cloud Computing Certification Standards

The purpose of this section is to check the respondents' intentions regarding certification and how standards can support them.

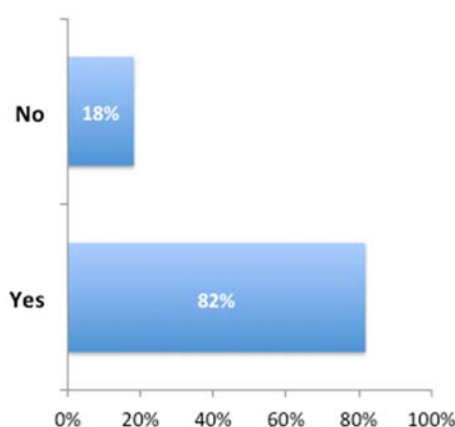
It is supported by the following text in the survey:

Certification is a way to indicate to customers that a company follows certain rules and processes (defined in the context of certification) and consequently to disburden them from regularly checking the certified company.

Cloud Customers are encouraged - or even obliged by national law in some European countries - to verify the reliability of a (Cloud) provider before signing a contract. Cloud Computing Certification Standards may appear helpful as decision support, specifically as far as the Certification scope covers the main areas of interests and is fully transparent.

Q47 Would you consider Cloud Certification as a possibility to improve confidence in Cloud?

143 answers - ☒ ☒ ☒

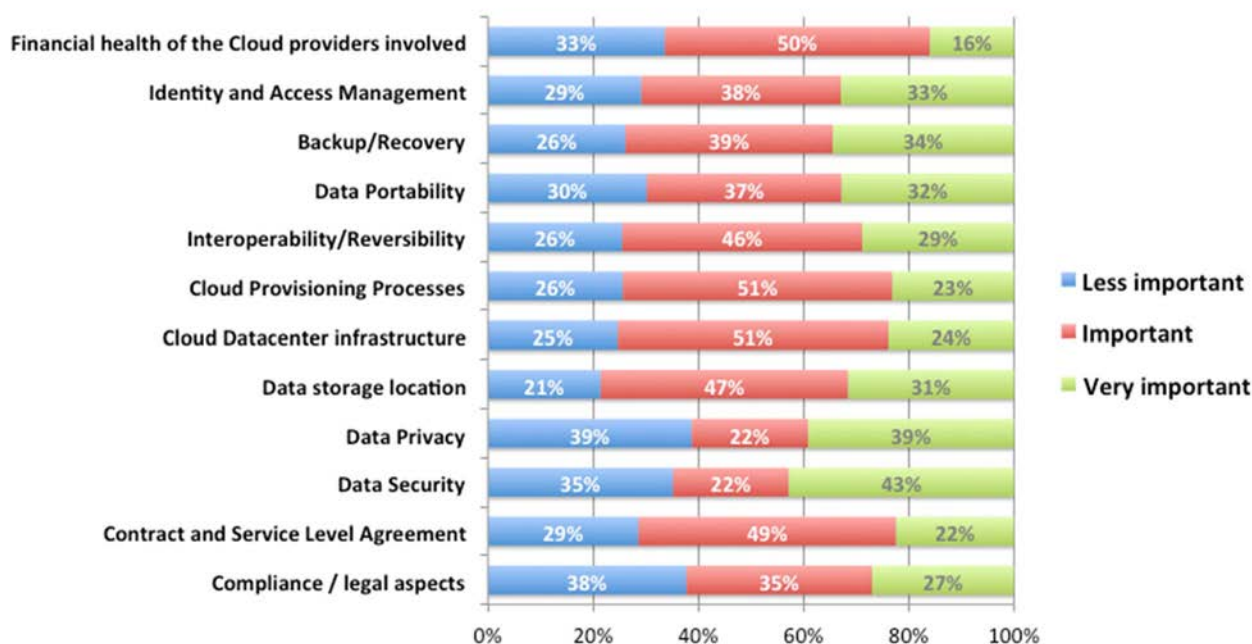


The feedback from the respondents on the role of certification is clear: it is a very useful way to improve confidence in Cloud Computing for a very large majority (over 80 %).

Q48 Please rank the following Cloud Certification areas according their importance

243 answers - ☒ ☒ ☒

Regarding the scope of certification, a list of 12 domains has been proposed in this question.



The number one candidate for certification is Data storage location. This is reflecting the concern already identified in clause A.10 of the survey (e.g. adoption of Cloud) on legal and technical support to the protection of the organization's data. Certification is seen as a potential enabler.

The next three domains in the respondents' ranking are regarding technical concerns: Cloud Datacenter infrastructure, Cloud Provisioning processes and Interoperability/Reversibility. Here again the question of data (integrity, reversibility) can be seen as a major concern.

Q49 Which further areas would you consider as relevant for a Cloud Certification?

19 answers - ☒ ☐ ☐

This was an open question. Amongst the answers received:

- Cloud service insurance
- Green datacenter infrastructure
- ITIL Processes API interactions Financial Control
- We just need two certifications: 1) sufficient security; 2) Compliant with the European laws (Directive 1995) and eventual national additions. But these certifications should be validated by the WP29 as "Enough to be fully compliant with the European and national laws"
- Accountability
- Governance

Additional certification areas mentioned include "jurisdiction and legal system governing the provider", "capacity management", "green datacenter infrastructure", "security rating", "Cloud service insurance" and "multi-vendors scheme".

Q50 Can you rate the importance of the following types of certification for your organization?

134 answers - ☒ ☒ ☒

Several types of certification are proposed for evaluation.

The question is supported by the following text:

Cloud Provider Certification:

Certification of individual enterprises, who are providing - one or several cloud services - to the market.

Cloud Service Certification:

Certification of individual cloud services and across all partners involved in the service provisioning process.

Self Certification:

Certification Process conducted by the cloud service provider himself.

Certification by accredited auditors:

Certification Process conducted by independent and accredited auditors.

Certification Standards reflecting European requirements:

The Certification Scope covers Cloud Security & Privacy, operational and contractual aspects in reference to legal European requirements.

Certification Standards reflecting Global requirements:

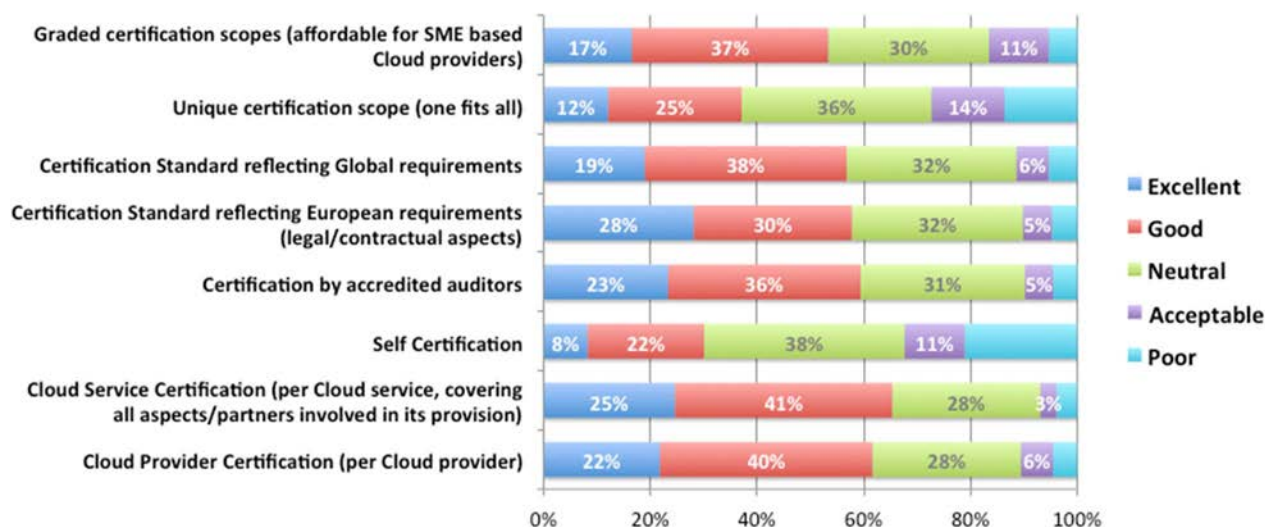
The Certification Scope covers Cloud Security & Privacy aspects in reference to Global requirements.

Unique Certification Scope:

A defined Certification Scope for all types of Cloud Services or Cloud Providers (see above).

Graded Certification Scope:

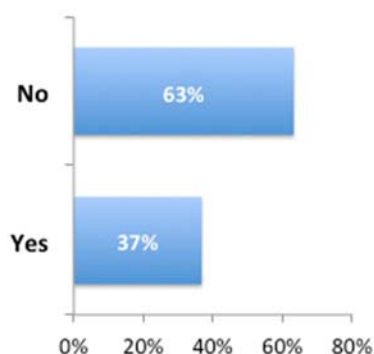
A set of graduated certifications reflecting different quality levels to allow certification also for medium-sized cloud providers.



With the exception of self-certification, and to some degree of the "one-size-fits-all" one, all other schemes are seen as having some merit.

Q51 Are you aware of the Cloud Certification Schemes List (CCSL)?

136 answers - [xxx](#)

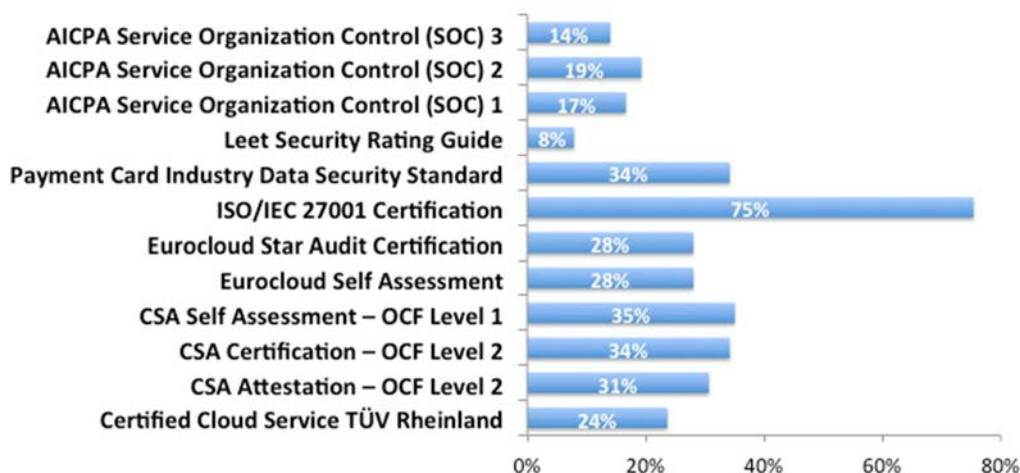


When facing the selection of Cloud Certification schemes, an organization is offered a large set of such schemes. The Cloud Certification Scheme List (CCSL) is an attempt to make a selection of such schemes. The survey shows that only 31 % of respondents are aware of this list.

Q52 Which of the following Cloud Certification Schemes listed in CCSL are you are aware of?

114 answers - [xxx](#)

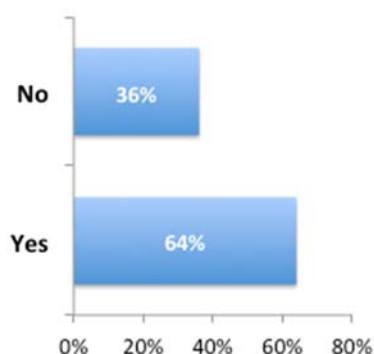
This question was meant for more precise answers for the (31 % - as seen in Q51 - of) respondents that are aware of the CCSL list regarding 12 certification schemes referenced.



The most significant result is the specific appeal of ISO/IEC 27001 [1.8], though it is not a Cloud Computing specific standard. The other certification schemes are largely behind, maybe because they all are country and region specific and do not have the global recognition that ISO/IEC has worldwide.

Q53 As a Cloud Customer, do you plan to include one of these Certifications in your Cloud Purchasing processes?

136 answers - ☒ ☒ ☒



There is a clear majority of "Yes".

Q54 If not, what are the main reasons?

27 answers - ☒ ☐ ☐

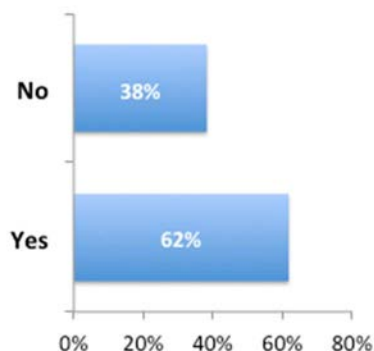
This question was open question and only a few voluntary answers expected. Amongst the answers received:

- Not yet needed
- Not familiar with them
- We are satisfied with present level and delivery of services
- No money
- Too complex, we don't know what do they really mean, what do they really cover, who has elaborated them in who's interest, whether they are compliant with European or WP29 obligations, and ISO 27001 [i.8] and SOC1&2 not Cloud specific. We just need 2 certifications stamped by the EC&WP29 to be sure that our data is protected and that we are compliant with European laws
- Lack of information regarding Cloud Certification Schemes; insufficient trust in their capabilities to adequately assess/certify privacy/security aspects
- We only shop from major providers and have no position of negotiation

Many respondents that belong to the Cloud Customer categories that are NOT interested in certification programs are lacking insight into the value of the certification programs or are simply not aware of the certification programs. Lack of budget and uncertainties on the value are also presented as reasons for not using certification schemes.

Q55 As a Cloud Provider, do you plan to certify your Cloud service offering?

123 answers - ☒ ☒ ☒



There is a clear majority of "Yes".

Q56 If not, what are the main reasons?

20 answers - ☒ ☐ ☐

This question was open question and only a few voluntary answers expected. Amongst the answers received:

- We will only certify according to legal demand
- Not in plan now, but if market will ask for it, then we'll reconsider
- Not demanded by customers
- Only ISO 27001, as this has name recognition with customers
- Lack of time and knowledge

Amongst the providers who have not been yet using any certification program, "cost and time", "not requested by customers" and no perceived relevance are some of the motives for not using certification program.

A.12 Information on the person replying to the survey

The purpose of this section is to collect additional information from the respondents. None of this information is for public disclosure according to the privacy policy announced in clause A.1 of the survey. Some aggregation of the answers is possible.

Q57 What is your role in your organization? •

110 answers - ☒ ☐ ☐

This question was open question and only a few voluntary answers expected. Amongst the answers received:

- CXO positions (41 %).
- Project Managers, Architects, Data center administrators, ... (36 %)
- Researchers
- Consultants
- ...

Q58 What is your experience in Cloud Computing? (length, expertise, etc.)104 answers - ☒ ☐ ☐

This question was open question and only a few voluntary answers expected.

Respondents answering to the question about Cloud past experiences have in general 4 to 10 years of experience, with on average 4-5 years experience dominating among the respondents. Experiences span over many areas, with expertise spanning over procurement, SaaS development, Security, business process modeling and more.

Q59 You can also leave us your email34 answers - ☐ ☐ ☐

According to the privacy policy, these answers are not disclosed.

Annex B:

List of the survey distribution channels

Over 100 organizations, stakeholders and/or companies have been contacted for their support to the survey (many times twice or more). Depending on their abilities, the announcement of the survey has been relayed to part or all members of the contact (e.g. a company, a LinkedIn® group, a Standards Setting Organization, etc.).

The list can be consulted below.

Organization/Company/Stakeholder	Channel	First date	and again
AFNOR	Telephone/email	13/04/15	
Cloud Catalyst	Web/Newsletter	13/04/15	
Cloud Computing	LinkedIn®	30/03/15	15/05/15
Cloud Computing Association	LinkedIn®	30/03/15	15/05/15
Cloud Computing Best Practices	LinkedIn® Group, 6 000+ contacts	30/05/15	
Cloud Computing Standards Forum	LinkedIn®	30/03/15	15/05/15
Cloud Computing Standards Forum	LinkedIn® Group, 4 000+ contacts	30/05/15	
Cloud Networking	LinkedIn®	02/04/15	15/05/15
Cloud Pier	LinkedIn®	02/04/15	15/05/15
Cloud PSI	LinkedIn®	02/04/15	15/05/15
Cloud Security Alliance	LinkedIn®	02/04/15	15/05/15
Cloud Security Alliance German Chapter	LinkedIn®	02/04/15	15/05/15
Cloud Special Industry Group on SLA	e-mail	12/04/15	
Cloud Sweden	e-mail	30/03/15	
Cloud4Europe	e-mail	02/04/15	15/05/15
Cloud for Europe	Twitter	18/05/15	
Cloud Interop	Twitter	18/05/15	
CloudingSME	Web/Newsletter	13.04.15	
CloudScape	e-mail	30/03/15	
Cloudwatch	e-mail	30/03/15	02/04/15
Cloudwatch	LinkedIn®	15/05/15	
Conversations on Cloud Computing	LinkedIn® Group 10 000+ contacts	30/05/15	
CoreGRID	LinkedIn®	02/04/15	15/05/15
CSC phase 1 participants	Email	14/04/15	
DG CONNECT (EC)	email/telephone /Website	31/03/15	05/05/15
DG DIGIT (EC)	e-mail	01/04/15	
DIFI (the Norwegian ICT authority)	e-mail	30/03/15	
Digital Agenda for Europe 2010-2020	LinkedIn®	02/04/15	15/05/15
DIGITAL TRANSFORMATION (Cloud Computing, Virtualization, Social, Mobile and Big Data)	LinkedIn®	30/03/15	14/04/15
DIGITAL TRANSFORMATION (Cloud Computing, Virtualization, Social, Mobile and Big Data)	LinkedIn®	15/05/15	
DIGST (the Danish ICT authority)	e-mail	31/03/15	
DMTF	e-mail	01/04/15	
Eco e.V. (Germany/International)	Web/Newsletter, Twitter, LinkedIn®	13.04.15	
EGI	e-mail	30/03/15	
EGI, CloudWatchHub	e-mail	15/05/15	
ETSI	Collective Letter	03/04/15	05/05/15
ETSI people	LinkedIn®	22/05/15	
EU-China Cooperation on ICT Research	LinkedIn®	02/04/15	15/05/15
EuroCIO	email/telephone	13/04/15	15/05/15
Eurocloud Austria	Web/Newsletter	03.04.15	
Eurocloud Belgium	Web/Newsletter	03.04.15	
Eurocloud Denmark	Web/Newsletter	03.04.15	
Eurocloud Europe	Web/Newsletter/Twitter/LinkedIn®	03.04.15	
Eurocloud Europe Group	LinkedIn® Group, 2 200+ contacts	30/05/15	
Eurocloud France	LinkedIn® Group, 600+ contacts	30/05/15	
Eurocloud France	Web/Newsletter	03.04.15	

Organization/Company/Stakeholder	Channel	First date	and again
Eurocloud Germany	LinkedIn® Group, 400+ contacts	30/05/15	
Eurocloud Germany	Web/Newsletter	03.04.15	
Eurocloud Hungary	Web/Newsletter	03.04.15	
Eurocloud Italy	Web/Newsletter	03.04.15	
Eurocloud Luxembourg	LinkedIn® Group, 130+ contacts	30/05/15	
Eurocloud Luxembourg	Web/Newsletter	03.04.15	
Eurocloud Malta	Web/Newsletter	03.04.15	
Eurocloud Netherlands	LinkedIn® Group, 200+ contacts	30/05/15	
Eurocloud Netherlands	Web/Newsletter	03.04.15	
Eurocloud Poland	Web/Newsletter	03.04.15	
Eurocloud Portugal	Web/Newsletter	03.04.15	
Eurocloud Romania	Web/Newsletter	03.04.15	
Eurocloud Russia	Web/Newsletter	03.04.15	
Eurocloud Serbia	Web/Newsletter	03.04.15	
Eurocloud Slovakia	Web/Newsletter	03.04.15	
Eurocloud Slovenia	EC SI LinkedIn®	03.04.15	
Eurocloud Slovenia/ZITex	LinkedIn® Group, 600+ contacts	30/05/15	
Eurocloud Spain	Web/Newsletter	03.04.15	
Eurocloud Sweden	Web/Newsletter	03.04.15	
Eurocloud Sweden Group	LinkedIn® Group, 150+ contacts	30/05/15	
Eurocloud Swiss	Web/Newsletter	03.04.15	
Eurocloud UK	Web/Newsletter	03.04.15	
Eurocloud UK Group	LinkedIn® Group, 500+ contacts	30/05/15	
Fraunhofer Cloud Alliance	e-mail	30/03/15	15/05/15
Fraunhofer Cloud Alliance	e-mail	15/05/15	
French Ministry of Economy	email	15/04/15	
GI-Radar	e-mail	12/04/15	
HPC & Big Data	LinkedIn®	14/04/15	15/05/15
HPCcloud	LinkedIn®	02/04/15	15/05/15
I4MS	LinkedIn®	02/04/15	15/05/15
IAMCP Sweden	e-mail	30/03/15	
IBM Sweden	e-mail	30/03/15	
IEEE 2301	e-mail	15/05/15	
IEEE 2302	e-mail	15/05/15	
IEEE Cloud Computing	LinkedIn®	02/04/15	15/05/15
IEEE Computer Society Members	LinkedIn®	02/04/15	15/05/15
ISO JTC1 SC38	e-mail	01/04/15	
LinkedIn® pulse	LinkedIn® pulse	21/05/15	
NEA (network for e-Business in Sweden)	e-mail	01/04/15	
NIST	e-mail	01/04/15	
OASIS	e-mail	01/04/15	
OGF	e-mail	02/04/15	
OGF Standards	Twitter	01/04/15	
Open Cloud Computing Interface	LinkedIn®	02/04/15	15/05/15
Open Group	e-mail	01/04/15	
Open Nebula for the Enterprise	LinkedIn®	02/04/15	15/05/15
Open Nebula Open Source Cloud Community	LinkedIn®	02/04/15	15/05/15
OpenStack	LinkedIn®	13/04/15	15/05/15
OPTIMIS	LinkedIn®	02/04/15	15/05/15
ORBIT EU FP7 Project	LinkedIn®	02/04/15	
Scientific Cloud Computing (ScienceCloud)	LinkedIn®	02/04/15	15/05/15
Scout2Cloud	LinkedIn® Pulse, 500+ personal contacts	30/05/15	
Siena Initiative	LinkedIn®	02/04/15	15/05/15
Software as a Service	LinkedIn® Group, 68 000+ contacts	30/05/15	
Swedish Financial Management Authority (ESV)	e-mail	30/03/15	
Swedish ICT and Telecom organization	e-mail	30/03/15	
Swedish Ministry of Enterprise	e-mail	30/03/15	

Organization/Company/Stakeholder	Channel	First date	and again
Swedish Ministry of Pension	e-mail	30/03/15	
Swedish Standards Organization	e-mail	30/03/15	
TeleManagement Forum	e-mail	02/04/15	
Trusted Cloud Competence Centre	e-mail	30/03/15	
Uber Cloud	e-mail	06/04/15	
UEAPME	email	13/04/15	

Annex C:

Full text of the survey

The full text of the web survey conducted in April to September 2015 can be found below.

The different clauses are printed without page breaks. In the on-line survey, they are separated by a line with "Previous" and "Next" buttons.

Some background information on this survey

Cloud Standards Coordination (CSC)

CSC is a collaboration initiative between the European Commission and ETSI (the European Telecommunications Standards Institute). CSC Phase 1 took place in 2013 and addressed primarily the standards roadmaps. CSC Phase 2, launched in February 2015, addresses the needs and priorities of Cloud Computing users, assesses the maturity of Cloud Computing standards, and evaluates how standards can support the Cloud users priorities.

Purpose of this survey

This survey intends to collect feedback from the Cloud Computing community about needs, objectives, areas of concerns, and typical scenarios. It also intends to evaluate the perceived maturity of Cloud standards.

Target audience

This survey targets end users ("Cloud Service Customers") from the private or public sector, from the SMEs as well as large organizations, in all vertical sectors. Other stakeholders (e.g. Cloud Service Providers) are fully welcome to answer.

Who is in charge?

This survey has been created and will be analyzed by the CSC Phase 2 project, under the responsibility of ETSI.

Contact: ETSI CSC Phase 2 (survey.stf486@etsi.org)

Privacy/Confidentiality

No details of companies and/or individuals participating will be released to the general public in any form that allows identification of the respondent. Answers to this survey will be shared and used only amongst the ETSI experts. Only aggregated results will be published.

Please TAKE THE SURVEY, answering the following questions to the best of your knowledge.

It will take 20 minutes of your time and you will provide valuable input to the ongoing effort to develop relevant standards for use in Cloud Computing.

A few questions with an asterisk before the question number (e.g. *4. Size of your organization) require an answer.

1. Are you familiar with Cloud Standards Coordination?

☐ Yes ☐ Somehow ☐ No

2. Are you familiar with ETSI?

☐ Yes ☐ Somehow ☐ No

General purpose information

Some information to position your organization in the global landscape.

3. Name of your organization (not mandatory)

* 4. Size of your organization

- ☐ Micro (up to 9 employees)
☐ Small (up to 49 employees)
☐ Medium-sized (up to 249 employees)
☐ Large (over 249 employees)

* 5. Sector in which your organization operates

- | | |
|--|---|
| <input type="radio"/> Agriculture, Forestry and Fishing | <input type="radio"/> Real Estate Activities |
| <input type="radio"/> Mining and Quarrying | <input type="radio"/> Professional, Scientific and Technical Activities |
| <input type="radio"/> Manufacturing | <input type="radio"/> Administrative and Support Service Activities |
| <input type="radio"/> Electricity, gas, steam and air conditioning | <input type="radio"/> Public Administration and Defense; Social Security |
| <input type="radio"/> Water Supply; Sewerage, Waste Management | <input type="radio"/> Education |
| <input type="radio"/> Construction | <input type="radio"/> Human Health and Social Work Activities |
| <input type="radio"/> Wholesale and Retail Trade; Repair of Motor Vehicles | <input type="radio"/> Arts, Entertainment and Recreation |
| <input type="radio"/> Transportation and Storage | <input type="radio"/> Other Service Activities |
| <input type="radio"/> Accommodation and Food Service Activities | <input type="radio"/> Activities of Households as Employers |
| <input type="radio"/> Information and Communication | <input type="radio"/> Activities of Extraterritorial Organisations and Bodies |
| <input type="radio"/> Financial and Insurance Activities | |
| <input type="radio"/> Other (please specify) | |

Based on "Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008)", see [here](#).

* 6. Region/Country in which your organization mainly operates?

- | | |
|--|--|
| <input type="checkbox"/> Africa | <input type="checkbox"/> North America |
| <input type="checkbox"/> Asia | <input type="checkbox"/> Oceania |
| <input type="checkbox"/> Central America | <input type="checkbox"/> South America |
| <input type="checkbox"/> Europe (Eastern and/or non EU) | <input type="checkbox"/> The Caribbean |
| <input type="checkbox"/> Middle East | |
| <input type="checkbox"/> European Union (please specify) | |

Moving to Cloud Computing: expect benefits and challenges to face

7. How high are your expectations on potential Cloud Computing benefits?

	None	Low	Medium	High	Very high
Reduction of infrastructure investments (CAPEX)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduction of operational costs (OPEX)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Faster Time-to-Market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Faster Return on Investment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved compliance with regulation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved business agility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased focus on the core mission of our organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced need for ICT expertise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced risk from own ICT operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support for organizational growth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green ICT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. If there are other benefits highly expected by your organization, please specify

We would now like to understand which risks you see associated with Cloud Computing from two angles. On the one hand, there are challenges that your organization is facing before considering a migration to Cloud Computing and associated actions to be undertaken upfront. On the other hand, Cloud Computing itself may be mature enough or not depending on the expectations of your organization.

9. Maturity of your organization: how critical are the following challenges?

	Not critical	Somehow critical	Critical	Very critical
Lack of experience in Cloud Computing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of external Cloud Computing skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organizational resistance to change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current legacy investments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compatibility with in-house systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Privacy and integrity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legal issues, laws, regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. If there are other critical challenges to your organization, please specify

11. Maturity of Cloud Computing: how critical are the following issues for your organization?

	Not critical	Somehow critical	Critical	Very critical
Performance and efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of standards and standard APIs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of Open Source solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Portability across vendor solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interoperability across vendor solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Privacy and integrity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service Level Agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Governance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auditability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resiliency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vendor or data lock-in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. If there are other critical issues with Cloud Computing, please specify

* 13. Has your organization started to adopt Cloud Computing?

- ☐ No
 ☐ Somehow
 ☐ Yes

If your answer is "No", the section on adoption of Cloud Computing will be skipped.

Adoption of Cloud Computing in your organization

Please describe your Cloud Computing adoption strategy and your role.

14. Scope of your Cloud Computing usage in the near term

- ☐ Migration of supporting business processes
☐ Migration of core business systems (legacy)
☐ Cloud Computing as the platform for your ICT resources
☐ Other (please specify)

15. Stage of Cloud Computing Adoption

- ☐ Consider adoption in the near future
 ☐ Solutions already deployed on the Cloud
☐ On-going pilot experiment(s)
 ☐ Entire ICT on the Cloud
☐ On-going deployment of solutions

16. Role of your organization in Cloud Computing

- ☐ Cloud Service Customer
 ☐ Cloud Service Broker
☐ Cloud Service Provider
 ☐ Cloud Auditor
☐ Cloud Service Developer
☐ Other (please specify)

17. Level of your resources and support to Cloud Computing

- ☐ No specific resources
☐ Adequate support from the IT team
☐ Dedicated Cloud support team
☐ Other (please specify)

Cloud Computing adoption: preparing your organization

Some typical aspects need to be considered and some conditions must be met in order to make the transition to the Cloud in a secure and reliable way. We are going to address some of them below.

18. Data Categorization in your organization

- ☐ None
 ☐ Started
 ☐ On-going
 ☐ Done
 ☐ Unknown

Data Categorization describes data on the basis of how it is transferred, processed and used. Examples of Data Categories are customer data/content, derived data, cloud service provider data and account data. Please indicate above where you currently are in this process.

19. Data Classification in your organization

- ☐ None
 ☐ Started
 ☐ On-going
 ☐ Done
 ☐ Unknown

Data Classification typically refers to a way to specify how the information can be shared, from "openly" to "non-disclosed" (secret). Examples of Data Classification taxonomies are: "Public, Internal Use, Confidential and Regulatory Handling". Data Protection levels are associated with examples such as "Ranging from 0 (unrestricted use) to 3 (extreme confidentiality)". They require measures in order to enforce the levels, such as encryption, limited distribution, etc. Please indicate above where you currently are in this process.

20. Data Security in your organization

- ☐ Low
 ☐ Medium
 ☐ High
 ☐ Unknown

In order to move securely to the Cloud, many different aspects of **Data Security** such as information security, information integrity, access and identity management, contingency, and Personally Identifiable Information (PII) have to be addressed and should be well defined and understood. Please state above your organization's level of control and awareness in the data security domain.

21. Business Processes identification, description and alignment in your organization

- ☐ Low
 ☐ Medium
 ☐ High
 ☐ Unknown

In order to ensure a transition to the Cloud based on the needs of the organization, it is considered as best practice that the core and supporting processes of the organization be clearly defined and supported, where relevant, by ICT solutions. Well controlled processes make the transition easier and allow the organization to move to the Cloud on the basis of prioritized transition plans. Please state above your organization's level of business process situation in terms of identification, description and alignment.

22. Service Oriented Architecture in your organization

- ☐ None
 ☐ Started
 ☐ On-going
 ☐ Done
 ☐ Unknown

Architectures based on loosely coupled services, Service Oriented Architectures (SOA), facilitate the migration to the Cloud. Systems based on SOA may be progressively transitioned to the Cloud, based on priorities and any policies in terms of data distribution or security in place. Please state above your organization's level of service orientation.

23. Software Licences in your organization

- ☐ Not needed (e.g. no commercial software used)
 ☐ Not feasible (e.g. too expensive)
- ☐ On-going negotiation
 ☐ Unknown
- ☐ Negotiation completed successfully

If your company is working with commercial software, it has typically acquired software licenses that allow using this software on-site. When there is a plan to use this software in the Cloud, your company usually has to negotiate with the independent software vendor about using licenses for running the software in the Cloud. Please indicate above where you currently are in this process.

24. Ensuring Software Suitability in your organization

- ☐ Not needed (e.g. Software already runs in a virtualized environment)
- ☐ On-going evaluation
- ☐ Evaluation and necessary modifications completed successfully
- ☐ Not feasible (e.g. no appropriate environment available, porting too expensive)
- ☐ Unknown

If you plan to use software in the Cloud that you used on-site until now, additional efforts (besides resolving software licensing issues) might be needed. Examples of required efforts are: checking whether the software can be run in the VMs of the Cloud; adapting the software if needed to make use of the selected Cloud platform's features; investigating how to distribute the software across several VMs to maintain or increase performance; evaluating whether all prerequisites for the operation are in place, etc. Please indicate above where you currently are in this process.

Cloud Computing: Deployment models and Service categories

We would like to understand which Deployment models and which Service categories are of major interest to your organization.

25. Which Cloud deployment model seems best fit to your needs?

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> On-premises Private Cloud | <input type="checkbox"/> Public Cloud |
| <input type="checkbox"/> Off-premises Private Cloud | <input type="checkbox"/> Hybrid Cloud |
| <input type="checkbox"/> Community Cloud | |
| <input type="checkbox"/> Other (please specify) | |

26. Cloud Service Category: IaaS (Infrastructure as a Service)

- | | |
|--|---|
| <input type="checkbox"/> E-Delivery | <input type="checkbox"/> Internet of Things |
| <input type="checkbox"/> High Availability in the event of a disaster or a large-scale failure | <input type="checkbox"/> Peak Load Management including Cloud bursting across multiple clouds |
| <input type="checkbox"/> None or Other (please specify) | |

27. Cloud Service Category: PaaS (Platform as a Service)

- | | |
|---|---|
| <input type="checkbox"/> Internet of Things | <input type="checkbox"/> Software Development |
| <input type="checkbox"/> None or Other (please specify) | |

28. Cloud Service Category: SaaS (Software as a Service)

- | | |
|---|--|
| <input type="checkbox"/> General data storage | <input type="checkbox"/> Business Intelligence |
| <input type="checkbox"/> Customer Relationship Management (CRM) | <input type="checkbox"/> Internet of Things |
| <input type="checkbox"/> Enterprise Resource Planning (ERP) | <input type="checkbox"/> Open Data |
| <input type="checkbox"/> E-Invoicing | <input type="checkbox"/> Project Management |
| <input type="checkbox"/> E-Business | <input type="checkbox"/> Software Development |
| <input type="checkbox"/> Profiling (Social media, web presence) | <input type="checkbox"/> Supply Chain Management |
| <input type="checkbox"/> Human Resources | <input type="checkbox"/> Process sensitive data, including Personally Identifiable Information (PII) |
| <input type="checkbox"/> None or Other (please specify) | |

*29. Do you have interest in the emerging categories: CaaS, CompaaS, NaaS, DSaaS?

- | | |
|---------------------------|--------------------------|
| <input type="radio"/> Yes | <input type="radio"/> No |
|---------------------------|--------------------------|

If you answer "No", those categories will be skipped.

Emerging Cloud Service Categories

To specify your categories (and examples of instantiations in each category) of interest

30. Cloud Service Category: CaaS (Communication as a Service)

- ☐ VoIP ☐ Teleconferencing
- ☐ None or Other (please specify)

31. Cloud Service Category: CompaaS (Computing as a Service)

- ☐ Forecasting ☐ Simulation
- ☐ Modeling
- ☐ None or Other (please specify)

32. Cloud Service Category: NaaS (Network as a Service)

- ☐ Internet of Things
- ☐ None or Other (please specify)

33. Cloud Service Category: DSaaS (Storage as a Service)

- ☐ Big Data ☐ Back-up
- ☐ None or Other (please specify)

Cloud Computing and Standards

Your high-level view on Cloud Computing standards, good and/or bad.

34. Which impact can Cloud Computing Standards have on your organization's concerns?

	None	Low	Medium	High	Do not know
Performance and efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of Open Source solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Portability across vendor solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interoperability across vendor solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Privacy and integrity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service Level Agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Governance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auditability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resiliency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vendor or data lock-in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35. To which degree are Cloud Computing Standards considered or used in your organization?

- | | |
|---|--|
| <input type="checkbox"/> Standards are used | <input type="checkbox"/> Standards will require too much effort |
| <input type="checkbox"/> Standards are considered | <input type="checkbox"/> Standards will have little impact on business |
| <input type="checkbox"/> Standards are not well known | <input type="checkbox"/> Unaware of Cloud Computing standards |
| <input type="checkbox"/> Other (please specify) | |

* 36. Are you willing/able to give feedback in detail on Cloud Computing Standards?

- ☐ Yes ☐ No

If you answer "No", the section related to the evaluation of standards will be skipped.

Cloud Computing Standards: a detailed view

Here, we would like to evaluate your perception of standards gaps and to measure the notoriety of some major Cloud Computing standards.

37. In which domain have you been confronted with the lack of Cloud Computing standards?

- | | |
|---|---|
| <input type="checkbox"/> Security | <input type="checkbox"/> Portability |
| <input type="checkbox"/> Service Level Agreement | <input type="checkbox"/> Management |
| <input type="checkbox"/> Data protection | <input type="checkbox"/> Identity Management |
| <input type="checkbox"/> Interoperability | <input type="checkbox"/> Application Programming Interfaces (API) |
| <input type="checkbox"/> None or Other (please specify) | |

38. Your organization's adoption and use of CC standards: **General purpose**

	No knowledge	Under evaluation	Well known	Used & referenced
ITU-T Y.3500 ISO/IEC 17788: Cloud Computing – Overview and vocabulary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITU-T Y.3502 ISO/IEC 17789: Cloud computing reference architecture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITU-T Y.3501: Cloud Computing Framework and High-level Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITU-T Y.3510: Cloud Computing Infrastructure requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITU-T Y.3520: Cloud computing framework for end-to-end resource management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO/IEC 20000-1: Service management system requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TIA ANSI/TIA-942-A: Telecommunications Infrastructure Standards for Data Centers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

39. Your organization's adoption and use of CC standards: **Security**

	No knowledge	Under evaluation	Well known	Used & referenced
ISO/IEC 27001: Information security management systems – Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO/IEC 27002: Code of practice for information security controls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO/IEC 27017: Guidelines on Information security controls for the use of cloud computing services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITU-T X.1601: Security framework for cloud computing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSA CCM 3.0: Cloud Control Matrix (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSA CTP: Cloud Trust Protocol (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSA A6: Cloud Audit (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSA PLA: Privacy Level Agreement (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSA TCI Reference Architecture: Trusted Cloud Initiative (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSA OCF: Open Certification Framework (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40. Your organization's adoption and use of CC standards: **Data protection**

	No knowledge	Under evaluation	Well known	Used & referenced
ISO/IEC 27018: Code of practice for protection of personally identifiable information (PII) in public clouds acting as PII processors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. Your organization's adoption and use of CC standards: **Management**

	No knowledge	Under evaluation	Well known	Used & referenced
DMTF DSP0263: Cloud Infrastructure Management Interface (CIMI) Model and REST Interface over HTTP Specification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO/IEC 19831: Cloud Infrastructure Management Interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
DMTF DSP0264: Cloud Infrastructure Management Interface - Common Information Model (CIMI-CIM)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SNIA CDMI: Cloud Data Management Interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO/IEC 17826: Cloud Data Management Interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO 19099: Virtualization Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OGF GFD.183: Open Cloud Computing Interface - Core (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OGF GFD.184: Open Cloud Computing Interface - Infrastructure (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OGF GFD.185: Open Cloud Computing Interface - RESTful HTTP Rendering (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. Your organization's adoption and use of CC standards: *Service Level Agreement*

	No knowledge	Under evaluation	Well known	Used & referenced
TMF TR178v2: Enabling End-to-End Cloud SLA Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OGF GFD.192: Web Services Agreement (WS-Agreement)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OGF GFD.193: WS-Agreement Negotiation (Specification)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
QuEST Forum TL9000: TL 9000 Measurements Handbook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43. Your organization's adoption and use of CC standards: *Portability*

	No knowledge	Under evaluation	Well known	Used & referenced
DMTF DSP0243: Open Virtualization Format Specification V2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISO/IEC 17203: Open Virtualization Format Specification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OASIS TOSCA: Topology and Orchestration Specification for Cloud Applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OASIS CAMP: Cloud Application Management for Platforms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. Your organization's adoption and use of CC standards: *Multi-cloud, Cloud federation*

	No knowledge	Under evaluation	Well known	Used & referenced
ITU-T Y.3511: Framework of Inter- cloud computing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

45. Your organization's adoption and use of CC standards: *Application*

	No knowledge	Under evaluation	Well known	Used & referenced
ITU-T Y.3503: Requirements for desktop as a service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

46. Any other standard not listed here that your organization knows about and is considering (one or more)?

Cloud Computing Certification Standards

Checking your intentions regarding certification and how standards can support them.

Certification is a way to indicate to customers that a company follows certain rules and processes (defined in the context of certification) and consequently to disburden them from regularly checking the certified company.

Cloud Customers are encouraged - or even obliged by national law in some European countries - to verify the reliability of a (Cloud) provider before signing a contract. Cloud Computing Certification Standards may appear helpful as decision support, specifically as far as the Certification scope covers the main areas of interests and is fully transparent.

47. Would you consider Cloud Certification as a possibility to improve confidence in Cloud?

☐ Yes

☐ No

48. Please rank the following Cloud Certification areas according to their importance:

	Less important	Important	Very important
Compliance / legal aspects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contract and Service Level Agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data Security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data Privacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data storage location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cloud Datacenter infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cloud Provisioning Processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interoperability/Reversibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data Portability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Backup/Recovery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identity and Access Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial health of the Cloud providers involved in the service provision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49. Which further areas would you consider as relevant for a Cloud Certification?

50. Can you rate the importance of the following types of certification for your organization?

	Excellent	Good	Neutral	Acceptable	Poor
Cloud Provider Certification (per Cloud provider)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cloud Service Certification (per Cloud service, covering all aspects/partners involved in its provision)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self Certification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certification by accredited auditors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certification Standard reflecting European requirements (legal/contractual aspects)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certification Standard reflecting Global requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unique certification scope (one fits all)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Graded certification scopes (affordable for SME based Cloud providers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Cloud Provider Certification:

Certification of individual enterprises, who are providing - one or several cloud services - to the market.

Cloud Service Certification:

Certification of individual cloud services and across all partners involved in the service provisioning process.

Self Certification:

Certification Process conducted by the cloud service provider himself.

Certification by accredited auditors:

Certification Process conducted by independent and accredited auditors.

Certification Standards reflecting European requirements:

The Certification Scope covers Cloud Security & Privacy, operational and contractual aspects in reference to legal European requirements.

Certification Standards reflecting Global requirements:

The Certification Scope covers Cloud Security & Privacy aspects in reference to Global requirements.

Unique Certification Scope:

A defined Certification Scope for all types of Cloud Services or Cloud Providers (see above).

Graded Certification Scope:

A set of graduated certifications reflecting different quality levels to allow certification also for medium-sized cloud providers.

51. Are you aware of the Cloud Certification Schemes List (CCSL)?

☐ Yes

☐ No

ENISA (the European Union Agency for Network and Information Security) has defined **CCSL**, the Cloud Certification Schemes List (see <https://resilience.enisa.europa.eu/cloud-computing-certification>)

52. Which of the following Cloud Certification Schemes listed in CCSL are you are aware of?

☐ Certified Cloud Service TÜV Rheinland

☐ ISO/IEC 27001 Certification

☐ CSA Attestation – OCF Level 2

☐ Payment Card Industry Data Security Standard v3

☐ CSA Certification – OCF Level 2

☐ Leet Security Rating Guide

☐ CSA Self Assessment – OCF Level 1

☐ AICPA Service Organization Control (SOC) 1

☐ Eurocloud Self Assessment

☐ AICPA Service Organization Control (SOC) 2

☐ Eurocloud Star Audit Certification

☐ AICPA Service Organization Control (SOC) 3

53. As a Cloud Customer, do you plan to include one of these Certifications in your Cloud Purchasing processes?

☐ Yes

☐ No

54. If not, what are the main reasons?

55. As a Cloud Provider, do you plan to certify your Cloud service offering?

☐ Yes

☐ No

56. If not, what are the main reasons?

Information on the person replying to this survey

This is the last page of the survey. We finally would like some (anonymous) information on you.

57. What is your role in your organization?

58. What is your experience in Cloud Computing? (length, expertise, etc.)

Many thanks for the time you have spent with this survey.

**If you want to receive the results,
you can visit our site after June 15th at: http://csc.etsi.org/CSC2_survey**

or

59. You can also leave us your email:

Annex D: Change History

Date	Version	Information about changes
June 2015	1.0.0	First publication of the SR for comments
November 2015	2.0.0	Final publication based on the changes provided by: <ul style="list-style-type: none">- Comments from the NTECH Technical Committee review- Comments from the public review gathered on http://csc.etsi.org- Additional changes proposed during the final review workshop on October 1-2

History

Document history		
V2.1.1	February 2016	Publication