



**Title: How SLA-Ready directly responds to the EC COM (2016) 19/4/2016 on ICT Standardisation Priorities for the Digital Single Market**

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## Executive Overview

SLA-Ready (Making SLAs readily usable in the EU private sector) is a European initiative driving a common understanding of service level agreements for cloud services with greater standardisation and transparency so firms can make an informed decision on what services to use, what to expect and what to trust.

The SLA-Ready project will provide an SLA Common Reference Model which will benefit cloud service providers and cloud service customers by integrating a set of SLA components, e.g. common vocabularies, SLO service metrics and measurements, as well as best practices and relevant standards to fill identified gaps in the current SLA landscape.

Based on the Common Reference Model, SLA-Ready services will support cloud service customers, in particular SMEs, with practical services, to encourage them to carefully plan their journey and make it strategic through an informed, stepping-stone approach, so the cloud and applications grow with their business. SLA-Ready fills important information gaps key to increasing trust in and use of cloud services.

## The SLA-Ready Consortium

The SLA-Ready Partners make up a strong consortium which recognises the need for a lean team of partners with specific skill-sets in analytical studies, legal and cloud security, coordination and communication.

### Partners

- Trust-IT Services
- Cloud Security Alliance
- Technical University of Darmstadt
- Arthur's Legal

## Disclaimer

SLA-Ready has received funding under Horizon 2020, ICT-07-2014: Advanced Cloud Infrastructures and Services. The information contained in this document is the responsibility of SLA-Ready and does not reflect the views of the European Commission.

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## 1 The Digital Single Market

An objective of the Digital Single Market (DSM) in Europe is to make Europe a world leader in ICT and create one of the biggest digital marketplaces globally. Cloud computing is one of the five priority domains of the DSM while standardisation is a vital component of building trust and transparency in cloud services.

In the DSM strategy the Commission recognises the importance of the data economy. Data technologies and services that can be used for the collection, processing and other use and management by means of a combination of cloud computing, data analytics, internet of things and other technologies, are essential factors of progress in the new era of digitalisation.

In the section on ‘Maximising the growth potential of the Digital Economy’ the DSM strategy committed the Commission to proposing a European ‘Free flow of data’ initiative to tackle restrictions on the free movement of data within the EU and unjustified restrictions on the location of data for storage or processing purposes. In addition, it stated that the initiative *“(...) will address the emerging issues of ownership, interoperability, usability and access to data in situations such as business-to-business, business to consumer, machine generated and machine-to-machine data. It will encourage access to public data to help drive innovation”*.

Actors within the European data market need predictability and legal certainty on these and related issues in order to enter the market and invest in new business models, which is especially vital for SMEs.

From the small medium enterprise (SME) as cloud service customer (CSC) perspective, the existing awareness and expertise at both the CSCs, the cloud service provider (CSP) level as well as policy makers and authority level is generally not sufficient to provide actors in the data value chain with the trust, predictability and legal certainty each need to be able to assess, make informed decision and have reasonable access and use of cloud services. The same goes for the existing legal frameworks and current contractual practices, although this obviously differs per deployment model and service model of the service as well per CSP and the (envisioned or actual) use of the CSC thereof. Contractual practices, including the arrangements in or related to SLAs also create obstacles to the free and smooth flow of data or to data access as well as lock-in effects.

### **The SLA-Ready response**

SLA Ready supports the European Free Flow of Data Initiative as an important step at EU level to allow SMEs and their stakeholders, including businesses, citizens, researchers and consumers to take full advantage of data technologies and services. A free flow of data will support connectivity between sectors and industries, lowering costs, stimulating research and innovation and unleashing the potential of new economic models. Building on the work conducted by Standard Developing Organisation (SDOs), SLA-Ready is a European initiative that aims to deliver a common reference model for Cloud SLAs, a set of services to support cloud customers in the use of cloud SLAs through their life cycle, and encourage a culture of trust and transparency amongst CSPs.

## 2 How SLA-Ready helps – The Common Reference Model

The most enthusiastic adopters of Cloud services should be small firms, the lifeblood of the European economy. But lack of knowledge about Cloud services is the main reason why more firms are not using the Cloud as much as expected. Contracts for cloud services often contain Service Level Agreements (SLAs) with technical & legal provisions that are inappropriate, difficult to understand &/or illegal. Similarly, the application of established data protection concepts can be problematic, with uncertainties as to what is regulated, who is responsible & which laws apply.

The SLA-Ready Common Reference Model (CRM) provides a common understanding of SLAs for Cloud services by addressing the SLA life cycle, EC Cloud SLA Standardisation Guidelines and the SLOs set therein in a comprehensive way. This includes SLOs regarding data classification, data life cycle, data management, data portability and (personal) data protection and intervenability. The result is a set of 70 elements mapping 26 user requirements and categorised into 8 groups, as shown below.

**Table 1 The 26 requirements of the SLA-Ready CRM**

General	Freshness	Readability	Support
SLA URL Findable Choice of law Roles and responsibilities Cloud SLA definitions	Revision date Update Frequency Previous versions and revisions SLA duration	SLA language Machine-readable format Nr. of pages	Contact details Contact availability
Credits	Changes	Reporting	SLOs & Metrics
Service Credit Service credits assignment	SLA change notifications Unilateral change	Service Levels reporting Service Levels	Specified SLO metrics Cloud Service Performance SLOs

Maximum service credits (Euro amount) provided by the CSP		continuous reporting Feasibility of specials & customisations General Carveouts	Service Reliability SLOs Data Management SLOs Security SLOs
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In order to maximize the impact and facilitate the adoption of the contributed CRM with industrial stakeholders, and in particular with SMEs, it is necessary to guarantee its alignment with relevant standards and best practices. This will also benefit SMEs, which are not cloud experts, in understanding both cloud SLAs and the role of related standards/best practices.

## 2.1 How SLA-Ready Helps - Services towards a culture of transparency and trust for cloud contracts

The CRM forms the basis for services which can encourage culture of transparency in SLAs amongst CSPs while at the same time help educate CSCs so that they are more equipped to make informed decisions when selecting the right SLA for them.

### **An SLA-Readiness Index for CSPs**

A quantifiable SLA-Readiness Index will be launched in Q3 2016. Based on the Common Reference Model, the index allows CSPs to carry out a self-assessment of their SLA. CSPs will be given the option of publishing results in a publicly available repository of SLA-Ready SLAs. This will be made accessible to customers as a service by which they can easily compare results between CSPs.

The importance of customers having access to reliable, repeatable and measurable metrics cannot be underestimated. Ultimately, these metrics will result in the buying and selling of cloud services in a confident and trustworthy manner that will add to additional growth.

### **The SLA-Aid – an online tool to support CSCs in choosing the right cloud contract**

In assessing cloud service customer needs, SLA-Ready has identified a set of real-world use cases and assessed which elements of the Common Reference Model are important for each case. The SLA-Aid will guide SME CSCs, or prospective CSCs, through the entire cloud SLA life-cycle. This automated questionnaire helps CSCs match their cloud business use case for the service or services of choice, helping them understand related SLAs, and responsibilities and actions they need to take as a CSC. The tool will leverage SLA-Ready's CRM to help clarify the complex SLA terms and terminology and guide the SMEs in evaluating the expected service provision: from performance to security and privacy levels.

## 2.2 How SLA-Ready helps - SLAs and data ownership

SLAs generally do not address data ownership itself, although as explained above they may address or should address certain important components and element thereof. Data ownership is generally not addressed, as it is a particularly complex domain which is difficult to define. For example, CSPs and other vendors may have a totally different opinion or perception about data ownership than CSCs, whether being SMEs or not,. Furthermore, the laws and regulations that have deemed to be governing ownership are either outdated or are difficult to interpret, use and enforce in the digital world. It becomes even more problematic where some CSPs are very large, powerful and have a traditional mindset that owning assets, including data, is a goal in itself.

Taking another perspective, ownership of digital data in general is basically not possible. Owning data is just very difficult, as one would like, or need to, share such data, have it processed and transferred. The concept of ownership, which goes back far before the Romans codified it more than two thousand years ago, blurs the discussion – and sometimes debate – about who is entitled to do what with data, and stalls innovation and the potential of technology in general. Therefore, **SLA Ready and its consortium partners endorse joining the dialogue about how to be able address this domain of use rights and digital rights management.**

With regard to the free flow of data, it can be established that restrictions on the free movement of data within the EU and unjustified restrictions on the location of data for storage or processing purposes are generally not addressed in generic SLAs, which is understood as most restrictions are only applicable to certain industries, markets or use. **SLA-Ready recommends that these restrictions and related compliance matters need to be assessed and dealt with, and where appropriate should be arranged for in a more specific SLA.** The latter is not common practice at this point, also not in the relevant higher/highly regulated markets where Free flow of data is quite relevant.

## 3 How SLA-Ready helps – Supporting standardisation in SLAs

One of the three major objectives of the European Cloud strategy regards standards and certification, with the aim of building trust and confidence in Cloud services by helping:

*“users evaluate and compare services, and know which ones to trust. For example, we will put Cloud users more in control of their data, with standards based on the principles of interoperability, portability and reversibility”<sup>1</sup>*

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<sup>1</sup> A European strategy for Cloud computing, op cit.

A core activity within SLA-Ready is international co-operation and standardisation with the aim of building consensus on best/good practices through an in-depth analysis of the current standards landscape and industry-led initiatives. Our goal is to empower Cloud service customers through the use of standardised Cloud SLAs as a critical step towards better understanding the level of security and data protection offered by the CSP, and for monitoring the provider's performance and security levels.

SLA-Ready therefore takes a pro-active approach to standardisation efforts by engaging with relevant standards groups and actively influencing their Cloud SLA initiatives. The most relevant standards groups on the topic of cloud SLAs, and where SLA-Ready is involved, are:

- ISO/IEC of the Joint Technical Committee<sup>2</sup>
- European Telecommunications Standards Institute (ETSI) – Cloud Standards Coordination – Phase<sup>3</sup>
- National Institute of Standards and Technology (NIST)<sup>4</sup>.
- TM Forum<sup>5</sup>

In addition, SLA-Ready also acknowledges the importance of best-practices and other industrial initiatives in this area, for example, the work of the Cloud Security Alliance, the EC's Cloud Select Industry Group on SLAs (C-SIG), the European Agency for Network and Information Security (ENISA) and the Cloud Standards Consumer Council (CSCC).

Next we summarise SLA-Ready's contributions to relevant initiatives within these organisations:

### 3.1 ISO/IEC 19086

The four working items which make up the ISO/IEC 19806 are probably the most influential international standardization work on Cloud SLAs. They have the potential to provide higher levels of transparency and trust to the way Cloud Customers and CSPs will interact in the near future.

#### 3.1.1 ISO/IEC 19086 Part 1 – Overview and Concepts

This draft standard, which is currently moving into DIS version<sup>6</sup>, defines base terminology and concepts related to Cloud SLAs. This includes lifecycle and main Service Level

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<sup>2</sup> Please refer to [http://www.iso.org/iso/iso\\_technical\\_committee?commid=45020](http://www.iso.org/iso/iso_technical_committee?commid=45020).

<sup>3</sup> Please refer to <http://www.etsi.org/> and <http://csc.etsi.org/phase2.html>.

<sup>4</sup> Please refer to <http://www.nist.gov/>, <http://www.nist.gov/itl/anttd/Cloud-102214.cfm>.

<sup>5</sup> Please refer to <https://www.tmforum.org>

Objectives categories (known as “Components” in ISO/IEC) and is not restricted only to a security perspective.

**SLA-Ready Input:** With Part 1 near its final publication SLA-Ready focuses on keeping alignment of its CRM with the 19086 Part 1 DIS, in particular with respect to the list of applicable SLOs/SQOs/components (i.e., performance, security and privacy).

Table 1 shows the current timeline associated to ISO/IEC 19086 Part 1.

**Table 2 Stage history for ISO/IEC 19086 Part 1**

Version	Description	Limit date	Started	Status
1	New project approved		2014-09-22	CLOSED
1	Committee draft (CD) registered		2014-11-04	CLOSED
1	CD study/ballot initiated		2014-11-05	CLOSED
1	Close of voting/comment period		2015-02-07	CLOSED
1	CD referred back to Working Group		2015-07-01	CLOSED
2	CD study/ballot initiated		2015-07-01	CLOSED
2	Close of voting/comment period		2015-09-01	CURRENT
	DIS registered	2016-09-22		WAIT
	International Standard published	2017-09-22		WAIT

### 3.2 ISO/IEC 19086 Part 2 – Metrics

This draft standard is currently still in WD version. It proposes a technical model of reference for documenting Cloud SLA metrics (not only security-related). It is important to note that the current ISO/IEC 19086-Part 2 draft is passing through several changes in both structure and content, as expert feedback has highlighted that content is overly technical and complex.

**SLA-Ready Input:** SLA-Ready has provided expert feedback related to applying one of the proposed templates (from NIST) to security metrics in order to make it “SME-friendly”. SLA-Ready continues to focus on validating the proposed 19086 Part 2 model with the

<sup>6</sup> For an overview related to the development of ISO/IEC standards, see [http://www.iso.org/iso/home/standards\\_development.htm](http://www.iso.org/iso/home/standards_development.htm).

security and privacy metrics elicited in the context of ISO/IEC 19086 Part 4, including the re-use of results from SPECS and A4Cloud projects in which SLA-Ready partners the Cloud Security Alliance and the Technical University of Darmstadt participated.

Table 3 Stage history for ISO/IEC 19086 Part 2

Version	Description	Limit date	Started	Status
1	New project approved		2014-09-22	CURRENT
	New project registered in TC/SC work programme			WAIT
	DIS registered	2017-09-22		WAIT
	International Standard published	2018-09-22		WAIT

### 3.3 ISO/IEC 19086 Part 3 – Core Requirements

Based on both ISO/IEC 19086 Part 1 and Part 2, this draft “core requirements” document provides conformance criteria for Cloud SLAs based on three main pillars:

- Manifest of applicable documents (e.g., master service agreements, etc.),
- Covered services,
- Cloud SLA definitions including components defined in Part 1.

For each of these pillars, and following the structure from Part 1, this draft discusses particular requirements for assessing its conformance to the standard. For example, the ISO/IEC 19086 Part 3 defines that the “covered services” component referenced in Part 1 shall identify the Cloud service(s) that are covered by the Cloud SLA.

**SLA-Ready Input:** The core requirements being documented in the draft 19086 Part 3 are closely related to the best practices that SLA-Ready is developing for the CRM. During the rest of its duration, the SLA-Ready consortium will actively contribute to 19086 Part 3 with a set of best practices that align the proposed compliance requirements with the actual SME expectations. Furthermore, in the current 19086 Part 3 there is a conspicuous lack of core requirements related to the security and privacy components being documented in ISO/IEC 19086 Part 4. SLA-Ready will also contribute to those requirements by engaging relevant communities through the partners’ network of contacts e.g., deploying targeted surveys in the CSA website/channels.

Table 4 Stage history for ISO/IEC 19086 Part 3

Version	Description	Limit date	Started	Status
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1	New project approved		2014-09-22	CURRENT
	New project registered in TC/SC work programme			WAIT
	DIS registered	2017-09-22		WAIT
	International Standard published	2018-09-22		WAIT

### 3.4 ISO/IEC 19086 Part 4 – Security and Privacy

In October 2014 Cloud stakeholders (including CSA) highlighted the need for an international standard focused on the definition of security and privacy Cloud SLA elements. Based on this argument, in late 2014 CSA participated on a proposal for a new working item under ISO/IEC JTC 1/SC27 (IT security techniques) which became the current 19086-Part 4 draft. Given its strong relationship to ISO/IEC SC38, during Q2/2015 the SC27 committee created a liaison with SC38 to leverage their expertise on the topic.

**SLA-Ready Input:** SLA-Ready plans to provide security/privacy requirements aligned to 19086 Part 4. Furthermore, SLA-Ready will follow-up on the contributions that originated from EU FP7 projects SPECS and A4Cloud, both of which are finishing Q1/2016.

Table 5 Stage history for ISO/IEC 19086 Part 4

Version	Description	Limit date	Started	Status
1	Proposal for new project registered		2014-12-11	CLOSED
1	New project ballot initiated		2014-12-12	CLOSED
1	Close of voting		2015-03-14	CLOSED
1	New project approved		2015-03-30	CURRENT
	DIS registered	2018-03-30		WAIT
	International Standard published	2019-03-30		WAIT

### 3.5 ETSI CSC Phase II

The ETSI CSC Phase II (finished in December 2015) produced four reports: Cloud Computing User Needs (WI1), Standards and Open Source (WI2), Interoperability and

Security (WI3), and Standards Maturity Assessment (WI1). The topic of Cloud SLAs was mostly in the focus of the WI3 report.

**SLA-Ready Input:** SLA-Ready provided feedback on Cloud SLAs to the WI3 report during the public commenting period in September-2015. The following areas were covered:

1. Proposed a categorization of Cloud SLA standards, given that the reviewed version did not have such classification.
2. Proposed further research/awareness on the topic of machine-readable SLAs, as considered by the SLA-Ready CRM.
3. Provided explicit references to the work being done by ISO/IEC JTC 1 SC 38/WG 3 on Cloud SLAs.
4. Highlighted the relevance of metrics/SLOs/SQOs for the creation of Cloud SLAs.

The final version of the ETSI CSC Phase II WI3 report managed and integrated all the received SLA-Ready comments .

With the ETSI CSC Phase II activity finalized in December 2015, resulting reports will become part of the CRM's recommended set of guidelines for understanding Cloud SLAs. During 2016, the SLA-Ready consortium will further analyse the recommended set of actions (in particular from WI3) to fine-tune the CRM. In particular:

- The relevance and potential high-value use of the upcoming framework for Cloud SLA (ISO/IEC 19086 Part 1 to 4).
- Using the Cloud SLA to identify and populate core concepts with content relevant for the Cloud service for which the Cloud SLA is created, in order to substantially alleviate the burden of keeping track of all relevant areas that need to be included in the Cloud SLA.
- The availability of standardised metrics that can be populated with values set in the Cloud SLA as a mean to provide better visibility in terms of the level of quality of the Cloud services provided, thus establishing better trust and confidence in the Cloud Computing space.

### 3.6 CSA Cloud Trust Working Group

The Cloud Trust (CT) working group aims to build confidence in the market and to accelerate secure adoption of Cloud services by promoting collaboration between Cloud customers (in particular SMEs), CSPs, international standards organisations and global regulatory authorities, all of which are considered stakeholders in the CT Working Group. The CT working group's activities focus on the collection and validation of monitorable security and privacy metrics for Cloud SLAs, which includes the following tasks:

1. Developing a catalogue of security and privacy Cloud service metrics with standardized measurement methods, based on the latest research in the field, industry practices and Cloud customers' interests.
2. Motivating and documenting the validation of the metrics catalogue by stakeholder.
3. Documenting the best practices associated with the use of these metrics in the definition of SLAs, as well as their measurement and monitoring.

### **SLA-Ready Input.**

With the support of SLA-Ready, the CT working group aligned its activities in order to support ISO/IEC and NIST. In particular, SLA-Ready contributed to the CT's catalogue of security/privacy metrics (partially documented in WP2). Furthermore, SLA-Ready supported the CT WG by providing feedback related to the automated catalogue of Cloud SLA security and privacy metrics being developed by the EU FP7 SPECS project. This automated catalogue system was described in a previous section, where contributions to NIST were presented.

The best practices developed in the context of the CRM will be provided to CT as part of the efforts to develop the foreseen "CSA Cloud metrics guidance" late 2016.

### **3.7 C-SIG SLA**

On October 29th, 2015 the EC organized a meeting to discuss follow-up actions associated to the Cloud Selected Industry Groups (C-SIGs) including C-SIG SLA. One of the main topics discussed during this meeting was the synergy generated between the C-SIGs and the Digital Single Market communication (DSM). This section focuses on C-SIG SLA.

#### **SLA-Ready Input**

Starting from the CRM requirements, SLA-Ready has adopted the vocabulary proposed by the C-SIG SLA guidelines. Also, in support to C-SIG SLA the security and privacy SLOs have been part of the project's contribution to 19086-Part 4 (WP3), just as mentioned in Section 3.1.

SLA-Ready will further analyse the relationships between its main outcomes and the future C-SIG SLA objectives. An early collection of potential Year 2 activities where synergies between SLA-Ready and C-SIG SLA can be developed is mentioned next:

1. End-user/SME engagement in order to further refine and validate the produced SLA Guidelines.
2. Lowering the barriers for SMEs to understand and make informed decisions involving Cloud SLAs.



3. Providing a “categorization” of Cloud SLAs, possibly based on the analysis of case studies (as planned by SLA-Ready’s Deliverable 2.3).