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Foreword

This ETSI Guide (EG) has been produced by ETSI User Group (USER).

This is a revision of the earlier edition which included, among other contributions, parts of the University of Wollongong (AU) SLA template and guidelines have been incorporated, in particular in annex A. The current revision takes into account the changes to parts 1 and 2.

The present document is part 3 of a multi-part deliverable covering the quality of telecom services, as identified below:

Part 1: "Methodology for identification of indicators relevant to the Users";

Part 2: "User related indicators on a service specific basis";

Part 3: "Template for Service Level Agreements (SLA)".

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

Quality of Service can be evaluated from different perspectives and therefore using different measurement methods:

a) The first is related to the reliability of the equipment and can be measured accurately via technical means, although these measures might be expensive because of both the dispersion of the test results and the size of the sample to be tested.

b) The second is related to the service provision and is closely linked to the use of the service. Therefore appropriate metric have to be defined according to this use.

c) The last is intended to measure the subjective satisfaction of the customer and there is often no other means than a survey to get it.

In the two first categories, technical means can be used to perform the measurements and in such cases, standards are often useful to achieve a common approach; therefore standards are given as references where appropriate. They include a precise definition of what is meant as a failure: total failure, poor performance, etc.

Assessing these different aspects is of paramount importance to the provider who endeavours to improve the offered QoS. From a user viewpoint, the end-to-end QoS is the most relevant. Hence objective and subjective measurements may be usefully combined for a better assessment of the QoS.

Measurements of every interesting metric all the time might be very expensive and could jeopardize service performances. It is often cheaper and sufficient to get them via a poll. In addition, it may be convenient to rely on a third party to carry out these measurements to avoid any criticism from one of the involved parties.

In the current state of the service provisioning it is worth noting that:

a) QoS is not a quantity that can be measured using some deterministic meter. The evaluation of QoS can only be performed statistically. Statistical rules apply and to obtain a precision of 1 %, the size of the sample analysed should be as large as 1 000 units and the sample should be taken out of a population 100 or 1 000 times larger. This implies practically that the QoS assessment needs a very large number of measurements.

b) If an operator commits himself to a 99 % or 99,9 % QoS level, this means that less than 1 item out of 100 or 1 000 is out of the specified range. Adding the traditional sampling ratios and precision of measurement ratios leads to populations as large as 10^6 or 10^7 units.

c) An SLA that concerns units, dozens or hundreds of anything (leased lines, Frame relay circuits, etc.) with 99 % committed QoS is meaningful if and only if these units are taken out of a very big population.

d) It is hopeless to expect that screening the "very best" units out of a poor quality population would allow guarantying high QoS level for the selected items. A poor quality product might certainly contain some high quality "nuggets" but the indicators enabling their sorting out are hazardous.

e) The only means to obtain high level QoS products from an operator is to make sure that:

- the purchased service is widely provided and the provider is mastering all manufacturing, installation and support processes;
- the average QoS score of his production is close to the commitment he is intending to negotiate with you;
- a quality assurance plan exists, has been labelled, is annually monitored and is auditable in accordance with ISO 9000 standard family.

QoS and Reliability in the ICT area, concerns more and more aspects supplementary to the product or service as described in clause 6 in addition to the performance indicators.

The existence of a Quality assurance plan labelled, monitored and auditable is key to the QoS. Moreover, in some aspects like security or charging/billing there are no other means to ensure that the QoS expected is actually provided.

In this context, the achievement of a satisfying SLA requires an in depth analysis of the user needs for which guidance is given in ETSI EG 202 009-1 [i.1] and ETSI EG 202 009-2 [i.2].

1 Scope

In the current competitive world, Quality of Service (QoS) is becoming, jointly with cost, a key parameter in selling and buying telecommunications services. At the same time, technology and liberalization trends are raising new types of concerns unknown with the Plain Old Telephony Services (POTS) using switched connections provided by a single monopoly supplier. As explained in other parts of ETSI EG 202 009 [i.1] and [i.2], the monitoring of a QoS commitment should refer to contractual values set either by governmental rules or in a mutual agreement between the provider and its customer. This is why achieving a SLA is more often perceived as the best means to meet specific QoS requirements while ensuring the optimal cost/quality ratio to the customer and the provider in a win-win perspective.

Nowadays, there are several standards describing QoS measurements but the questions of which indicators are to be monitored and which values they should meet are still open. This part of the document defines a framework for a Service Level Agreement between a customer and a supplier of ICT (Information and Communication Technology) Services. Such framework uses the service specific QoS metrics proposed in ETSI EG 202 009-2 [i.2] to evaluate the Quality of Service, while ETSI EG 202 009-1 [i.1] gives a methodology to identify the indicators relevant to the users.

The present document was written to make available to the providers and users of any kind of ICT services a common basis for mutual understanding about SLA. It aims to establish adequacy between the user's requirements in terms of Service Level Objectives (SLO) and the providers' offer with the associated QoS.

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

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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] ETSI EG 202 009-1: "User Group; Quality of telecom services; Part 1: Methodology for identification of indicators relevant to the Users".

[i.2] ETSI EG 202 009-2: "User Group; Quality of telecom services; Part 2: User related indicators on a service specific basis".

[i.3] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive) - (article 17).

[i.4] Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC.

[i.5] Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services.

[i.6] Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services.

[i.7] Corrigendum to Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services.

[i.8] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive) - (article 11, 22 and annex III).

[i.9] Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users" rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (Text with EEA relevance).

[i.10] Corrigendum to Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users" rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EG 202 009-1 [i.1] and the following apply:

access session: all the processes to establish the terms and conditions of the user access (e.g. authentication, selection of service profile) during the connection of a user to a system

NOTE: See figure 3.

connectivity session: all the processes providing technology-independent interfaces to establish and maintain the access to service composition through different networks

NOTE: See figure 3.

network session: all the processes and events allowing the user to connect to start a service session

NOTE: The network session is composed of the access session and connectivity session. The processes are on different planes, and this is why this composition is called vertical (see figure 3).

service session: all the processes and events in the time interval between initialization and termination of an application implementing a service composition

NOTE: These services are of the same nature and located on the service plane, this is why this composition is called horizontal (see figure 3).

3.2 Abbreviations

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

AU	Australia
E2E	End-to-End
EC	European Council
FCAPS	Fault, Configuration, Accounting, Performance, Security
GSAR	Guaranteed Service Availability Ratio
GTTD	Guaranteed Time To Delivery
GTTR	Guaranteed Time To Repair
ICT	Information & Communication Technology
ID	IDentifier
ITU-T	International Telecommunication Union - Telecommunication sector
MOS	Mean Opinion Score
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
OR	Opinion Rating
PaaS	Platform as a Service
POTS	Plain Old Telephony Service
QoS	Quality of Service
SLA	Service Level Agreement
SLO	Service Level Objective
SME	Small and Medium Enterprise

4 SLA Principles

A Service Level Agreement (SLA) is an agreement formally negotiated between client and service provider.

The SLA serves as a means of formally documenting the service(s), performance expectations, responsibilities and limits between service providers and their users. It deals with managing service quality through the customer experience life cycle. This means managing service quality beyond the in-use phase of the life cycle in order to include sales, provisioning, in-use phase and service termination aspects.

Another key aspect of SLAs is the need to incorporate an element of flexibility of contract, in order to accommodate environmental change that is common within organizations. One way of building flexibility is to separate the areas of agreement that are unlikely to change, from the details that can be altered according to negotiation.

A review process should be put in place and each party to the agreement should discuss and monitor the agreement throughout its life and state who will be responsible for reviewing performance.

It is important to define how the agreement will be monitored and the mechanisms that will be used to resolve issues that may arise during the course of the agreement. If the service levels and standards have been defined clearly, and indicators to measure performance have been established, then, the monitoring will be relatively easy. The agreement should build a process for feedback between both parties, via reporting or another agreed communication method between the representatives of both parties.

A service level is an agreed process which may include one or more of the following elements to describe the service behaviour:

- Service features and service composition.
- Quantitative aspects.
- Quality aspects.
- Conditions of use.
- Cost/tariff.

When both parties have established agreed service levels, the next step is to agree on methods of measurement of service level performance. It is essential to implement a system that will provide credible results; otherwise all parties within the process may lose confidence.

The SLA should be described in two parts:

- The users request their requirements, corresponding to the Demand.
- The offer by provider with the guarantees provided (services offers associated QoS, penalties) corresponding to the offer.

In the first part, in ETSI EG 202 009-1 [i.1], the expression of the request as SLO has been described.

In the second part, in ETSI EG 202 009-2 [i.2], in accordance with the method, indicators which reflect the expected behaviour of the service have been identified. But indicators imply measures whose conditions need to be precisely defined between the provider and his customer.

Therefore it is important that in the SLA the following points are made:

- Who will evaluate it?
- What are the acceptable measuring procedures (test specification i.e. ITU-T recommendation, or ETSI standard and the frequency of measurement, sample size, confidence limits, etc.)?
- In the event of a dispute or disagreement, what are the resolution procedures?
- What are the penalty clauses?
- Who will be the arbitrating body in the event of a disagreement?
- The final stage consists in selecting, among the QoS parameters, the most relevant ones, the level of which will be monitored with respect to the agreed commitments as described in the SLA.

Here should be taken into account the relevant aspects of the current regulation, e.g. the European Directives (Directive 2002/21/EC [i.3] as amended by [i.4], [i.5], [i.6] and [i.7], Directive 2002/22/EC [i.8]) as amended by [i.9] and [i.10] as well as the corresponding national regulation.

5 SLA Contract

5.0 SLA contract principles

A Service Level Agreement (SLA) is a contract that defines an agreement between two parties: user and service provider (see figure 1). It describes the terms and conditions of service provisioning. On the user side, it identifies the user requirements. On the provider side, it indicates the commitments (capabilities) of the provider to the client.

The SLA serves as a means of formally documenting the service(s), performance expectations, responsibilities and limits between service providers and their users.

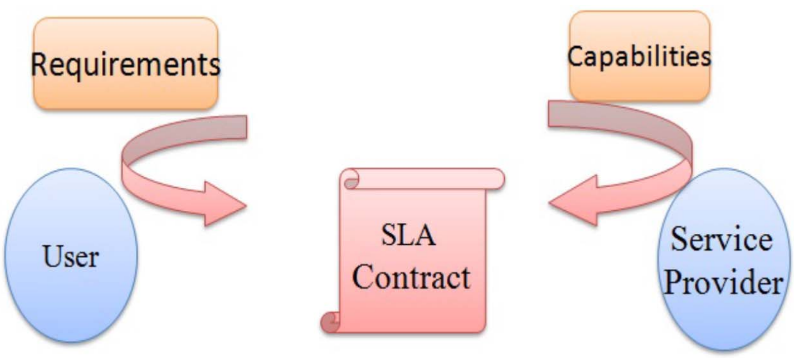

Figure 1: SLA Contract