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SERIES E: OVERALL NETWORK OPERATION,
TELEPHONE SERVICE, SERVICE OPERATION AND
HUMAN FACTORS

Quality of telecommunication services: concepts, models,
objectives and dependability planning – Terms and
definitions related to the quality of telecommunication
services

**Quality of service parameters for supporting
service aspects**

Recommendation ITU-T E.803

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Recommendation ITU-T E.803

Quality of service parameters for supporting service aspects

Summary

Recommendation ITU-T E.803 deals with the quality of service (QoS) parameters that could be of primary interest and concern to the customers and users of ICT services who wish to compare the performances of service providers (SPs) of the information and communications technology (ICT) services during the non-utilization stages of such services and secondarily to regulators and service providers.

Recommendations that cover service-specific performances usually apply to services when they are in actual use. However, the services surrounding ICT services offered by service providers that are outside the actual usage of services are of interest and concern to the users. The quality and content of information on a service and its features, the contractual conditions offered by the service provider, provisioning facilities, documentation, and service support after the contract with the customers are examples of non-utilization stages of the ICT services that could be of concern to the users. Similarly, users are also concerned about the indicators of the service's performance. This Recommendation identifies non-utilization stages and lists several QoS parameters from which a selection may be made for the customer to assess the performance of the provider.

History

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FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation ITU-T E.803

Quality of service parameters for supporting service aspects

1 Scope

This Recommendation deals with the quality of service (QoS) parameters that could be of primary interest and concern to the customers and users of the information and communications technology (ICT) services who wish to compare the performances of service providers (SPs) of ICT services during the non-utilization stages of such services and secondarily to regulators and service providers.

Recommendations that cover service-specific performances usually apply to services when they are in actual use. However, the services surrounding ICT services offered by service providers that are outside the actual usage of services are of interest and concern to the users. The quality and content of information on a service and its features, the contractual conditions offered by the service provider, provisioning facilities, documentation, and service support after the contract with customers are examples of non-utilization stages of ICT services that could be of concern to the users. Similarly, users are also concerned about the indicators of the service's performance. This Recommendation identifies non-utilization stages and lists several QoS parameters from which a selection may be made for the customer to assess the performance of the provider.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T E.802] Recommendation ITU-T E.802 (2007), *Framework and methodologies for the determination and application of QoS parameters*.
- [ITU-T G.1000] Recommendation ITU-T G.1000 (2001), *Communications Quality of Service: A framework and definitions*.
- [ETSI EG 202 843] ETSI EG 202 843 V1.2.1 (2013-03), *User Group; Quality of ICT services; Definitions and methods for assessing the QoS parameters of the customer relationship stages other than utilization*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 cessation [b-ITU-T E.800]: All activities associated with the cessation of a service by a service provider from the instant a contractual agreement is in force between the customer and the service provider to the instant all hardware and software associated with the service is made inoperative and/or removed from the customer's premises.

3.1.2 charging [b-ITU-T E.800]: The set of functions needed to determine the price assigned to the service utilization.

3.1.3 confidence level [b-ITU-T E.800]: The value of the probability associated with a confidence interval or a statistical tolerance interval.

3.1.4 customer [b-ITU-T E.800]: A user who is responsible for payment for the services.

3.1.5 measure [b-ITU-T E.800]: A unit by which a parameter may be expressed.

Example: Waiting time for the provision of a service may be expressed as calendar or working days.

3.1.6 parameter [b-ITU-T E.800]: A quantifiable characteristic of a service with specified scope and boundaries.

Example: The parameter for estimating the 'misdialling probability' would be expressed as: 'The number of misdialed calls per 100 call attempts'.

NOTE – Parameters may be objective or subjective.

3.1.7 quality of service (QoS) [b-ITU-T E.800]: Totality of characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service.

3.1.8 service provider [b-ITU-T E.800]: An organization that provides services to users and customers.

3.1.9 user [b-ITU-T E.800]: User is an entity that makes use of the communication entity (CE) (e.g., initiates or answers a call ([b-ITU-T Q.1300])).

or

A person or entity external to the network, which utilizes connections through the network for communication.

NOTE – Connection is used in the context of establishing communication between two points in a network. Connection is "bearer path, label switched path, virtual circuit, and/or virtual path established by call routing and connection routing". ([b-ITU-T E.360.1] and [b-ITU-T E.361])

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 opinion rating (OR): A quantitative value (a number) assigned to a qualitative performance criterion on a predefined rating scale to reflect the merit of that criterion to a user or customer. (Refer also to Annex B.)

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CDF	Cumulative Distribution Function
CE	Communication Entity
CM	Complaint Management
OR	Opinion Rating
PDF	Probability Density Function
PI	Preliminary Information
QoSAP	QoS Assessment Party
SP	Service Provider

5 Conventions

Annex A shows time-line sequences of the progress of a criterion (expressed as a parameter) to illustrate the events that are significant for the identification and measurement of the parameter performance value(s).

6 Identification of QoS parameters for stages other than the utilization of a service

Identification of quality of service (QoS) criteria for non-utilization stages of ICT services may be facilitated by the use of the frameworks given in [ITU-T G.1000] and [ITU-T E.802].

Some of the QoS parameters defined in Annex A are based on the contents of [ETSI EG 202 843]. Additional materials to implement these parameters may be found in [b-ETSI TS 102 844] and [b-ETSI TS 102 852].

The criteria have been defined as parameters and care has been taken to ensure that different viewpoints are covered. The range of parameters is intended to cater to different requirements of the various customer segments of the population. When selecting a set of QoS parameters to compare the performance of SPs, it is necessary to only focus on those that are of relevance, and which may be restricted to as few as 5 to 15. The parameters identified are in Annex A.

7 Selection of parameters for the comparison of a service provider's performance by customers

The following considerations should be applied in the selection of parameters for use by customers to determine the service provider's (SP) performance.

- a) Comparison of performance of SPs is more likely to be relevant for the providers in a region or country rather than on a global basis. A recognized stakeholder, e.g., the regulator may select QoS parameters for the comparison of SPs. This selection could reflect the local market characteristics, customer's preferences and requirements.
- b) The number of parameters may be chosen to be manageable both for reporting and for practical application.
- c) Where local market characteristics require different sets of parameters for different customer sectors this may be reflected in the choice of the parameters.

8 Reporting of QoS performance levels for the benefit of customers

Performance levels may be estimated from one or more of the following sources:

- data held in the SP's systems,
- customer surveys,
- opinion rating (OR) by expert panels.

The stakeholder/regulator of a region/country may recommend a method of presenting the performance values to enable customers to make an easy comparison between SPs. The process of obtaining performance values ought to be audited to international standards.

Annex A also provides more details on the procedures for measuring and reporting performance values on a selection of parameters and Annex B provides some guidance to ensure the comparability of performance values.

Annex A

List of QoS parameters and procedures for measuring, computing and reporting performance values on selected parameters

(This annex forms an integral part of this Recommendation.)

The following QoS parameters have been identified as being potentially useful for the comparison of the SPs' performance levels.

A.1 Preliminary information on telecommunication services

A.1.1 Parameter 1: Integrity of preliminary information

A.1.1.1 Definition

The integrity of the preliminary information (PI) is characterized by a true and fair view of the main points of an ICT service provided to the potential customers by the SP.

A.1.1.2 Measurement

Measured as: Opinion rating.

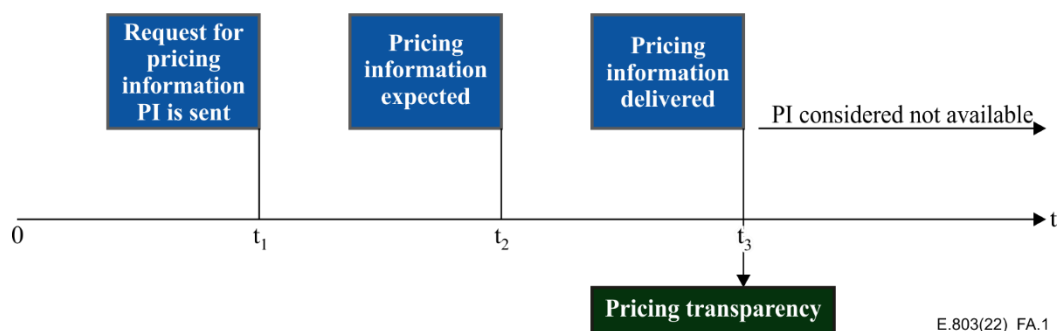
A.1.1.3 Reference

See [ETSI EG 202 843] (in P101: Integrity of PI).

A.1.2 Parameter 2: Pricing transparency

A.1.2.1 Definition

Pricing transparency of an ICT service is characterized by clarity, conciseness, and unambiguity in every tariff structure for all usage conditions for every service provided by the SP.



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Figure A.1 – Events for preliminary information – "pricing transparency"

A.1.2.2 Explanation of the definition of the parameter

Pricing information should clearly state the rules for the calculation of the amount the customer has to pay under specified conditions of use and for exceeding the conditions, e.g., exceeding the usage time where there is a limited allocation for a given tariff. The pricing structure should include all the usage conditions.

A.1.2.3 Equation

$$P[OR] = \frac{\sum_{i=1}^N OR_i}{N}$$

where:

OR is the mean opinion rating, with OR_i ($i = 1 \dots N$) being the individual opinion ratings for the N members of the audit panel

i Index of expert/customer

N Number of experts/customers in the panel.

A.1.2.4 Measurement

Measured as: Opinion rating (OR).

A.1.2.5 Specific description of the evaluation

Opinion rating is perhaps best carried out by an expert panel. The number of members in the panel is at the discretion of the stakeholder(s).

Examining if there is a significant difference between the opinion of the expert panel and that of the public is recommended for services where there is likelihood of such a difference. The two sets of ratings (expert panel and consumer survey) could complement each other and provide assurance to the potential customers. Opinion ratings based on the feedback from the end-customers may be taken into account to adjust both the sources of the rating information.

Expertise required in the panel is a technical familiarity with the use of the service or the types of services.

Precondition: preliminary information is delivered.

A.1.2.6 Trigger points

OR may be established whenever PI for a new service is being introduced into the market. It is also established whenever there is/are change(s) to the tariff structure introduced by the provider and the PI is amended.

Table A.1 – Trigger points

Event	Trigger point from customer's viewpoint	Condition
PI is delivered to the customer	t_3 in Figure A.1	
PI considered not available	Beyond t_3	

A.1.2.7 Representativeness

Tariffs are normally applicable to the whole customer population. Where there are special offerings to segments of the population, e.g., disabled, elderly or any other segment, the tariff information could be subject to OR scores for each of these categories.

A.1.2.8 Presentation of parameter values

The opinion rating of the expert panel should be presented with an indication of the distribution of the members' individual scores taking into account the various types of services. The mean value should be given as a synthetic indication.

Where the opinion of the public has also been taken into consideration the OR of both the public and the expert panel should be published.

Results should be provided on a regular basis with a clear indication of the panel composition and size.

A chart can be used to display the results of the various types of services.

A.1.3 Parameter 3: Availability of PI

A.1.3.1 Definition

The ratio of the number of requests for PI from potential users and customers which have been delivered to the total number of requests within a pre-defined time interval.

A.1.3.2 Measurement

Measured as: Fraction or percentage.

A.1.3.3 Reference

See [ETSI EG 202 843] (in P103: Availability of PI).

A.1.4 Parameter 4: Response time for the provision of PI

A.1.4.1 Definition

Time taken from the instant a request for PI is sent to the SP to the instant all the requested information is delivered to the customer requesting the information.

A.1.4.2 Measurement

Measured as: Time.

A.1.4.3 Reference

See [ETSI EG 202 843] (P104: Response time for the provision of PI).

A.1.5 Parameter 5: Response time of the commercial desk

A.1.5.1 Definition

Time elapsed between the end of dialling and reaching a commercial operator (by a human being):

P105a [Time]: mean time to answer; and

P105b [%]: percentage of calls answered within 20 seconds.

A.1.5.2 Reference

See [ETSI EG 202 843] (in P105).

A.2 Contractual matters between ICT service providers and customers

A.2.1 Parameter 6: Integrity of contract information

A.2.1.1 Definition

True and fair view of the pertinent information on supply, maintenance, and cessation of a telecommunications service provided by an SP.

NOTE 1 – A contractual document describing the supply, maintenance, and cessation of a telecommunication service by an SP is clear, accurate, complete, understandable, and unambiguous.

NOTE 2 – The language, phrasing and expressions chosen are aimed at maximum understanding for the target customer segment.

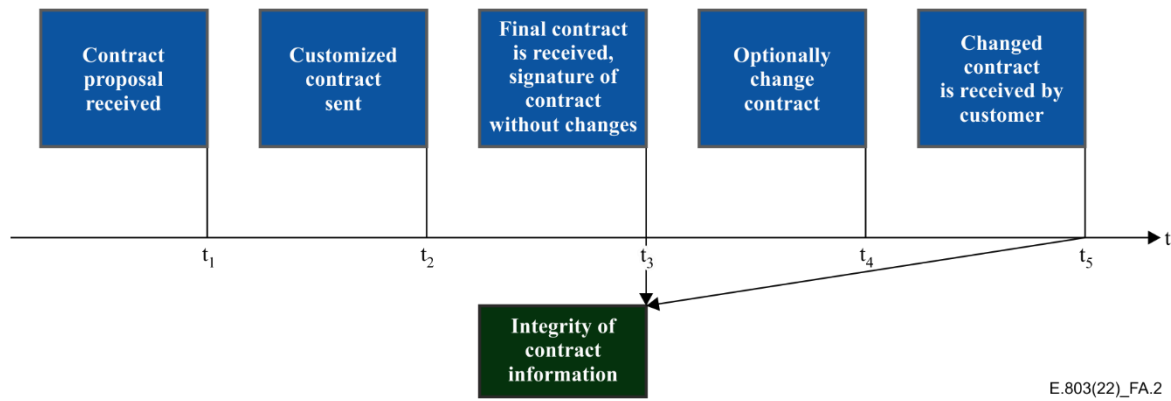


Figure A.2 – Events associated with contract information from SP to customer

A.2.1.2 Explanation of the definition of the parameter

The contractual document lists all the pertinent terms and conditions that affect both the customer and the SP. These include escalation procedures and any compensation schemes that may apply when the implied or the agreed performance of the SP is not met.

The terms and conditions stated are both fair and reasonable to both parties.

A.2.1.3 Equation

$$P[OR] = \frac{\sum_{i=1}^N OR_i}{N}$$

where:

OR is the mean opinion rating, with OR_i ($i = 1 \dots N$) being the individual opinion ratings for the N members of the audit panel

i Index of the expert

N Number of experts in the panel.

A.2.1.4 Measurement

Measured: Opinion rating (OR).

A.2.1.5 Specific description of the evaluation

Preferably the opinion rating is carried out by an expert panel. The number of members in the panel is at the discretion of the stakeholder(s), which could be a regulator or any national institution that undertakes to provide responsible information to the users.

Expertise required in the panel is telecommunications law and a technical familiarity with the use of the service. Members of the assessment team may be trained to professionally evaluate all the aspects of the service.

There are three separate instances of integrity checks:

- 1) normal or standard contracts reflecting the PI supplied,
- 2) the customized contract where the customer has asked for specific changes in the terms and conditions of the contract,
- 3) amendments carried out after the standard or customized contract is signed.

The panel members should be trained to appreciate and assess the key points in a contract between the SP and a customer/user. The members ought to look specifically for compliance of the information provided in the PI with the information provided in the contract. They also ought to look for ambiguity, e.g., what has not been said being of relevance. The members will have an insight into the

legal aspects of the use of this service or family of services to enable them to critically evaluate the legal aspects from the customer's and SP's viewpoint.

A.2.1.6 Trigger points

Opinion rating is to be carried out whenever a new service is introduced into the market. Any significant change to the terms and conditions will also attract a review of the opinion rating. Otherwise, there is no need to review the opinion rating.

Table A.2 – Trigger points

Event	Trigger point from customer's viewpoint	Condition
Final contract is received by customer, signature of contract without changes	t_3 in Figure A.2	Normal contract
Final customized contract is received by the customer	t_4 in Figure A.2	When a customer asks for customization
Changed contract is received by the customer	t_5 in Figure A.2	When a customer asks for post contract amendment(s)

A.2.1.7 Representativeness

Normally the contractual terms are standard for the whole population except in cases where customization by individual organizations is required.

A.2.1.8 Presentation of parameter values

The rating may be expressed as the mean of the members' individual ratings at specified periods. Histograms of the panel members' opinion rating (OR) should be provided.

A chart can be used to display the results of the different available contracts.

A.2.2 Parameter 7: Compliance of contractual terms with preliminary information

A.2.2.1 Definition

Degree of concurrence of the contents of the contractual document to the preliminary information (PI). This comparison between the contractual terms and the PI should be based on the PI in force during the period of the contract. The contractual document could have detailed terms which were implicit in the PI. Where differences exist, these are not to be considered as errors as long as additional and non-contradictory information is provided.

A.2.2.2 Measurement

Measured as: Ratio or percentage.

A.2.2.3 Reference

See [ETSI EG 202 843] (in P202).

A.2.3 Parameter 8: Flexibility for customization before contract

A.2.3.1 Definition

The scope and boundary to meet an individual customer's specific requirements of service feature(s), service performance(s) and terms and conditions before a formal signature on the contract.

NOTE – These specific requirements would be departures from the standard service features, performance and terms and conditions normally offered by the SP.

A.2.3.2 Measurement

Measured as: Opinion rating.

A.2.3.3 Reference

See [ETSI EG 202 843] (in P203)

A.2.4 Parameter 9: Ease and flexibility to amend terms after the formal contract

A.2.4.1 Definition

The scope and boundary of the amendments that could be accommodated to contractual terms to satisfy the post contractual amendments sought by a customer.

This excludes contracts that the provider has specifically stated as not considered for amendments.

A.2.4.2 Measurement

Measured as: Opinion rating.

A.2.4.3 Reference

See [ETSI EG 202 843] (in P204)

A.3 Provision of services

A.3.1 Parameter 10: Meeting promised provisioning date

A.3.1.1 Definition

Successful completion of the provisioning of service on the date promised in the contract in relation to the total number of signed contracts with promised service provisioning dates.

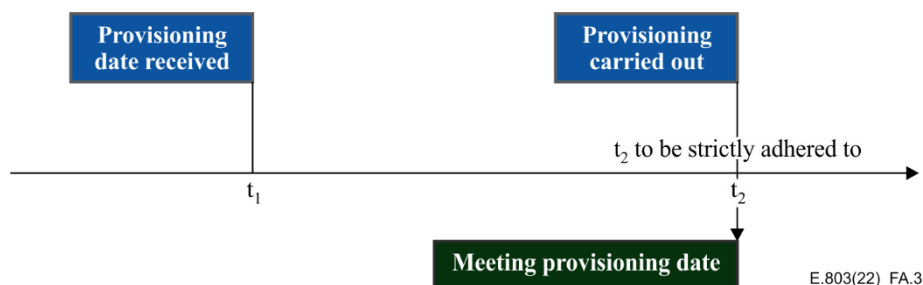


Figure A.3 – Events illustrating "meeting promised provisioning date"

A.3.1.2 Explanation of the definition of the parameter

For specific customers, it is of high importance that the promised date is met. This applies especially to customers whose business depends on fully operational network connections.

This parameter is only applicable if the negotiated service contract contains a fixed date for service provisioning.

A.3.1.3 Equation

$$P[\%] = \frac{N_p}{N_s} \times 100\%$$

where:

N_p Number of contracts with successful service provisioning on the promised date

N_s Number of signed contracts with announced service provisioning.

All measurements are related to the reporting period.

A.3.1.4 Measurement

The indicator is expressed as a percentage.

A.3.1.5 Specific description of evaluation

Precondition: Provisioning done by the SP.

Evaluation of this parameter can be achieved by:

- analysis by the quality of service assessment party (QoSAP) of data stored at the SP,
- survey of relevant customers.

A.3.1.6 Trigger points

Table A.3 – Trigger points

Trigger point from customer's viewpoint	Timeline	Methodology / System specific trigger points
SP announces the scheduled provisioning date	t_1 in Figure A.3	Announcement is received by the customer
Successful provisioning on the announced provisioning date	t_2 in Figure A.3	Customer registers a correct provisioning on the announced date
Unsuccessful provisioning on the announced provisioning date	t_2 in Figure A.3	Customer registers an unsuccessful provisioning attempt on the announced date
Successful provisioning not on the announced date	t_2 in Figure A.3	Customer registers a correct provisioning, but not on the announced date

A.3.1.7 Representativeness / confidence level

If not all the contracts are considered, the number of samples should be defined to ensure that the confidence level is at least x% (see Annex B).

A.3.1.8 Presentation of the parameter values

The results of this parameter are reported as:

- percentage of the provision meeting promised date,
- reporting period,
- number and types of contracts considered.

Results should be provided on a regular basis with a clear indication of the panel composition and size or/and volume of the SP data reviewed.

A chart can be used to display the results for the various types of services.

A.3.2 Parameter 11: Time for provisioning

A.3.2.1 Definition

The period between the scheduled provisioning time and the actual provisioning time

A.3.2.2 Measurement

Measured as: Time.

A.3.2.3 Reference

See [ETSI EG 202 843] (in P302)

A.3.3 Parameter 12: Successful provisioning within a specified period

A.3.3.1 Definition

The number of successful service provisioning events in relation to all expected provision events within a pre-defined period.

A.3.3.2 Measurement

Measured as: percentage.

A.3.3.3 Reference

See [ETSI EG 202 843] (in P303)

A.3.4 Parameter 13: Contract cancelled due to non-fulfilment

A.3.4.1 Definition

Contracts cancelled due to the ongoing non-fulfilment and considered unreasonable to wait any longer to the total number of signed contracts within a given assessment period.

A.3.4.2 Measurement

Measured as: percentage.

A.3.4.3 Reference

See [ETSI EG 202 843] (in P304)

A.3.5 Parameter 14: Completeness of fulfilment of contractual specification in the provision of a service

A.3.5.1 Definition

Contracts with all networks and/or service features specified in the contract fulfilled (after its provisioning) in relation to the number of contracts that have been considered fulfilled for provisioning.

A.3.5.2 Measurement

Measured as: percentage.

A.3.5.3 Reference

See [ETSI EG 202 843] (in P305)

A.3.6 Parameter 15: Punctuality of the service provisioning

A.3.6.1 Definition

Time difference between the actual service provisioning and that contractually specified.

A.3.6.2 Measurement

Measured as: Time (minutes/hours/days)

A.3.6.3 Reference

See [ETSI EG 202 843] (in P306)

A.3.7 Parameter 16: Punctuality of the equipment delivery of the service provisioning

A.3.7.1 Definition

Time difference between the actual equipment delivery and the scheduled delivery announced by the service provider for the service provisioning.

A.3.7.2 Measurement

Measured as: Time (days). A finer granularity of the time dimension is not required.

A.3.7.3 Reference

See [ETSI EG 202 843] (in P307)

A.3.8 Parameter 17: Provisioning not complete and correct first time

A.3.8.1 Definition

The ratio of service provisioning that is either not completely carried out or not correctly carried out in the first attempt, to the total number of contracts where the provisioning is deemed completed.

NOTE – The indicator for this parameter provides how well the SP has performed in complete and correct provisionings at the first attempt.

A.3.8.2 Measurement

Measured as: Percentage.

A.3.8.3 Reference

See [ETSI EG 202 843] (in P308)

A.4 Service alteration

A.4.1 Parameter 18: Time for alteration of the service

A.4.1.1 Definition

Time elapsed from the instant the alteration notification is received by the user to the instant the alteration is completed.

A.4.1.2 Measurement

Measured as: Time (days).

A.4.1.3 Reference

See [ETSI EG 202 843] (in P401)

A.4.2 Parameter 19: Successful service alteration within a specified period

A.4.2.1 Definition

Ratio (percentage) of the number of contracts (or services) with a successful service alteration to the total number of contracts (or services) with an announced service alteration within the contractual specified period of time.

A.4.2.2 Measurement

Measured as: Percentage.

A.4.2.3 Reference

See [ETSI EG 202 843] (in P402)

A.4.3 Parameter 20: Completeness of the fulfilment of the contractual specification in the alteration of a service

A.4.3.1 Definition

The ratio of all the contracts where all the specifications related to the service alteration contractually agreed are met or completed to the total number of contracts where the alteration has been requested.