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International Telecommunication Union

Overview on ITU-T Handbook on QoS and Network Performance

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Overview on ITU-T Handbook on QoS and Network Performance - Content -

- Scope

  The QoS Handbook sets out to specify network service quality parameters that enable services to be offered to customers/users in order to satisfy customers'/users' quality of service expectations. These parameters relate to both implementation and ongoing use of the service. Service quality is also related to all aspects of network assessment and management of the network.

- Structure
  - Chapter 1: Introduction to Quality of Service and Network Performance
  - Chapter 2: Roadmap to ITU-T Recommendations on QoS
  - Chapter 3: QoS Parameters
  - Chapter 4: QoS Measurement
  - Chapter 5: Security
  - Annex: Service Level Agreement (SLA)

Chapter 1: Introduction to Quality of Service and Network Performance

- List of existing definitions of the term "QoS"
- Explanation and understanding of the term "QoS" and the basic QoS concept of Handbook
- Based on ITU-T Rec. G.1000 *Communications Quality of Service: A framework and definitions*
  - "top-down" path from a general quality definition (ISO 8402) to a QoS definition (ITU-T Rec. E.800) to network performance (ITU-T Recs. I.350 and Y.1540) to a functional breakdown of all components of service quality
- List of work on QoS within ITU-T and other organisations

Chapter 2: Roadmap to ITU-T Recommendations on QoS

- List of terms/concepts in connection with QoS and NP
  - List of terms like e.g. accuracy, delay, throughput capability given in ITU Recommendations that are useful for QoS and NP description/assessment
  - Analysis of relevant ITU-T Recommendations by series to provide an overview on Recommendations structure and explain interrelations between them
- Intention is to provide guidance and an easy start to apply ITU-T Recommendations efficiently for QoS and NP evaluation work

Chapter 3: QoS Parameters

- General concept and categories of QoS
  - Application of QoS Parameters
  - Objective and subjective parameters
  - Primary and derived parameters
- Relationship between QoS and NP
- Regulatory and industrial directives on QoS parameters
- Survey of standardized QoS parameters and QoS classes

Chapter 4: QoS Measurement

- Description of different measurement concepts
  - Objective measurements
    - Intrusive and non-intrusive
    - Network performance measurement
    - Use of models
    - Use of switch or probe-based xDRs
  - Subjective measurements
    - Listening, conversation and double talk tests
    - Interviews and surveys
    - Customer panels
  - Concept of (Mean Opinion Score) MOS values
- QoS perspectives (user and service provider)
- Measurement of speech transmission quality

Chapter 5: Security

- Relationship between security objectives, threats, risks, security requirements and services
- Description of the process of how to derive "security requirements“
- Six levels of security
  - Administrator
  - Network
  - Physical security
  - Monitoring
  - Software
  - Security tools
  - Security auditing
- Threats to network security

Annex: Service Level Agreement (SLA)

- An SLA may include statements about performance, billing, service delivery but also legal and economic issues
- The part of the SLA which refers to QoS is called a QoS Agreement and includes provisions for choosing, measuring and monitoring QoS parameters
- The Annex provides a formal structure for SLAs including QoS Agreements.
- An example of an SLA is given

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Overview on ITU-T Handbook on QoS and Network Performance - Conclusion -

The Handbook provides:

- A comprehensive introduction to ITU-T QoS framework
- An overview on existing ITU-T Recommendations and their relationship towards QoS and NP
- A basic description of the determination and application of QoS parameters
- An overview on measurement concepts for QoS and NP

➢ Handbook is a good starting point for entering QoS standardization

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Overview on ITU-T Handbook on QoS and Network Performance - Next steps -

Within Q.4/2 the work on the QoS Handbook lead to further studies for improving and revising standards and frameworks of QoS:

- Draft New ITU-T Recommendation E.802: *Framework and methodologies for the determination and application of QoS parameters* (working title E.QoSParam)
  Was approved at SG 2 Plenary meeting May 2006 for determination according to Traditional Approval Procedure (TAP) according to Resolution 1
- Revision of ITU-T Recommendation E.800 *Terms and definitions related to quality of service and network performance including dependability* (was published 08/94; revision needed due to updated and new QoS documents Handbook, G.1000, E.802)

Overview on ITU-T Handbook on QoS and Network Performance - ITU-T Rec. E.802 -

Content of ITU-T Rec. E.802

- Frameworks and methodologies for the identification of QoS criteria relevant to users and guidelines for conversion of these criteria into QoS parameters that can be used to evaluate the QoS of telecommunication services.
- Guidelines to obtain user's QoS requirements and to prioritize the criteria or parameters are given. All these may be applied to services supported by the terrestrial and wireless legacy networks as well as services supported by the emerging IP network.
- Guidelines for the definition of QoS objectives and target values are given. This includes examples of quality objectives for performance and QoS parameters for various telecommunication services.

Overview on ITU-T Handbook on QoS and Network Performance - ITU-T Rec. E.800 -

- Revision of ITU-T Rec. E.800
  - Work has just started; to be finalized by end of this Study Period (2008)
  - Main tasks:
    - Update and elaboration of terminology and definitions neded for QoS and NP concepts
    - Revision of existing quality of service concept and relationship between quality of service and network performance
      (see Figure 1/E.800)
    - Further study on an overall Framework for QoS within ITU-T

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Overview on ITU-T Handbook on QoS and Network Performance
- Contact details -

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Overview on ITU-T Handbook on QoS and Network Performance - References -

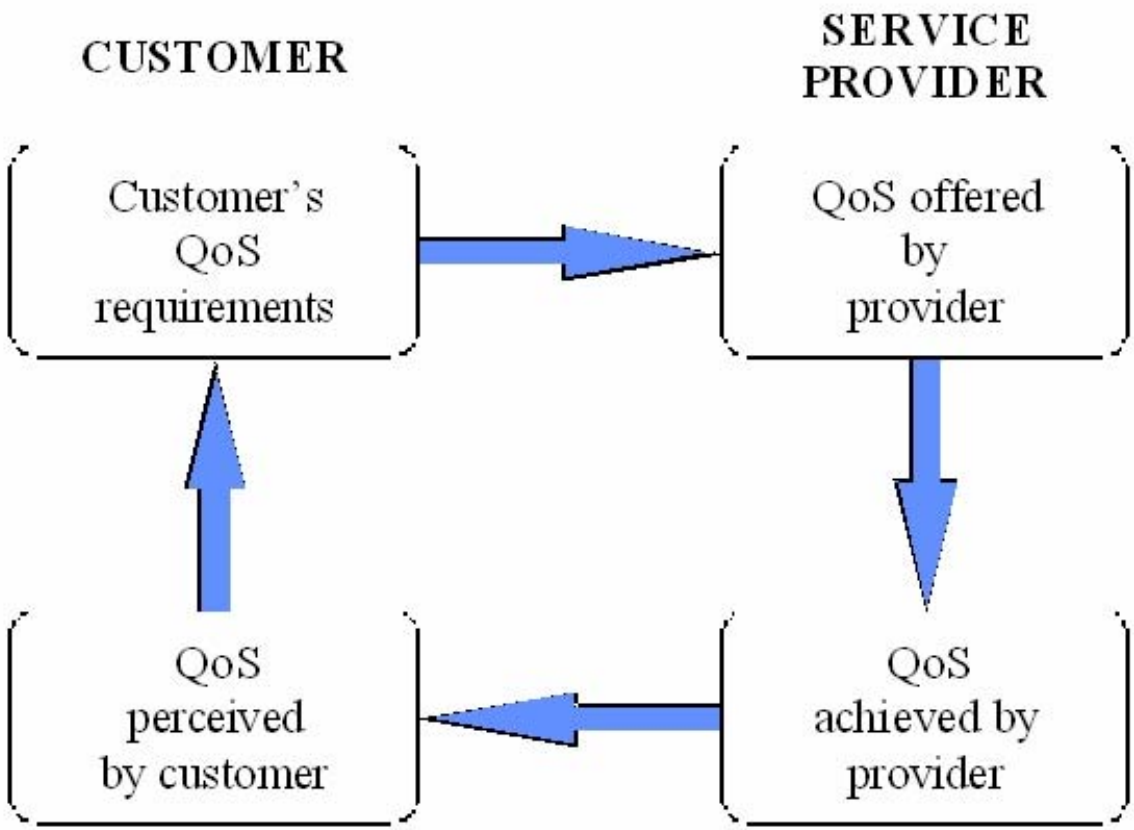
- ✓ ITU-T Handbook on QoS and Network Performance (http://www.itu.int/pub/T-HDB-QOS.02-2004/en)
- ✓ ITU-T Rec. G.1000 *Communications Quality of Service: A framework and definitions* (http://www.itu.int/rec/T-REC-G.1000-200111-I/en)
- ✓ ITU-T Recommendation E.800 *Terms and definitions related to quality of service and network performance including dependability* (http://www.itu.int/rec/T-REC-E.800-199408-I/en)
- ✓ ITU-T Rec. E.802 *Framework and methodologies for the determination and application of QoS parameters* (within approval procedure, TD16Rev1(PLEN/2), TIES account required)

Overview on ITU-T Handbook on QoS and Network Performance - Backup slides -

QoS criteria matrix QoS Handbook

		Service quality criteria						
		SPEED 1	ACCURACY 2	AVAILABILITY 3	RELIABILITY 4	SECURITY 5	SIMPLICITY 6	FLEXIBILITY 7
Service function								
SERVICE MANAGEMENT	1 Sales and pre-contract activities							
	2 Provision							
	3 Alteration							
	4 Service support							
	5 Repair							
	6 Cessation							
CONNECTION QUALITY	7 Connection establishment							
	8 Information transfer							
	9 Connection release							
10 Billing								
11 Network/Service management by customer								

Four viewpoints of QoS (G.1000)



Universal Model (E.802)

	Quality components and criteria			
	Performance criteria	*Aesthetic criteria*	*Presentational aspects*	*Ethical aspects*
Functional elements				
1. ...				
2. ...				
3. ...				
...				
...				
...				
n. ...				

Figure 1: Universal Model

Overview on ITU-T Handbook on QoS and Network Performance
- Backup slides -

Performance Model (E.802)

		Service Quality Criteria						
		SPEED 1	ACCURACY 2	AVAILABILITY 3	RELIABILITY 4	SECURITY 5	SIMPLICITY 6	FLEXIBILITY 7
Service Function								
SERVICE MANAGE -MENT	Sales & Pre-Contract Activities 1							
	Provision 2							
	Alteration 3							
	Service Support 4							
	Repair 5							
	Cessation 6							
CON-NECTION QUALITY	Connection Establish. 7							
	Information Transfer 8							
	Connection Release 9							
Billing 10								
Network/Service management by customer 11								

Figure 2: Performance Model

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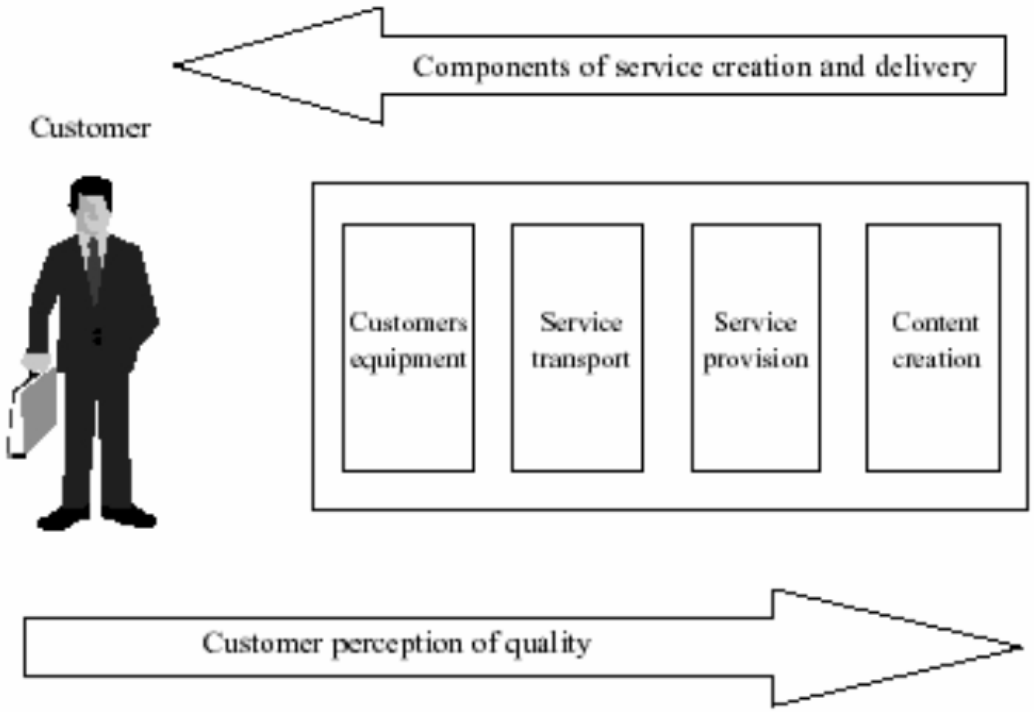
- Backup slides -

Four Market Model (E.802)



Model 3: Four Market model