INTERNATIONAL TELECOMMUNICATION UNION

CCITT

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

M.21

(11/1988)

SERIES M: GENERAL MAINTENANCE PRINCIPLES

Maintenance of international transmission systems and telephone circuits – Introduction

---

PRINCIPLES FOR MAINTENANCE PHILOSOPHY AND CONSIDERATIONS FOR MAINTENANCE STRATEGY FOR TELECOMMUNICATION SERVICES

Reedition of CCITT Recommendation M.21 published in the Blue Book, Fascicle IV.1 (1988)

NOTES

1 CCITT Recommendation M.21 was published in Fascicle IV.1 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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

Recommendation M.21

PRINCIPLES FOR MAINTENANCE PHILOSOPHY AND CONSIDERATIONS FOR MAINTENANCE STRATEGY FOR TELECOMMUNICATION SERVICES[1]

1 Introduction

The purpose of this Recommendation is to provide principles for a maintenance philosophy which can be applied to all telecommunication services, and from which a common strategy can be derived.

2 Quality of Service

An important concept in the consideration of a maintenance philosophy is that of Quality of Service (QOS).

This is defined in Recommendation E.800 [1] as "the collective effect of service performances which determine the degree of satisfaction of a user service".

3 Quality of Service factors

QOS comprises a number of Quality of Service factors or performances which are enumerated and defined in Recommendation E.800 [1] and listed below. Some of these comprise further factors.

They are illustrated in Figure 1/M.21 which is taken from Recommendation E.800 [1].

i) service support performance;

ii) service operability performance;

iii) serveability performance;

iv) service accessibility performance;

v) service retainability performance;

vi) service integrity;

vii) transmission performance;

viii) trafficability performance;

ix) propagation performance;

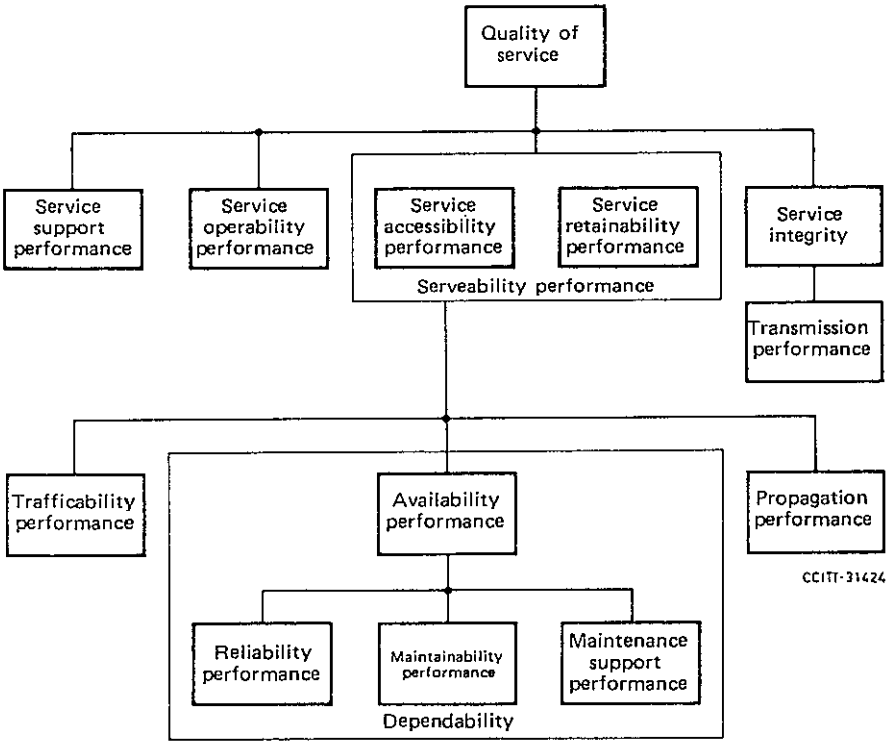
x) availability (performance);

xi) reliability (performance);

xii) maintainability (performance);

xiii) maintenance support (performance).

[1] It is intended that the subject matters contained in this Recommendation will be studied and developed further as the results of the work done in other Study Groups on Quality of Service concepts become available.



Note – Not all connections between service concepts have been shown in this figure, e.g., connection between service integrity and maintainability performance.

FIGURE 1/M.21
Performance concepts

4 Relationship between Quality of Service factors which are relevant in maintenance

Figure 1/M.21 indicates the relationship between the availability performance of individual items (e.g., terminal equipment, networks, etc.) which are used in the operation of a service and the serveability performance of that service. This relationship is such that, given satisfactory trafficability and propagation performances, then the availabiity performance of each item is the means by which satisfactory serveability of a service is obtained.

5 Principles of maintenance philosophy for telecommunication service

5.1 Serveability performance of a service should be completely and precisely defined, in terms of parameters to be taken into consideration and performance objectives, tolerances and conditions for these parameters.

5.2 Performance objectives of items used for services should be considered with reference to the serveability performance of these services.

5.3 In the case where an item is shared by services, then its performance objectives should be such as to enable the service with the most stringent serveability requirement to meet this, given that trafficability and propagation performance are satisfactory.

5.4 Maintenance arrangements for a service should be such that all Quality of Service factors which are relevant to maintenance are satisfactory.

5.5 As factors other than those of Quality of Service (maintenance and operation costs, durability of equipments, etc.) and a large variety of networks and services need to be taken into consideration when organizing maintenance, arrangements for maintenance of a service should be defined as far as possible within a common and global approach.

6 Maintenance considerations for new telecommunication services

6.1 When a new service is to be introduced, early consideration should be given to its operational and maintenance requirements. In practice, these will depend on its Quality of Service objectives and therefore on the performance

parameter objectives which are set for each item which is used for operating the service (e.g., terminal equipment, network, etc.). Thus each item should be considered individually.

6.2 If such an item is unique to a service, there will be new operational and maintenance requirements.

6.3 If such an item is not unique to a service and it is already used in providing an existing service, then consideration should be given to whether the existing operational and maintenance requirements need to be changed. This will depend on whether the performance parameter objectives are changed.

6.4 Operational and maintenance requirements should address the following areas:

- line-up and provisioning procedures;
- maintenance procedures, including those for fault prevention, detection, reporting and localization;
- restoration procedures;
- restoration requirements (e.g., maximum permitted number of restoration links in tandem, maximum permitted propagation delay, maximum tolerable interruption duration, degree of protection required);
- serveability performance;
- organization of operation and maintenance effort to deal with the above-mentioned areas;
- the interaction required between elements and centres of operation and maintenance effort;
- testing equipment and facilities for use within the operation and maintenance organization;
- the exchange of contact point information (as indicated in Recommendation M.93);
- maintenance limits for transmission performance parameters.

6.5 Consideration should also be given to whether, in the provision and maintenance of a service, these subject areas require inter-administration agreements or the development of specific CCITT Recommendations.

References

[1] CCITT Recommendation *Quality of Service and dependability vocabulary*, Vol. II, Rec. E.800.

ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	**TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits**
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems

Printed in Switzerland

Geneva, 2008