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MAN-MACHINE LANGUAGE

NETWORK MANAGEMENT ADMINISTRATION

ITU-T Recommendation Z.337

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Z.337 was published in Fascicle X.7 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.

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NETWORK MANAGEMENT ADMINISTRATION

1 General

This Recommendation has been developed in accordance with the methodology defined in Recommendations Z.332 and Z.333.

The main part of this Recommendation deals with the model of the Network Management Administration. A glossary of the terms used is also included.

The list of operator jobs and the list of system functions to be controlled are contained in Annex A.

For each system function to be controlled by means of MML, one or more MML functions can be derived and each of them can be described using the metalanguage defined in Recommendation Z.333, in order to detail the relevant information structure.

Annex B contains guidelines for the definition of the list of MML functions and the information structure diagrams associated to each of them to be used as guidelines.

2 Introduction

Network management is the function of supervising the network and taking action to control the flow of traffic so as to ensure the maximum utilization of the network in all situations. The objective is to enable as many calls as possible to be successfully completed. In its current scope, Network Management doesn't address the aspects of managing traffic on portions of the network that are leased or under the control of network customers.

According to CCITT Recommendations E.410 through E.414, E.502, Q.542 and Q.544, Network Management requires the performance of a certain number of activities to detect abnormal network conditions and to initiate the execution of corrective actions and/or controls. The general scenario of Network Management activities can be described through the involved information flow as depicted in Figure 1/Z.337. Network Raw Data related to traffic parameters and the status (i.e. level of overload, out of service conditions, etc.) of the Network Elements can be processed to provide Network Management Parameters, using the Network Reference Data which are necessary to calculate Network Management Parameters. The Network Raw Data are produced from Network Management Elements.

Network Management Parameters, describing the current network status and performance, can be related to some threshold values (representing the boundary between normal and abnormal behaviour) in order to detect abnormal conditions.

Abnormal Condition Reports, Network Management Parameters and other information (from telephone operators, work centres, news media, etc.) are used to identify the origin of the problem and, as a consequence, to decide the proper actions to be taken or the most suitable controls to be activated.

Network problem identification and consequent corrective actions can be handled manually or automatically by an "expert" system which is capable of performing the functions of abnormal condition detection, problem analysis and problem solving. All the activities carried out for Network Management can be handled by the operator supervision.

Furthermore, for cooperation, coordination and planning purposes, Network Management Reports could be distributed to other operating centres, to higher authorities, etc.

Depending on each Administration and network organization, Network Management activities can be partially or totally performed at exchange level or concentrated in one or more Network Management Centres.

Figure 2/Z.337 contains an example of how the general scenario can be applied to a particular operating organization. In this example, the functions shown for the Network Element and Network Management Operations System are performed by the system under operator control.

Considering the Network Management scenario and the operator activities (listed in Annex A to this Recommendation) three different sub-areas can be recognized:

- Network Management Data administration;
- Network Management Controls administration;
- Network Management Data Distribution administration.

Only the sub-areas for Network Management Data administration is covered by the present Recommendation. The remaining two sub-areas, namely Network Management Controls administration and Network Management Data Distribution administration are left for further study.

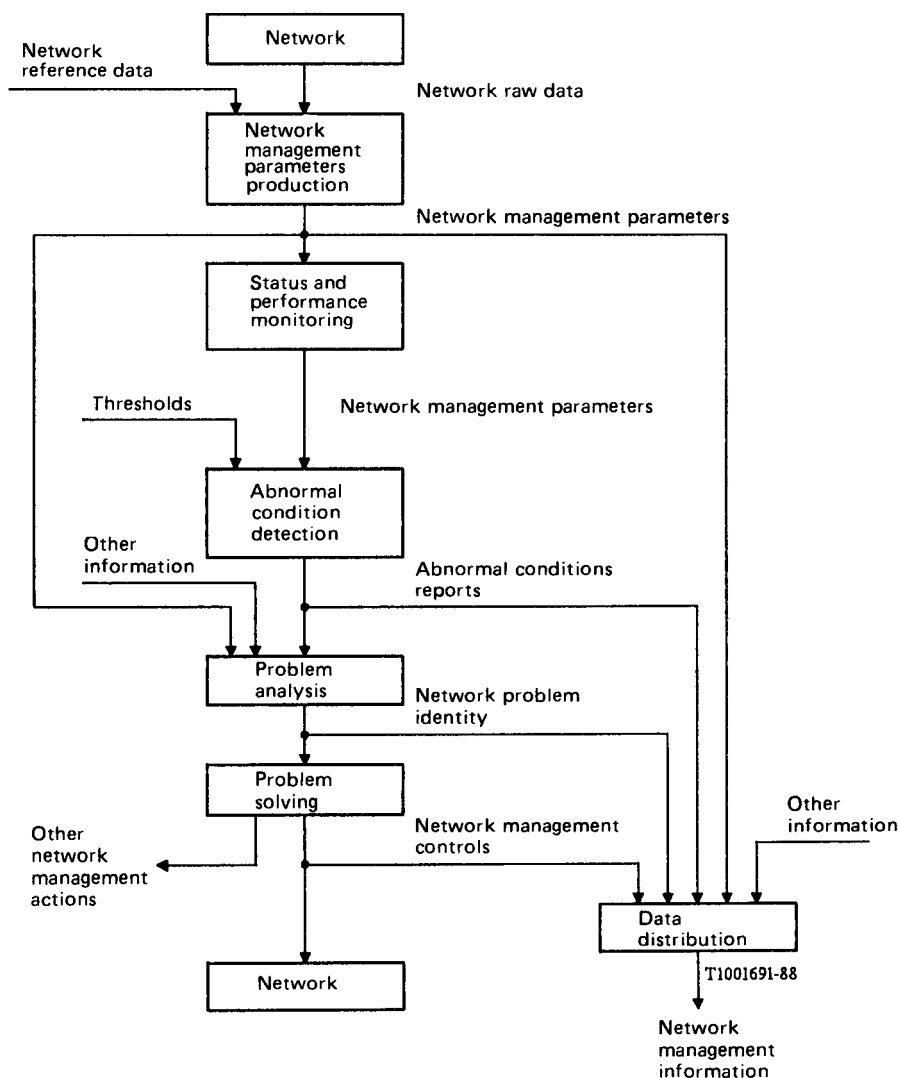


FIGURE 1/Z.337

General network management scenario



Note 2 – Controls may be taken in network elements via the network management system or by direct input to the network element.

Example of a practical application of the general scenario

3 Network Management Models

3.1 Introduction

According to the division of Network Management activities in three sub-areas as stated in § 2, three different models, as indicated in the following, have to be developed:

- Network Management Data administration model;
- Network Management Controls administration model;
- Network Management Data Distribution administration model.

3.2 Network Management Data administration model

Network Management Data administration sub-area concerns the operator activities for managing the set of information necessary to monitor the network status and performance. This information can be routed toward proper display and/or storage devices in the Network Management Centre or passed to remote Administrations under operator control.

Data administration is applied to the following data:

- Network Raw Data;
- Network Management Parameters;
- Network Management Indicators;
- Network Reference Data.

3.2.1 Network Raw Data

Network Raw Data describe, for each network management element, the current operating conditions (e.g. exchange load, number of in-service circuits, etc.) and traffic behaviour (e.g. number of seizures for circuits sub-group).

Network Raw Data are administered by the MML functions for Traffic Measurements Administration, therefore they are not considered in the Network Management functional area.

3.2.2 Network Management Parameters

Network Management Parameters describe the network status and performance in terms of entities (as indicated in Recommendation E.411) and Network Management Objects.

Network Management Objects are the set of Network Elements subject to measurement for Network Management purposes.

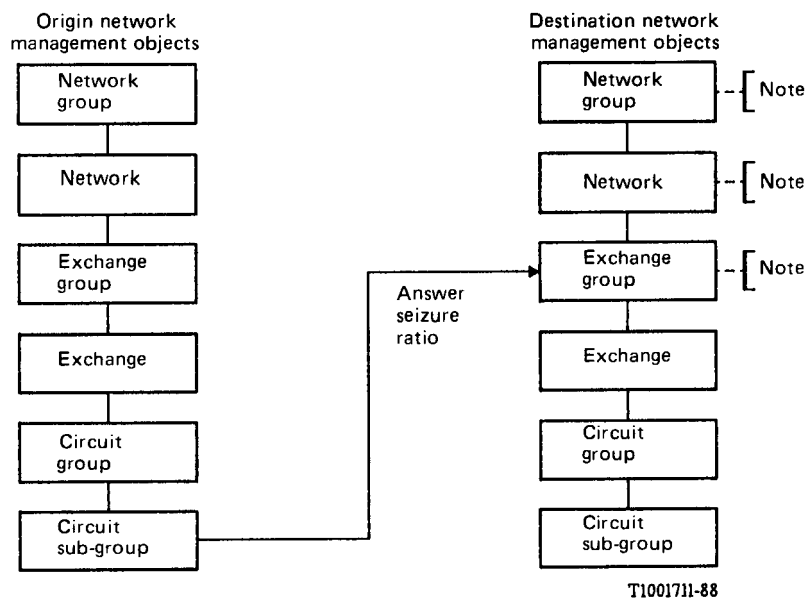
One or more Network Management Objects can be grouped as origin and/or destination objects to define traffic flow; the Network Management Objects are hierarchically presented below:

- network group;
- network;
- exchange group;
- exchange;
- circuit group;
- circuit sub-group.

Network management monitoring and control of circuit groups and circuit sub-groups can only be performed via an exchange.

In Figure 3/Z.337 is represented, as an example, a Network Management Parameter in terms of the entity “answer/seizure ratio” for traffic handled by a circuit sub-group and forwarded to a set of exchanges characterized by the same destination code.

Figure 3/Z.337: Network Management Parameter



Note – Identified only by destination code.

FIGURE 3/Z.337

Example of network management parameter

3.2.3 Network Management Indicators

Network Management Indicators represent the logical results (e.g. yes or no) obtained from the comparison of Network Management Parameters against a predefined set of numerical values (thresholds).

Numerical values associated with thresholds can be time-dependent (e.g. morning/afternoon hours, holidays, etc.).

3.2.4 Network Reference Data

Network Reference Data can be administered by the MML functions which are appropriate for each type of reference data, therefore they are not considered in the network management functional area.

3.3 Network management control administration model

To be developed.

3.4 Network management data distribution administration model

To be developed.

4 Glossary of terms

abnormal Condition Report

Information produced in the Network Management Centre after detection of abnormal network status or performance.

circuit group

The set of all switched circuits which directly interconnect one exchange with another.

circuit sub-group

A group of circuits within a circuit group which are uniquely identifiable for operational or technical reasons. A circuit group may consist of one or more circuit sub-groups.

exchange group

A set of exchanges which handles traffic forwarded to or coming from a specific geographical area (e.g. area code, switching centre, etc.).

network

All the exchanges which are relevant to the service standpoint operated by a company in a country.

network Element

Telecommunication equipment which may perform signalling, switching and transmission functions.

network group

A group of telecommunication networks relevant to the service standpoint (e.g. different operating companies offering the same service in the same country).

network management action

The activity performed, not necessarily in the network elements, to regulate traffic flow.

network Management Centre

A centre where network management functions are performed (e.g. O and M centre, switching centre).

network Management Control

The capabilities in network elements to regulate traffic flow and network operation in order to insure the maximum utilization of the network capacity in all situations of traffic overload and network element failure.

network Management Data

The set of information necessary to monitor, detect and identify a network problem.

network Management Indicator

A logical result of comparison of Network Management Parameters and thresholds comparison.

network Management Information

The set of information produced in the Network Management Centre describing the network status and performance, the abnormal conditions detected, the problems identity and the active network management controls.

network Management Object

A set of network elements under control of network management functions and/or subject to measurement for network management purposes.

network Management Parameters

Information produced in the Network Management Centre to be used for the production of abnormal condition report and for display on alerting devices.