INTERNATIONAL TELECOMMUNICATION UNION

CCITT E.491

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

TRAFFIC MEASUREMENT BY DESTINATION

Recommendation E.491

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is the permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation E.491 was prepared by Study Group II and was approved under the Resolution No. 2 procedure on the 16th of June 1992.

CCITT NOTE

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

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TRAFFIC MEASUREMENT BY DESTINATION

1 Introduction

Traditionally, traffic measurements for network planning and other purposes have been taken on a circuit group basis. These measurements could be used directly for circuit group administration, and, for hierarchical networks, could be combined with pre-defined routing information to approximate point-to-point traffic matrices.

However, these measurements do not allow accurate evaluation of end-to-end blocking, and thus, do not reflect the Quality of Service perceived by customers.

In addition, with widespread use of network management controls and dynamic routing where the concept of final trunk groups vanishes, destination-based measurements are required to allow evaluation of network performance and Quality of Service.

The use of destination-based traffic measurements can be beneficial in all three cycles of network operations which are described in Recommendation E.490. Because service problems are identified directly, trunk group additions and adjustments become straightforward and so do network traffic management actions.

It should be noted that the advent of multi-service integrated networks will require that data measured on a destination basis be further split into classes of service. This will be necessary in order to ensure service specific performance objectives in an environment where each service has its own traffic characteristics.

This Recommendation outlines two approaches to destination-based measurements and defines the operational layers to which they each apply.

2 Measurements from call records

2.1 *Description*

A call detail record (CDR) is created for each trunk seizure and is stored locally, until polled from a central area for direct access or downstream batch processing.

The CDR information can be used for QOS statistics, billing and revenue settlements but also for various traffic measurements.

For details of information to be recorded, reference is made to measurement types 15 and 16 in Recommendation E.502.

Using an off-line system, a large variety of traffic measurements such as erlang loading, 24 hour traffic distribution, call duration, set-up time, conversation time, answer seizure ratio (ASR), grade of service (GOS) and overflow, can be derived from the CDR.

These measurements can be computed by either origin, using the inlet source, or by destination, using the dialled digits, for both terminal and transit traffic.

Each measurement can be further broken down by exchange, trunk group, circuit, area code or even customer number.

The use of off-line reference tables to indicate the foreign country, city, exchange, the signalling type, facility type, etc. allows an almost unlimited flexibility in the sorting and grouping of the statistics extracted (i.e. by country, alternate route, high usage, final).

To avoid the double counting of traffic, any call record for calls switching through more than one exchange (within the same network) is matched by specific fields such as dialled digits, inlet source, identity of exchange outlet and regrouped into a complete record consisting of an incoming portion, an outgoing portion and as many intermediate portions as required (depending on the number of intermediate exchanges).

2.2 *Application*

This approach allows accurate forecasting of traffic, especially in toll networks where billing records are available and can be used to reflect precisely traffic trands in subtending networks.

Because it gives detailed description of the treatment given to calls, the call detail records provide valuable information for servicing and maintenance purposes without requiring any assumption on the routing.

3 Direct destination measurements

3.1 *Description*

Measurements on origin and destination basis can be made by direct measurement where the measurement object is the destination code, e.g. country code, numbering area code. Direct destination measurement may be performed on each route separately (measurement type 11 in Recommendation E.502) or for all outgoing traffic from an origin switch (measurement type 22 in Recommendation E.502). For each destination code, in addition to carried traffic, the number of bids/seizures and calls meeting congestion should be recorded. If possible, recording of the number of calls/seizures resulting in an answer signal should also be made. This gives valuable information in interpreting measurement results and could also be used for network management purposes Answer seizure ratio/Answer bid ratio (ASR/ABR).

3.2 *Application*

This approach allows direct identification of the corrective actions which are required in the network. Since these direct measurements are pegged for every call, a large sample of data can be analysed for given network topology and traffic conditions.

Because traffic data is typically aggregated on a switch basis, a small volume of data needs to be retained. Although somehow less precise than call detail records, this data can also be accumulated and used for forecasting.

If collected in near real-time, direct destination measurements can be used for network traffic management, thereby encouraging the use of dynamic routing strategies.

4 Measurement principles

All the considerations presented in Recommendation E.500 with respect to circuit group measurements also apply to destination-based measurements.

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