Recommendation T/CAC 3 (Stockholm 1989 (CAC))

MONITORING OF NETWORK PERFORMANCE ASPECTS OF QUALITY OF INTERNATIONAL PACKET-SWITCHED SERVICE USING INTERNALLY DERIVED INDICATORS

Recommendation proposed by the project team X.25

Text of the Recommendation adopted by the "Telecommunications" Commission:

"The European Conference of Posts and Telecommunications Administrations,

considering

— that Recommendation T/CAC 2 E on the measurement of packet network performance and quality of service identifies in particular the need to monitor two indicators, Unsuccessful NC calls ratio (UNCR) and Mean time between NC disconnections (MTNC), derived from internal network management information,

— that Recommendation T/CAC 2 E also identifies, with lower priority, the need to monitor the indicator Mean time between resets (MTRS), derived from internal network management information,

recommends

that the procedures to be used by Administrations for monitoring these indicators should be as defined below."

Note. Procedures for monitoring the lower priority indicator are at present for further study.

1.   UNSUCCESSFUL NC CALLS RATIO (UNCR)

1.1.   Definition

The Unsuccessful NC calls ratio (UNCR) indicator is defined as the proportion of all call attempts which are cleared, prior to entering the data transfer phase, with the clearing cause "Network congestion".

It may be calculated as the ratio C/A

where   C is the number of call attempts cleared, prior to entering the data transfer phase, with the clearing cause "Network congestion";

   A is the total number of call attempts (successful or not).

The value of the UNCR indicator reflects the degree of unavailability of service due to failures in the network, but will be exaggerated by any unsuccessful repeat attempts generated as a result of a network failure, and is thus partly dependent on user actions.

1.2.   Requirements

The validity of the indicator depends on the correct use of clearing causes by all networks involved. The correct use is defined in CCITT Recommendations X.25, X.75 and X.96.

The UNCR may be calculated from call records (such as are normally collected for billing and/or accounting purposes), providing that the following information is available for each recorded call attempt:

— whether or not the call entered the data transfer phase;

— whether or not the clearing cause was "Network congestion".

In addition, to perform the analysis of UNCR described below, the values of the following attributes must be available for each call attempt:

— the DNIC of the calling interface;

— the DNIC of the called interface;

— the date of the attempt.

Note. For a more detailed analysis of UNCR, the values of other attributes may need to be available for each call attempt, for example:

— the identities of the links used by the call;

— the sequence of TNICs (if any);

— the direction from which the clear was received;

— the CNIC (if present);

— the types of the calling and called interfaces;

— the time of the call attempt.

1.3. Procedures

Every calendar month each operator of a public X.25 network should compute the UNCR for all call attempts from its own network(s) to each other public X.25 network, observing the following conditions:
— the period over which the measurements are made should be one calendar month;
— each X.25 network counted as either a calling or a called network will be uniquely identified by a single DNIC, and have directly connected X.25 customers; a network not having any directly connected X.25 customer should not be counted as either a calling or a called network.

The operator should study the figures for UNCR thus computed and satisfy itself that no unexpected adverse result has been produced. This assessment may take into account both previous figures for the same traffic stream, figures for other traffic streams, and the size of the traffic stream. If an unexpected adverse result is found, the operator should investigate the cause by whatever practical means are available. All results should be checked before the end of the next calendar month.

Each operator of a public X.25 network should ensure that its partner operators are kept informed of the DNIC(s) of its network(s) with directly connected X.25 customers.

1.4. Processing

A body designated by CEPT will compile a single aggregate CEPT figure for UNCR for May and November of each year. The aggregate figure will be published and made freely available.

This implies that each operator will send its own computed UNCR results for each May and November, plus information on the number of call attempts used as a base in each case, to the body designated by CEPT.

Each operator may independently publish and make freely available every month its own computed figures for UNCR.

Each operator should as soon as possible inform its appropriate partner operators of the occurrence and suspected cause of any unexpected adverse UNCR result.

2. MEAN TIME BETWEEN NC DISCONNECTIONS (MTNC)

2.1. Definition

The Mean time between NC disconnections (MTNC) indicator is defined as the aggregate duration, expressed in hours, of all calls which entered the data transfer phase, divided by the number of those calls cleared with the clearing cause "Network congestion".

It may be calculated as the ratio D/P
where D is the total duration in hours of all calls which entered the data transfer phase;
         P is the number of calls which entered the data transfer phase and were cleared with the cause "Network congestion".

The value of the MTNC indicator reflects the degree of immunity from premature disconnection due to failures in the network, but will be exaggerated if network failures tend to occur during periods of higher than average traffic, and is thus partly dependent on user actions.

2.2. Requirements

The validity of the indicator depends on the correct use of clearing causes by all networks involved. The correct use is defined in CCITT Recommendations X.25, X.75 and X.96.

The MTNC may be calculated from call records (such as are normally collected for billing and/or accounting purposes), providing that the following information is available for each recorded call attempt:
— whether or not the call entered the data transfer phase;
— whether or not the clearing cause was "Network congestion";
— the duration of the call (prior to any rounding for billing or accounting purposes).

In addition, to perform the analysis of MTNC described below, the values of the following attributes must be available for each call attempt:
— the DNIC of the calling interface;
— the DNIC of the called interface;
— the date of the attempt.

Note. For a more detailed analysis of MTNC, the values of other attributes may need to be available for each call attempt, for example:
— the identities of the links used by the call;
— the sequence of TNICs (if any);
— the direction from which the clear was received;
— the CNIC (if present);
— the types of the calling and called interfaces;
— the time of the call attempt.

2.3. Procedures

Every calendar month each operator of a public X.25 network should compute the MTNC for all call attempts from its own network(s) to each other public X.25 network, observing the following conditions:
— the period over which the measurements are made should be one calendar month;
— each X.25 network counted as either a calling or a called network will be uniquely identified by a single DNIC, and have directly connected X.25 customers; a network not having any directly connected X.25 customer should not be counted as either a calling or a called network.

The operator should study the figures for MTNC thus computed and satisfy itself that no unexpected adverse result has been produced. This assessment may take into account both previous figures for the same traffic stream, figures for other traffic streams, and the size of the traffic stream. If an unexpected adverse result is found, the operator should investigate the cause by whatever practical means are available. All results should be checked before the end of the next calendar month.

Each operator of a public X.25 network should ensure that its partner operators are kept informed of the DNIC(s) of its network(s) with directly connected X.25 customers.

2.4. Processing

A body designated by CEPT will compile a single aggregate CEPT figure for MTNC for May and November of each year. The aggregate figure will be published and made freely available.

This implies that each operator will send its own computed MTNC results for each May and November, plus information on the number of calls used as a base in each case, to the body designated by CEPT.

Each operator may independently publish and make freely available every month its own computed figures for MTNC.

Each operator should as soon as possible inform its appropriate partner operators of the occurrence and suspected cause of any unexpected adverse MTNC result.