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HUMAN FACTORS

Traffic engineering – Definitions

TERMS AND DEFINITIONS OF TRAFFIC ENGINEERING

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NOTES

1 CCITT Recommendation E.600 was published in Fascicle II.3 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.

TERMS AND DEFINITIONS OF TRAFFIC ENGINEERING**Introduction**

This Recommendation provides terms and definitions for use in the field of traffic engineering. Traffic engineering includes measurements, forecasting, planning, dimensioning and performance monitoring. Traffic engineering has a goal of ensuring trafficability performance objectives for telecommunications services. Trafficability performance is one of the major factors in Quality of Service (QoS). Recommendation E.800 explains the relation of various Quality of Service factors and gives terms and definitions for Quality of Service concepts and for availability and reliability aspects.

The purpose of this vocabulary is to aid in the understanding of traffic engineering and related Recommendations. The terms defined here may also be defined differently for applications outside the area of traffic engineering.

Alternatives for the preferred terms are given following a semi-colon.

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1 General theory

1.1 communication

F: communication

S: comunicación

Transfer of information according to agreed conventions. The information flow need not be bidirectional.

1.2 connection

F: connexion

S: conexión

An association of resources providing means for communication between two or more devices in, or attached to, a telecommunication network.

- 1.3 **resource**
F: ressource
S: órgano
Any set of physically or conceptually identifiable entities within a telecommunications network, the use of which can be unambiguously determined.
- 1.4 **user**
F: usager
S: usuario
Any entity external to the network which utilizes connections through the network for communication.
- 1.5 **telecommunications traffic; teletraffic**
F: trafic de télécommunications: télétrafic
S: tráfico de telecomunicación; teletráfico
A process of arrivals and releases of demands for resources in a network.
Note – The unit for the variable traffic is the Erlang (symbol: E).
- 1.6 **observed traffic**
F: trafic observé
S: tráfico observado
Instantaneous observed traffic is the amount of occupied resources at a given instant. Average observed traffic is the time average of instantaneous observed traffic over a given period.
- 1.7 **poisson traffic; pure chance traffic**
F: trafic poissonnien: trafic de pur hasard
S: tráfico poissoniano
Traffic that has a Poisson distribution of arrivals.
Note – Poisson traffic has a peakedness factor equal to 1.
- 1.8 **peakedness factor**
F: facteur d'irrégularité
S: factor de irregularidad
The ratio of variance to mean of a traffic.
- 1.9 **smooth traffic**
F: trafic régularisé
S: tráfico con distribución uniforme
Traffic that has a peakedness factor less than 1.
- 1.10 **peaked traffic**
F: trafic survariant
S: tráfico con distribución en pico
Traffic that has a peakedness factor greater than 1.
- 1.11 **traffic volume**
F: volume de trafic
S: volumen de tráfico
The integral of the instantaneous traffic over a given time interval.
Note 1 – Traffic volume is equal to the sum of the holding times of the resources.
Note 2 – A unit used for traffic volume is the Erlang hour (symbol: E).

1.12 **erlang**

F: erlang

S: erlang

The unit of traffic (symbol: E). In traditional telephony the number of Erlangs is the number of busy resources or the expected number of busy resources under stated conditions.

1.13 **bid**

F: tentative de prise

S: tentativa de toma

A single attempt to obtain the use of a resource of the type under consideration.

Note – In a network management context, the absence of a qualification implies a bid to a circuit group, a route or a destination.

1.14 **seizure**

F: prise

S: toma

A bid that obtains the use of a resource of the type under consideration.

1.15 **idle (state)**

F: libre

S: reposo (estado de); estado libre

Condition of a resource that is free to be seized.

1.16 **busy (state)**

F: occupé

S: ocupado (estado de)

Condition of a resource following its seizure.

1.17 **release**

F: libération

S: liberación

The event which changes the condition of a resource from busy to idle.

1.18 **holding time**

F: durée d'occupation

S: tiempo de ocupación; tiempo de retención

The time between the seizure of a resource and its release.

1.19 **blocked mode of operation**

F: mode d'exploitation avec blocage

S: modo de operación con bloqueo (de llamadas)

A mode of operation in which bids which find no suitable resources idle and accessible are not permitted to wait.

1.20 **delay mode of operation**

F: mode d'exploitation avec attente

S: modo de operación con espera (de llamadas)

A mode of operation in which bids which find no suitable resources idle and accessible are permitted to wait.

1.21 **call congestion**

F: encombrement d'appel

S: congestión de llamadas

The probability that a bid to a particular pool or resources will not result in an immediate seizure.

1.22 **time congestion**

F: congestion temporelle

S: congestión temporal

The proportion of time that a particular pool of resources does not contain any idle resource.

1.23 **waiting time ; queuing time**

F: temps de mise en attente

S: tiempo de espera; tiempo de cola

In delay mode of operation, the time interval between the bid for a resource and its seizure.

2 Calls

2.1 **call**

F: appel

S: Ramada

A generic term related to the establishment, utilization and release of a connection. Normally a qualifier is necessary to make clear the aspect being considered, e.g. call attempt.

2.2 **call intent**

F: intention d'appel

S: intención de llamada; intento de llamada

The desire to establish a connection to a user.

Note – This would normally be manifested by a call demand. However, demands may be suppressed or delayed by the calling user's expectation of poor Quality of Service performance at a particular time.

2.3 **call demand**

F: demande d'appel

S: demanda de llamada

A call intent that results in a first call attempt.

2.4 **call attempt**

F: tentative d'appel

S: tentativa de llamada

An attempt to achieve a connection to one or more devices attached to a telecommunications network.

Note – At a given point in the network a call attempt is manifested by a single unsuccessful bid, or a successful bid and all subsequent activity related to the establishment of the connection.

2.5 **first call attempt**

F: première tentative d'appel

S: primera tentativa de llamada

The first attempt of a call demand that reaches a given point of the network.

2.6 **repeated call attempt; reattempt**

F: tentative d'appel répétée

S: tentativa de llamada repetida

Any of the call attempts subsequent to a first call attempt related to a given call demand.

Note – Repeated call attempts may be manual, i.e. generated by humans, or automatic, i.e. generated by machines.

2.7 **call string**

F: chaîne d'appel

S: cadena de llamada

All the call attempts related to a single demand.

2.8 **blocked call attempt**

F: tentative d'appel bloquée

S: tentativa de llamada bloqueada

A call attempt that is rejected owing to a lack of resources in the network.

2.9 **abandoned call attempt**

F: tentative d'appel abandonnée

S: tentativa de llamada abandonada

A call attempt aborted by the calling user.

2.10 **successful call attempt; fully routed call attempt**

F: tentative d'appel acheminée

S: tentativa de llamada fructuosa; tentativa de llamada totalmente encaminada

A call attempt that receives intelligible information about the state of the called user.

2.11 **completed call attempt; effective call attempt**

F: tentative d'appel ayant abouti; tentative d'appel efficace

S: tentativa de llamada completada; tentativa de llamada eficaz

A successful call attempt that receives an answer signal.

2.12 **successful call**

F: appel ayant abouti

S: llamada fructuosa

A call that has reached the wanted number and allows the conversation to proceed.

2.13 **completion ratio**

F: taux d'efficacité

S: relación respuesta/toma; tasa de completion; tasa de eficacia

The ratio of the number of completed call attempts to the total number of call attempts, at a given point of a network.

2.14 **answer seizure ratio (ASR)**

F: taux de prise avec réponse (TPR)

S: tasa de tomas con respuesta (TTR)

On a route or a destination code basis, and during a specified time interval, the ratio of the number of seizures that result in an answer signal, to the total number of seizures.

2.15 answer bid radio (ABR)

F: taux de tentatives de prise avec réponse (TTPR)

S: tasa de tentativas de toma con respuesta (TTTR)

On a route or a destination code basis and during a specified time period, the ratio of the number of bids that result in an answer signal, to the total number of bids.

2.16 calling rate

F: taux d'appel

S: tasa de llamadas

The number of call attempts at a given point, over a period of time, divided by the duration of the period.

2.17 dialling-time

F: durée de numérotation

S: tiempo de marcación

Time interval between the reception of dial tone and the end of dialling of the calling user.

3 Circuits

3.1 circuit

F: circuit (de télécommunication)

S: circuito

A transmission means which allows communication between two points.

3.2 trunk circuit

F: circuit (commuté)

S: circuito (entre centrales); circuito troncal

A circuit terminating in two switching centres.

3.3 one way; unidirectional

F: à sens unique; unidirectionnel

S: en un solo sentido; unidireccional

A qualification applying to traffic or circuits which implies that the establishment of a connection always occurs in one direction.

3.4 two way ; bidirectional

F: à double sens; bidirectionnel

S: en ambos sentidos; bidireccional

A qualification applying to traffic or circuits which implies that the establishment of a connection may occur in either direction.

3.5 circuit group

F: faisceau (de circuits)

S: haz de circuitos

A group of circuits which are traffic engineered as a unit.

3.6 **circuit subgroup**

F: sous-faisceau

S: subhaz de circuitos

A part of a circuit group with similar characteristics (e.g. type of signalling, type of transmission path, etc.).

3.7 **first choice circuit group**

F: faisceau de premier choix

S: haz de circuitos de primera elección

With respect to a particular traffic relation, the circuit group to which this traffic is first offered.

3.8 **high usage circuit group**

F: faisceau débordant

S: haz de circuitos de gran utilización

With respect to a particular traffic relation, a circuit group that is traffic engineered to overflow to one or more other circuit groups.

3.9 **final circuit group**

F: faisceau final

S: haz final de circuitos

With respect to a particular traffic relation, a circuit group from which there is no possibility of overflow to another circuit group within the routing scheme currently in effect.

3.10 **fully provided circuit group**

F: faisceau totalement fourni

S: haz de circuitos totalmente provisto

With respect to a particular traffic relation, a circuit group which is the first choice circuit group for this traffic and which is traffic engineered as a final circuit group.

4 **Grade of service**

4.1 **grade of service (GOS)**

F: qualité d'écoulement du trafic

S: grado de servicio (GDS)

A number of traffic engineering variables used to provide a measure of adequacy of a group of resources under specified conditions; these grade of service variables may be probability of loss, dial tone delay, etc.

Note 1 – The parameter values assigned as objectives for grade of service variables are called grade of service standards.

Note 2 – The values of grade of service parameters achieved under actual conditions are called grade of service results.

4.2 **quality of service variable**

F: variable de qualité de service

S: variable de calidad de servicio

Any performance variable (such as congestion, delay, etc.) which is perceivable by a user.

Note – For a description of the relations of quality of service factors see Recommendation E.800.

4.3 **dial-tone delay**

F: durée d'attente de tonalité

S: demora del tono de invitación a marcas; periodo de espera del tono de invitacion a marcar

Time interval between off hook and reception of dial tone.

4.4 **post-dialling delay**

F: attente après numérotation

S: demora después de marcar; periodo de espera después de marcar

Time interval between the end of dialling by the user and the reception by him of the appropriate tone or recorded announcement, or the abandon of the call without tone.

4.5 **answer-signal delay**

F: délai du signal de réponse

S: demora de la señal de respuesta

Time interval between the establishment of a connection between calling and called users, and the detection of an answer signal at the originating exchange.

4.6 **incoming response delay**

F: durée de présélection

S: demora de la preselección; duración de la preselección

The interval from the instant when an incoming seizure is recognizable at the incoming side of the exchange to the instant when the proceed to send signal is sent to the preceding exchange by the receiving exchange.

Note – This definition is only applicable in the case of channel associated signalling.

4.7 **exchange call set-up delay**

F: durée de sélection d'un commutateur

S: demora de establecimiento de la comunicación por una central; tiempo de establecimiento de la comunicación por una central

The interval from the instant when the address information required for setting up a call is received at the incoming side of the exchange to the instant when the seizing signal or the corresponding address information is sent to the subsequent exchange.

4.8 **through-connection delay**

F: durée d'établissement d'un commutateur

S: demora de transconexión; tiempo de transferencia de una central

The interval from the instant when the information required for setting up a through-connection in an exchange is available for processing in the exchange, to the instant when the switching network through-connection is established and available for communication.

4.9 **internal blocking**

F: blocage interne

S: bloqueo interno

The probability that a connection cannot be made between a given point in a network and any suitable idle resource in an external pool of resources owing to call congestion within the portion of the network being considered.

4.10 **external blocking**

F: blocage externe

S: bloqueo externo

The probability that a connection cannot be made between a given point in a network and any suitable resource in an external pool of resources owing to call congestion within the pool of resources.

5 Traffic engineering

5.1 busy hour

F: heure chargée

S: hora cargada

The continuous 1-hour period lying wholly in the time interval concerned for which the traffic or the number of call attempts is greatest.

5.2 average daily peak hour traffic

F: moyenne du trafic des heures chargées

S: trafico medio de las horas punta

The average busy hour traffic of several days; it is usually not related to the same hour each day.

5.3 time consistent busy hour

F: heure chargée moyenne

S: hora cargada media repetitiva o sistemática

The 1-hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration.

5.4 day to busy hour ratio

F: rapport du trafic journalier au trafic à l'heure chargée

S: relación del tráfico diario al tráfico en la hora cargada

The ratio of the 24-hour day traffic volume to the busy hour traffic volume.

Note – Busy hour to day ratio is also used.

5.5 traffic carried

F: trafic écoulé

S: tráfico cursado

The traffic served by a pool of resources.

5.6 traffic offered

F: trafic offert

S: tráfico ofrecido

The traffic that would be carried by an infinitely large pool of resources.

5.7 effective traffic

F: trafic efficace

S: tráfico eficaz

The traffic corresponding only to the conversational portion of effective call attempts.

5.8 overflow traffic

F: trafic de débordement

S: tráfico de desbordamiento

The part of the traffic offered to a pool of resources which is not carried by that pool of resources.

5.9 blocked traffic

F: trafic bloqué

S: tráfico bloqueado

The part of the overflow traffic that is not carried by subsequent pools of resources.

- 5.10 **lost traffic; abandoned traffic**
F: trafic perdu; trafic abandonné
S: tráfico perdido; tráfico abandonado
That part of the blocked traffic which does not result in reattempts.
- 5.11 **suppressed traffic**
F: trafic non exprimé; trafic supprimé
S: tráfico suprimido
The traffic that is withheld by users who anticipate a poor quality of service (QOS) performance.
- 5.12 **origin**
F: origine
S: origen
The location of the calling user. This may be specified to whatever accuracy is necessary.
- 5.13 **destination**
F: destination
S: destino
The location of the called network termination. This may be specified to whatever accuracy is necessary; in international working, the area or country code is usually sufficient.
- 5.14 **traffic relation**
F: flux de trafic
S: relación de tráfico
The traffic between a particular origin and a particular destination.
- 5.15 **traffic matrix**
F: matrice de trafic
S: matriz de tráfico
A structured presentation of the traffic between a number of origins and destinations.
- 5.16 **originating traffic**
F: trafic de départ
S: tráfico de origen
Traffic generated within the network considered, whatever its destination.
- 5.17 **terminating traffic**
F: trafic d'arrivée
S: tráfico de destino
Traffic which has its destination within the network considered, whatever its origin.
- 5.18 **internal traffic**
F: trafic interne
S: tráfico interno
Traffic originating and terminating within the network considered.
- 5.19 **incoming traffic**
F: trafic entrant
S: tráfico entrante
Traffic entering the network considered, from outside it, whatever its destination.

- 5.20 **outgoing traffic**
F: trafic sortant
S: tráfico saliente
 Traffic leaving the network considered, destined for sinks located outside it, whatever its origin.
- 5.21 **transit traffic**
F: trafic de transit
S: tráfico de transito
 Traffic passing through the network considered.
- 5.22 **traffic distribution imbalance**
F: déséquilibre interne de trafic
S: desequilibrio de la distribución interna de tráfico
 Unevenly distributed traffic among similar resources.
- 5.23 **route**
F: voie d'acheminement
S: ruta
 One or more circuit groups providing a connection between switching centres.
- 5.24 **traffic routing**
F: acheminement de trafic
S: encaminamiento de tráfico
 The selection of routes, for a given traffic relation; this term is applicable to the selection of circuit groups by switching systems or operators, or to the planning of routes.
- 5.25 **call routing**
F: acheminement d'appel
S: encaminamiento de la llamada
 The selection of appropriate circuit subgroups or individual circuits for a particular call attempt.
- 5.26 **alternative route ; alternate route**
F: voie d'acheminement détourné
S: ruta alternativa
 A second, or subsequent choice route between two switching centres usually consisting of two or more circuit groups in tandem.
- 5.27 **network cluster**
F: faisceau de faisceaux
S: agrupación de haces
 A final circuit group and all the high usage circuit groups which have at least one traffic relation for which the final circuit group is in the last choice route.
- 5.28 **equivalent random traffic**
F: trafic equivalent
S: tráfico aleatorio equivalente
 The theoretical poisson traffic that, when offered to a theoretical circuit group (equivalent random circuit group) produces an overflow traffic with a mean and variance equal to that of a given offered traffic.
Note – The equivalent random traffic and circuit group represent the traffic impact of a more complex arrangement of offered traffics and high usage circuit groups.

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