Terms and Definitions

This section[1] defines terms that appear in the IEEE 802.17 resilient packet ring (RPR) specification. A term is a word that has a specific technical interpretation. Terms referenced within a definition are italicized.

The following rules are applied:
- The expansion of an acronym is not capitalized even in cases where the source document does capitalize the expansion.
- U.S. English spellings are used in cases where there are multiple English spellings (e.g. color vs. colour).
- In cases of alternative U.S. English spellings (e.g. queueing vs. queuing), the most common, or preferred, spelling is used.
- In cases where there is not a preferred spelling, a spelling is chosen and used consistently.
- Circular definitions are avoided.

802.17 adopts terms and definitions from existing specifications unless there is a reason to do otherwise. Preference is generally given to existing IEEE 802 definitions. This section describes adopted terms and their sources, modifications to existing definitions related to their use in the 802.17 context, and new terms and definitions associated with the 802.17 standard. Sources include:

IEEE 802	LAN/MAN
ISO X.200 (OSI)	Abstract concepts associated with layers, protocols, etc.
ANSI X3.139 (FDDI)	Station and ring structure
ITU I.233 (frame relay)	QoS
FRF.13/.19 (frame relay forum)	Service Level Definitions / OA&M

List of Terms[2] Arranged by Subject

protocol

resilient packet ring (RPR) A *connectionless* ring-based *MAC protocol* appropriate for *LAN*, *MAN*, or *WAN* deployment[3].

IEEE Std. 802.17: The IEEE *resilient packet ring* standard.

802.17: *IEEE Std. 802.17*.

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[1] This document is a ***draft*** (version 6/6/01) of a proposed *terms and definitions* section of the IEEE 802.17 specification. It is incomplete and is known to have bugs. Comments can be directed to bob.sultan@fnc.fujitsu.com. The working version of this section contains some terms that will not appear in the final document but are useful for discussion.

[2] A term/definition preceded by [HvA-Ed] is based-on the definition as proposed by Harmen van As in his posting of 4/17/01, with some modification. The reader can consult Harmen's posting to compare modified definitions with originals. A term preceded by [HvA-Alt] proposes a definition that differs in meaning from Harmen's definition.

[3] Or should this be specifically the protocol standardized by the IEEE?

spatial reuse protocol (SRP): An *RPR protocol* proposed by Cisco Systems, described in IETF RFC 2892, August 2000.

network

network (data transmission): [IEEE 100[4] (COM/SUB/PE) 99-1992, 599-1985] A series of points interconnected by communication channels.

local area network (LAN): [adapted from IEEE 100 (C/DIS) 1278.2-1995, 1278.3-1996[5]] A communications network designed for a user premises, typically not exceeding a few kilometers in length, and characterized by moderate to high data transmission rates, low delay, and low bit error rates.

metropolitan area network (MAN): [IEEE 100 (C/LM) 8802-6-1994] A *network* for connecting a group of individual *stations* and *networks* [for example, *local area networks (LANS)*] located in the same urban area. Note: A *MAN* generally operates at a higher speed than the networks interconnected, crosses network administrative boundaries, may be subject to some form of regulation, and supports several access methods.

regional area network (RAN): A *MAN* spanning multiple urban areas.

wide area network (WAN): [IEEE 100 (C/DIS) 1278.2-1995] A communications network designed for large geographic areas. Sometimes called *long-haul* network.

medium

transmission medium:: [IEEE 100 (C/LM) 8802-6-1994] The material on which information signals may be carried; e.g., optical fiber, coaxial cable, and twisted-wire pairs.

medium: *Transmission medium.*

layer/sublayer

medium access control (MAC) sublayer: [IEEE 100 (C/LM) 8802-5-1995] The portion of the *data station* that controls and mediates the access to the *ring*.

logical link control (LLC) sublayer: [C/LM 8802-5-1992s] That part of the *data link layer* that supports *media* independent *data link* functions, and uses the services of the *medium access control sublayer* to provide services to the *network layer*.

physical layer (PHY): [(C/LM) 8802-5-1995] The layer responsible for interfacing with the transmission medium. This includes conditioning signals received from the MAC for transmitting to the medium and processing signals received from the medium for sending to the MAC.

reconciliation sublayer (RS): [adapted from IEEE 100 (C/LM) 802.3 -1998[6]] A mapping function that reconciles the signals at the media independent interface (MII) to the media access control (MAC) – physical signaling sublayer (PLS) service definitions.

MAC client: The *protocol layer* (or *sublayer*) immediately above the *MAC layer*. Generally the *network layer* or *logical link control (LLC) sublayer*.

upper-layers: The collection of *protocol layers* above the *data-link layer*.

layer entities

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[4] The Authoritative Dictionary of IEEE Standards Terms

[5] 'moderate sized geographic area' replaced by 'user premises, typically not exceeding a few kilometers in length,'

[6] . The word 100BASE-T, appearing in the original, has been omitted.

physical layer entity (PHY)[7]:: [(C/LM) 802.3-1998] That portion of the physical layer between the medium dependent interface (MDI) and media independent interface (MII) consisting of the physical coding sublayer (PCS), physical medium attachment (PMA), and, if present, physical medium dependent (PMD) sublayers. The PHY contains the functions that transmit, receive, and manage the encoded signals that are impressed on and recovered from the physical medium.

layer agnosticism[8]

NOTE: I am still puzzled by 'agnosticism'. Is there any MAC that is *not* medium agnostic? The notion of the (PHY) reconciliation sublayer (RS) seems to be part of the layer model. To me this implies that agnosticism is also part of the model. Is there any MAC that looks at the upper layer payload? Can someone describe why we need to specify agnosticism?!!!!

medium[9] agnostic Denotes a *MAC* sublayer that can operate with arbitrary physical layer alternatives, requiring a *reconciliation sublayer* for each specific PHY type supported.

payload agnostic: Denotes a *MAC sublayer* that can operate with arbitrary upper-layer protocol alternatives.

station

station (data station): [adapted[10] from IEEE 100 (C/EMB/LM) 1073.3.1-1994, 1073.4.1-1994, 8802-5-1995] A device that may be attached to a shared medium network for the purpose of transmitting and receiving information on that shared medium. A data station is identified by a destination address.

source station: The *station* that *inserts* a given frame into a ring**.**
destination station : A *station* that *copies* a given frame from a ring[11].
downstream station: A *station* that lies *downstream* of a given *station* with respect to a *ringlet*.

upstream station: A *station* that lies *upstream* of a given *station* with respect to a *ringlet*.

source (data source): [ISO/IEC2382-25 25.01.15] The functional unit that provides data for transmission. (2) [IEEE 100 (PE) 599-1985w] (data transmission) The equipment which supplies data signals that enter into a data link (3) [IEEE 100 (C) 610.7-1995] The functional unit that originates data for transmission. Contrast: data sink.**sink (data sink): (1)**[ISO/IEC2382-25 25.01.16] The functional unit that provides data for transmission. (2) [IEEE 100 (PE) 599-1985w] (data transmission) The equipment which accepts data signals after transmission (3) [IEEE 100 (C) 610.7-1995] The functional unit that accepts transmitted data. Contrast: data source.

port: (1) A *PHY-layer entity* associated with a *station*. The *port* is the point of *ingress* for *frames* entering a *station* from a *segment* and the point of *egress* for *frames* exiting a *station* via a *segment*. (2) [Adapted from IEEE 100 (C/LM) 802.1G-1996, 8802-5-1995] A signal interface provided by token ring stations, passive concentrator lobes, active concentrator lobes, or

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[7] IEEE 100 refers to both the *physical layer* and the *physical layer entity* as the *PHY*. This must be an error.
[8] It is not clear to me that either of these terms is meaningful. Doesn't the concept of layering include this kind of agnisticism?
[9] Standards documents are split on whether this is medi*a* or medi*um*. Medium, the singular, seems more appropriate and is used here.
[10] *Local area network (LAN)* has been changed to *network*.
[11] The definition allows zero or more destination stations in the case of a multicast. Note that the multicast frame source station is not a destination station for that frame. The source strips, but does not copy, the frame.

concentrator trunks[12] that is generally terminated at a media interface connector (MIC). Ports may or may not provide physical containment of channels.

link/segment

transmission channel: [ISO/IEC2382-9 09.02.14] A means of transmission of a signal in one direction between two points.

channel: *Transmission channel*.

forward channel: [ISO/IEC2382-9 09.02.15] A *transmission channel* in which the direction of transmission is restricted to the direction in which user data are being *transferred*.

backward channel : [ISO/IEC2382-9 09.02.16] A *transmission channel* associated with the *forward channel* but with the opposite direction of *transmission* in which the direction of *transmission* is restricted to the direction in which user data are being *transferred*, used for supervisory and error control signals.

link: One of the individual unidirectional transmission channels interconnecting adjacent *stations*[13]. Consistent with [IEEE 802.3 1.4.153]. **segment:** The set of *links* interconnecting adjacent *stations*. A *station* on a *ring* is connected to each of its two neighbor stations by a segment.

link aggregation group:: [IEEE 802.3 1.4.154]

link partner:: [1.4.156]

ring/ringlet

ring: (1)The collection of *stations* and *segments* forming a *resilient packet ring*. (2) The collection of concentric ringlets forming a *resilient packet ring*.

ringlet: (1) A collection of *stations* and *links* arranged in a unidirectional circular configuration. (2) [IEEE 100 (C/MM) 1596-1992] The closed path formed by the connection that provides feedback from the output link of a node to its input link. This connection may include other nodes or switch elements.

ring medium: The abstraction of a *ring* as a continuous circular *transmission medium*.

dual-ring: A *ring* composed of exactly two concentric *ringlets*.

multi-ring: A *ring* composed of multiple concentric *ringlets*.

opposing ringlet: A *ringlet* whose *traffic* travels in the direction opposite that of a given *ringlet*.

downstream[14]: The direction in which *data frames* circulate on a *ringlet*.

upstream[15]: The direction opposite to the *downstream* direction on a *ringlet*.

ring interconnection

interconnected rings: *Rings* that intersect at one or more points.

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[12] Changed “token ring stations, passive concentrator lobes, active concentrator lobes, or concentrator trunks” to “stations”.

[13] A *station* on a *dual-ring*, for example, terminates four *links* under normal conditions.

[14] The definition that appears in IEEE 100 is not applicable: The direction of data flow along a bus, i.e., away from the Head of Bus function. (C/LM) 8802-6-1994

[15] The definition that appears in IEEE 100 is not applicable: The direction along a bus that is towards the head of bus function. This is opposite to the direction of data flow along a bus. (C/LM) 8802-6-1994

biconnected rings: *Rings* that intersect at exactly two points.

multiconnected rings: *Rings* that intersect at more than two points.

bridge[16]

bridge: A functional unit interconnecting two or more *rings* at the *802.17 MAC layer*. [ISO/IEC2382-25 25.01.12] A functional unit that interconnects two local area networks that use the same logical link control protocol but may use different medium access control protocols.

bridged metropolitan area network (bridged MAN) : [17]

A concatenation of individual metropolitan area networks interconnected by MAC bridges.

transparent bridge:

encapsulating bridge:

address

broadcast address: [ISO/IEC2382-25 25.01.13] A group address that identifies the set of all *stations* on the *network.*

individual address: [ISO/IEC2382-25 25.01.14] An address that identifies a particular *station* on a *network.*

group address: [ISO/IEC2382-25 25.01.15] An address that identifies a group of *stations* on a *network.*

multicast address: [ISO/IEC2382-25 25.01.16]. A group address that identifies a subset of the *stations* on a *network*

frame/packet

frame: A *MAC-layer PDU*. The term frame can be prefixed with an orientation (*ingress, egress, inbound, outbound*) or an operation (*inserted, copied, stripped, transit*).

data frame: A *frame* carrying *user data* (including *upper-layer* control information).

control frame: A *frame* carrying only *MAC layer* control information.

packet: A *frame* to which has been added those fields that are medium dependent[18] [1.4.198]. The term *L3 PDU* should be used instead of the term *packet* when referencing a *network-layer PDU*.

stream/flow

stream: [1.4.263]
conversation: [1.4.263]
data-stream: A *stream*.
point-to-point data-stream: A *data-stream* flowing between two specific *stations* on the network.

multipoint data-stream: A data-stream flowing from one station on the network and to multiple stations on the network.

traffic: Generic term for the *stream* of *frames* circulating on a *ring*.

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[16] These *bridge* related terms are under construction.
[17] Adapted from **bridged LAN** [IEEE 100 (C/LM) 10038-1993, 802.1G-1996] by replacing **LAN** with **MAN**.
[18] This appears to be the 802 view of a *packet*. While I usually think of a *packet* as an *L3 PDU*, I'm not sure that the name *resilient **packet** ring* would still be appropriate if *packet* meant *L3 PDU*.

flow: A specific *stream* of *frames* identified by one or a combination of values carried in the *protocol header(s)* of *PDU*s at the *MAC layer* and above.

orientation

inbound : The direction of arrival of a *frame* at a *station* via a *ringlet*.

outbound : The direction of departure of a *frame* from a *station* via a *ringlet*.

ingress : The direction from the *upper layer* towards the *station*.

egress : The direction towards the *upper layer* from the *station*.

operation

insert : The placement of a *frame* on the *ring* by a *station*.

strip (stripping) : The removal of a *frame* from the *ring* at a *station*. *Strip* is the inverse operation of *insert*. [ISO 8802.25 25.04.09] An action taken by an originating data station to remove its frames from the network after a successful transit of the data around the ring.

destination stripping [HvA-Ed]: The removal of *frames* at the *destination station*.

source stripping : The removal of *frames* at the *source station*.

copy (copying) : The delivery of a *frame* to the *upper-layer* with or without *stripping*.

transit : The passing of a *frame* through a *station* via the *ring*[19].

transmit (transmission) : The sending of a *frame* on a *link* by a *station*. Consistent with [ISO/IEC2382-09 9.01.02]. The transfer of data from one point to one or more other points over telecommunications facilities.

data transmission: transmission

receive (receipt, reception) : The *reception*[20] of a *frame* on a *link* by a *station*.

transfer : [ISO/IEC2382-09 9.03.01] To send from one location and receive at another. Used also for the movement of an SDU from one layer to an adjacent layer.

prepend: [1.4.215]

discard : [FRF glossary]

encapsulation:

time/rate

bit rate: [ISO/IEC2382-09 9.03.01] The speed at which bits are transferred.

bit time (BT): [1.4.50] This definition is specific to the MAC layer. When this term is used, the point of measurement should be made clear by the context.

actual transfer rate: transfer rate

transfer rate: [ISO/IEC2382-09 9.05.21] The average number of bits, characters or blocks transferred per unit time between two points.

effective transfer rate: [ISO/IEC2382-09 9.05.22] The average number of bits, characters or blocks transferred per unit time between two points and accepted as valid at the destination.

activation

[19] Includes the case of wrapping, if supported.
[20] Any ideas on avoiding circularity here?

plug-and-play : (Alt. 1) The requirement that a station be capable of Topology Discovery and optional insertion and drop of user frames without manual intervention other than the physical connection of the equipment[21].
(Alt. 2) The property that a station be operational some time after physical insertion of the station into the ring and power-on of the station, without a requirement for explicit station provisioning or configuration[22].

operational : The state of a station in which it transits traffic, inserts traffic consistent with explicit or default provisioning, copies and/or strips traffic destined for the station, and performs control activities associated with the steady-state.

discovery

hello message : [BH} the message you send when you wake up on a ring

neighbor : - a station one hop away

upstream neighbor - the neighbor who is upstream one hop

downstream neighbor - the neighbor who is downstream one hop

partitioned ring - when a ring is broken into two non-communicating ring segments

ring segment - one portion of a partitioned ring

partition healing - when the ring segments of a partitioned ring are reconnected

station introduction - introducing a station into an existing ring

station removal - Removing a station from a ring

insertion disable - a network management command which disables the insertion of traffic onto a ring by a given station

station capability - the representation of the capabilities of a given station

link capability - the representation of the capabilities of a given link

station status - the current state of operation of a given station

link status - the current state of operation of a given link

topology/path selection

path: The sequence of *stations* and *links* (including bridges) traversed by a *frame* in *transit* from *source station* to *destination station*.

topology database update (TDU): A *control frame* propagated for the purpose of distributing information regarding *ring* topology.

topology database : A representation of the connectivity and capabilities[23] of *stations* and *links* on the *ring*.

topology discovery : The process by which the connectivity and capabilities of the stations and links on the ring is discovered by a newly added station.

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[21] Proposed by Brian Holden
[22] Proposed by Bob Sultan
[23] 'and capabilities' proposed by Brian Holden. 'Inevitably we will end up with at least one bit of standards-based optional capability which will need to be stored in the database….BH

path selection : The decision made at the source station as to the *link* (or *ringlet*) on which a *frame* should be *transmitted*.

protection (resilience)

steering: Placement of a *frame* on the *outer ring* or *inner ring* at the *ingress data-station* based on knowledge of the *ring* topology[24]. *Steering* provides resiliency by directing frames on a path that does not *transit* a failed transmission *link* or node.

wrapping: The *transit* of a *frame* such that it is *received* on one *transmission ring* and *retransmitted* on the *opposing ring*. *Wrapping* provides resiliency by allowing *traffic* to bypass a failed *transmission link* or *node* on the *ring.*

steering[25]**:** The placement of a *frame* on a specific *ringlet* at the *ingress station* based on knowledge of the *ring* topology[26].

wrapping: The *transit* of a *frame* such that the *frame* is *received* on one *ringlet* and *retransmitted* on the[27] *opposing ringlet*[28]. **buffer**

buffer: An area of memory used for temporary storage of *frames*.

egress buffer[29]**:** *MAC layer buffer* storing *frames* received from the *PHY-layer* and awaiting *transfer* to the *upper-layer.*

ingress buffer[30]**:** *MAC layer buffer* storing *frames* received from the *upper-layer* and awaiting *transfer* to the *PHY-layer*.

transit buffer [HvA-Alt]: *MAC buffer* used to store all or part of a *transit frame* before *retransmission*. *Frames* are stored when *transmission* of another *frame* is in progress or other *frames* are to be *transmitted* first.

insertion buffer [HvA-Alt] : A type of *transit buffer* used to store all or part of a *transit frame* or *frames* awaiting completion of an *ingress frame transmission* when the *buffer insertion method* is deployed[31].

shaping buffer : A *buffer* intended to store bursts of *ingress traffic* that fall within the *maximum burst size (MBS)*.

queue

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[24] Is steering used generally for the binary routing decision on a *dual-ring* or is it only used to describe a protection method?

[25] Does steering describe the binary routing decision on a dual-ring or is it only used to describe a protection method?

[26] *Steering* provides resilience by directing *frames* on a *ringlet* that does not *transit* a failed *link* or *station*.

[27] The definition describes the case of a dual-ring as agreed in the May meeting. In the case of a multi-ring, this might be changed to 'an opposing ringlet' or 'a different (or alternate) ringlet'. It might also be unchanged, depending on what is considered to be a useful definition of wrapping in the multi-ring environment.,

[28] *Wrapping* provides resilience by allowing *traffic* to bypass a failed *link* or *station*.

[29] The term *egress buffer* is an alternative**.**

[30] The term *ingress buffer* is an alternative. Use of the term *transmit buffer* has been avoided because of the similar appearance of the words *transmit* and *transit.*

[31] The *insertion buffer* does not necessarily operate in *cut-thru mode* as implied by Harmen's definition of an *insertion buffer* as a '*MAC buffer* operating in *cut-through mode'*). An *insertion buffer* is equal in size to the *MTU* of the local *station* as a *transit frame* need wait at most the time required for the *ingress frame transmission* in progress to complete.

queue: The organization of a *buffer* such that *frames*, or portions of *frames*, can be removed from the *buffer* in the same order in which they were placed in the *buffer*. The term *queue* can be prefixed with any term or terms with which the term *buffer* is prefixed, indicating a *buffer* of the specified type that is organized as a *queue*.

queue element: The unit of storage that is added to or removed from a *queue* in a single operation.

queue depth: The number of *queue elements* on a *queue*.

delay and latency

ring latency:[25.04.03] The ring latency includes the signal propagation delay through the ring medium, including drop cables, plus the sum of the propagation delays through each data station connected to the ring and is related to the data transmission rate.

propagation delay [HvA-Ed]: Time required for a *signal* to traverse the *transmission medium*.

ingress queue delay [HvA-Ed]: Time interval between the enqueue of a *frame* to the *ingress queue* and that *frame* reaching the head of the *ingress queue*.

egress queue delay [HvA-Ed]: Time interval between the enqueue of a *frame* to the *egress queue* and that *frame* reaching the head of the *egress queue*.

medium access delay [HvA-Ed]: Time interval between an *ingress frame* reaching the head of the *ingress queue* and that *frame* gaining *access* to the *medium*, excluding *frame transmission time*.

ring end-to-end delay[32] [HvA-Ed]:: Time required for a frame to travel from a *source* to *a destination station* on the same *ring* as measured from the time that the *frame* is delivered to the *physical layer* at the *source station* to the time that the *frame* is delivered to the *MAC layer* at the *destination station*.

MAC end-to-end delay [HvA-Ed]: Time required for a *frame* to travel from a *source station* to a *destination station* on the *ring* as measured from the time that the *frame* is fully *transferred* to the *MAC layer* at the *source station* to the time that the *frame* is fully transferred to *upper-layer* at the *destination station*.

round trip propagation time: [IEEE 802.3 25.01.15].Twice the time for a bit to travel between the two most distance. (not clear how this would be defined in the 802.17 context)

compression delay [HvA-Ed]: Time required to encode the information sent by a real-time source such as live video in order to reduce the amount of data transmitted.

packetization delay [HvA-Ed]: Time required to fill a packet with information from a real-time source.

protocol stack delay [HvA-Ed]: Time required to process *PDUs* in the *upper protocol layers*.

decompression delay [HvA-Ed]:: Time required to restore the format of a received compressed packet before relaying it to the acoustical and/or video equipment.

playout buffer delay[33] [HvA-Ed]: *Delay* enforced on the receive-side of a real-time communication in order to achieve a constant *user end-to-end delay*.

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[32] Describe how this differs from *ring latency*.

[33] The value of *playout buffer delay* is equal to that of the maximum *jitter*.

user end-to-end delay [HvA-Ed]: Total *delay* between two end-users or applications.

station transit delay[34] [HvA-Alt]: Time between the arrival of a *start-of-frame* at the *transit buffer* and the *retransmission* of the *start-of-frame* on the *medium*.

transit buffer delay [HvA-Alt]:]: Component of *transit delay* associated with the buffering of a *frame* (or portion of a *frame*) until the time of its *retransmission*.

insertion buffer delay [HvA-Alt]: : Identical to *transit buffer delay* in the special case where a *buffer insertion ring* is deployed[35]**.**

frame transmission time [HvA-Ed]: Time required to *transfer* a complete *frame* to the *medium* after *access* is acquired.

latency : The time interval between two events. *Latency* is distinguished from *delay* in that *delay* describes the time interval between two positions (or more generally, states of being) of a single entity, while *latency* is a more general term describing the time interval between any two events.

control latency[36] : Interval between the time that a *control frame* is sent from a *station* and the time that the effect of that *control frame* is visible at the issuing *station*.

fairness

fairness: The assignment of transmission-ring ingress rates such that available capacity is shared equitably according to a specified algorithm.

weighted-fairness: A class of *fairness algorithm* that allows the assignment of *unequal* shares of *ring capacity*.

simple-fairness: A class of *fairness algorithm* that assigns *equal* shares of *ring capacity*.

fairness protocol [HvA-Ed]: That portion of the *RPR MAC protocol* that ensures *fairness*.

fairness algorithm: Algorithm that ensures *fairness* among *RPR MAC users*.

global fairness [HvA-Ed]: The assignment of *transmission ring ingress rates* such that globally available *ring capacity* is partitioned equitably according to a specified algorithm.

local fairness [HvA-Ed]: The assignment of *transmission ring ingress rates* in excess of those assigned by the *global fairness algorithm*, intended to use of locally available *capacity* made available by *spatial reuse*.

fairness period [HvA-Ed]:: Time between adjustments in *ring ingress rates* by the *fairness algorithm*.

bandwidth allocation (BWA):: (alternative to fairness)

dynamic bandwidth allocation:: (alternative to fairness)

dynamic bandwidth allocation algorithm:: (alternative to fairness)

rate control

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[34] The term *station* is used to qualify the term *transit-delay* since the term *transit-delay* is used by *frame relay* to indicate *end-to-end transit delay*.

[35] Harmen's definition of *insertion buffer delay*, 'Time required for a packet to pass through the insertion buffer operating in cut-through mode', implies that cut-thru mode is *always* deployed in a BIR. This is not the case. A BIR may deploy store-and-forward or cut-thru for transit traffic.

[36] On the exploder, control latency has been related to round-trip delay. Can someone provide an exact definition of round-trip delay in the RPR context?

rate control [HvA-Ed]: Limitation of the *traffic rate* in bytes over a specified time interval.

ingress rate control: *Rate control* performed at the *transmission ring ingress*.

congestion / flow control

flow control:: [09.06.21]
pause: : [1.4.209]
backpressure [HvA-Ed]: Sending of a *control frame* towards the *traffic source*, via the *opposing ring*, to stop or slow the flow of *traffic*.

throttle: Sending of a *control frame* to the *traffic source*, via the *opposing ring*, to stop or slow the flow of *traffic*.

congestion control [ITU I.233.1 A.9]

congestion management [ITU I.233.1 A.10]

congestion avoidance [ITU I.233.1 A.11]

congestion recovery [ITU I.233.1 A.12]

discard eligibility (DE) [FRF glossary][37]

quality of service[38] (QoS)

quality of service (QoS): One or a combination of measurable properties (parameters) defining the requirements of a given data service. QoS parameters associated with RPR are throughput, delay, jitter, frame loss, and availability.

throughput [ITU I.233.1 A.1]

transit delay[39] [ITU I.233.1 A.2]

significant instant:: [ISO/IEC2382-9 9.2.08]Short-term noncumulative variations of the significant instants of a digital signal from their ideal positions in time.

significant interval:: [ISO/IEC2382-9 9.2.09]Short-term noncumulative variations of the significant instants of a digital signal from their ideal positions in time.

jitter:: [ISO/IEC2382-09 9.02.10]Short-term noncumulative variations of the significant instants of a digital signal from their ideal positions in time.

wander:: GR-253 GR-1244

information integrity [ITU I.233.1 A.3]

access rate [ITU I.233.1 A.4]

committed burst size (Bc): [ITU I.233.1 A.5]

excess burst size (Be): [ITU I.233.1 A.6]

committed rate measurement interval (Tc): [ITU I.233.1 A.7]

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[37] http://www.frforum.com/basicguide/glossary.html

[38] IEEE 802 and ISO/ITU LAN/MAN standards do not currently specify *quality of service*. ITU I233.1 does specify QoS for a frame relay bearer service. While frame relay and RPR differ in their connection-orientation, they are similar in that they both use frames as their unit of data transfer (vs. e.g. ATM) and both support QoS. The frame relay QoS model has been widely deployed by service providers and is well understood by customers. Frame relay terminology related to QoS is for RPR where applicable (in some cases with changes to the term or definition).

[39] This definition is from frame relay and is probably inconsistent with the transit delay through an individual station.

committed information rate (CIR) [ITU I.233.1 A.8]

residual error rate [ITU I.233.1 A.13]

delivered errored frames [ITU I.233.1 A.14]

delivered duplicated frames [ITU I.233.1 A.15]

delivered out-of-sequence frames [ITU I.233.1 A.16]

lost frames [ITU I.233.1 A.17]

misdelivered frames [ITU I.233.1 A.16]

QoS parameters [ITU I.233.1 3.1] Throughput; access rate; committed information rate; committed burst size; excess burst size; transit delay; residual error rate; delivered errored frames; delivered duplicated frames; delivered out-of-sequence frames; lost frames; misdelivered frames[40].

error detection [D.3.2.4]

lossy service: Service that allows the loss of frames but may make guarantees associated with frames that are not lost.

low-loss service (LLS): Service that guarantees a low rate of frame loss relative to other services.

low-delay service (LDS): Service that guarantees a low value relative to other services.

guaranteed-service (GS): Service that specifies minimum delivered data-rate, maximum delay, and maximum loss for a specified fraction of the service period.

low-loss guaranteed-service (LLGS): A guaranteed service having the property that loss is small.

low-delay guaranteed-service (LDGS): A guaranteed service having the property that delay/jitter is a relatively small.

best-effort service (BES): A service not providing any guarantees.

service level definition[41]

service level agreement (SLA): Contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish.

service level definition : Contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish.

frame transfer delay (FTD) [FRF.13 section 3]

frame delivery ratio (FDR) [FRF.13 section 4]

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[40] ITU X.200 5.10.2.2.1 provides an alternative list but that list contains at least one questionable parameter (priority) and is not as specific as the I.233 list.

[41] RPR service level definitions adopt terminology from frame relay service level definitions as both offer a frame-based service to subscribers. RPR definitions use the term *data stream* instead of *connection* to reflect the connectionless nature of the RPR. Another source of definitions is the document *An Assured Rate Per-Domain Behaviour for Differentiated Services* <draft-ietf-diffserv-pdb-ar-00.txt>, and related documents, that treat similar issues in the context of the IETF Differentiated Services Working Group.

data delivery ratio (DDR) [FRF.13 section 5]

service availability [FRF.13 section 6]

class of Service (CoS)

class of service (CoS): The grouping of traffic that shares the same *relative* delivery priority.

traffic class:

traffic class: The grouping of *traffic* that shares the same of rules for *ring access* and *ring transit*.

transit

transit[42]: The movement of a *frame* through a *station* such that the *frame* is *received* from the *ring* and is *retransmitted* to the *ring*. This includes the case in which a *frame* is *retransmitted* on the *opposing ring* (ie. *wrapping*).

clump (clumping) : A string of two or more contiguous transit frames.

cut-thru: The transit of a frame through a node such that the first bit of the frame is retransmitted before the last bit is received[43].

store-and-forward: A method *transit* such that *all* bits of *the frame* are *received* and *buffered* before retransmission begins[44]. This definition is more precise than that provided in 09.07.13 ISO/IEC 2382-9. That d

buffer insertion ring (BIR): A *ring* that allows *transit frames* to be *transmitted* ahead of *ingress frames* except when the latter has already begun *transmission*. A station contains a *transit buffer* (*insertion buffer*) of sufficient size to store *transit frames received* during the time that an *ingress frame* is being *transmitted*. In the worst case, a *transit frame* is delayed by the time required to *transmit* a *frame* of the *MTU size* at each *station* along the *path*.

buffer insertion method: The method of using a *BIR* for ring transport and access. The buffer insertion method can be applied to all *traffic* on the *ring* or to one or more specific *traffic classes*.

transit queuing: A method of *ring transit* in which *transit traffic* is *queued* to allow *transit* or *insertion* of *traffic* of *higher priority*.

MTU transparency: The *transit* of *frames* of any *MTU size* not addressed to the local *station*.

preemption[45][HvA-Alt]: The interruption of transmission of a frame in order to send a frame of higher priority.

non-destructive preemption: The case of preemption where the remaining portion of a preempted frame is delivered at a later time.

destructive preemption: The case of preemption where part or all of the preempted frame is discarded.

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[42] Might be good to use something that doesn't look so much like trans*mit*.

[43] LAN switches typically perform cut-thru of 802.3 frames after reception of the destination *MAC address* (first six bytes of the *frame*). LAN switch cut-thru is not described in 802.1D but is left as a device specific feature. The frame check is not performed for frames that are cut-thru.

[44] The definition that appears in 09.07.13 ISO/IEC 2382-9 1995, 'A mode of operation of a *data network* in which data are temporarily stored before they are *retransmitted* toward the *destination*', is ambiguous, as it is not clear whether 'data' refers to a complete *frame* or some portion of a *frame*.

[45] This term was called ***packet*** *preemption* in Harmen's posting.

fragment[46]: A portion of an frame whose transmission is interrupted by preemption.

transit mode

full cut-thru mode: A mode of operation in which all *transit frames* are *cut-thru*[47].

partial cut-thru mode: A mode of operation in which *transit frames* are *cut-thru* when there is not a *frame* in *transmission*[48].

cut-thru mode [HvA-Alt]: A generic term describing partial or full *cut-thru* modes.

store-and-forward mode[49] [HvA-Alt]: A mode of operation in which the *store-and-forward* method is applied to every *transit frame*.

spatial reuse

spatial reuse [HvA-Ed]: Generic term referencing global spatial reuse and/or local spatial reuse.

global spatial reuse: The utilization of ring capacity by other *stations* when the *station* to which the *capacity* is assigned does not utilize that *capacity*.

local spatial reuse The utilization of the same *capacity* by *stations* on disjoint *segments* of the *ring*.

access

simultaneous access [HvA-Ed]: The insertion of traffic into the ring medium by two or more nodes at the same instant.

shared access: The ability of two or more nodes to share the capacity of the *ring medium*[50].

multiple access: Any technique whereby a number of terminals are able to share the capacity of a transmission channel in a predetermined manner or in accordance with traffic demand.

customer separation

customer separation[51] : The property that data associated with a group of users (e.g. a customer organization) is not communicated to a different group of users.

closed user group (CUG):: [09.08.14]
closed user group identifier (CUGID)): An identifier that uniquely distinguishes a *closed user group*.

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[46] *Fragments* can be reassembled into complete *frames* or discarded at the *station* immediately *downstream* from the *station* where *preemption* occurred. Alternatively, *fragments* can be *reassembled* into complete *frames* or discarded at the *destination*, but in the case of *destination reassembly*, it must be possible to identify the *source* of each *fragment*, as *fragments* from different *stations* may be interleaved.

[47] *Full cut-thru mode* implies that transit frames *preempt* frames in transmission. The *cut-thru transit traffic* experiences low *delay* at the expense of higher *delay* for *add-traffic*.

[48] *Partial cut-thru mode* can improve average *transit-buffer delay*, but not worst-case *transit-buffer delay*. If some *frames* are *cut-thru* and others are not, then any improvement in average *transit-buffer delay* is offset by increased *jitter*.

[49] ISO/IEC 2382-9 09.07.13 **defines** *store-and-forward* as a *mode*. Here, the word *mode* is added explicitly to the term store-and-forward, to distinguish the case where all frames are *store-and-forward* (*store-and –forward mode*) from the case where a specific *frame* is *store-and-forward*.

[50] The definition of *ring latency* in ISO/IEC 2382-25 25.04.03 suggests that the *ring* is modeled as a *shared medium* even if it is not a continuous physical medium.

[51] It was suggested that we use *customer traffic separation* instead.

VLAN/VMAN

virtual MAN (VMAN): : Describes the extension of the 802.3/802.1D virtual LAN (VLAN) to the 802.17 environment[52].

virtual LAN (VLAN): :

virtual media: : Describes the extension of the 802.3/802.1D virtual LAN (VLAN) to the 802.17 environment[53].

QTag prefix: : [1.4.222]

tagged MAC frame: : [1.4.269]

network management

agent:: [1.4.30]

network control host: : [1.4.168]

management information base (MIB): : [1.4.163]

Alphabetical Listing of Terms (with page references)

802.17, **1**
access rate, **11**
actual transfer rate, **6**
agent, **15**
backpressure, **10**
backward channel, **4**
bandwidth allocation (BWA), **10**
best-effort service (BES), **12**
biconnected-ring, **4**
bit rate, **6**
bit time (BT), **6**
bridge, **5**
broadcast address, **5**
buffer, **7**
buffer insertion method, **13**
buffer insertion ring (BIR), **13**
channel, **4**
class of service (CoS), **12**
closed user group (CUG), **14**
closed user group (CUGID), **14**
clump (clumping), **12**
committed burst size (Bc), **11**
committed information rate (CIR), **11**
committed rate measurement interval (Tc), **11**
compression delay, **8**
congestion avoidance, **10**
congestion control, **10**
congestion management, **10**
congestion recovery, **10**
control frame, 5
control latency, **9**
conversation, **5**
copy (copying), 6
customer separation, **14**
cut-thru, **13**
cut-thru mode, **14**
data delivery ratio (DDR), **12**
data frame, 5
data sink, **3**
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data transmission, 6
data-stream, **5**
decompression delay, **9**
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delivered errored frames, **11**
delivered out-of-sequence frames, **11**
destination station, **3**
destination stripping, **6**
destructive preemption, **13**
discard, **6**
discard eligibility (DE), **10**
downstream, **4**
downstream station, **3**
dual-ring, **4**
dynamic bandwidth allocation, **10**
dynamic bandwidth allocation algorithm, **10**
effective transfer rate, **6**
egress, 6
egress buffer, **7**
egress queue delay, **8**

[52] It might be reasonable to just call this a VLAN in the 802.17 environment, depending on the degree to which these are similar in detail.

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encapsulating bridge, **5**
encapsulation, **6**
error detection, **11**
excess burst size (Be), **11**
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fairness algorithm, **9**
fairness period, **10**
fairness protocol, **9**
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flow control, **10**
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frame transfer delay (FTD), **12**
frame transmission time, **9**
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global spatial reuse, **14**
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guaranteed-service (GS), **12**
IEEE 802.17, **1**
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individual address, **5**
information integrity, **11**
ingress, 6
ingress buffer, **7**
ingress queue delay, **8**
ingress rate control, **10**
insert, 6
insertion buffer, **7**
insertion buffer delay, **9**
interconnected rings, **4**
jitter, **11**
latency, **9**
link, **4**
link aggregation group, **4**
link partner, **4**
local area network (LAN), **2**
local fairness, **10**
local spatial reuse, **14**
logical link control (LLC) sublayer, **2**
lossy, **11**
lost frames, **11**
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low-delay guaranteed-service (LDGS), **12**
low-loss (LL), **11**
low-loss guaranteed-service (LLGS), **12**
MAC client, **3**
MAC end-to-end delay, **8**
management information base (MIB), **15**
medium, **2**
medium access control (MAC) sublayer, **2**
medium access delay, **8**
medium agnostic, **3**
metropolitan area network (MAN), **2**
misdelivered frames, **11**
MTU transparency, **13**
multicast address, **5**
multiconnected-ring, **4**
multiple access, **14**
multipoint datastream, **5**
multi-ring, **4**
network, **2**
network control host, **15**
non-destructive preemption, **13**
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partial cut-thru mode, **13**
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reconciliation sublayer (RS), **2**
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round trip propagation time, **8**
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service level definition, **12**
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significant interval, **11**
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store-and-forward mode, **14**
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upstream station, **3**
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