



IP Premium service implementation

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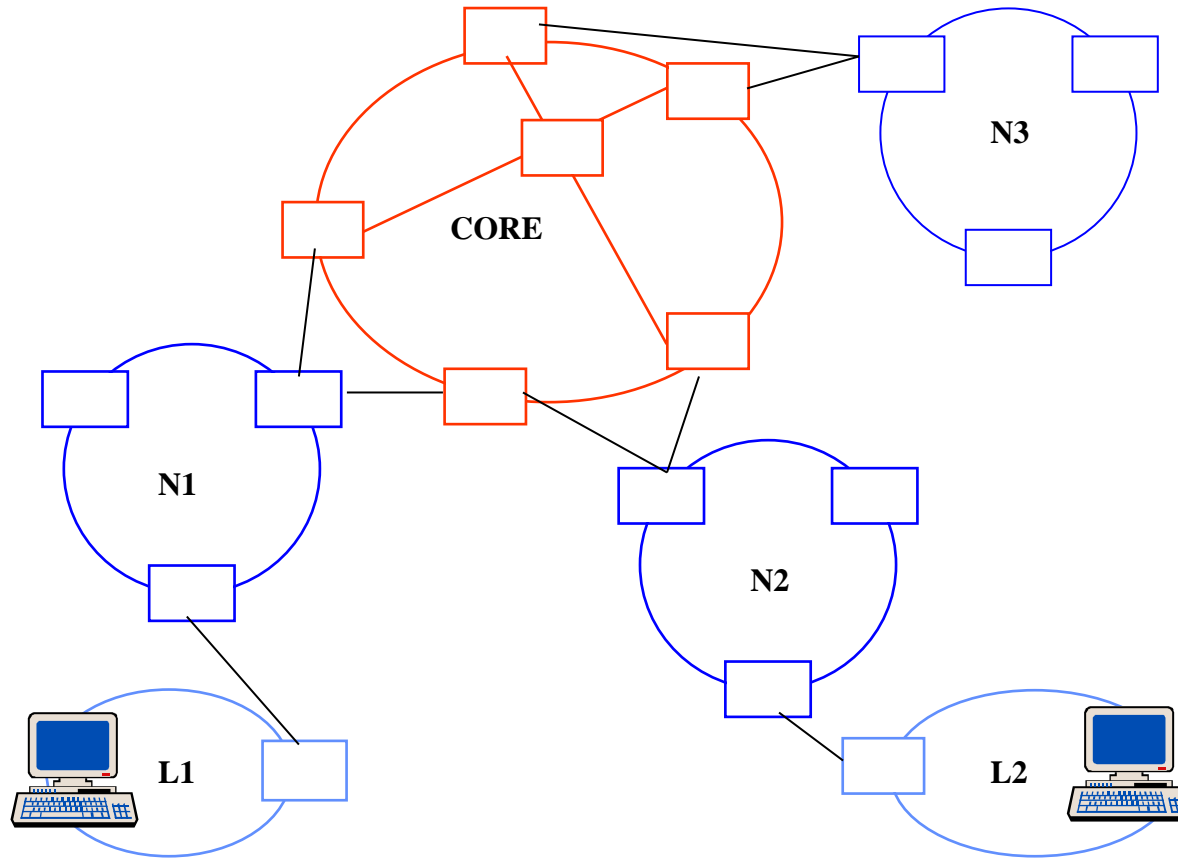



IP Premium Service Specification

Basic principles:

minimise number of action per node
do not use a signalling protocol over multiple
domains

Sample multidomain network



- L1, L2 : end user domain (for example LANs)
- N1, N2, N3 : intermediate transport domains (for example NRENs backbones)
- CORE : interconnection domain (for example GÉANT)
-  : router/switch

Assumption and decisions



- 1 The service will not police or shape per flow, being based on an aggregation model. Nonetheless it will police aggregates according to destination domains as a safety measure.
- 2 The speed of the core link and the highest priority in scheduling for the packets of the IP Premium service make delay variation small even at aggregation points. At 2.5 Gb/s the transmission time of a 1500 bytes packet is about 5 microseconds. The consideration suggests to start the service without enabling shaping in the core and it shaping may be optional also at the border, provided the sources produce a well shaped flow.

Assumption and decisions (cont)



- 3 The sending host or source is expected to shape traffic according to allowed capacity, to avoid initial packet loss due to policing when entering the Diffserv domain
- 4 The network is not responsible for fair sharing of premium capacity between microflows
- 5 Only a small fraction of the total bandwidth of the links, as an initial estimate about 5% ,will be made available for IP Premium service to minimise the probability of instantaneous burstiness at aggregation nodes and to avoid any possibility of starving Best Effort traffic.

Assumption and decisions (cont)



- 6 Policing will be performed by means of a token bucket. Token bucket depth will be chosen larger than one packet in the core and just one closest to the source. This choice is made to avoid, as much as possible, any packet loss, at the price of a small increase of delay variation
- 7 Admission to the IP Premium service will be based at the border closest to the source on IP source and destination addresses and packets will be policed according to the agreed capacity. Packets exceeding the allowed capacity will be discarded. In the core packet will be served according to the QoS tag (DSCP or IP Precedence), "trusting" the ingress domain and performing a less stringent policing for safety reason only. The admission control can be based also on other parameters, as defined case by case. A particular case is that the source is capable of tagging the packets and admission is then granted only when the tag is present.

Assumption and decisions (cont)



- 8 there will be no policing and shaping applied at egress from a domain. The above described choices will ensure that egress IP Premium traffic will not exceed a safety value.
- 9 Marking will not require a single value on all Diffserv domains, although uniformity it is strongly suggested.
- 10 The link between domains is required to behave according to the EF PHB.

Assumption and decisions (cont)



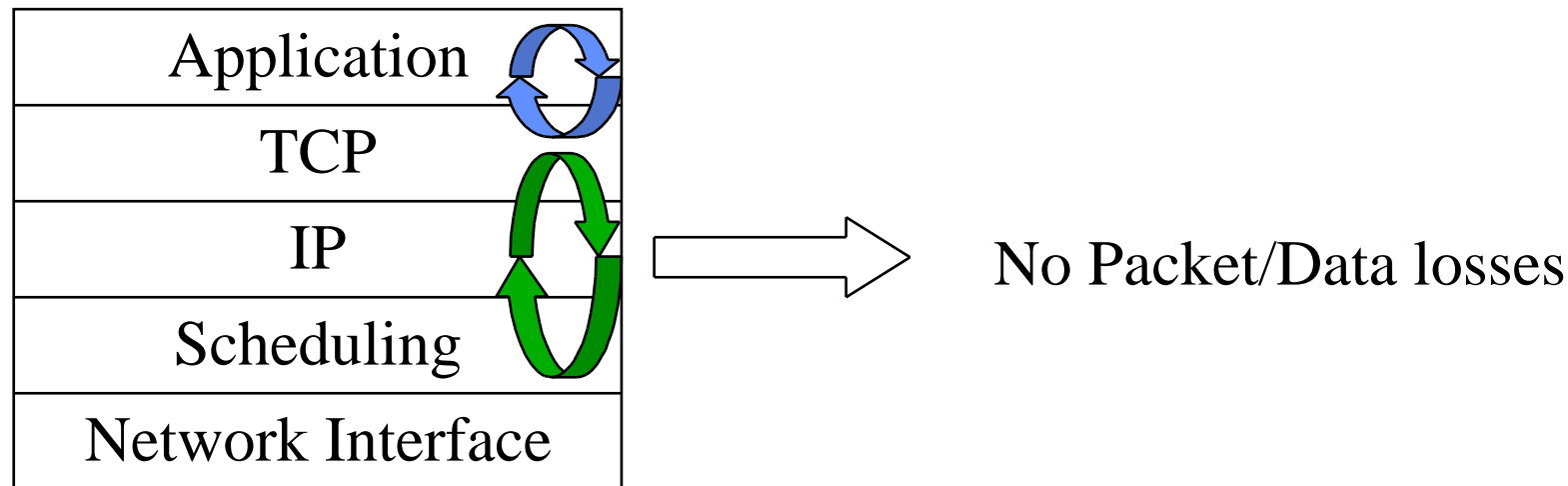
- 11 The IP Premium service is aimed at providing end to end QoS. To fulfil this goal the establishment of a particular service instance, for example between a node in L1 and a node in L2, must be made known to all domains involved. The service must be defined both as an end to end service level agreement and be accepted as a modification in the chain of service level agreements between all involved domains. For example the capacity requested between node in L1 and a node in L2 will be seen by domains N1, N2 and CORE as an increase of the premium capacity agreed between them

Shaping



Shaping is intended here as limiting the rate of transmission of data to a specific configured.

Shaping inside the Host itself is the preferred way, shaping from the network will in most case lead to packet losses

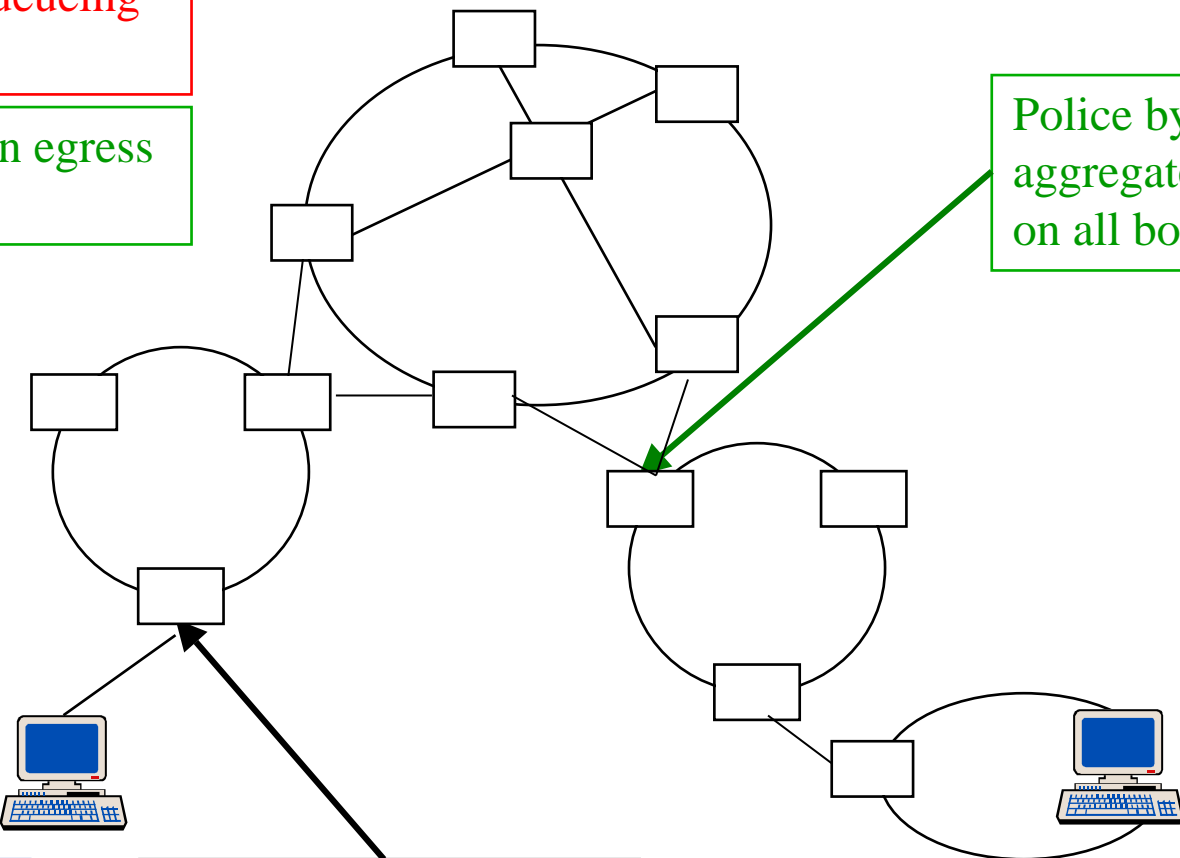




Classify (DSCP)
High priority queueing
on all nodes

Do not police on egress
Do not shape

Police by (source,dest)
aggregate capacity
on all border nodes



Shape ONLY here

Classify (IP Pairs)
Police - Strict, Capacity
Mark
High priority queueing

What's missing



- Detailed specification of monitoring system
- Detailed draft of SLA/SLS
- Router configurations (now platform unknown :-)
- Experimental Data on shaping