



IP Premium Agenda

- Status of IP Premium definition
- open issues
 - general
 - technical
- What's next



IP Premium status

- ✓ - Diffserv Architecture
- ✓ - Expedited Forwarding Per Hop Behavior
- ✓ - manual provisioning (no dynamic signalling)
- ✓ - multiple diffserv domains - different EF implementation

IP Premium deliverable almost ready, it will contain the definition of the service and part of the detailed implementation specifications

The detailed implementation specifications for GÉANT will follow the ongoing tests and general agreement on the service initial characteristics from NREN



IP Premium open issues

General Issues

- Admission control parameters
- Asymmetric Service Level Specifications
- Local Vs global (end to end) agreements



Admission control rule

In principle might be an arbitrary combination of:

- IP v4 Header contents
 - IP source and destination
 - ToS
- Ports
- Protocol
- time of the day, application type, load....

but the choice has profound impact on the type of assurances to be specified



Admission control rule (continued)

Destination aware versus destination unaware or
Virtual Leased Lines Vs aggregate IP Premium capacity

Destination aware

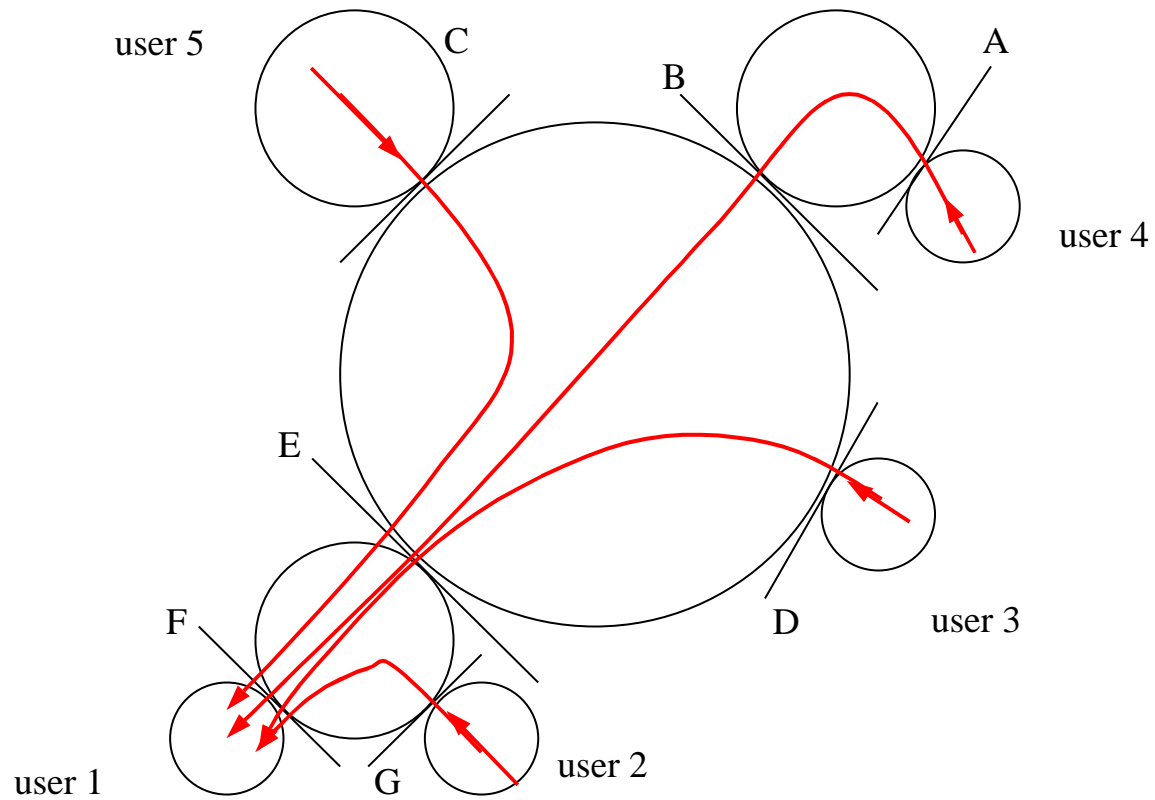
- precise dimensioning of resources at each node
- allows more stringent bounds on delay and delay variation
- *detailed knowledge of routing*
- *more complex if sub-aggregates have to be metered separately at each ingress point*
- *sensitive to routing failures*



Admission control rule (continued)

Destination UN-aware

- simpler configuration of the network
- does not need precise knowledge of the network
- weakly sensitive to re-routing
- *does not allow stringent bounds on delay and delay variation*
- *implies overprovisioning or absence of policing at the egress*
- *general constraints on maximum amount of IP Premium bandwidth on all the network as a function of the lowest speed link*
- *shaping only on aggregates (non per-flow guarantees)*



user	IN (SLS)	OUT (SLS)
1	10	10
2	10	10
3	10	10
4	10	10
5	10	10



Admission control rule (cont)

Just ToS (DSCP or IP Precedence), protocol or ports admission control imply both a destination and source unaware case.

Too prone to DoS attacks and wishful users...

Nonetheless the possibility of configuring the GÉANT network to make pure transport of DSCP marked packets, without doing any other check, has to be carefully considered as a cost to benefit ratio.



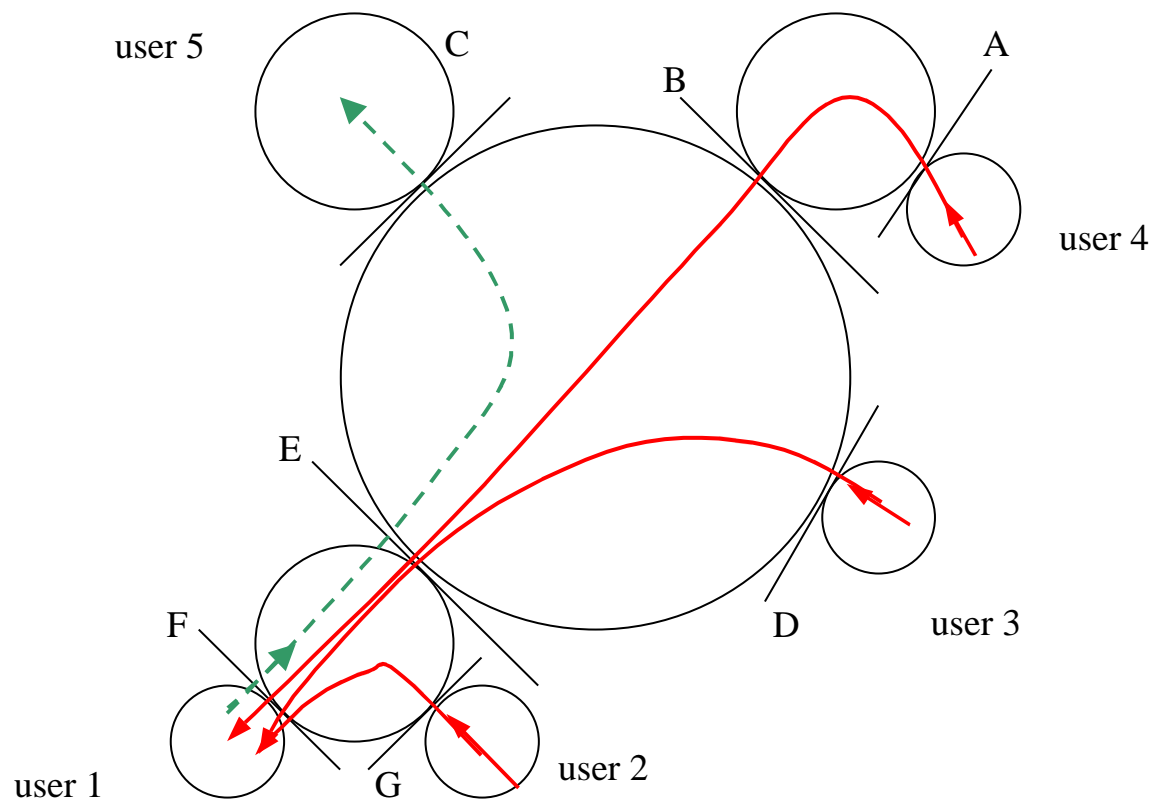
Asymmetric SLS

There is in principle no reason to avoid asymmetric SLS for ingress and egress on the same boundary, for example for capacity.

If destination un-aware policy is chosen the ingress SLS to a user site has to be left unspecified and can only be assumed to be up to a maximum equal to the sum of all the total egress IP Premium capacity of all the user sources.



Local Vs Global agreements



Suppose user 1 wants to speak IP Premium with user 5 only. Users 2, 3, 4 wants to speak with 1

If the destination address is known, then it is possible to dimension boundary F, but user 1 will send and receive much more IP Premium traffic than he expects.

The SLA should be propagated end to end



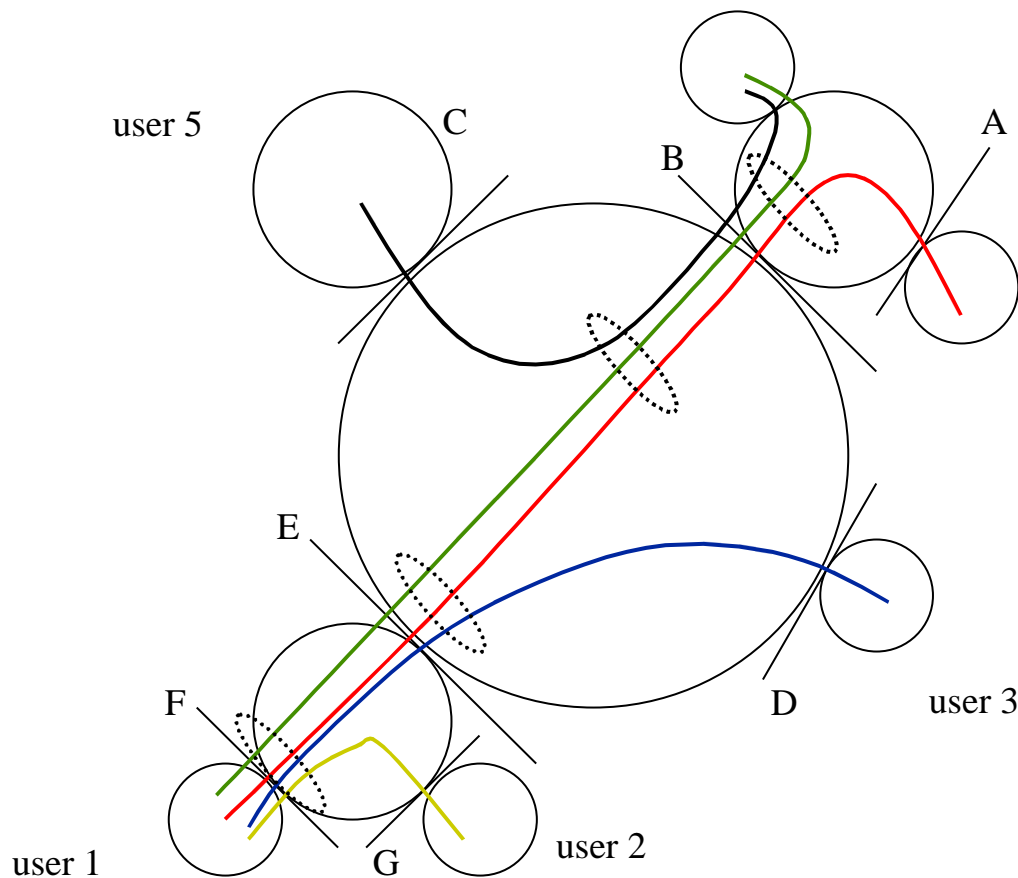
IP Premium open issues

Technical Issues

- shaping
- aggregation
- basic (empty) network behavior
- multiple Diffserv domains
- a LAN as a Diffserv domain
- implementation according to hardware and its performance
- tuning (in particular queuing)
- monitoring
- effects and tuning for protocols other than UDP



Shaping and aggregation



Shaping is required at the source.

Multiple aggregation-deaggregation points and link speed changes.

Is shaping preserved and up to which level (tied to IPDV end to end) ?



What's next

- Clarify and take an agreement on general issues
 - admission control parameters
 - end to end SLA
- Start measuring unloaded network performance
- Concentrate on test on shaping
- Start focusing on the next GÉANT hardware configuration to write a detailed implementation plan
- Tackle the LAN environment