

Premium IP parameters

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Monitoring Infrastructure

SEQUIN workshop,
Amsterdam, 1 February 2002

Nicolas Simar
DANTE



QoS monitoring – Nicolas Simar (Nicolas.Simar@dante.org.uk)

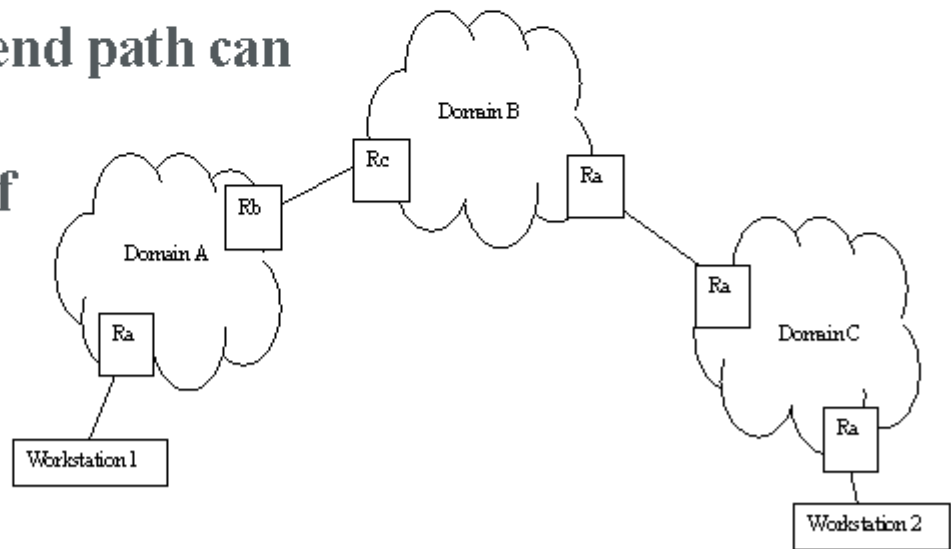


Premium IP parameters

- **Premium IP has four main parameters:**
 - one-way delay
 - one-way IP packet delay variation (IPDV)
 - losses
 - bandwidth
- **These parameters should be monitored for the DSCP/IP Precedence value corresponding to the Premium IP service.**

Premium IP parameters

- The parameters are guaranteed on an end-to-end basis
- The end-to-end path can be seen as a succession of domains.





Measure on a per domain basis

- **Check the conformance of the network behaviour against the SLA/SLS metrics.**
- **Usage of the network in respect of the Premium IP service.**
- **Network planning.**





Methodologies

- *Active*
- injects measurement traffic
- RIPE TTM, Surveyor, chariot
- suitable for loss, delay, jitter
- *Passive*
- observes traffic
- netflow, counters on routers
- suitable for average used capacity and observed packet loss



Bandwidth

- **On the input and output of each router interface.**
 - On Cisco routers with the CISCO-CLASS-BASED-QOS-MIB (7000 series IOS 12.0(12)s, not yet on 12000 series)
 - On Juniper routers, “firewall filter” counters have to be created. The value can be retrieved in the firewall MIB.



Packet loss

- **At layer3, the packets can be dropped due to policing or queueing.**
- **Policing is done on the ingress interface of the network.**
 - On Cisco routers with the class map
 - On Juniper routers, when a policer is created, a counter is automatically associated to this policer. Value can be retrieved in the Juniper firewall MIB.



Packet loss

- **Due to the fullness of the queue at an router egress interface (no drop are expected here).**
 - On Cisco routers with the CISCO-CLASS-BASED-QOS-MIB
 - On Juniper with the CLI “*show interfaces so-4/1/0 queue*” (the IP Premium traffic being the only one in this queue)
JUNOS4.4
- **No information about impact on Premium IP packets of losses at a lower layer, active monitoring has its interest.**

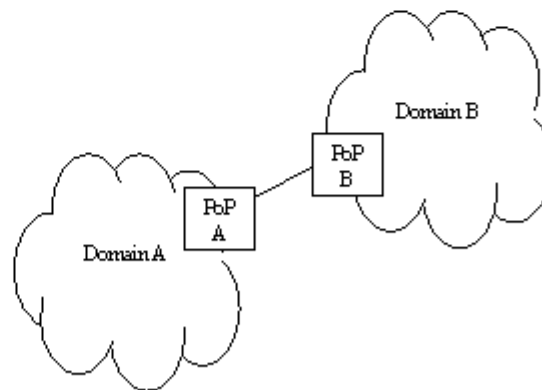


One-way delay

- **The end-to-end delay could be seen as the sum of the delay in each domain encountered on the path.**
- **The one-way delay in a domain can be measured for example with two RIPE TTM systems**
 - The box must be modified to be able to write the DSCP value and present a matrix per Class of Service.
 - The box should be located in each access PoP. The delay between the ingress PoP and the egress PoP can be monitored.

One-way delay

- To monitor delay between domains implies that two domains make necessary arrangements and agreements





IPDV

- **The IPDV should be monitored end-to-end and on a per-domain basis.**
 - Supported by the RIPE TTM box
 - Requires modification to account for DSCP values.



User perspective

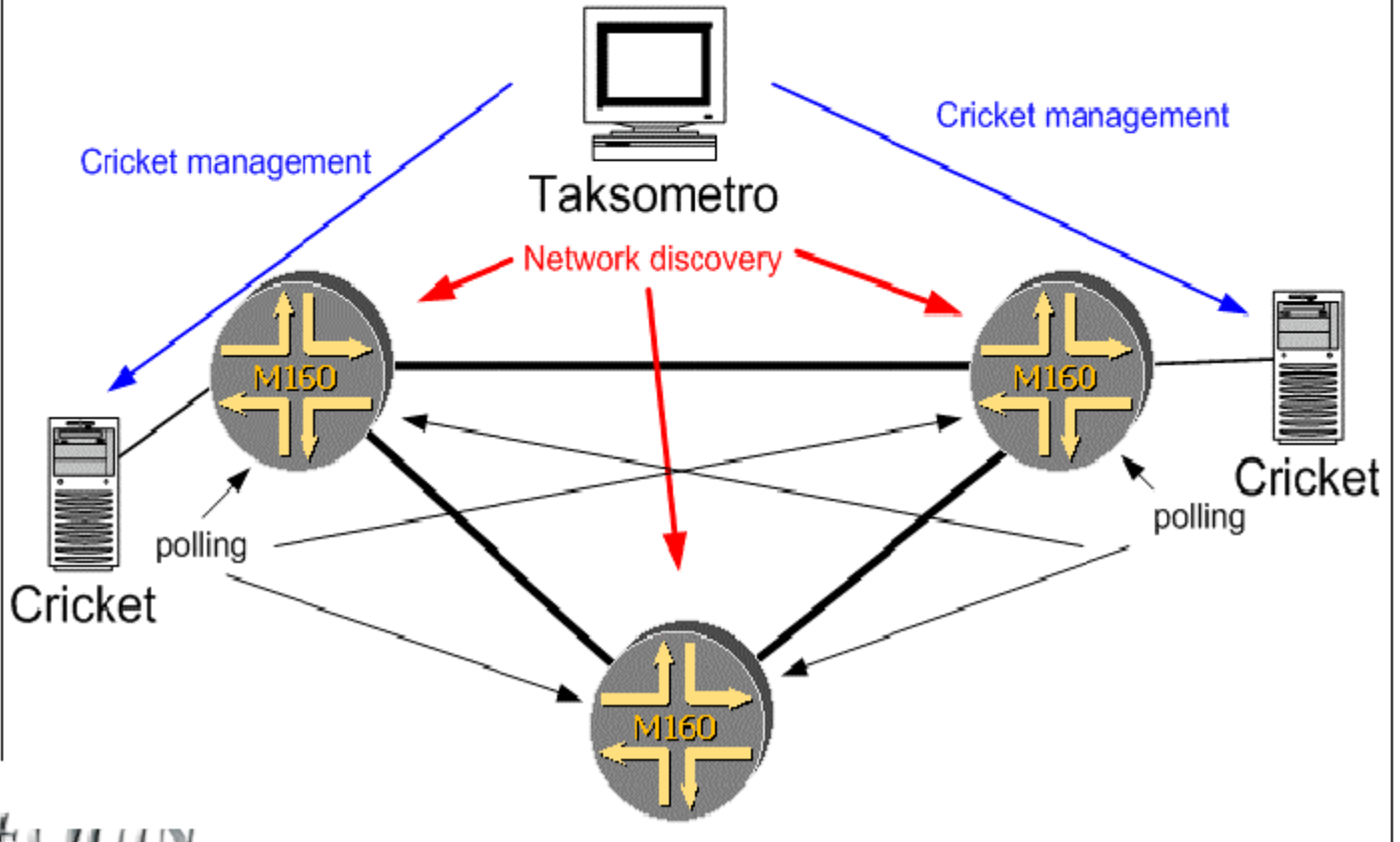
- **Due to the number of networks involved, such monitoring infrastructure will be deployed in a phased manner.**
- **User or application must have their own tools or perception.**
- **Transit networks can only provide information on aggregates.**



Network QoS Monitoring infrastructure

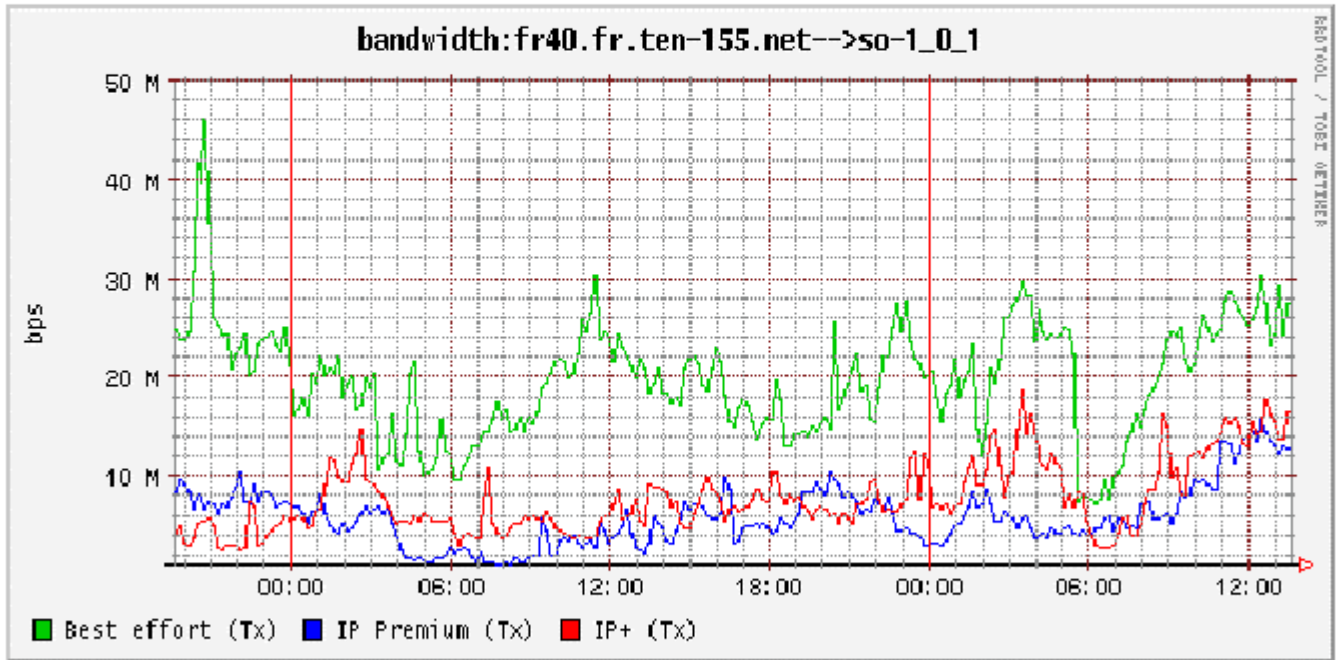
- **Taksometro: a tool to monitor QoS**
 - tool based on a modified version of cricket for the polling and the presentation
 - Graphs accessible via web
 - bandwidth and losses (L3) for selected DSCP value
 - a module for delay and IPDV per DSCP value can be included.

Taksometro principle





Bandwidth



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Conclusion

- **There is a clear need for QoS monitoring.**
- **Integration of a (large?) number of different tools.**
- **End-to-end monitoring is a challenge.**
- **Your feedback is needed!**