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Comparing Two Implementations of the Delay and Loss Metrics (ANS and RIPE-NCC)

Sunil Kalidindi <kalidindi@advanced.org>

Henk Uijterwaal <henk@ripe.net>

René Wilhelm <wilhelm@ripe.net>

Matt Zekaukas <matt@advanced.org>

IPPM

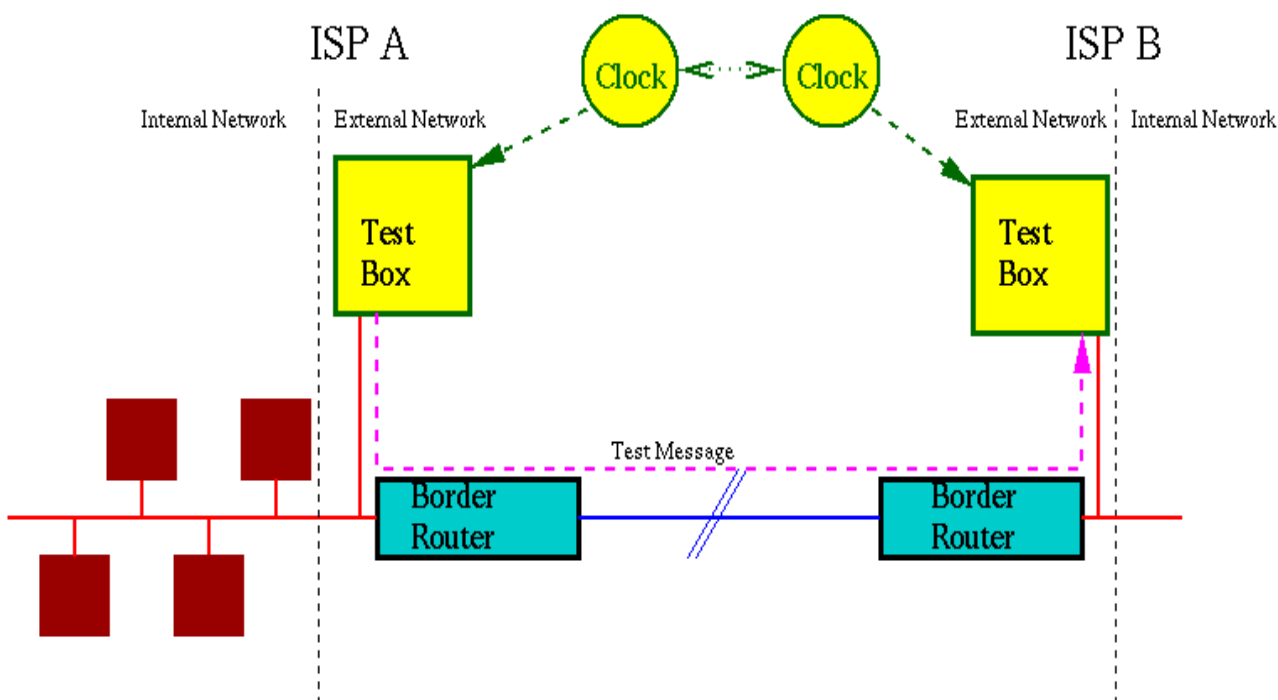
March 18, 1999



Motivation

- ANS and RIPE-NCC have both implemented the 1-way-delay and lost drafts
- When measuring delays or losses on the same path, both implementations should give the same results
- This has to be checked though
⇒ Results in this talk

Experimental Setup



- Implementation of the 1-way-delay draft
 - ANS “Surveyor Box”
 - RIPE-NCC “Test Box”
 - Independent implementations

Experimental Setup (2)



- RIPE-NCC and ANS exchanged boxes in October 1998.
- Boxes are on the same network segments at both sides
- Data taking since October 26.



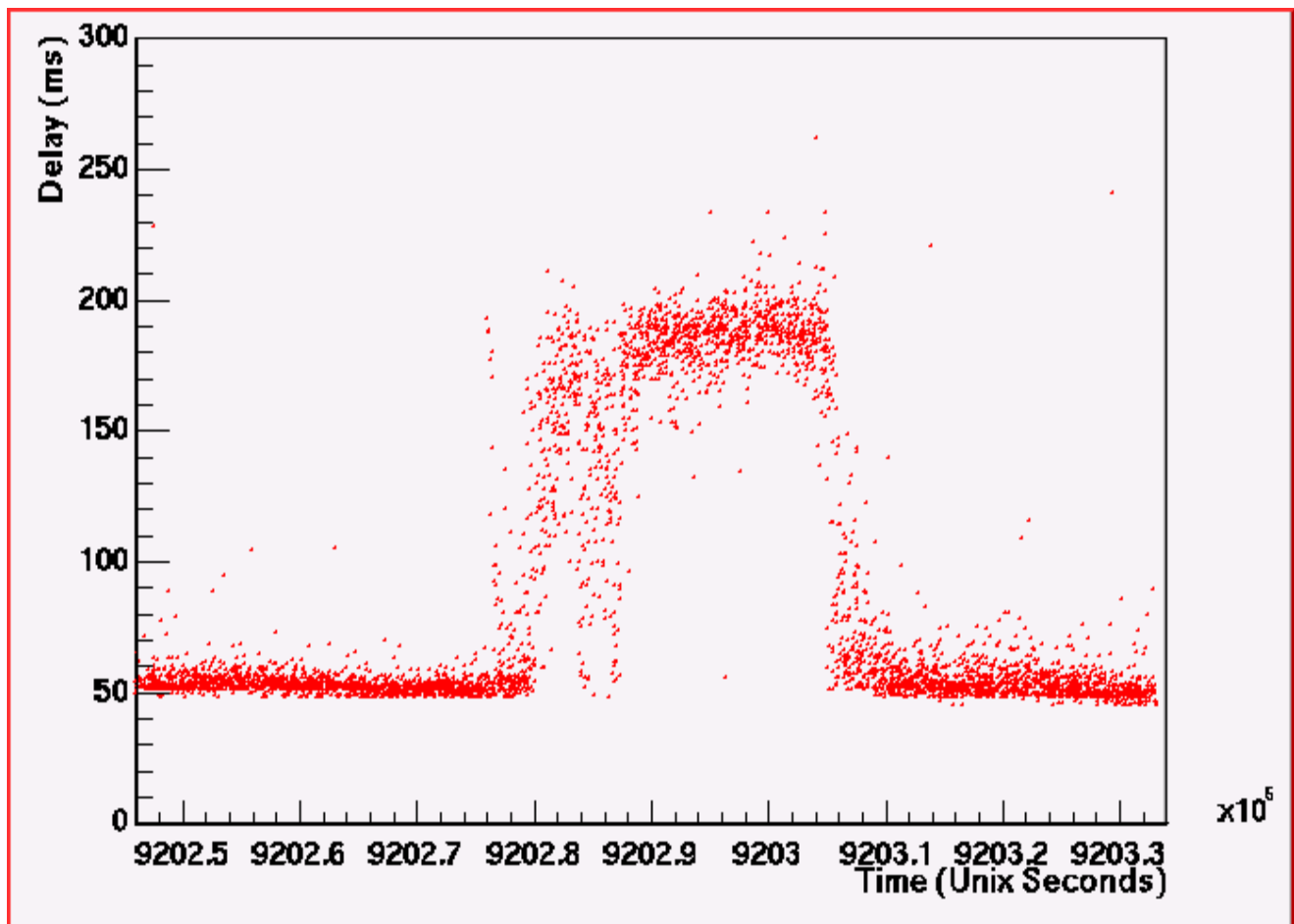
Differences in Setup

- Packet size and rate:
 - RIPE-NCC: 100 bytes, 3 packets/minute
 - ANS: 40 bytes, 2 packets/second
- Calculation of percentiles:
 - RIPE-NCC: remove lost packets from the calculation
 - ANS: include lost packets as packets with infinite delay
 - Packet losses usually at the 1%-level
 - Small effect



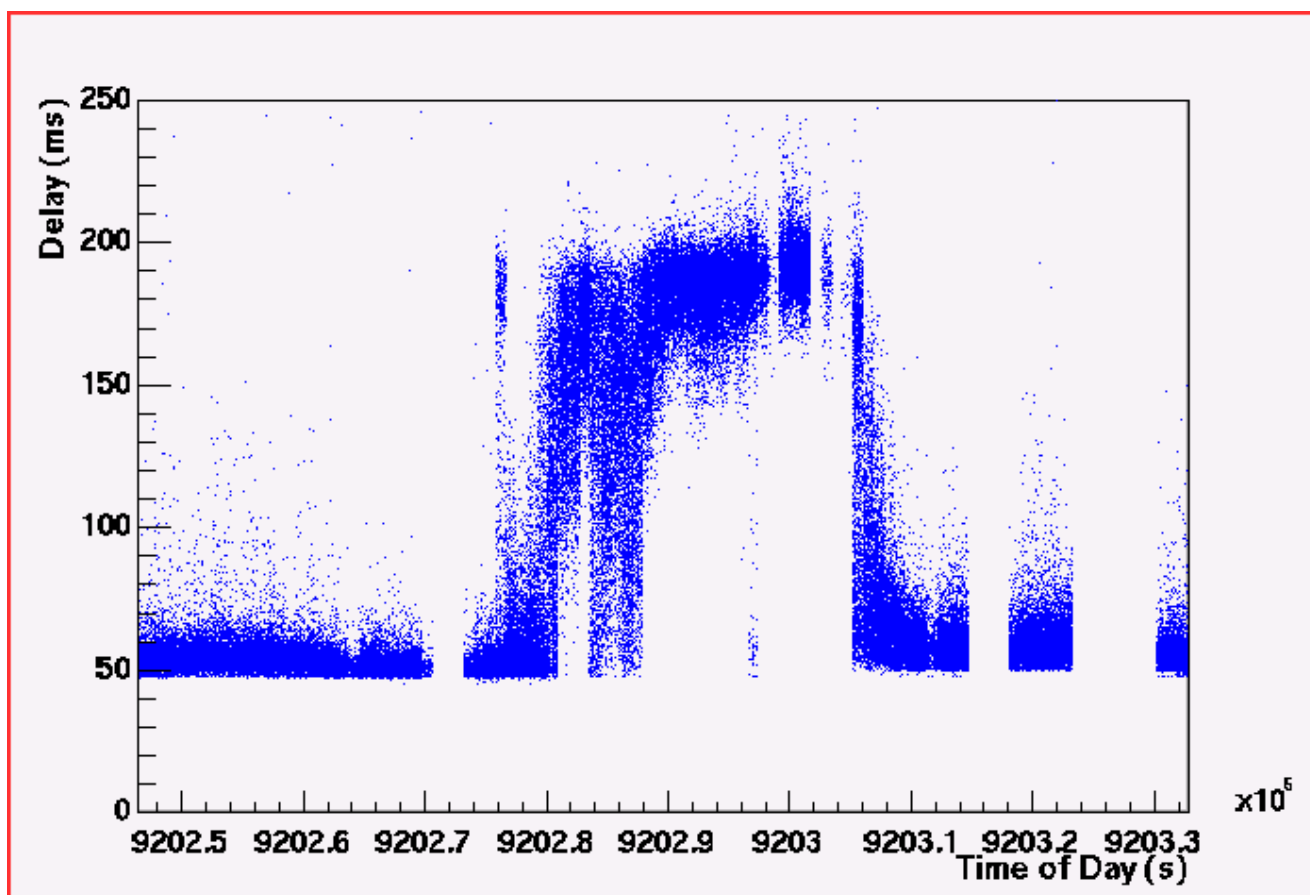
Raw Delays

- RIPE-NCC data
- Monday March 1, 1999
- All data points



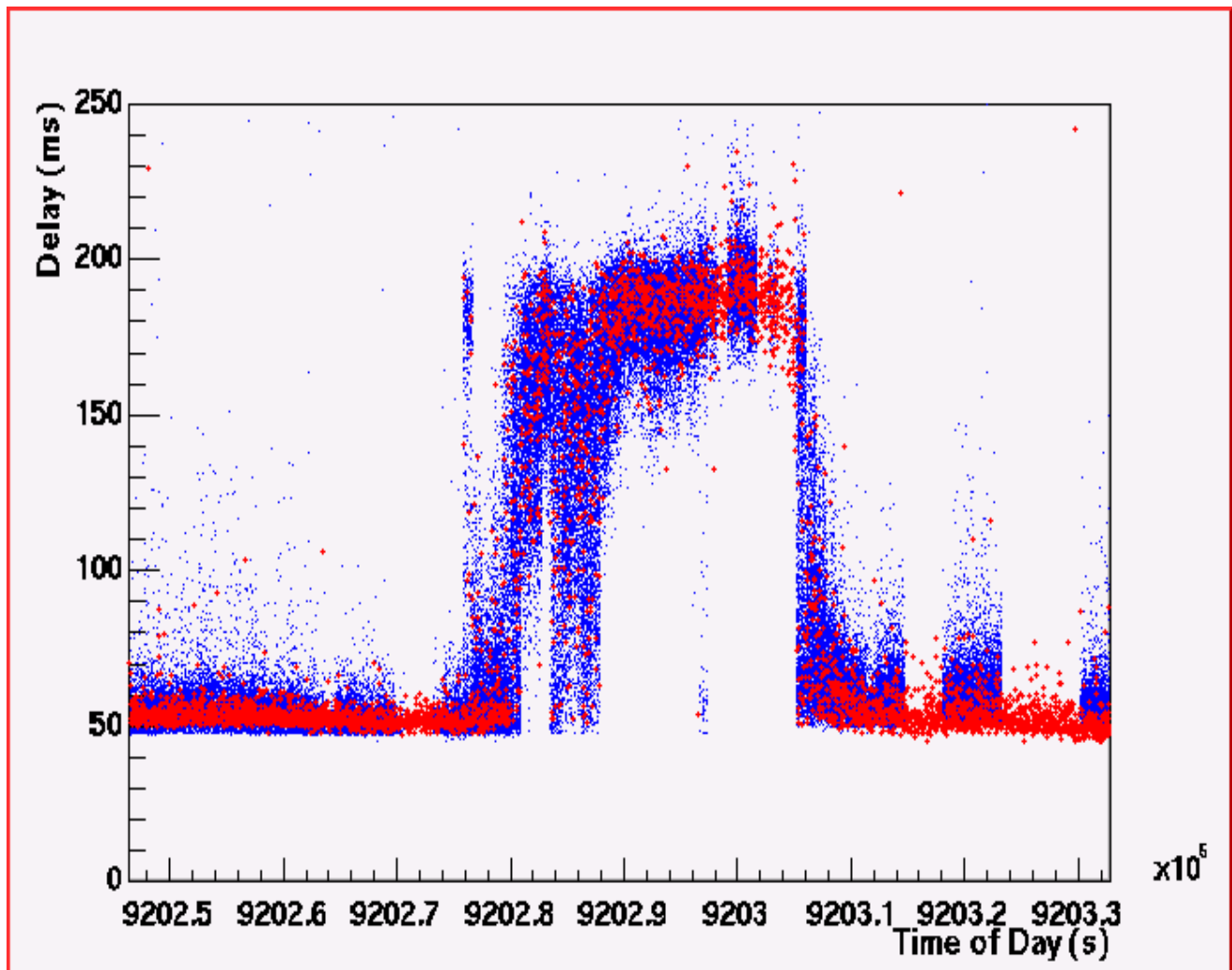
Raw Delays (2)

- ANS data
- Monday March 1, 1999
- All data points



Raw Delays (3)

- The two data-sets combined
- ANS in blue, RIPE-NCC in red





Raw Delays (4)

- Both plots show the same features
 - 50 ms delay during the night
 - Increase during the day to 200 ms
 - Dips during the day
 - Drop-off at the end of the working day
- All at exactly the same time
- **Both experiments see the same effects in the delays**



Delays over Time

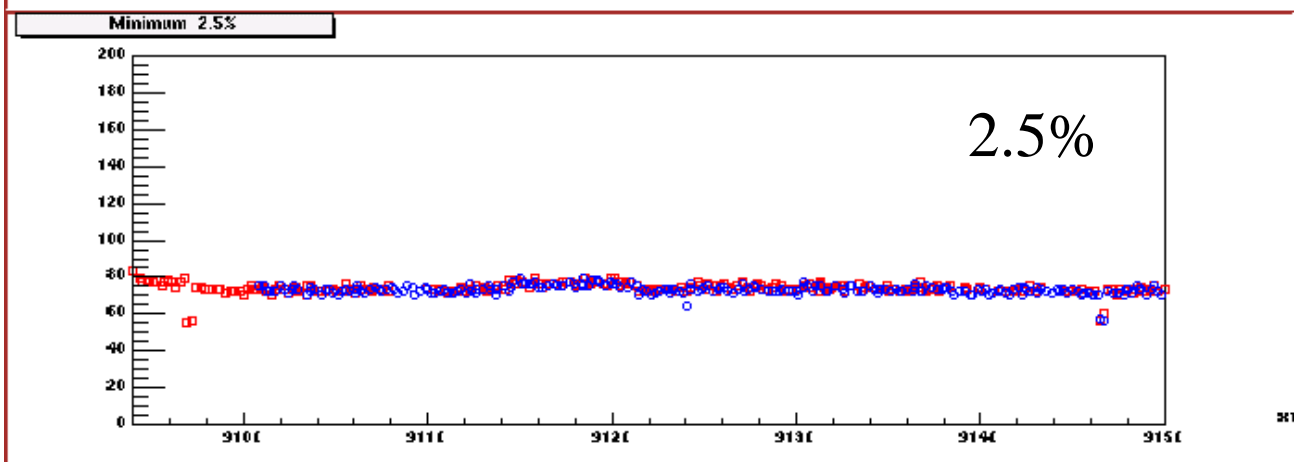
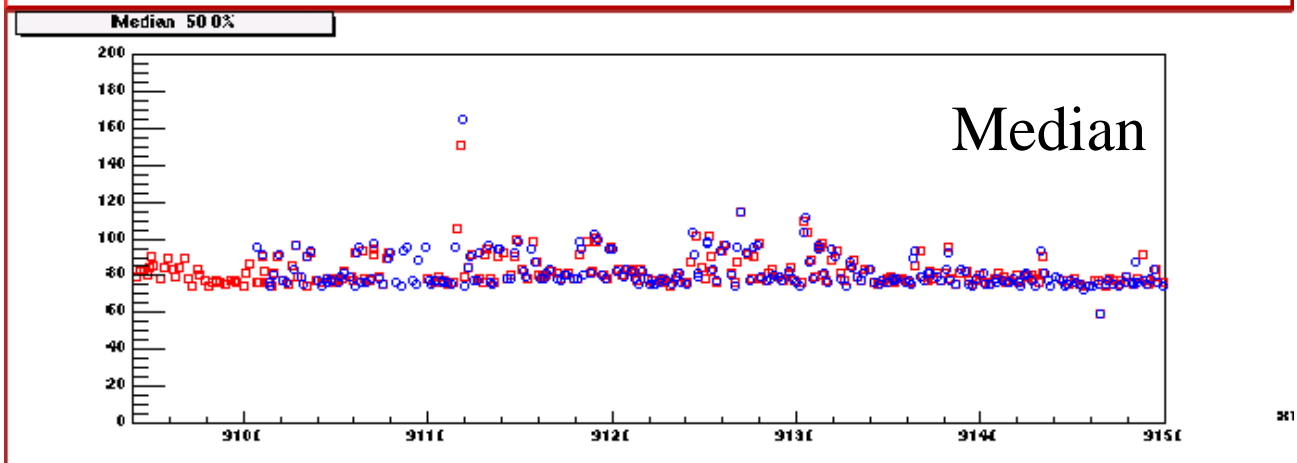
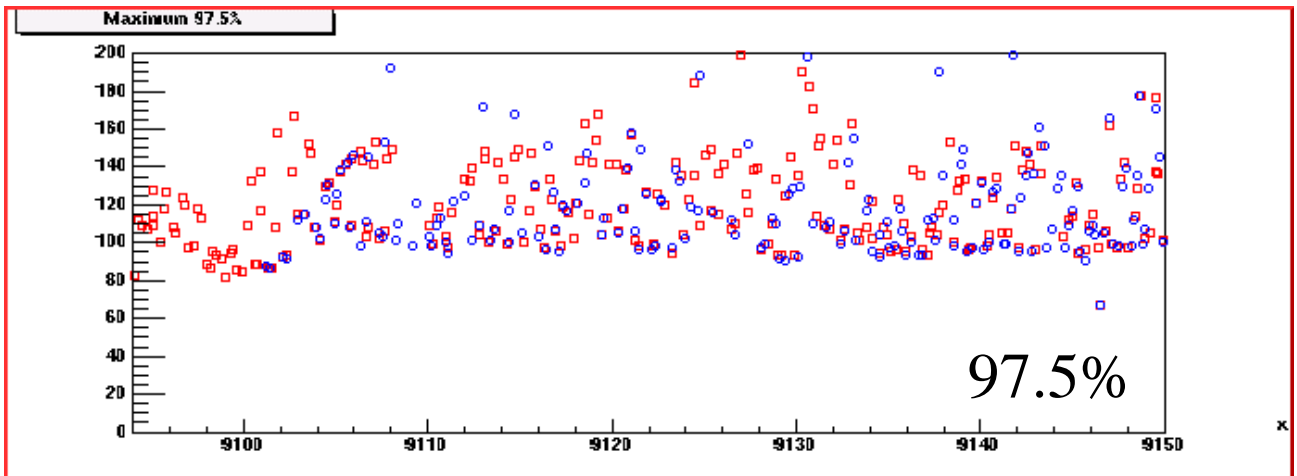
- Do the experiments agree over a longer period?
- 2 months of data
 - Oct 26...Dec 31, 1998.
- Calculate Median, 2.5 and 97.5 percentiles for 6 hour intervals
 - 0.00-6.00 UTC (“Night” in the RIPE-NCC-area)
 - 6.00-12.00 UTC (“Morning”)
 - 12.00-18.00 UTC (“Afternoon”)
 - 18.00-24.00 UTC (“Evening”)
- Plot as a function of UTC



ANS to RIPE-NCC

ANS-data

RIPE-NCC-data

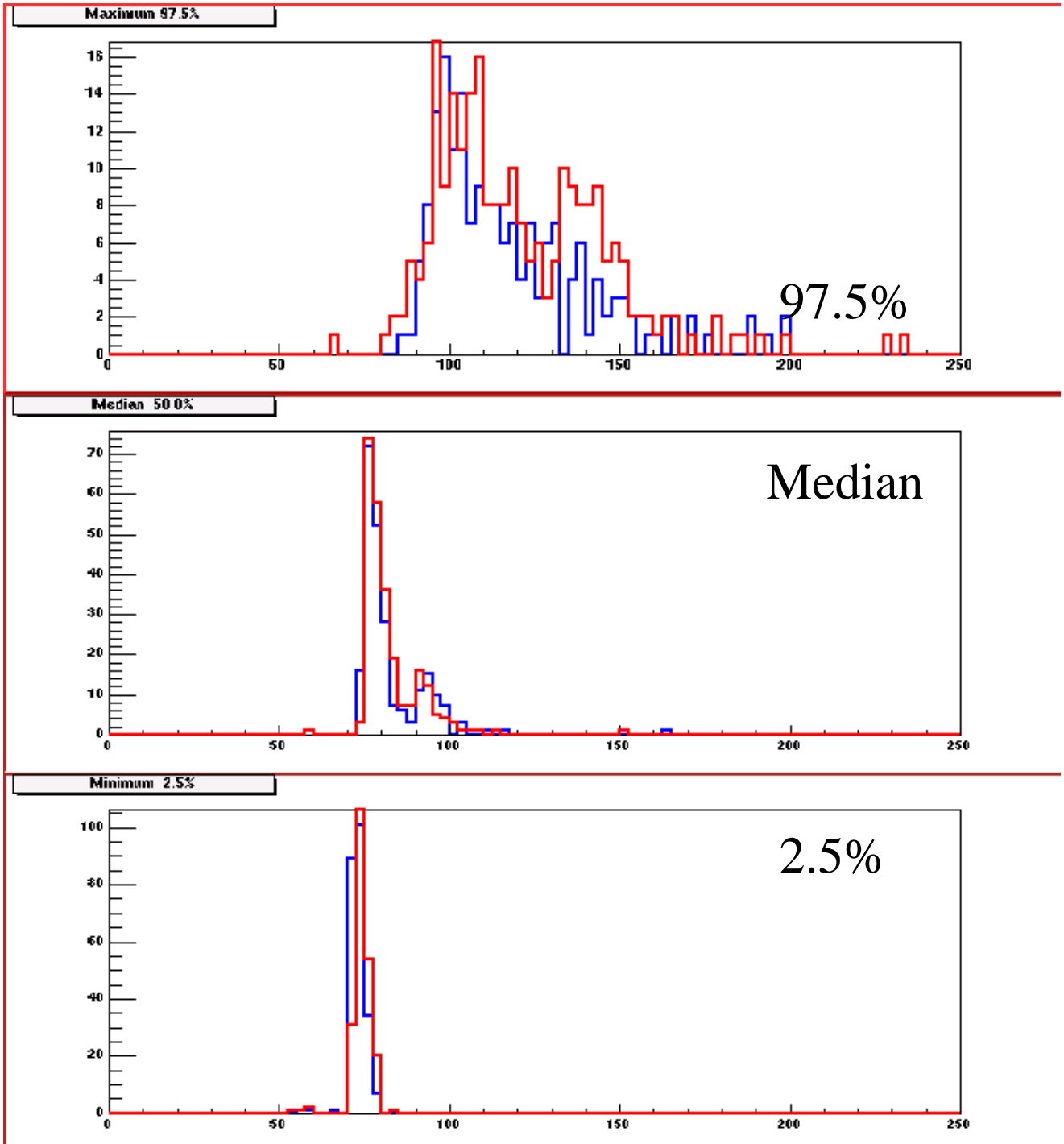


ANS to RIPE-NCC

(Projection along y-axis)

ANS-data

RIPE-NCC-data

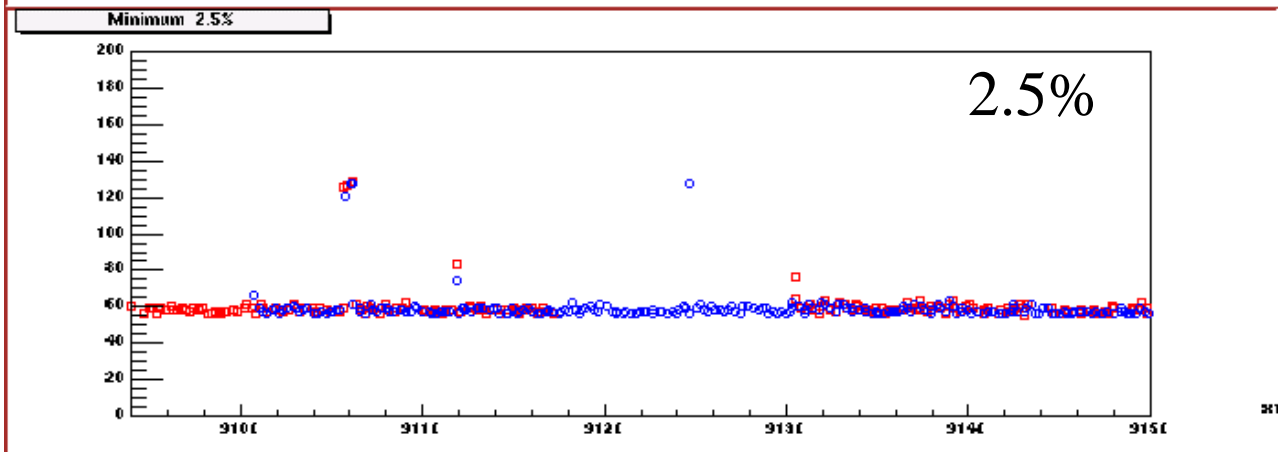
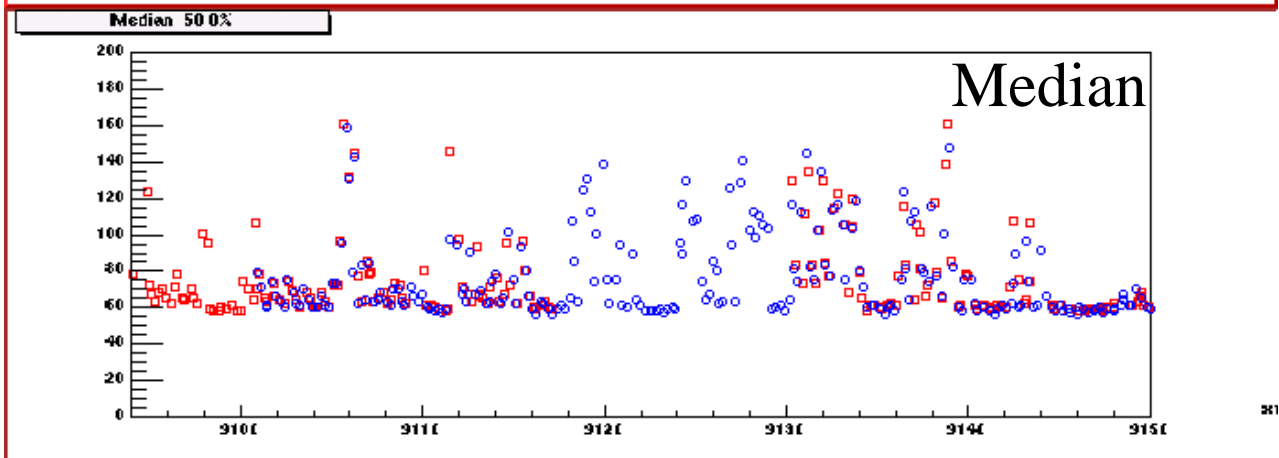
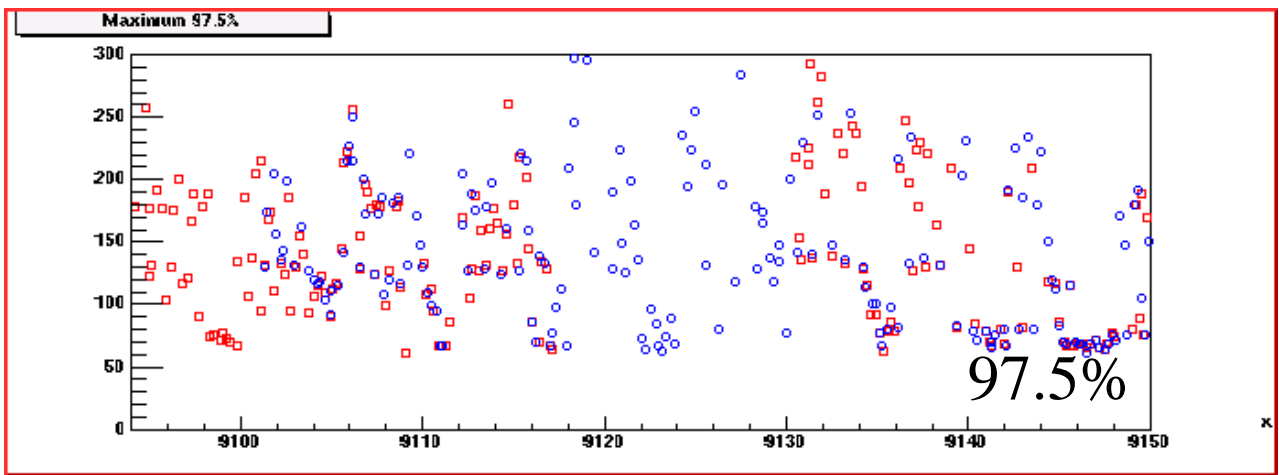




RIPE-NCC to ANS

ANS-data

RIPE-NCC-data

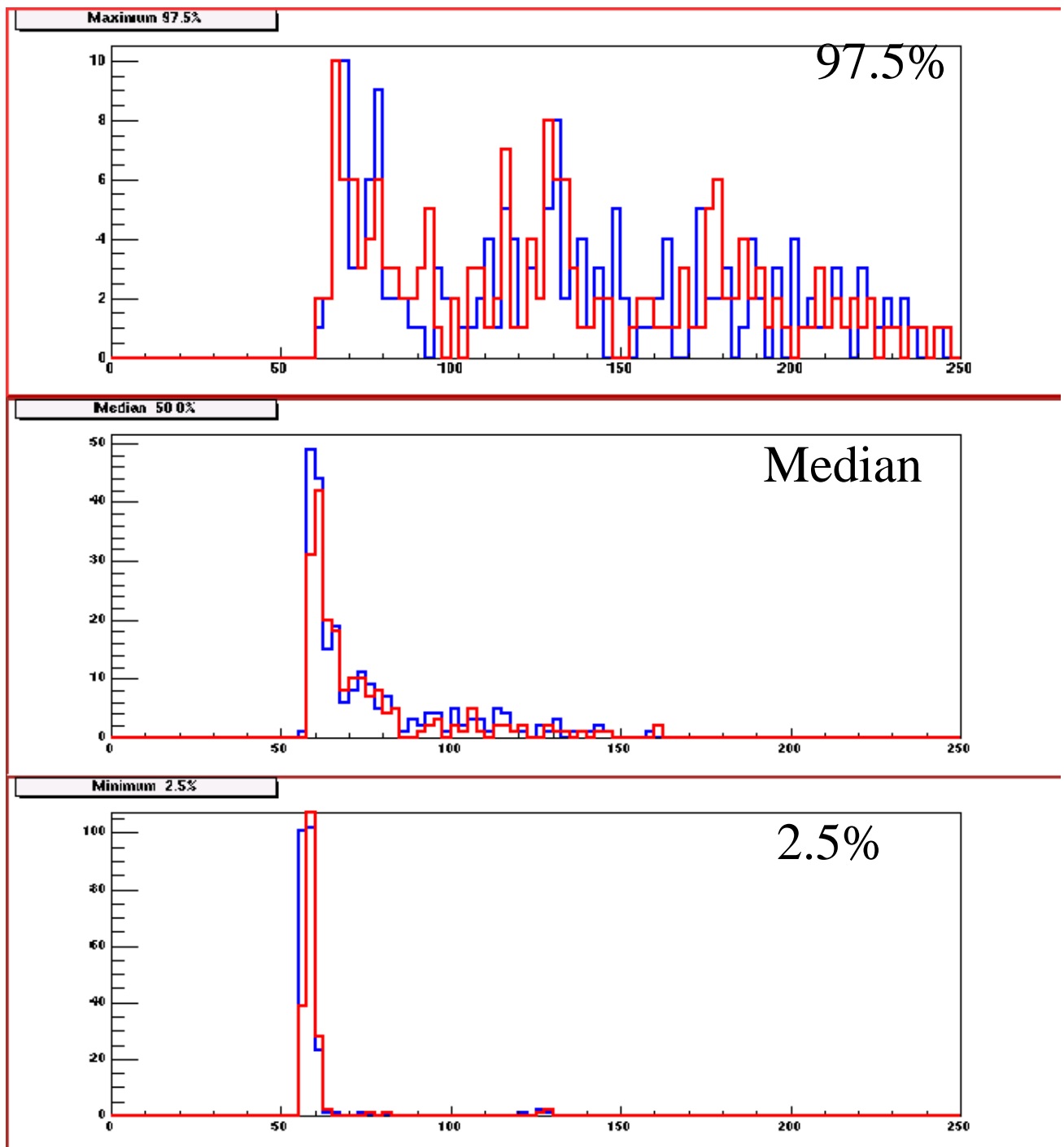


RIPE-NCC to ANS

(Projection along y-axis)

ANS-data

RIPE-NCC-data





Delays over time

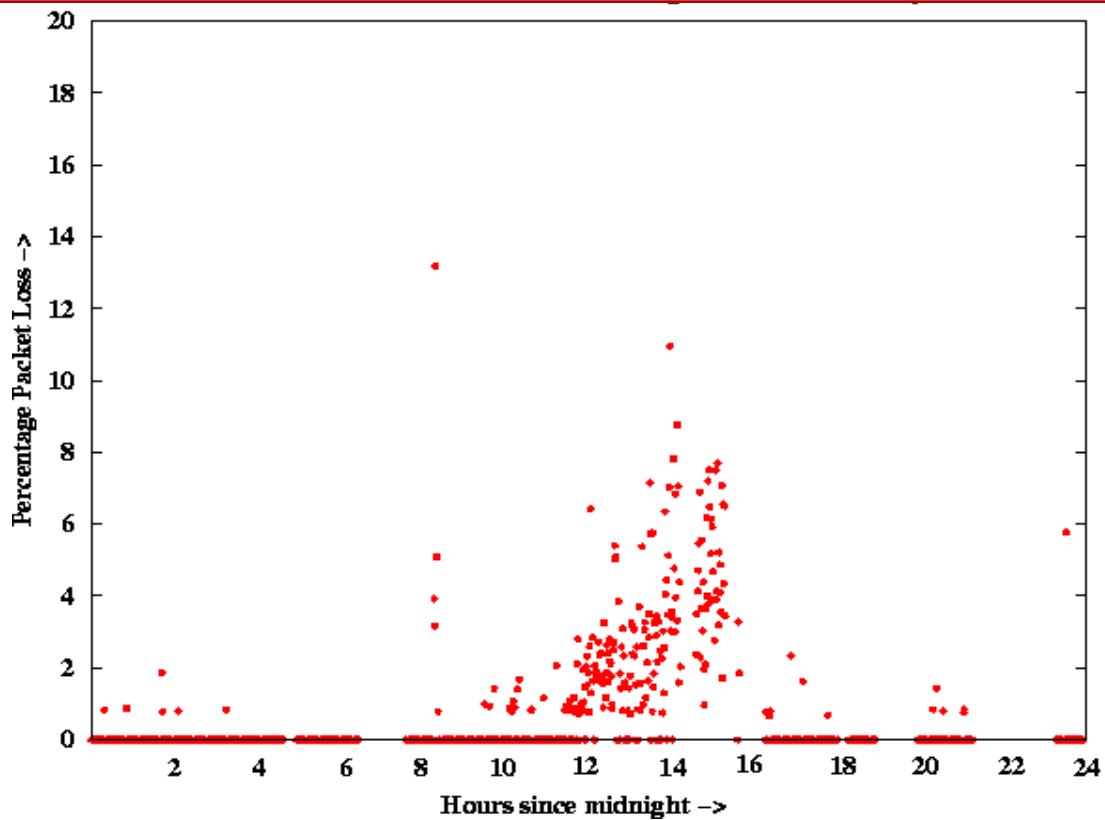
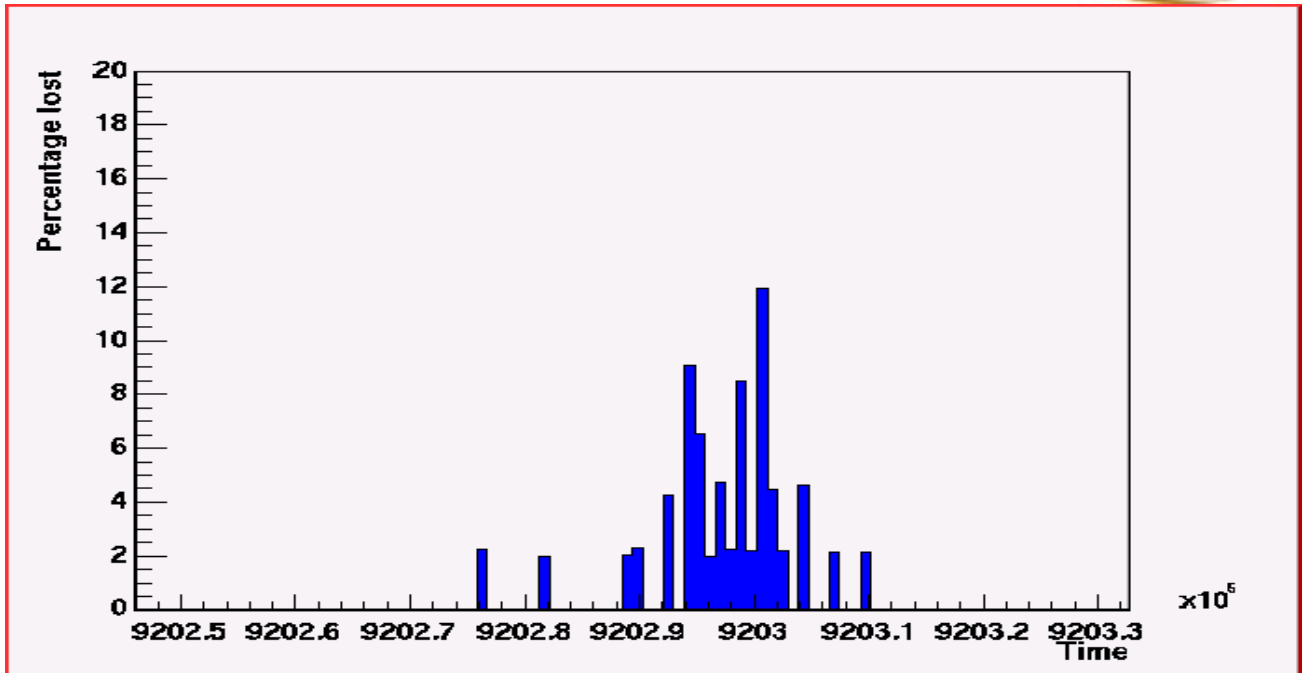
- 2.5% agrees very well
 - 2.5% is the line speed and should be the same
- Median agrees
 - Both experiments see the same trends
 - Kolmogorov-Smirnov test: 62% probability that the curves originate from the same underlying distribution
- Differences in 97.5%
 - Different method to calculate percentiles
 - Worst case, does not have to be the same for both experiments



Packet Losses

- Fraction of packets that did not arrive during a certain interval
 - RIPE-NCC: 15 minute interval
 - ANS: 1 minute interval
- Packet losses usually at the percent level
- No real test-case found
- Same trends in the data

RIPE-NCC and ANS data





Conclusion

- Two independent implementations of the 1-way delay and loss drafts, measure the same effects



Questions?

