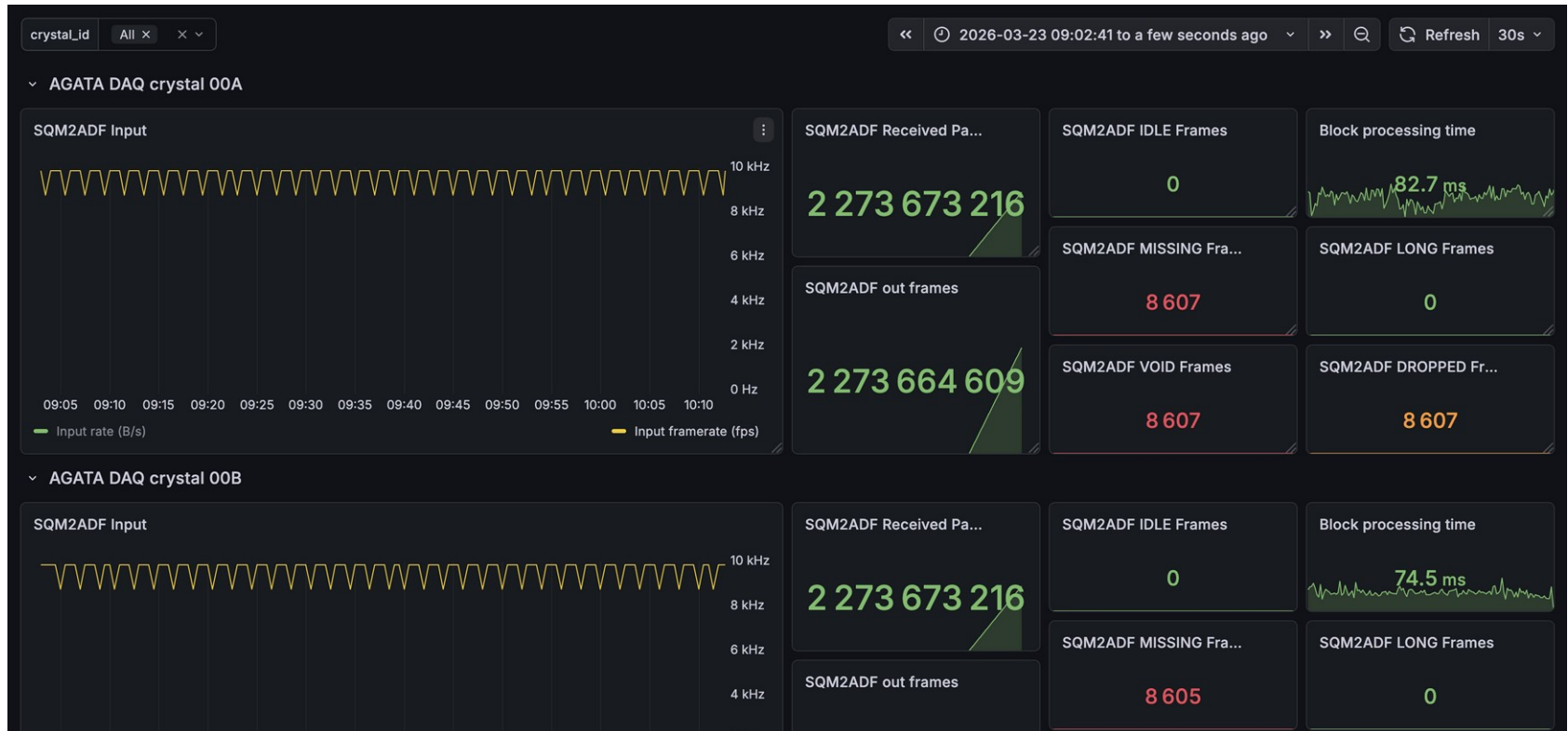


V2 Electronics – DAQ and Processing tests

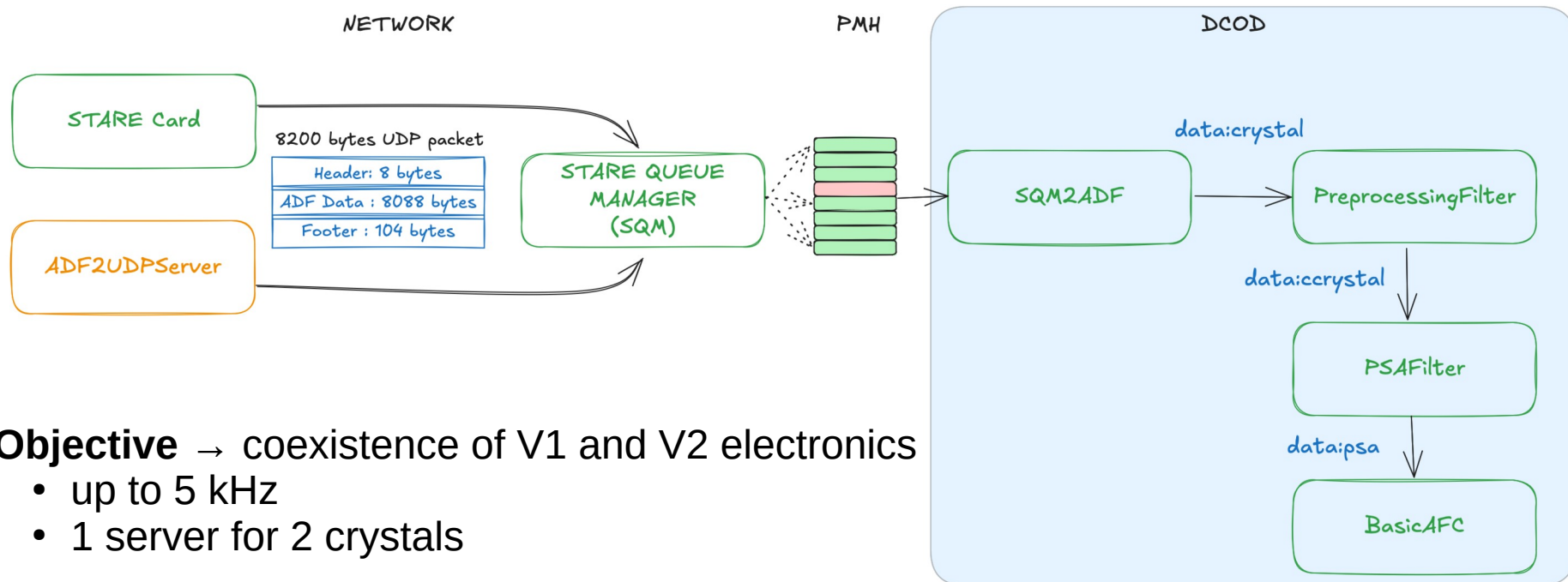


Tests configuration Tests results Future

G. Baulieu, C. Bonnin, N. Dosme,
S. Elloumi, N. Karkour, X. Lafay,
P. Lejeannic, O. Stezowski, M. Taurigna, M. Vecchio

Previously, on V2 DAQ tests (2025)

Dataflow



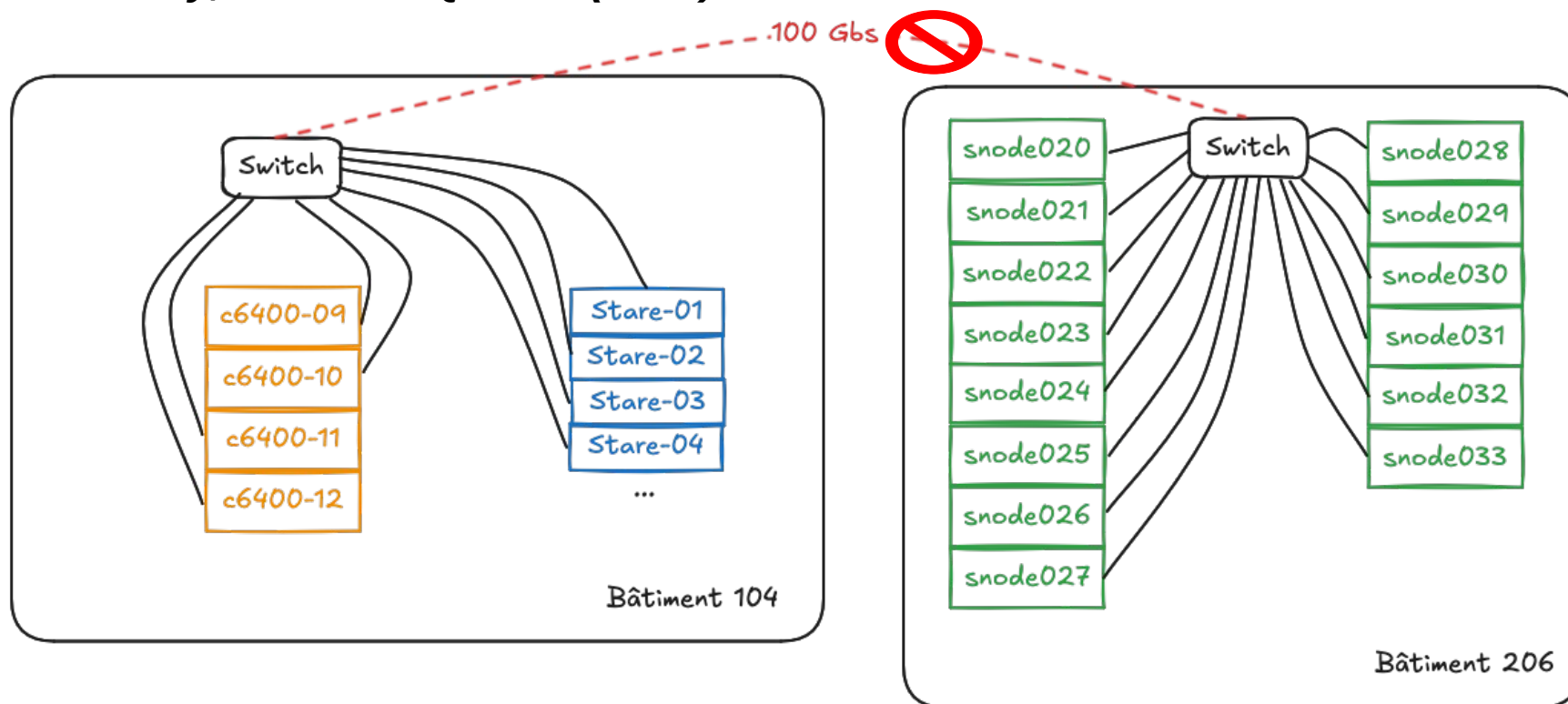
Objective → coexistence of V1 and V2 electronics

- up to 5 kHz
- 1 server for 2 crystals

Risk → UDP protocol does NOT ensure packets reception

- No way of retrieving packet if lost
- Packet loss may happen at different places : NIC, switch, OS Kernel...
- We can only reduce the probability of packets loss

Previously, on V2 DAQ tests (2025)

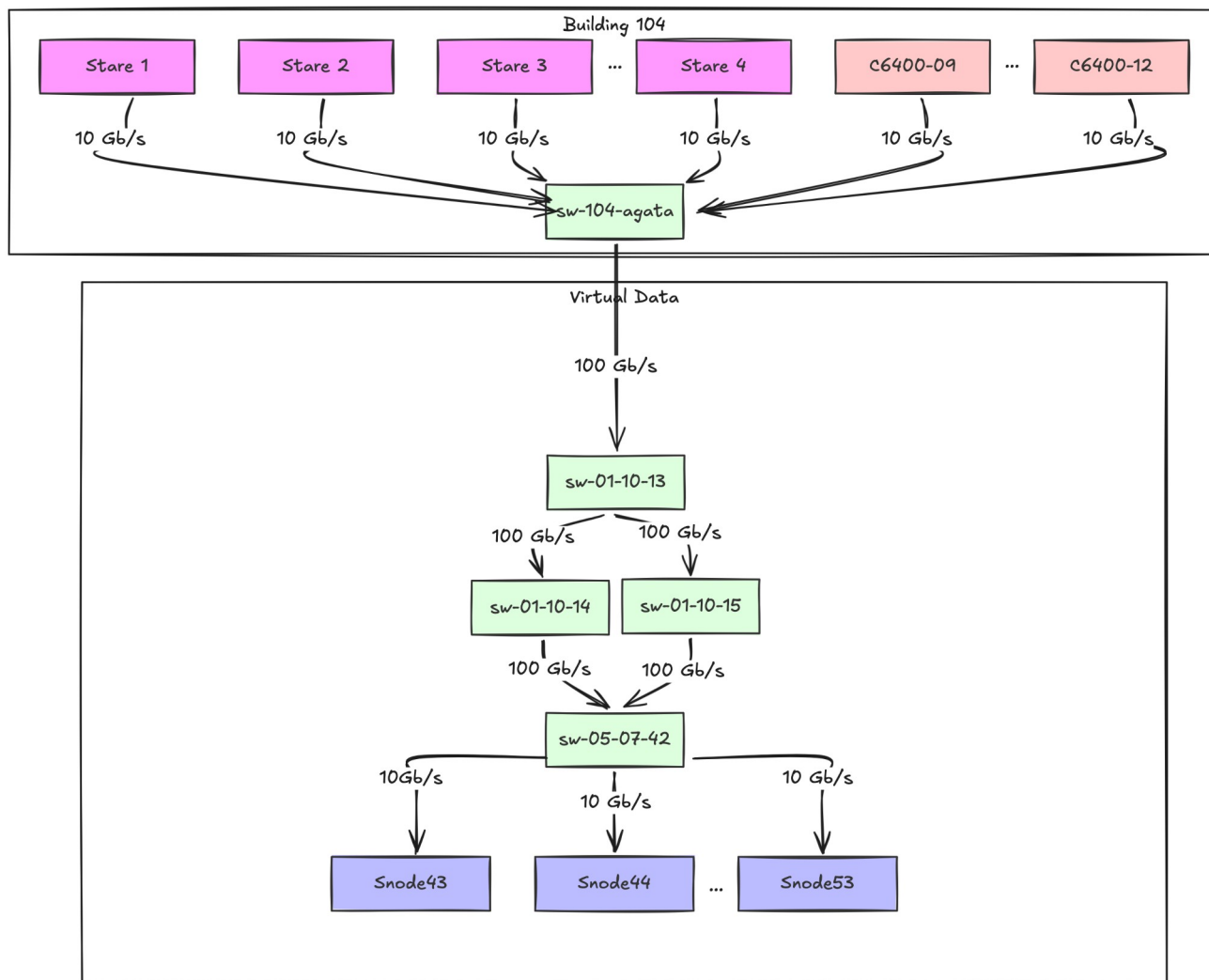


Stare → old server on Debian 10 ✓

Soft Emulator → new server on Debian 12 ✓

... No link between buildings

Network Architecture



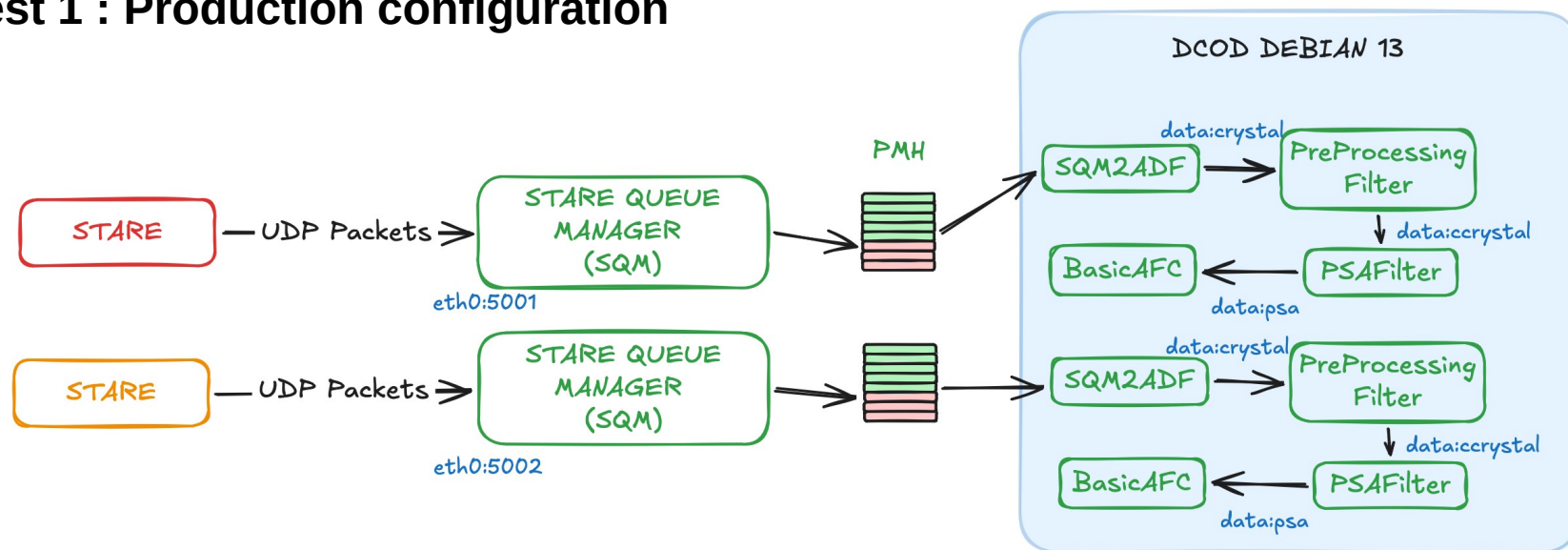
Data sources

~ AGATA

Acquisition servers
Debian 13

~ Computing Center

Test 1 : Production configuration

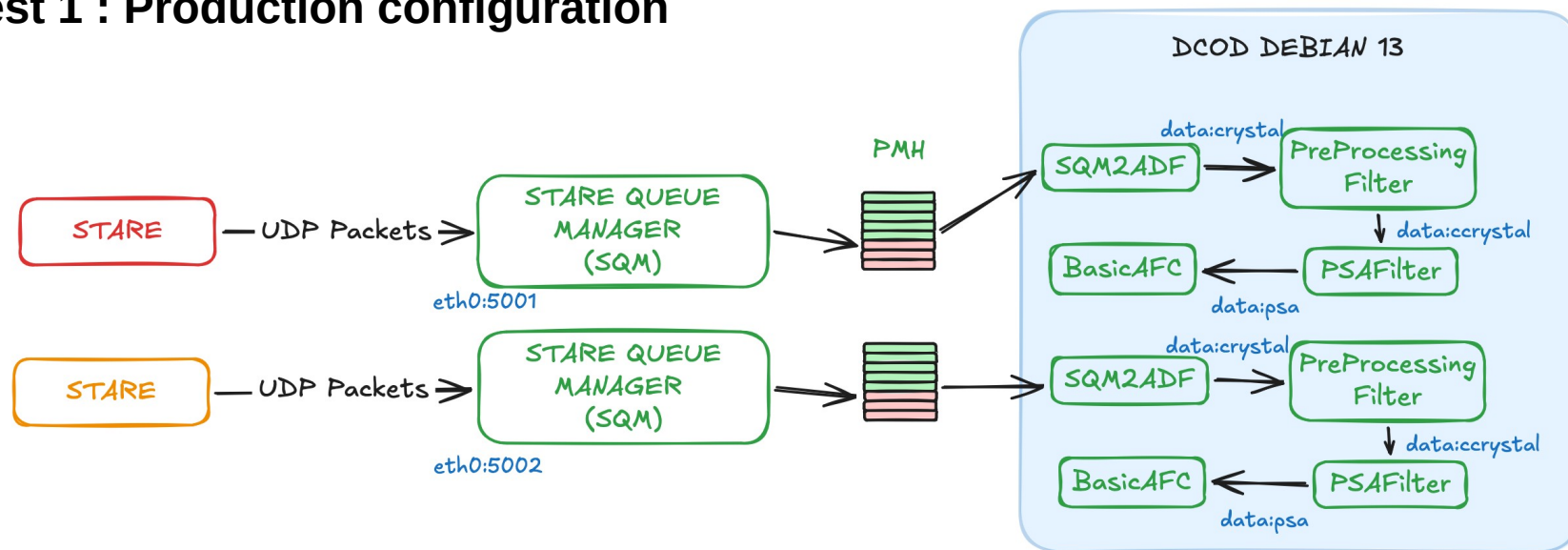


18 STARE cards + 4 software emulators : 22 links @5 kHz (310 Mbs)

Data received by 11 servers (2 crystals per server on one interface – 620 Mbs)

Full processing and storage

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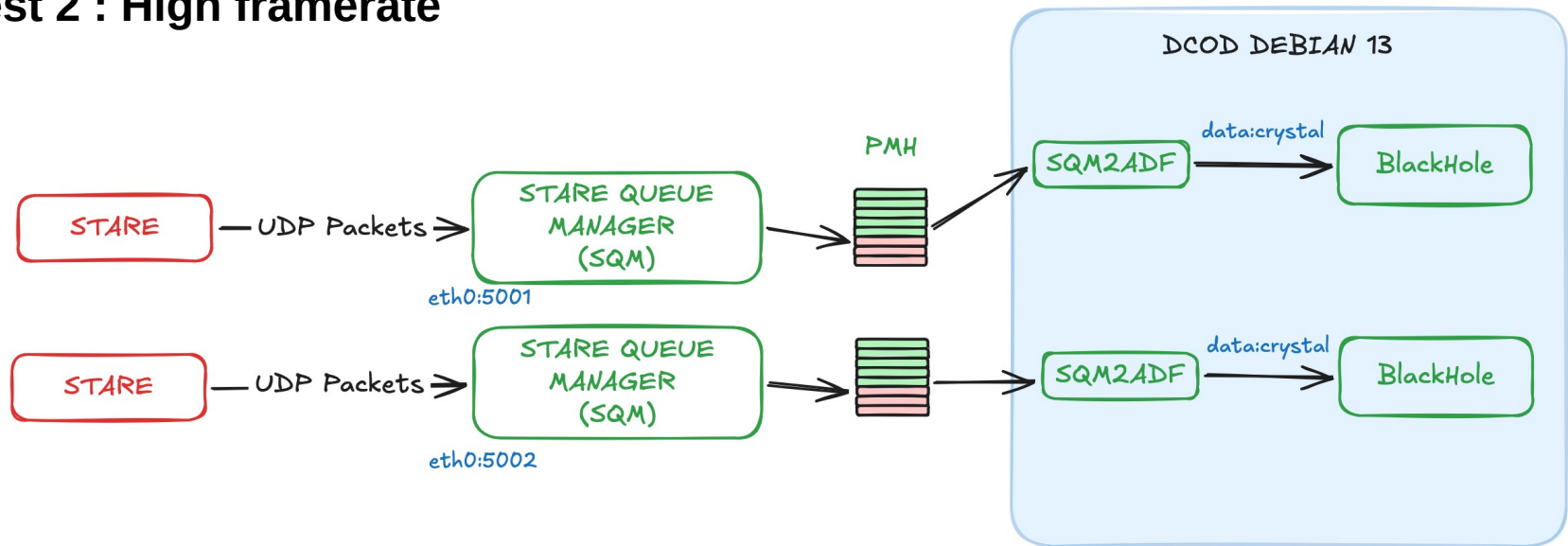


18 STARE cards + 4 software emulators : 22 links @5 kHz (310 Mbs)
Data received by 11 servers (2 crystals per server on one interface – 620 Mbs)
Full processing and storage

72 hours of data taking

- **No packet loss** on any STARE link
- **Packet loss < 4.5×10^{-5} %** on soft emulator links (→ network bursts)

Test 2 : High framerate

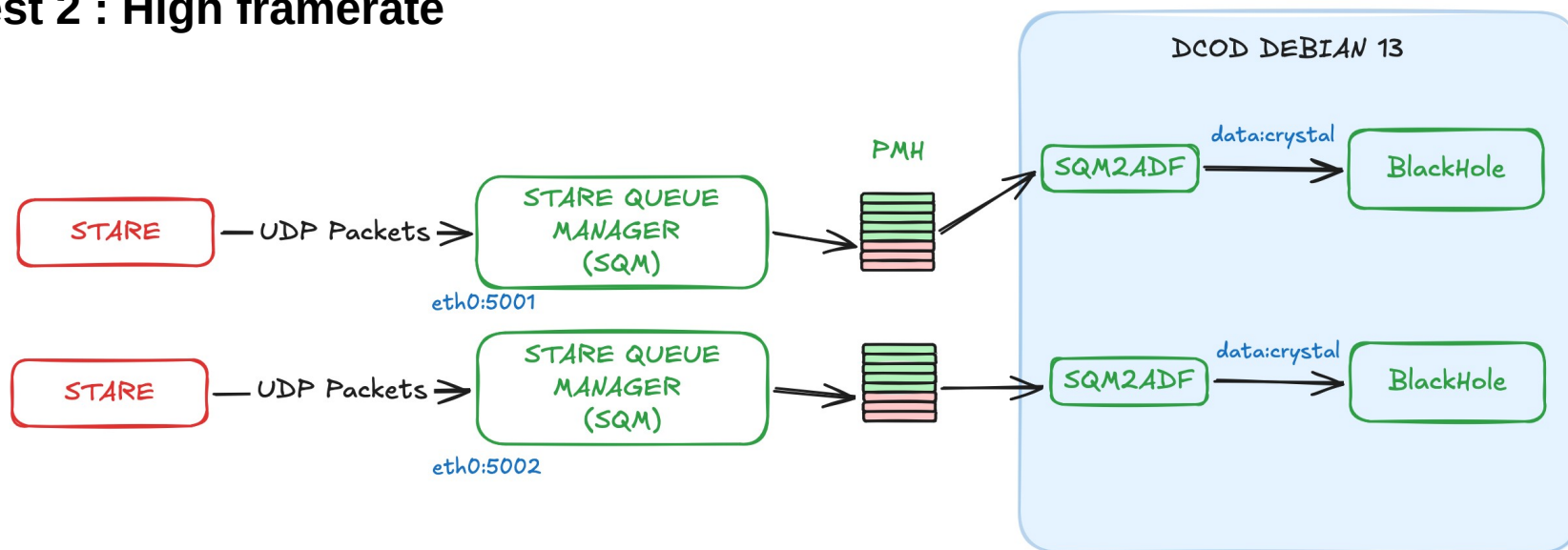


18 STARE cards @50 kHz (3100 Mbs)

Data received by 9 servers (2 crystals per server on one interface – 6200 Mbs)

Data dropped after SQM2ADF (no processing)

Test 2 : High framerate



18 STARE cards @50 kHz (3100 Mbs)

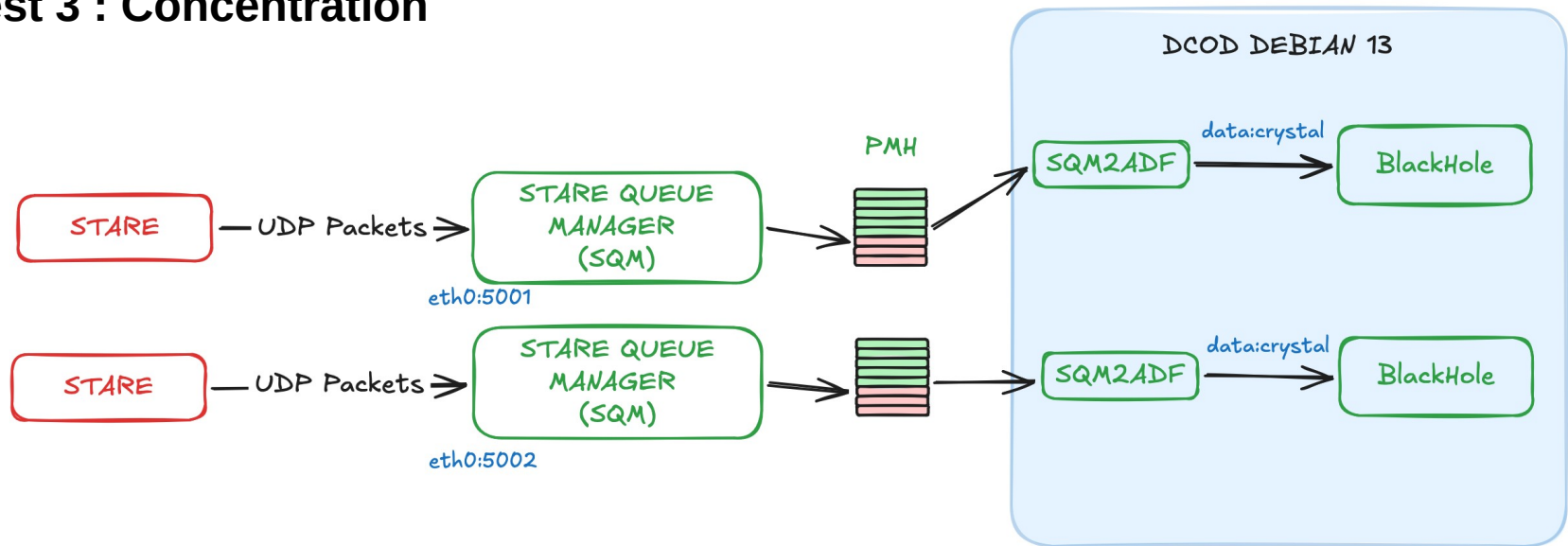
Data received by 9 servers (2 crystals per server on one interface – 6200 Mbs)

Data dropped after SQM2ADF (no processing)

30 hours of data taking

→ **No packet loss** on any STARE link

Test 3 : Concentration

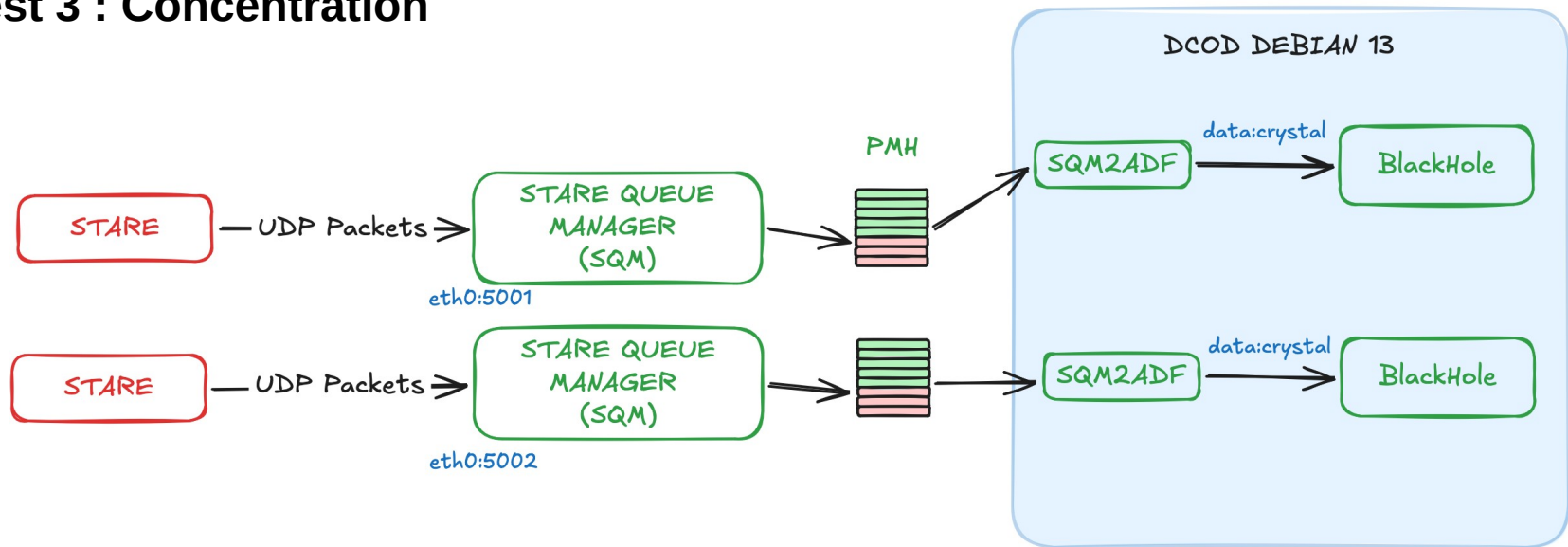


12 STARE cards @12,2 kHz (760 Mbs)

Data received by 1 server (12 crystals per server on one interface – 9120 Mbs)

Data dropped after SQM2ADF (no processing)

Test 3 : Concentration



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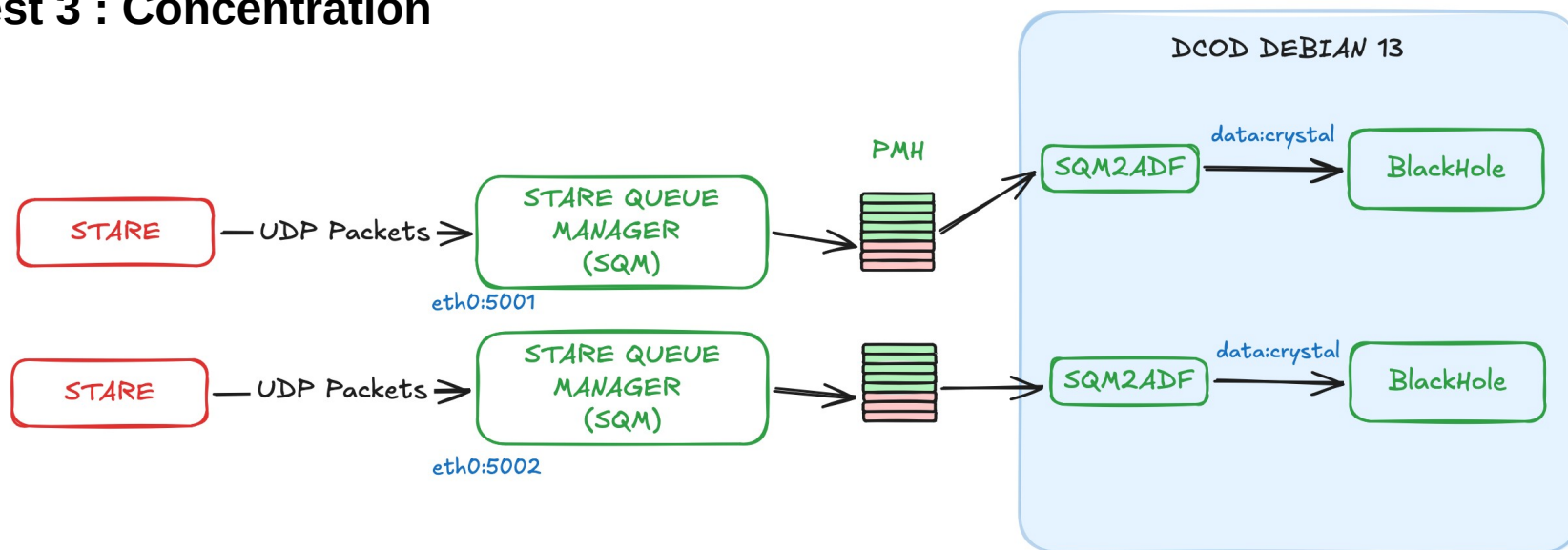
23 hours of data taking

10 first hours → **No packet loss** on any STARE link

1 hour → **8.5 % of packets lost**

12 last hours → **No packet loss** on any STARE link

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Broadcast due to other team test !

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Future and in progress (1/2)

- Better SQM initialization : no more hanging but still one second dead time at startup

Future and in progress (1/2)

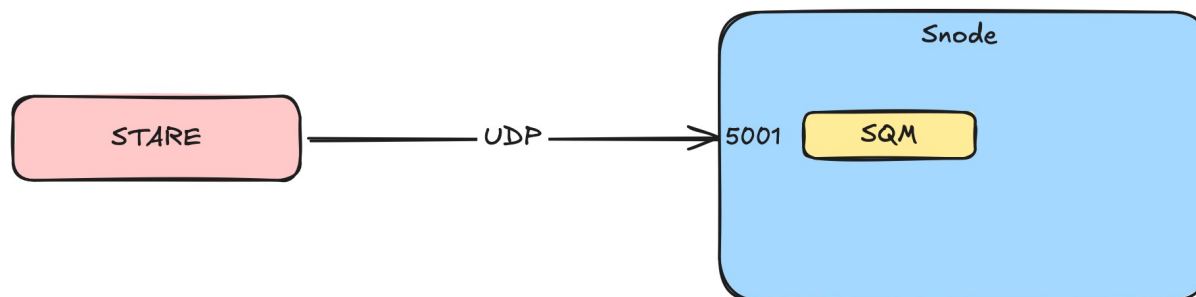
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- Integration of Agapilot for monitoring and slowcontrol
- Correction of Stare firmware when receiving big ICMP packets
 - Receive link was killed → no more answering to ARP requests → Broadcast over the whole network
 - Big input packets are filtered out → more stable

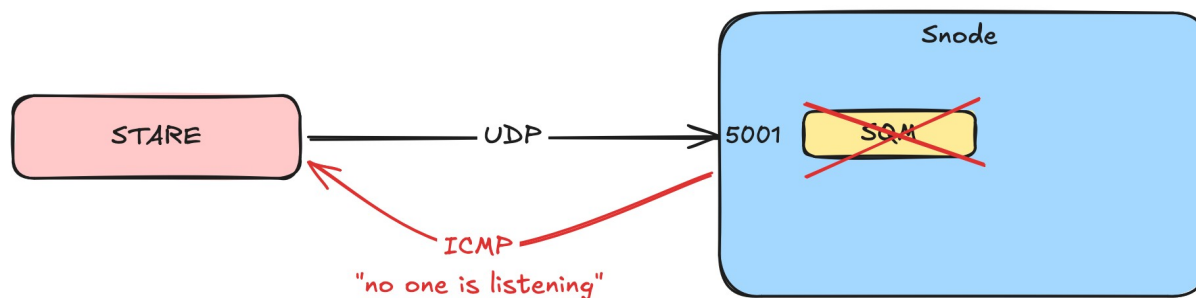
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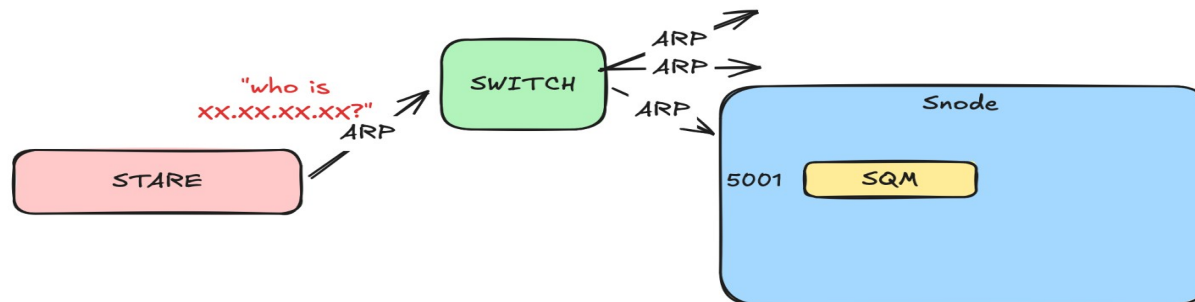
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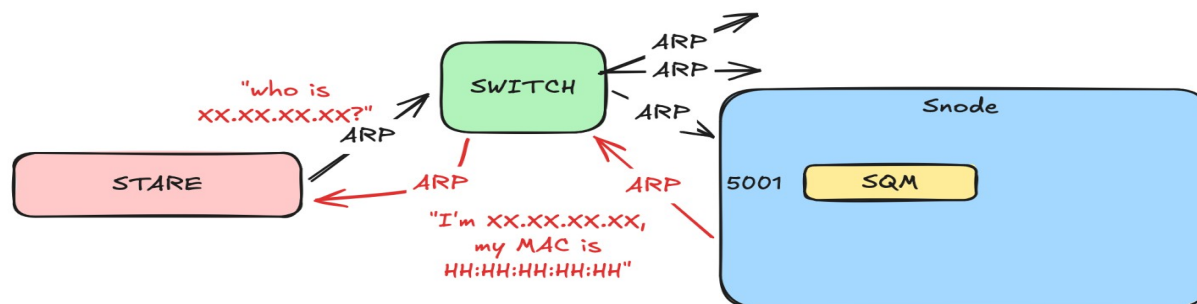
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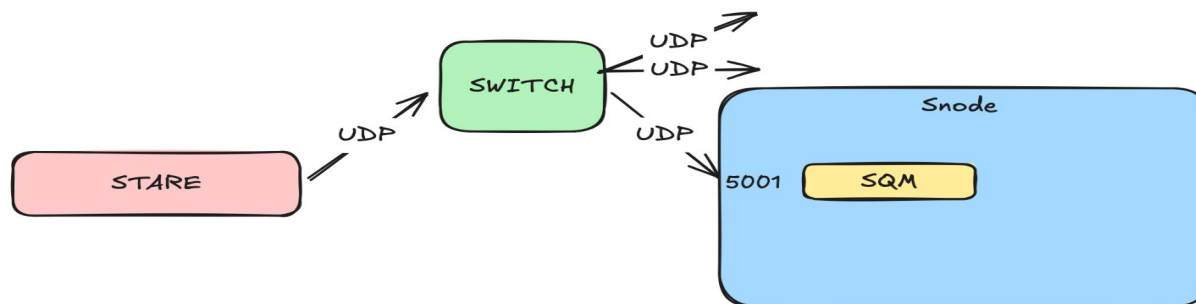
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- Tests on 100 Gbs interface for concentration

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- Tests on 100 Gbs interface for concentration
- Tests on separation of acquisition and processing
- Check robustness (many start/stop/reconfiguration)
- Support of CAEN cards?
- Upgrade of current DAQ Box to Debian 13 and new software

Conclusion

- With current hardware correctly configured, **we don't need R-UDP**
- Topology with 2 crystals per server @5kHz works correctly
- Network monitoring is a must have
- Still under test for robustness after many start/stop/reconfigurations
- Optimistic for more advanced topologies (processing on cluster, beyond 5 kHz, ...)