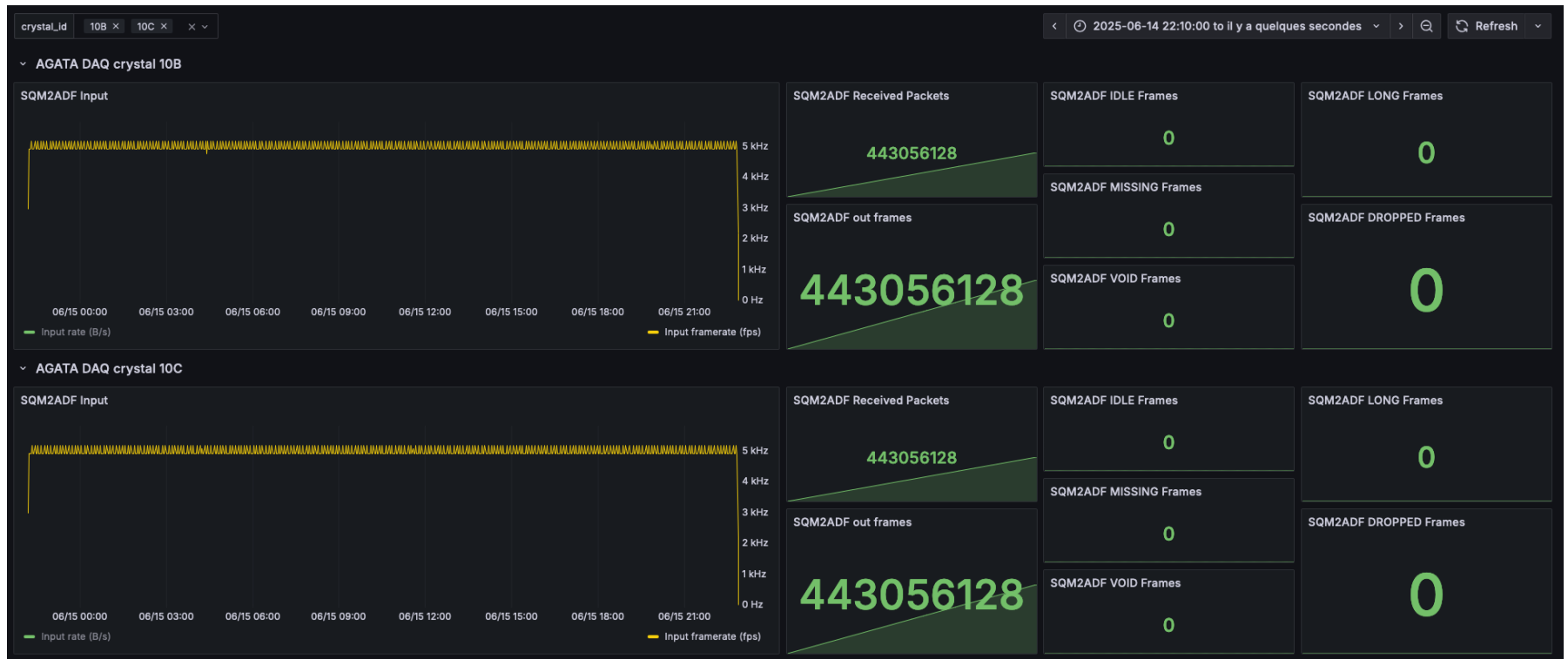


V2 Electronics – DAQ and Processing tests



Hardware & Software Dataflow Tests results

G. Baulieu, N. Dosme, S. Elloumi, X. Lafay
and the AGATA Data Processing Group

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 - Used for development for several years
 - Debian 10 (too old for production)
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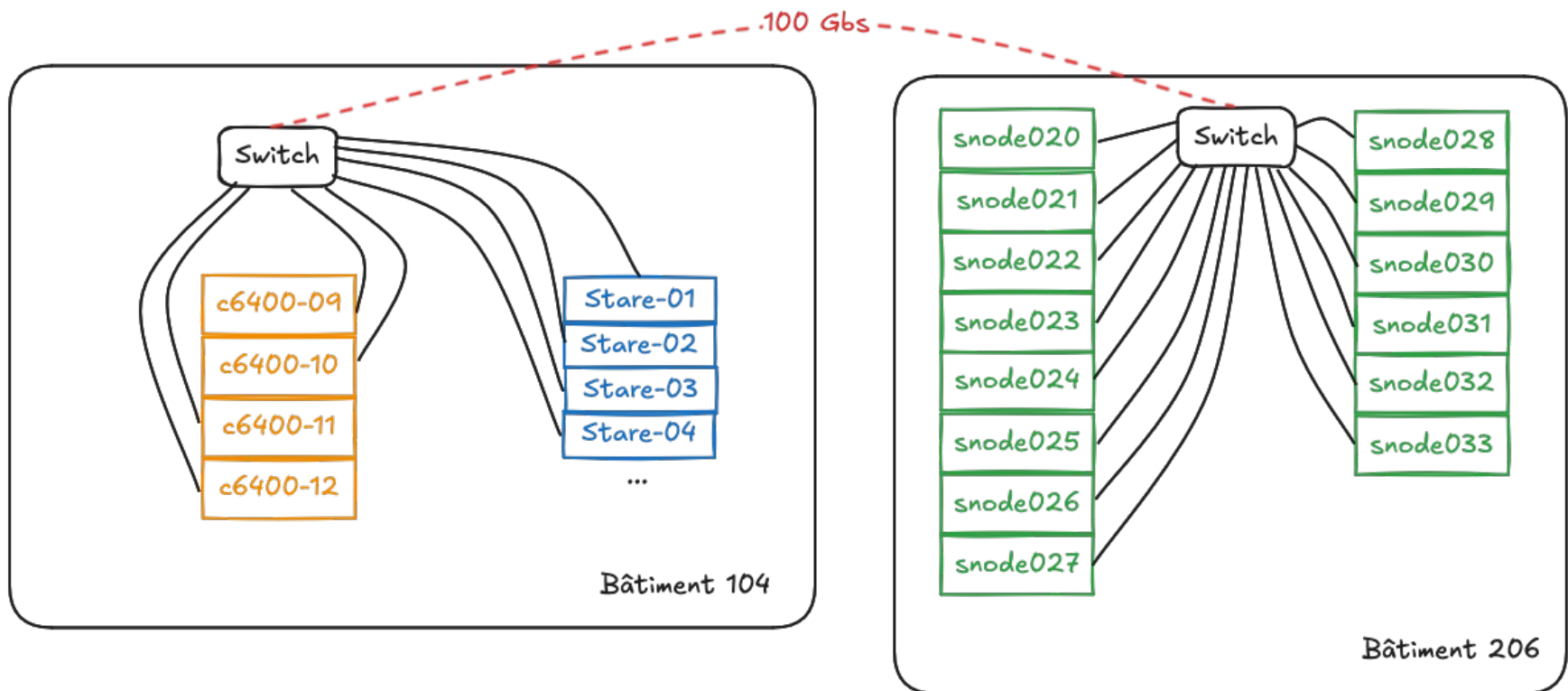
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- **STARE cards :**
 - Real datasources for production
 - Data from firmware emulator (loop on 1 event in memory)
- **Software Emulator (ADF2UDPServer) :**
 - Send data using STARE format
 - Can load any ADF file
 - Loop over hundreds of thousands of events
 - Different packets timeline from STARE card

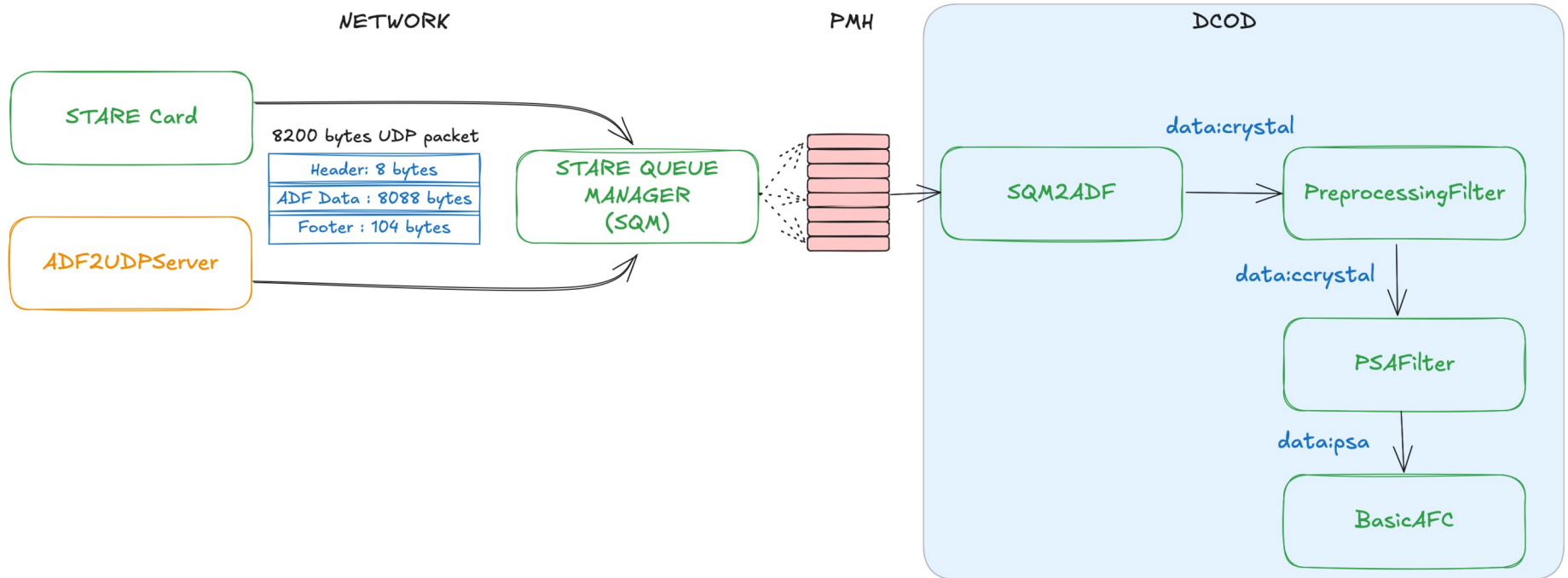
Hardware location



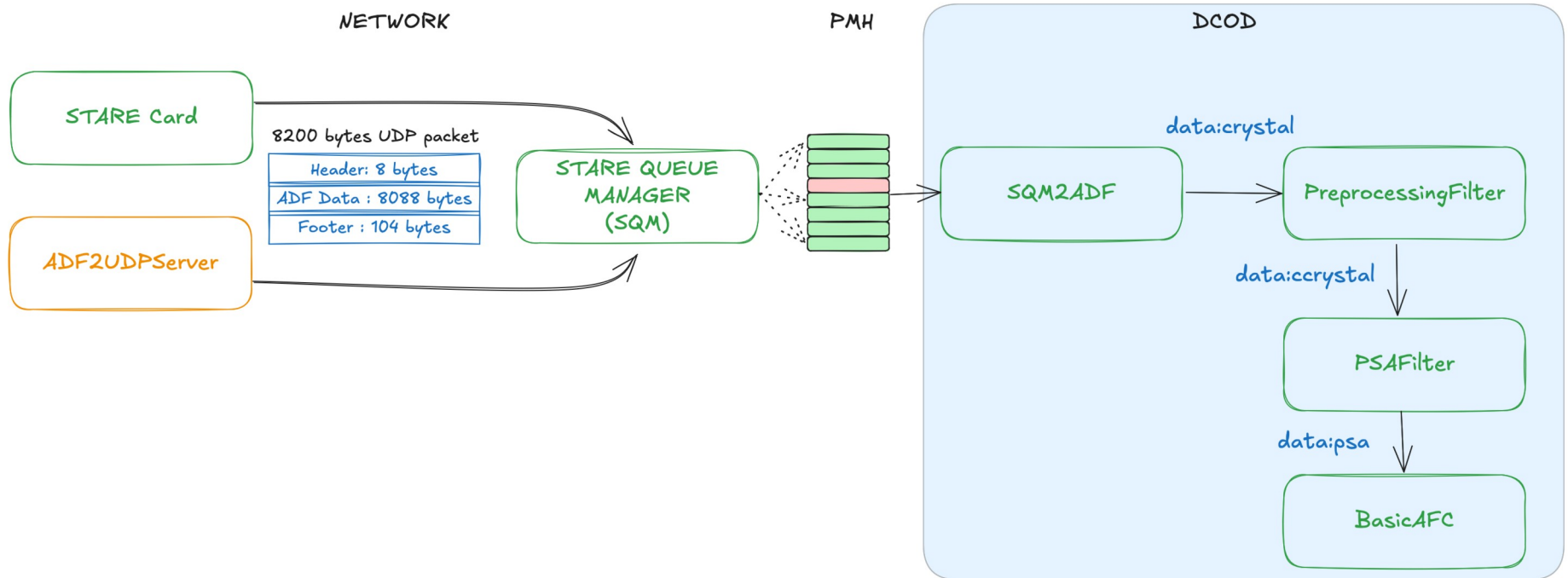
100 Gb/s link installed during summer but not yet configured : currently no connection between 2 buildings : can NOT send data from STARE cards to snode*

→ Tests on snode* will use the Software Emulator

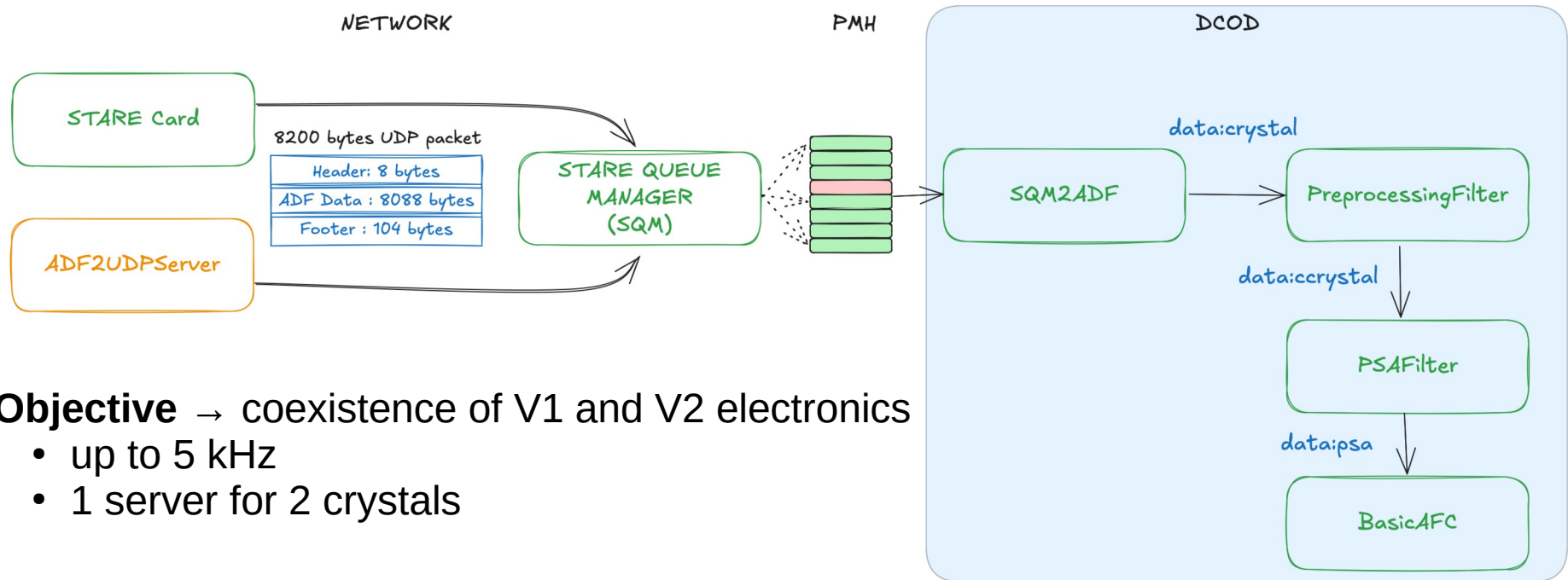
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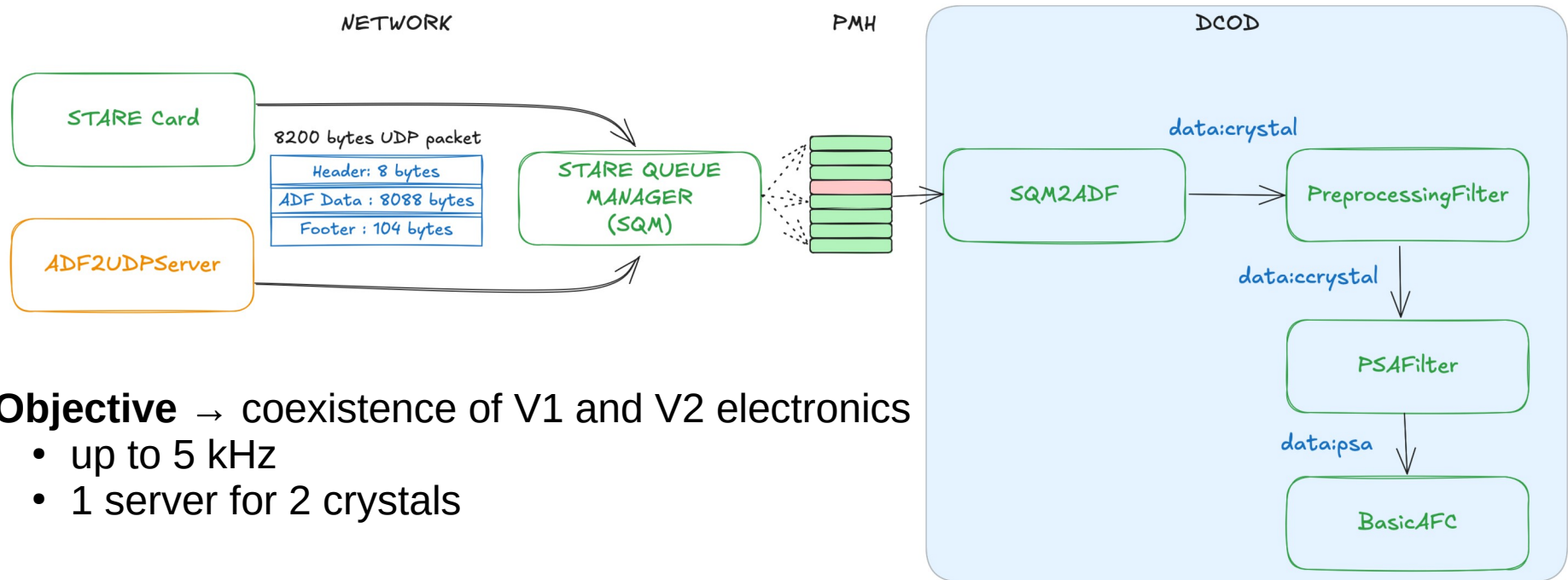
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Objective → coexistence of V1 and V2 electronics

- up to 5 kHz
- 1 server for 2 crystals

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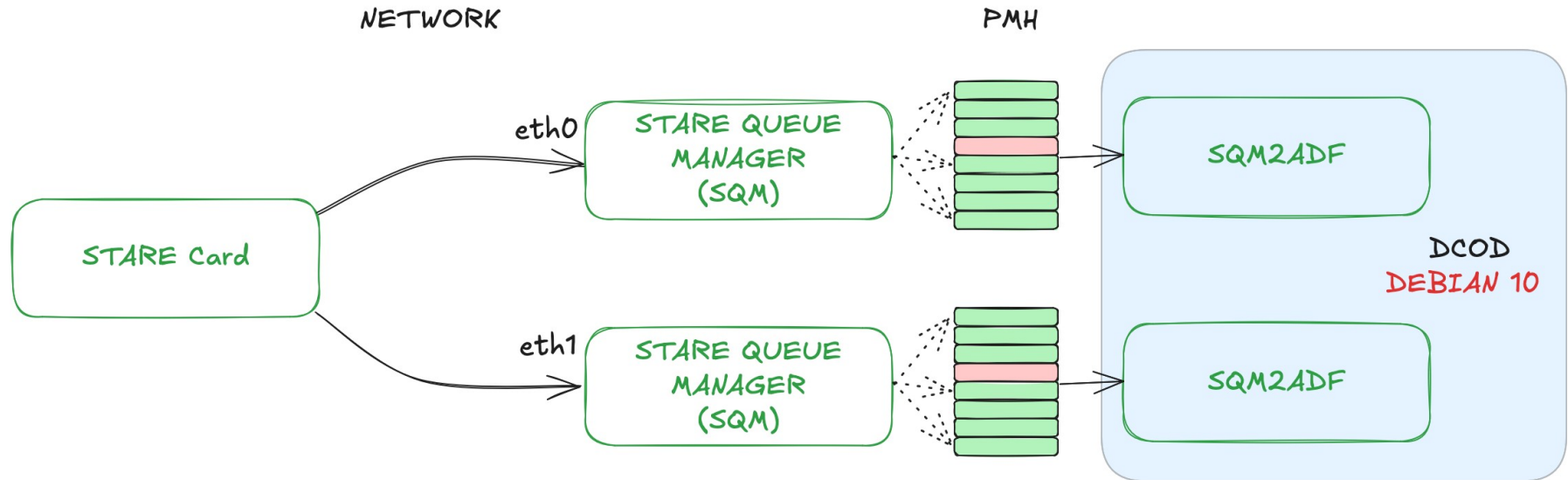
Objective → coexistence of V1 and V2 electronics

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Risk → UDP protocol does NOT ensure packets reception

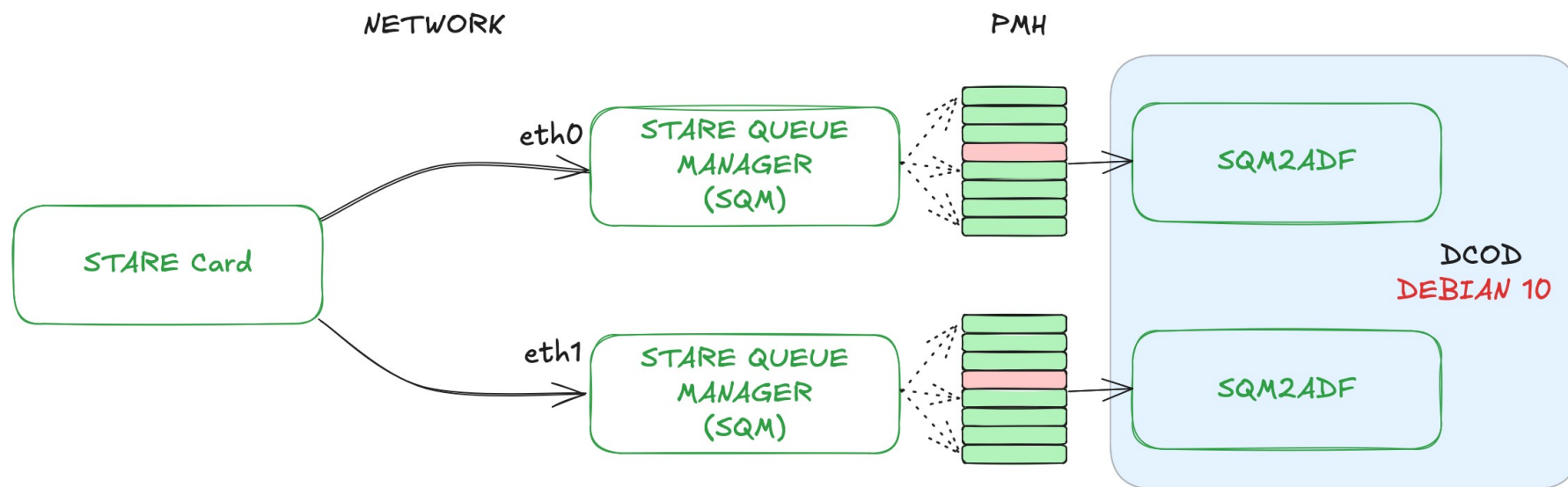
- No way of retrieving packet if lost
- Packet loss may happen at different places : NIC, switch, OS Kernel...
- We can only reduce the probability of packets loss

STARE card to SQM2ADF



2 different ADF frames loaded on each emulator

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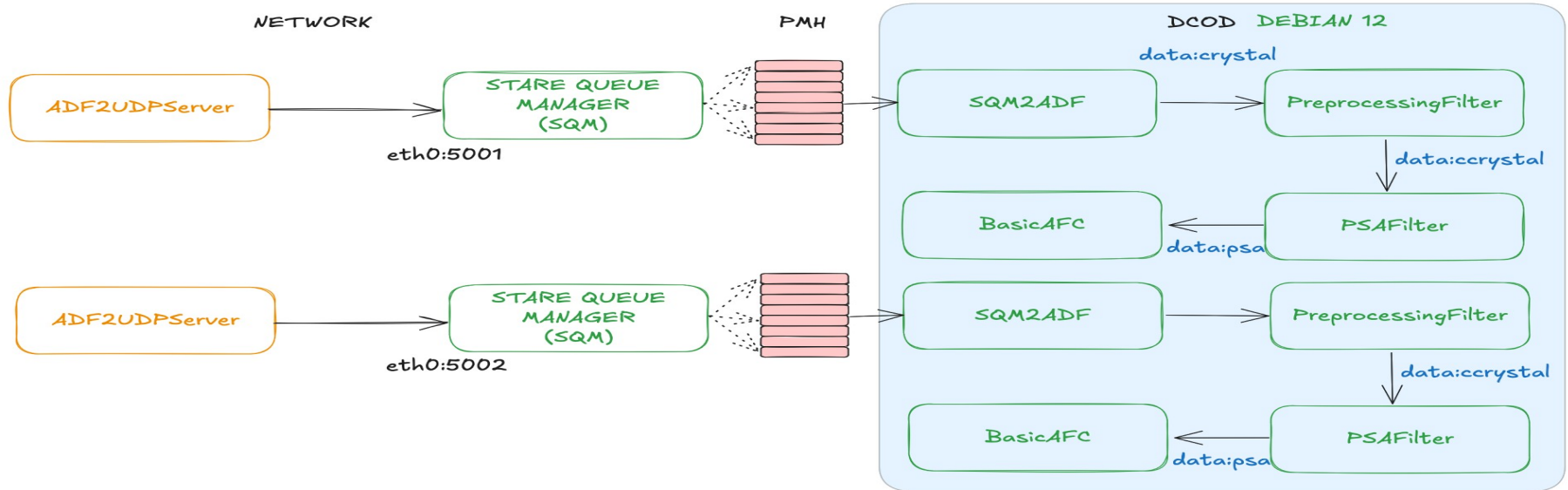
18H @5kHz :

- 323.780.608 packets sent on each interface
- Respectively **234 and 0 packets lost**

7H45 @15kHz :

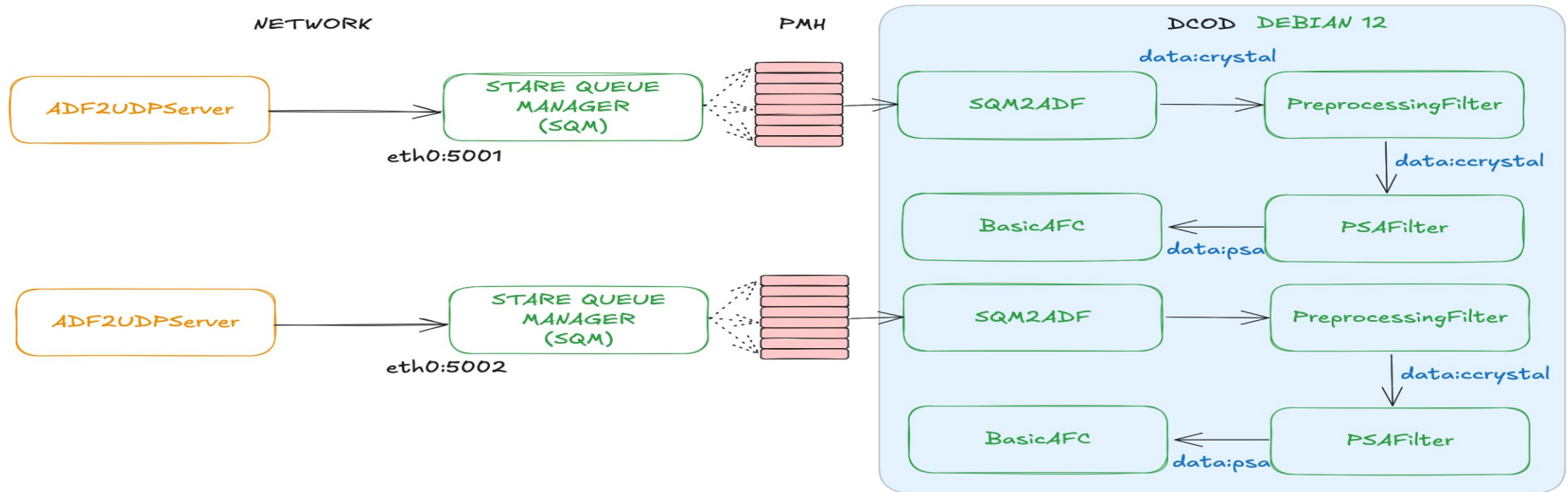
- 419.397.632 packets sent on each interface
- **No packet loss**

2 x Soft Emulator → Full Chain



[After incremental updates of configuration on reception server (Kernel+NIC)]

2 x Soft Emulator → Full Chain

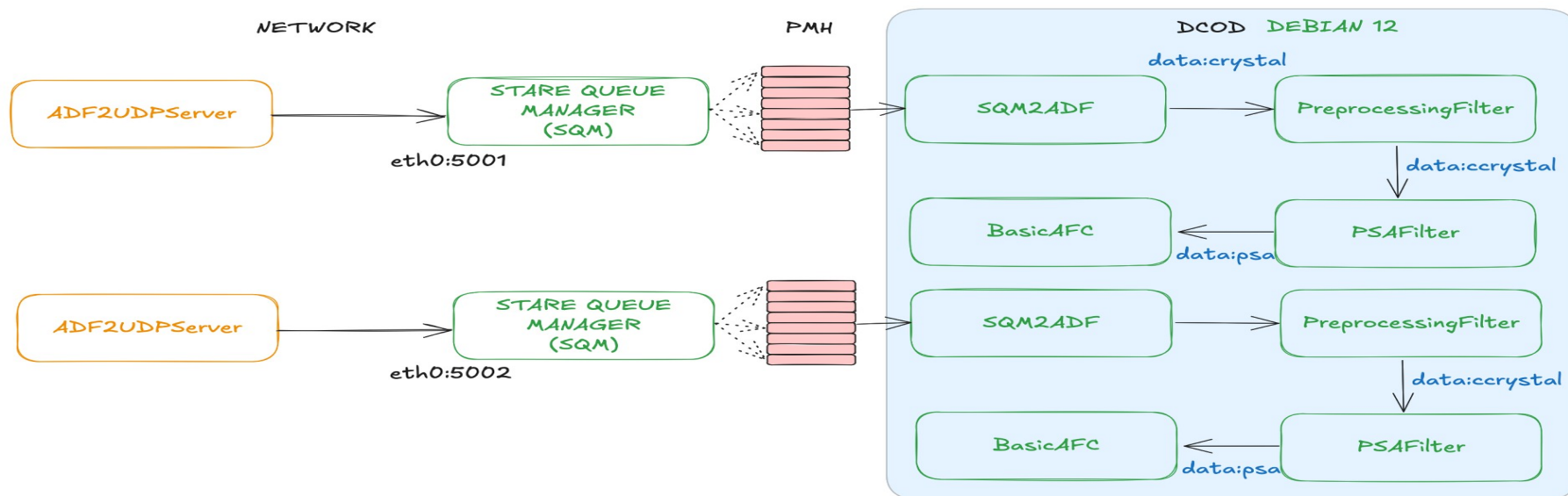


[After incremental updates of configuration on reception server (Kernel+NIC)]

24H @5kHz :

- 443.056.128 packets sent on each interface
- **Both chains show no packet loss**

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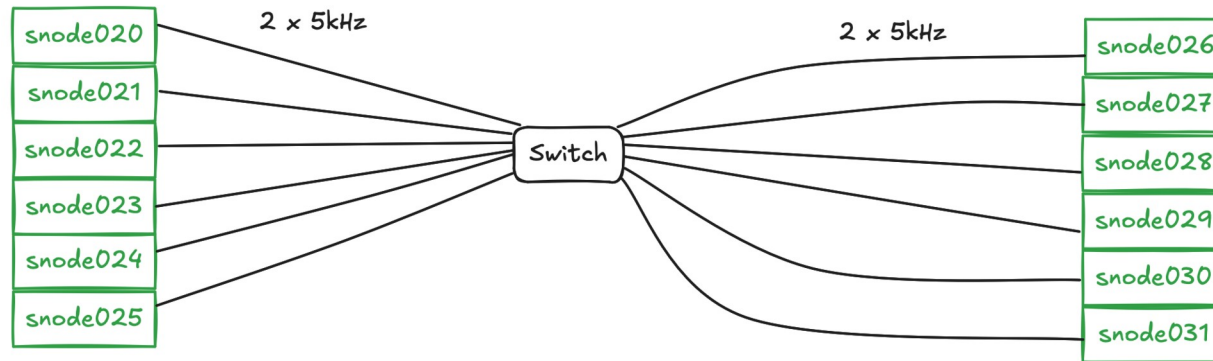
- 443.056.128 packets sent on each interface
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Stopping 1 chain (1 server for 1 crystal) :

- 22H @ 10kHz : no packet loss
- + 8h30 @ 12kHz : no packet loss
- + 1h30 @ 14kHz : no packet loss ... PSA back pressure @15kHz

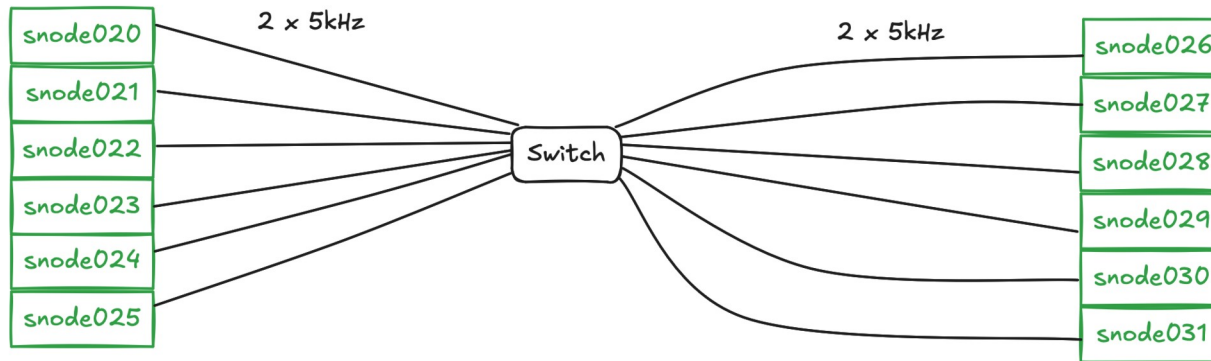
Loading the network :

12 x Soft Emulators on 6 servers → 12 x Full Chains on 6 servers



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24H30 @5kHz :

- 442.073.088 packets sent on each chain
- **447, 425 and 1** packets lost on 3 chains (2 first from same source computer)
- 9 chains with **no packet loss**

Conclusions

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Conclusions

- After first tests, a well configured snode server seems able to manage 2 x 5kHz full processing chains with acceptable UDP packets loss.
- Adapting the server kernel and NIC buffers size is mandatory
- Need to study possible UDP packets loss at switch level and adapt configuration
- Waiting for 100 Gb/s link between buildings 104 and 206 to start tests from Stare cards to snode servers :
 - 12 full chains from stare cards
 - 12 full chains from stare cards + 12 full chains from soft emulator