Handling Bad Input Data

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Correlating Bad Data

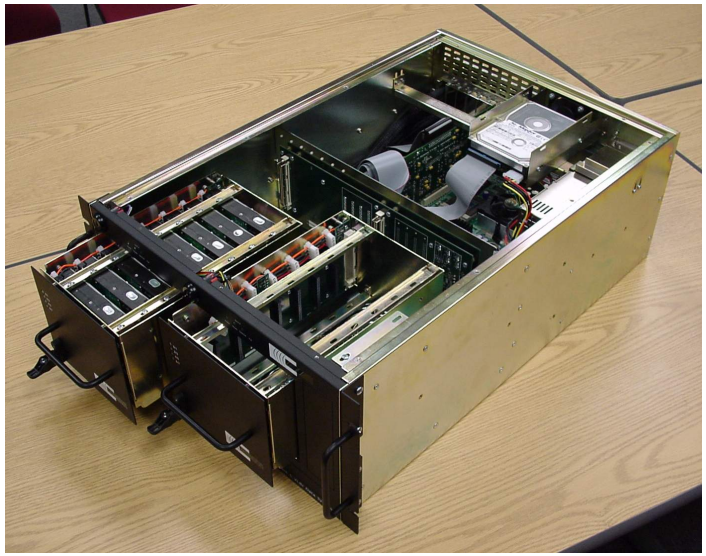
Goals:

- Recover as much data as possible
- Minimize the amount of bad data reaching the PI
  - We all hate flagging!
- Don’t slow down correlation

In SFXC we:

- Keeps track of blocks of bad data
- Set samples in these blocks to 0.0 during conversion to floating-point
  - Same mechanism is used to handle data-replacing headers (Mark4)

The Weakest Link?



The Mark5 data recorder problems:

- Not all data makes it onto the disks
- Disks failures
  - Data is replaced by fill pattern

SFXC searches for fill-pattern in input data

Optimized by recognizing fill-pattern blocks are 64k

An annoying problem remains:

- XLRRead sometimes fails instead of return fill pattern
  - Further XLRReads fail as well, even at different byte address
  - Only a full reset of StreamStor hardware fixes this

Problems are disproportionally bad at 1 Gbit/s

Mark5A issues

- Mark4 Formatters develop bad tracks
  - Complicates looking for sync words
  - Bad track means we have to throw away entire subbands
  - Seen something similar with VLBA recently
    - But only once so far

- Incomplete Mark4 frames
  - Easy to detect: sync word not at expected location
  - Expensive to fix: resync data stream
    - SFXC uses Horspool's algorithm

Mark5B Frame# Corruption

	Bit 31		Bit 0
Word 0	Sync word (TBD)		
Word 1	User-specified (16 bits)	T	Frame# within second (starting at 0)
Word 2	VLBA BCD Time Code Word 1 ('JJJSSSSS')		
Word 3	VLBA BCD Time Code Word 2 ('.SSSS' plus 16-bit CRCC)		

Table 1: Disk Frame Header format

- Frame# supposed to start at 0 at second boundary
  - Sometimes just keeps increasing
  - Sub-second VLBA timestamp still correct
- SFXC switches to using VLBA timestamps if needed
  - Sub-second VLBA timestamp not always accurate enough
    - Use additional heuristic to "fix" timestamps

Questions?

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