VMM3a/SRS

Network package structure

Wireshark

- Use lua-plugin to make network data human-readable
- LINK

Wireshark

- See how the different components are highlighted in Wireshark

- Here the full package component is highlighted

Wireshark

- See how the different components are highlighted in Wireshark

- Here only a specific component
  - Framecounter

- Example here:
  - DEC: 67227
  - HEX: 1 06 9b
  - Both as highlighted

HOW TO FIND EACH FRAME?

- Find unique components in frame that appear in all frames
  - "VM3" string
    - HEX: 56 4d 33
  - Source and destination port
    - DEC: 6006
    - HEX: 17 76
    - First source port, followed by destination port

HOW TO FIND EACH FRAME?

- Directly after the "VM3" string follows the FEC's IP address

HOW TO FIND EACH FRAME?

- As mentioned "VM3" string appears in all frames
  - HEX: 56 4d 33

- Here frame 17 instead of 1

Cross check:
137 packages -> how often do we find the "VM3" string in the pure hex code (56 4d 33)?

Check grep: 137 times => works

What is the last bit of a frame?

- The last bit is the last hit or Marker that has been recorded

- Here last frame (137)

How to differentiate hits and Markers? ON FEC LEVEL!

- CHECK ORDER OF THE BITS

- Hit = 1-bit data flag + 1-bit over-threshold flag + 6-bit channel + 10-bit ADC + 8-bit TDC + 12-bit CKBC + 5-bit VMM-ID + 5-bit Offset

- Marker = 42-bit FEC timestamp + 5-bit VMM-ID + 1-bit hit/marker flag

- Hit/marker flag for marker always 0

- Hits contains data flag, which is always 1

Examples of Markers and hits

Decoding on binary requires still manual proof

- 07 4f 2e c4 24 00 == 125572943872 + ID 9 + ?
- 07 4f 2e c4 28 00 == 125572943872 + ID 10 + ?
- 07 4f 2e c4 2c 00 == 125572943872 + ID 11 + ?
- 07 4f 2e c4 30 00 == 125572943872 + ID 12 + ?
- 07 4f 2e c4 34 00 == 125572943872 + ID 13 + ?
- 07 4f 2e c4 38 00 == 125572943872 + ID 14 + ?
- 07 4f 2e c4 3c 00 == 125572943872 + ID 15 + ?
- 21 c4 06 4b d4 89 == Offset 4, ID 7, ch 20, bcid 1138, tdc 137, adc 64, thl 1

Distribution of hit information in bytes (VMM2)

byte0	byte1	byte2	byte3	
FC3	FC2	FC1	FC0	Frame Counter
"V"	"M"	"2"	CH#	Header
H3	H2	H1	H0	Header Info
D0	D1	D2	D3	Data
D4	0x00	0x00	0x00	Data
D0	D1	D2	D3	Data
D4	0x00	0x00	0x00	Data

D4	7	FLAG	
	6	THR	
	5	CH#	0
	4		1
	3		2
	2		3
	1		4
	0		5
D3	7	AMP	0
	6		1
	5		2
	4		3
	3		4
	2		5
	1		6
	0		7
D2	7		8
	6		9
	5	TAC	0
	4		1
	3		2
	2		3
	1		4
	0		5
D1	7		6
	6		7
	5	BCID	0
	4		1
	3		2
	2		3
	1		4
	0		5
D0	7		6
	6		7
	5		8
	4		9
	3		10
	2		11
	1	UNUSED	
	0	UNUSED	