

Long Time Logging

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Outline

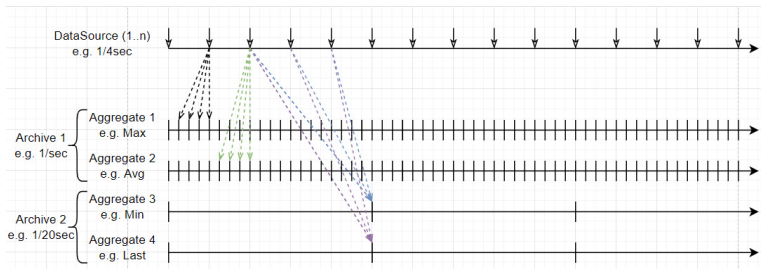
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Round Robin Database

Data Collection and Storage

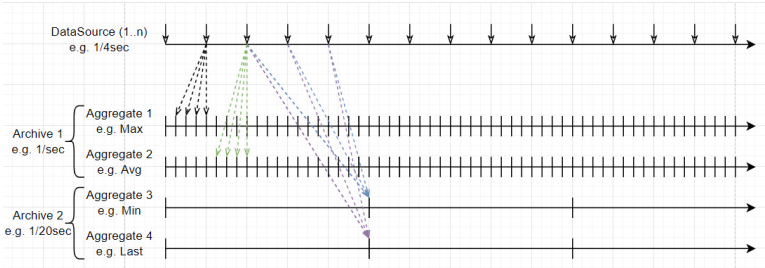
- Collects data from multiple **data sources**
 - each data source has a name and defines a specific data sample frequency (rate) e.g. RPM value once per second, temperature once every 5 seconds
- Stores collected data in multiple **archives**
 - archives are defined at database level
 - each archive defines a data sample frequency (rate) e.g. one value every second, every minute, every hour
 - also, the last value¹ of each data source is available



¹not same as last stored value

Round Robin Database

Aggregation/Resampling



- Mismatch between the sampling frequencies of each data source and of each archive
- Resampling needed before storing: **aggregation**
- Each data source defines 0 or more aggregations (one of: Min, Max, Average, Last)



Round Robin Database

Trivia

The current database is setup with 3 archives containing data samples for

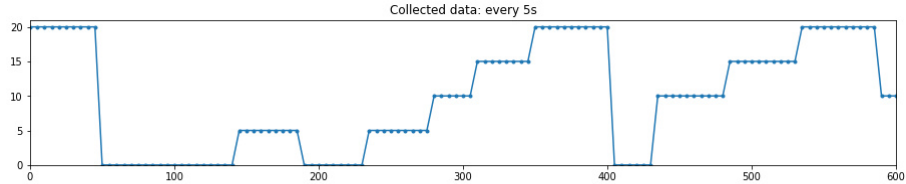
- every second for 72 hours
- every minute for 60 days
- every hour for about 9.75 years²



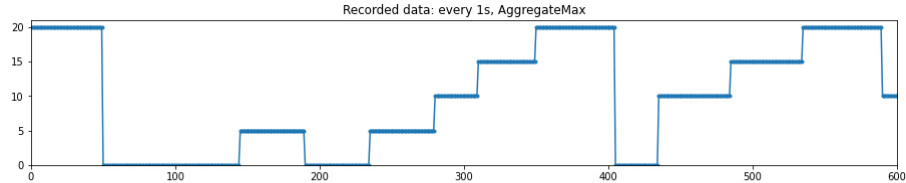
¹probably a mistake; likely intended to be 10 years

Data Aggregation

Supersamp''



Total time @ 0kV: 650 s
Total time @ 5kV: 805 s
Total time @ 10kV: 680 s
Total time @ 15kV: 805 s
Total time @ 20kV: 660 s

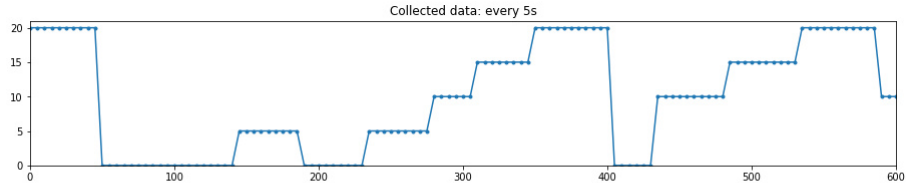


Total time @ 0kV: 650 s
Total time @ 5kV: 805 s
Total time @ 10kV: 680 s
Total time @ 15kV: 805 s
Total time @ 20kV: 660 s

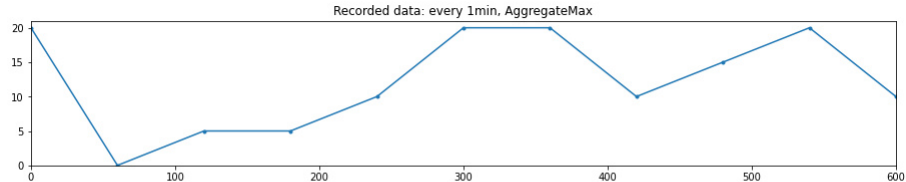


Data Aggregation

Subsampling



Total time @ 0kV: 650 s
Total time @ 5kV: 805 s
Total time @ 10kV: 680 s
Total time @ 15kV: 805 s
Total time @ 20kV: 660 s

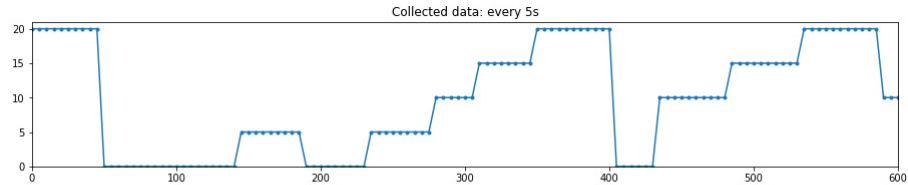


Total time @ 0kV: 180 s
Total time @ 5kV: 600 s
Total time @ 10kV: 420 s
Total time @ 15kV: 1140 s
Total time @ 20kV: 1260 s

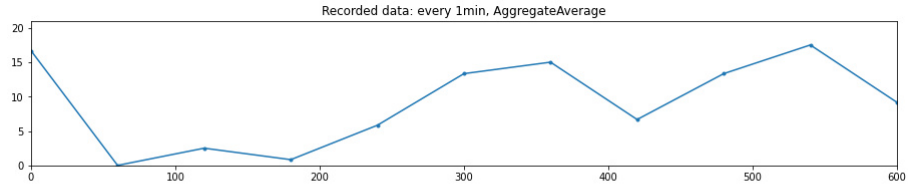


Data Aggregation

Subsampling



Total time @ 0kV: 650 s
Total time @ 5kV: 805 s
Total time @ 10kV: 680 s
Total time @ 15kV: 805 s
Total time @ 20kV: 660 s



Total time @ 0±2kV: 360 s
Total time @ 5±2kV: 780 s
Total time @ 10±2kV: 780 s
Total time @ 15±2kV: 960 s
Total time @ 20±2kV: 60 s



Data Aggregation

Limitations

- Fixed size database³, long term history of value evolution
- Total size (hence number of data sources and aggregates) to be kept in check
- Re-(sub-)sampling (i.e. low resolution of sampling) makes extracting totals difficult or unfeasible
- Totals and counters **may but don't need to** be part of the long term logging; they could be recorded in other forms of persistent storage



³for one aggregation of one data source

Operational Values

Which Values to Log?

- Define a list or a method to identify the values (and aggregations) to be recorded in the long term database
 - There seems to be some consensus that all "sensible" TAD values should be logged
 - not: strings, versions, video ADCs etc.
 - boolean or enum-like values might or might not be useful when aggregated
 - There is a proposal of adding other parameters but they are mostly just overall totals or counters (like total distance travelled by stage axes or number of valve actions)
 - Stigmation and source tilt (X and Y) history could qualify, but not sure how the loss of resolution would impact them



Operational Values

In TestUI

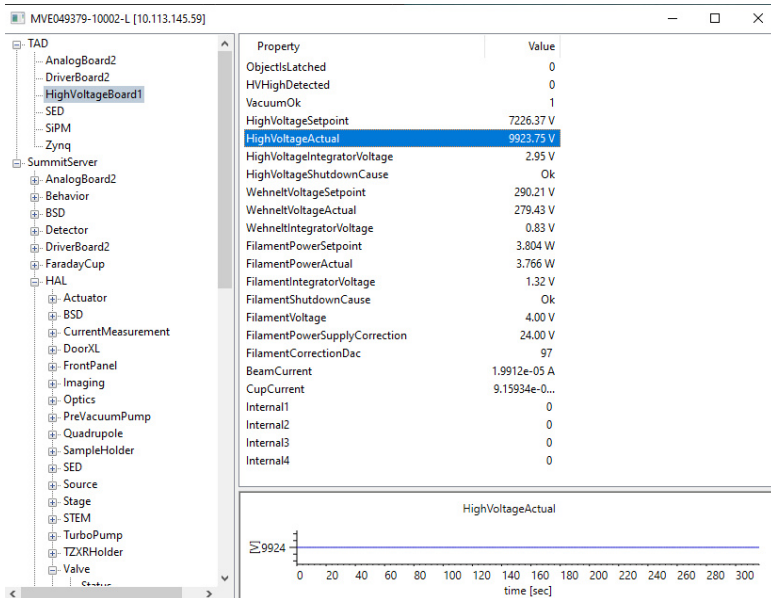
AnalogBoard2.TAD				DriverBoard2.TAD				HighVoltageBoard1.TAD				SED.TAD				Zynq.TAD			
+5		-5		Main+24		Aux+24		<input type="checkbox"/> ObjectsIsLatched	<input type="checkbox"/> HVHighDetecte			ScintillatorVout		ScintillatorIout		HWVersionId		HWPatchId	
4.96	V	-5.03	V	24.13	V	0.00	V					9.76562	V	2.5332e-07	A	2		2	
+12		-12		+20		+12		<input checked="" type="checkbox"/> VacuumOk	HighVoltageSetpoint			Type				MacAddress		SerialNumber	
12.41	V	-12.54	V	20.12	V	11.89	V		7226.37	V		SiPM				0000801f12326913		N/A	
+24		+200		-12		+5		HighVoltageActual	HighVoltageIntegrato...							+1V8		+3V3	
23.36	V	198.19	V	-11.94	V	4.93	V	9923.75	V	2.95	V					1.80	V	3.23	V
-200		Temp		+3.3		Temperature1		HighVoltageSh...	WehneltVoltageSetpo...							+5V		+24V	
-199.81	V	321.22	K	3.25	V	394.03	K	Ok	289.72	V		SiPM.TAD				4.98	V	23.61	V
Short200V		<input type="checkbox"/> Overcurrent200		Temperature2		<input checked="" type="checkbox"/> HardwareSwitc		WehneltVoltageActual	WehneltIntegratorVol...			Temperature		BiasVoltage		ScanXNeg		ScanXPos	
0.60				394.03	K			279.43	V	0.83	V	298.674	K	9.30846	V	0.00	V	2.03	V
DetectorBias		Channel1		CondenserLensVoltage		ObjectiveLensVoltage		FilamentPowerSetpo...	FilamentPowerActual							ScanYNeg		ScanYPos	
2.97	V	0.66	V	4.11	V	9.24	V	3.804	W	3.758	W					1.31	V	0.00	V
Channel2		Channel3						FilamentIntegratorVol...	FilamentShutd...							CommonModeZynq		CpuTemperature	
0.62	V	0.61	V					1.32	V	Ok						1.49	V	321.75	K
Channel4		Channel5						FilamentVoltage	FilamentPowerSupply...							FpgaVersionInfo		FirmwareVersionInfo	
0.62	V	3.30	V					4.00	V	24.00	V					Build date : Wednes		3.0.0-r0	
Channel6		Channel7						FilamentCorrectionDac	BeamCurrent							BuildDate		BranchName	
1.48	V	1.48	V					97	1.9912e-05	A						20220125175606		HEAD	
Channel8								CupCurrent	Internal1							GitHash		BoardType	
1.48	V							9.15934e-06	A	0						baac4f5badfde04efi		DriverImageBoard	
								Internal2	Internal3										
								0	0										
								Internal4											
								0											

Not all values can or should be logged.



Operational Values

In PhenomServiceTool



Operational Values

Plan

- Add all "sensible" TAD values and the two already requested (Stigmation and SourceTilt)
- Decide on how to handle totals and counters
- Collect input from R&D, Service, Apps over which other values to add
- Critically select which to add and which not, based on maximizing the "usefulness"



In SysInfoViewer



Questions and Discussions

