SIS and BIS data publication

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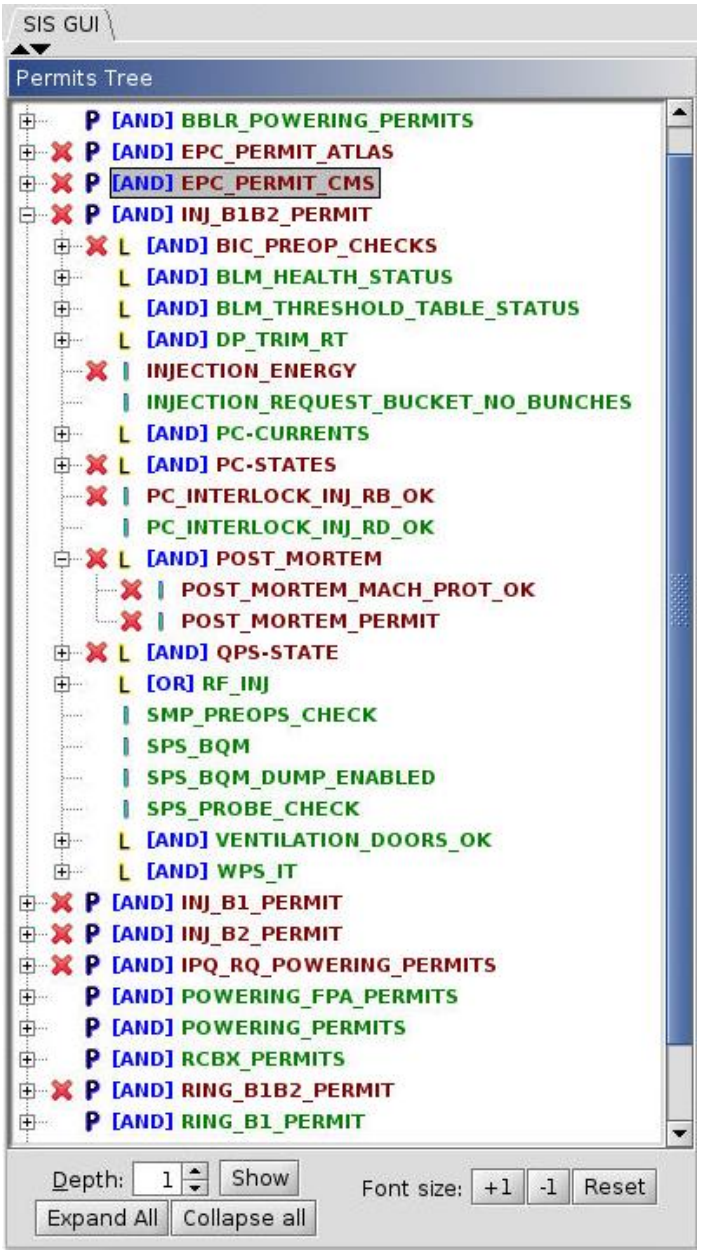
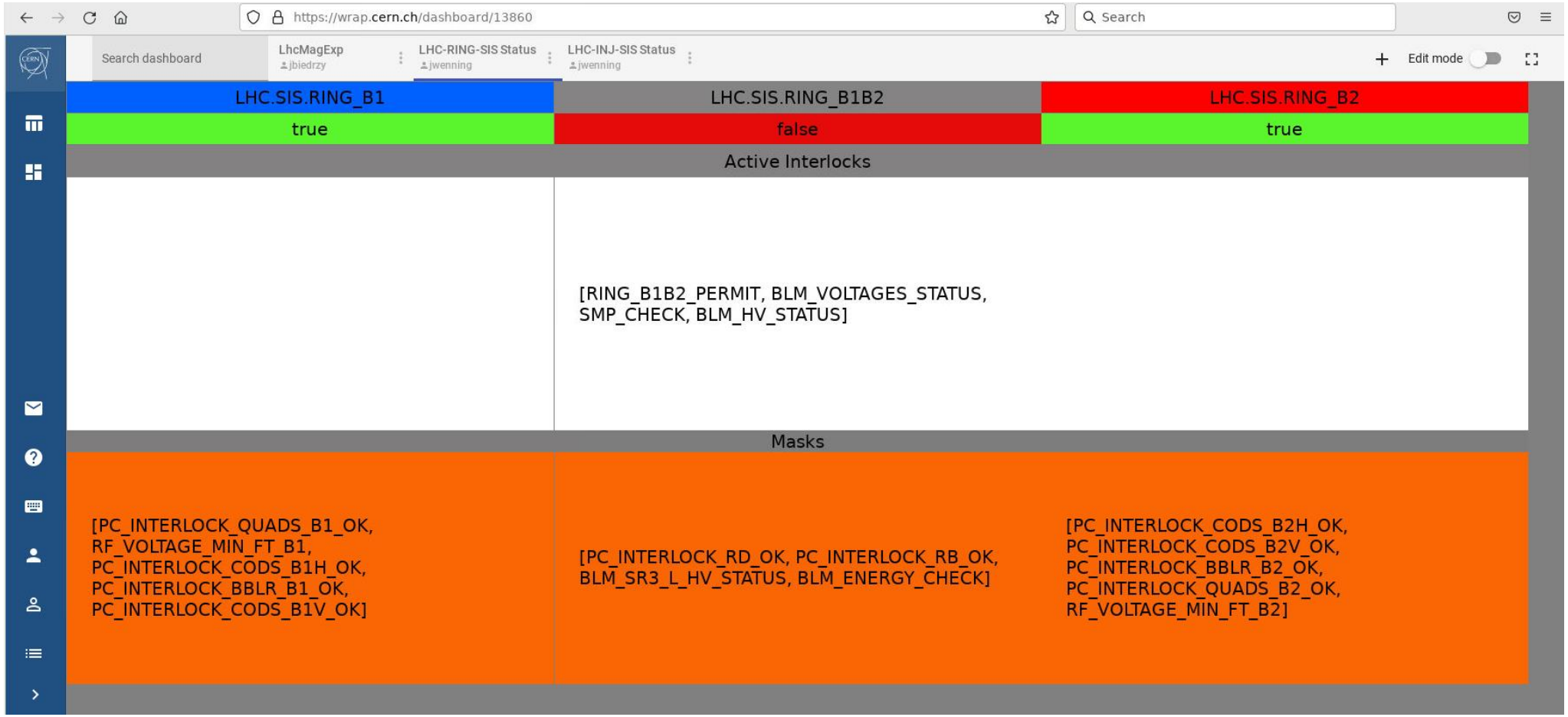
SIS trees

- A publication of the complete state of SIS trees was developed by E.Veyrunes from SPS-OP and implemented for the LHC SIS.
- The **LHC SIS injection and ring tree details** are now available over CWM through 6 devices:
  - LHC.SIS.RING_B1, LHC.SIS.RING_B2, LHC.SIS.RING_B1B2,
  - LHC.SIS.ING_B1, LHC.SIS.INJ_B2, LHC.SIS.INJ_B1B2
- Data published by those devices (property **Result**):
  - Names of interlocking tests (full names and short names),
  - List of masked tests,
  - For **all tests** in the tree:
    - Interlock state,
    - Mask state,
    - Latch state
- Final tuning in progress. NXCALS logging of the device data will be activated soon.



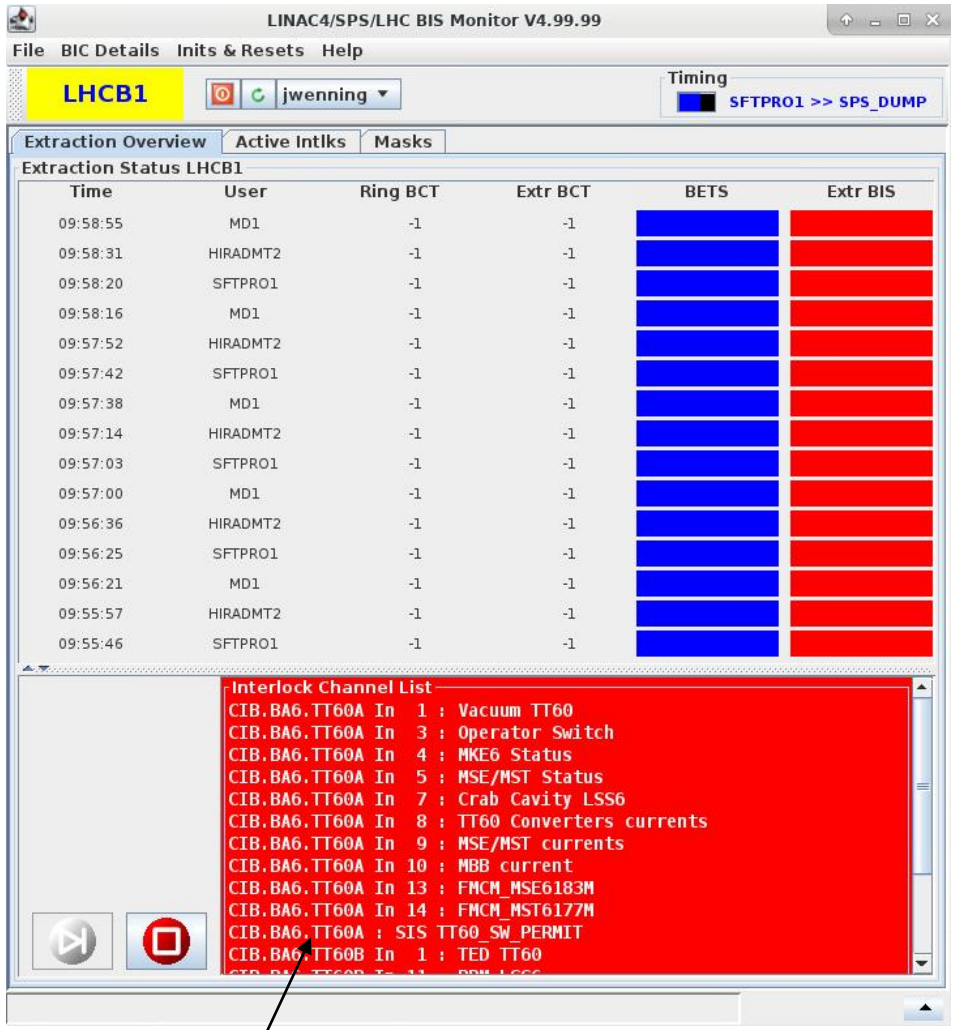
SIS tree displays

- Based on the published data new simple WEB displays based on WRAP have been prepared – one display for SIS ring trees and one for SIS injection trees.
  - A similar display will be put in place for BigSister to back up the audio messages.



BIS data decoding

- Since ~2006 the BIS monitor application is used to analyse **coherently** the state of all inputs contributing to a BIS configuration.
  - Analysis of fast pulsing BIS inputs (example FEIs) to determine if true or false at the appropriate time (extraction etc.).
  - Provides the list of FALSE BIC inputs, masks etc.
- All **deployed BIS configurations** are covered:
  - SPS ring, LHC ring,
  - SPS injection, TT2-TT10,
  - SPS extractions LHCB1(2), AWAKE, HIRADMAT,
  - LINAC4, LINAC4RF,
  - PSB extraction



List of relevant interlocks

Decoded BIS data publication

- A first set of UCAP transformations have been setup to **concentrate the BIC data** corresponding to one of the BIS configurations.
- The **concentrated data is published** and processed by a second set of UCAP transformations that **provides the same decoding than the BIS monitor application**. The results (list of interlocking channels) are published over RDA3.

- The **injector chain devices** are:
  - BISMON.INTERLOCK.AWAKE
  - BISMON.INTERLOCK.HIRADMAT
  - BISMON.INTERLOCK.LHCB1
  - BISMON.INTERLOCK.LHCB2
  - BISMON.INTERLOCK.LINAC4
  - BISMON.INTERLOCK.LINAC4RF
  - BISMON.INTERLOCK.PSBEXT
  - BISMON.INTERLOCK.SPSINJ
  - BISMON.INTERLOCK.SPSRING
  - BISMON.INTERLOCK.TT10

- The published property **BisState** provides the BIC crate names, input channel numbers and channel names of interlocking inputs.
  - A set of data fields for ALL inputs with state = false,
  - A set of data fields for inputs that are in state = false and actively interlocking.
    - Excludes channels that are for example ‘masked’ by an external condition, a TED dump etc and ignored by the master BIC.

Decoded BIS data publication (2)

- The transformations are currently running on a test node – **very stable for the injectors**.
  - Issue with the LHC BIC data concentration – to be investigated.
  - Testing of the results for injectors ongoing.
- In the next week(s):
  - **Move** the devices from the test node to **the production node**.
  - **Activate NXCALS logging**. This will provide for each cycle (for LHC @ 1 Hz) the decoded list of interlocking BIC inputs for each configuration.
- This fully decoded and logically grouped interlock data enables:
  - Automation of interlock tests.
  - Construction display grouping SIS, BIS, external conditions (timing) etc.
  - Easy extraction of the history of interlocking channels (NXCALS).