ALICE Overwatch: Online monitoring and data quality assurance using HLT data

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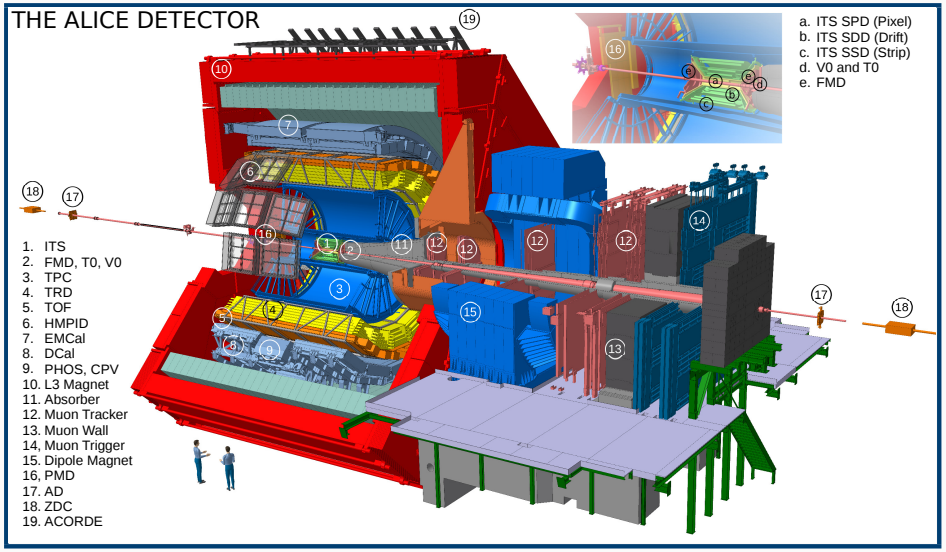
Motivation for additional data quality monitoring

- What type of data quality monitoring can be performed by taking advantage of ALICE High Level Trigger (HLT) capabilities?
- Can experience developed during Run 2 be useful for O2 Quality Control (QC) in Run 3?

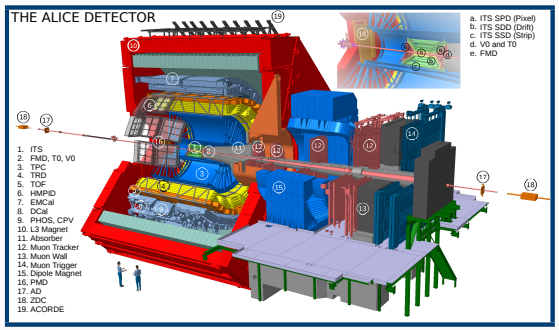


ALICE Overwatch

- **Overwatch**[1] is a project to **monitor and visualize** QA information from the HLT which began in late 2015.
  - Oriented towards expert level information.
  - Complementary to DQM.
- Unique capabilities within in ALICE:
  - Monitoring data is stored **persistently**.
  - Data is timed stamped, allowing for slicing of data in **time windows** ("time slicing").
  - Data can be explored via user directed **reprocessing**.

[1] **O**nline **V**isualization of **E**merging t**R**ends and **W**eb **A**ccessible de**T**ector **C**onditions using the **HLT**

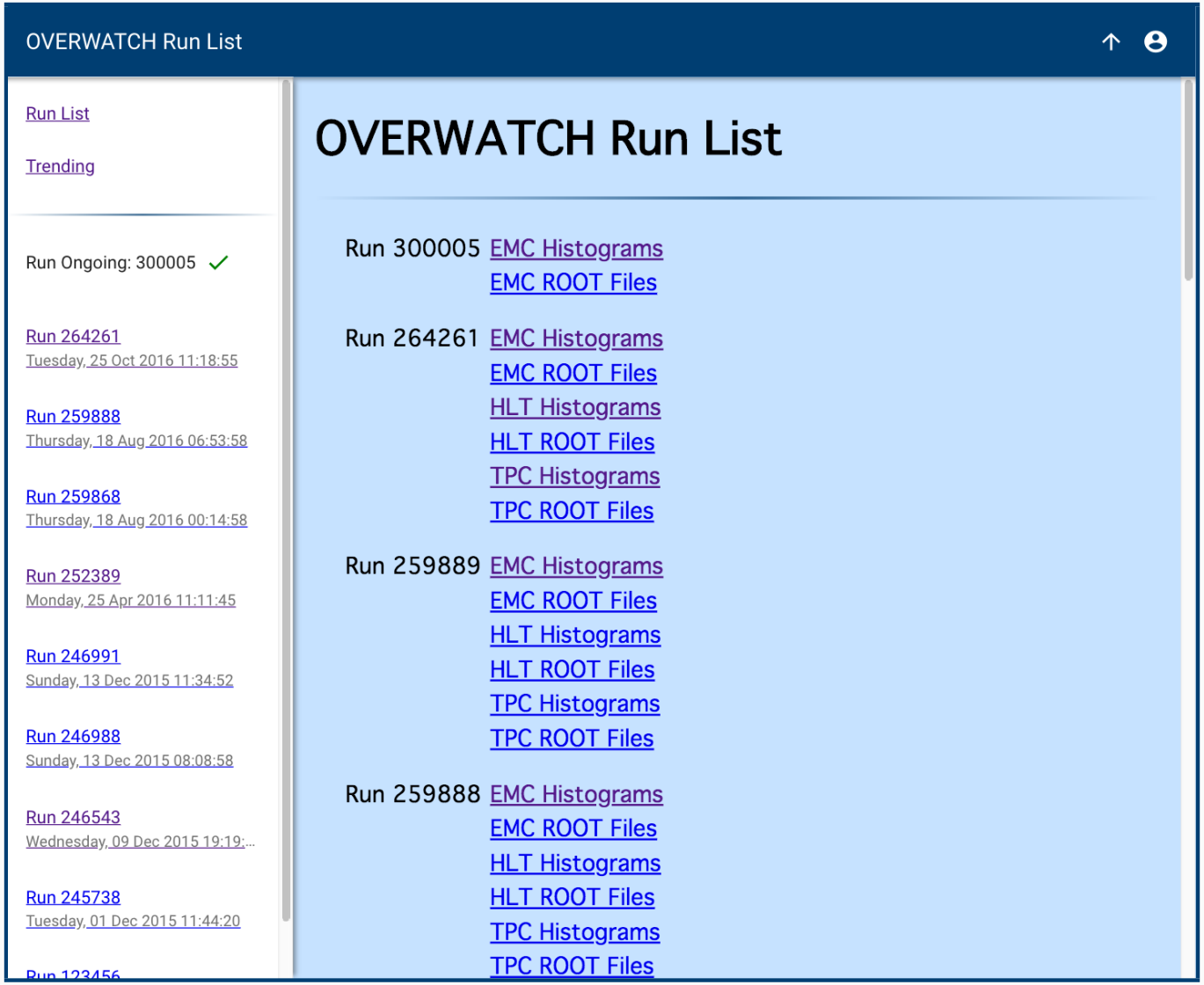
Architecture



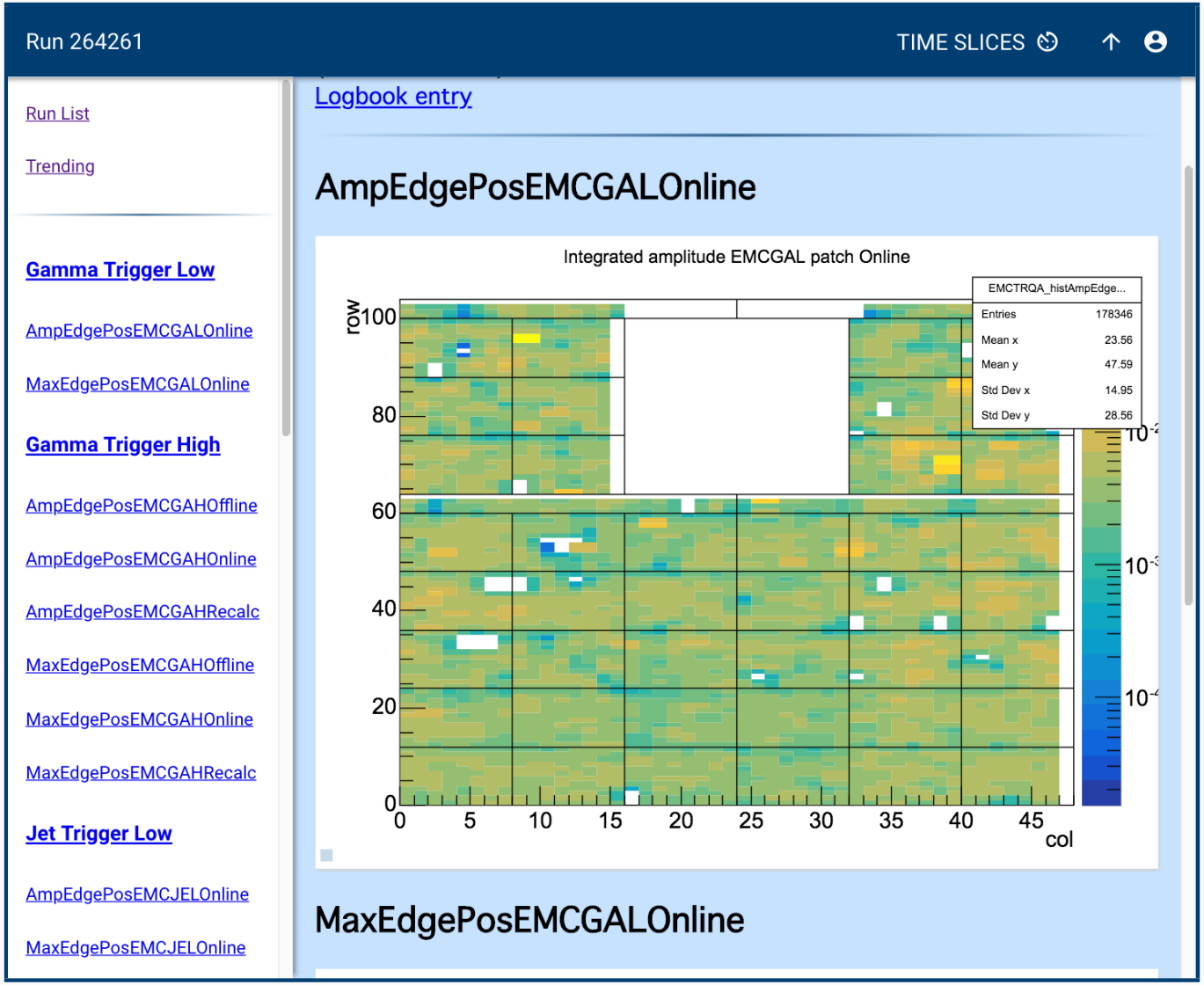
Overwatch capabilities

- Receives and stores $\approx$ 300 GB of histograms per year.
  - Increases each year.
- Two main python based components:
  - **Processing** built with `PyROOT`.
  - **WebApp backend** built with `flask`.
- **Front end** built with Google Polymer and JSROOT.
- Processing, trending, and visualization are extensible.
  - Detectors can plug-in to control all aspects of data processing and presentation.

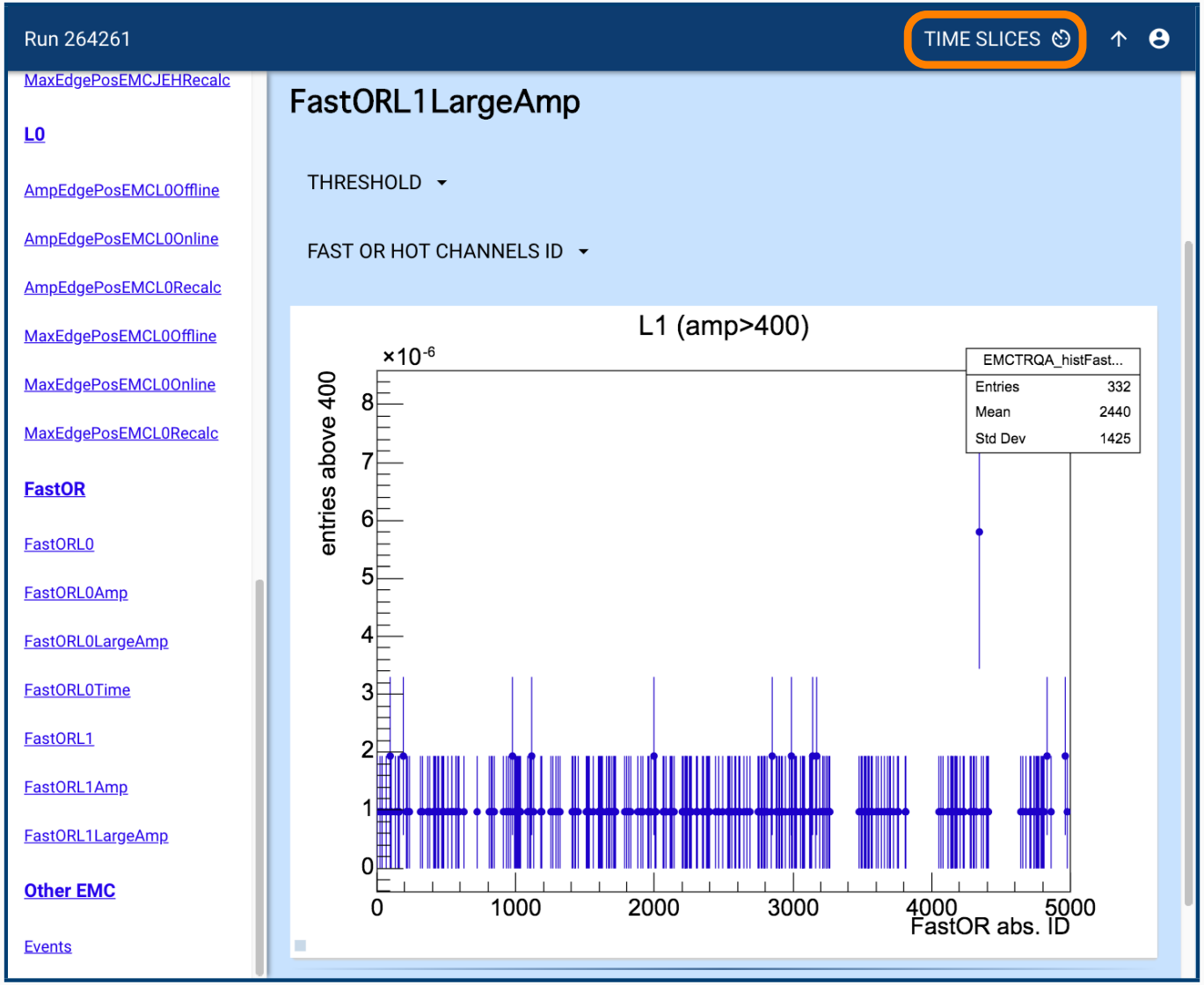
Visualization



Visualization



Information extraction and reprocessing



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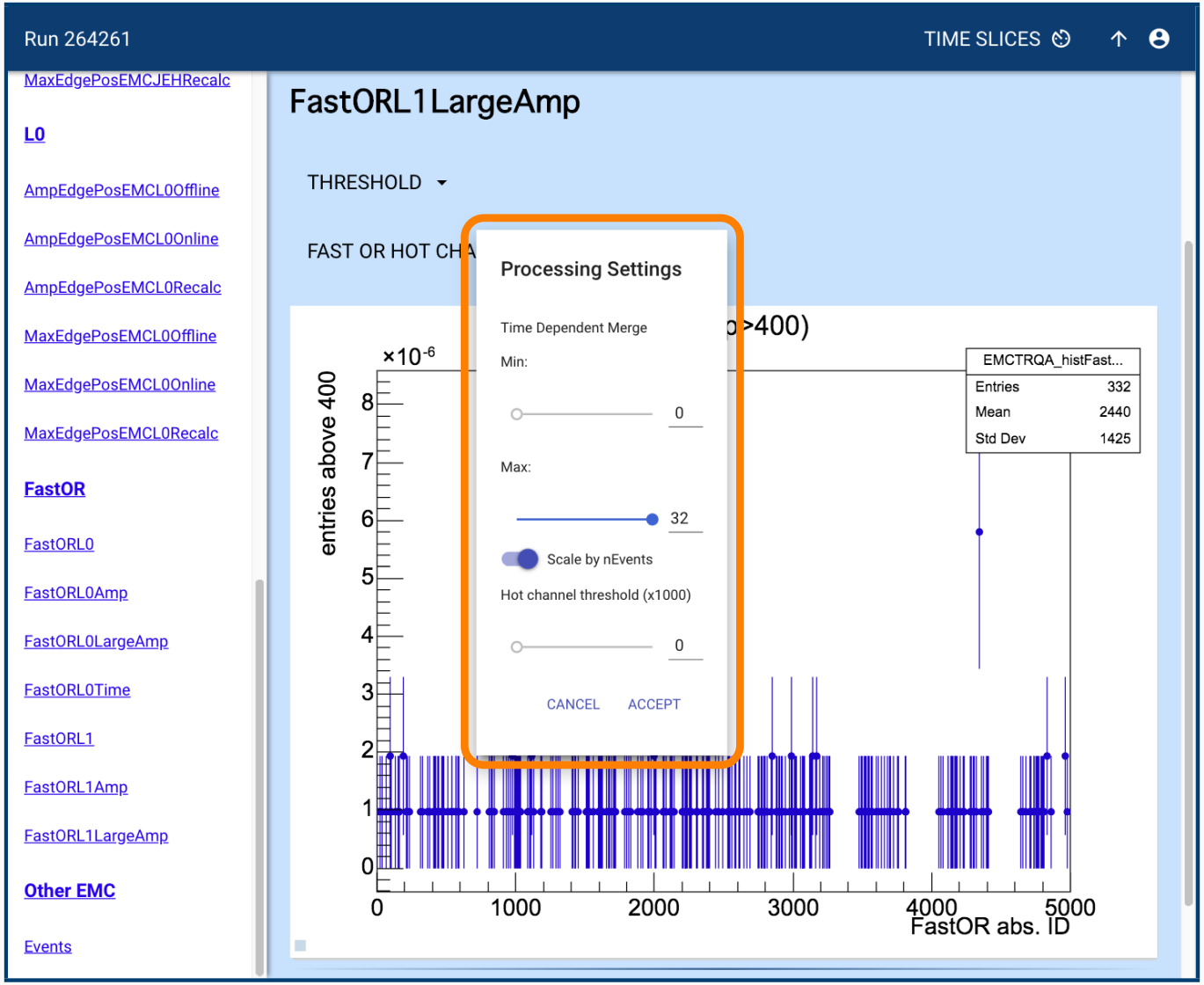

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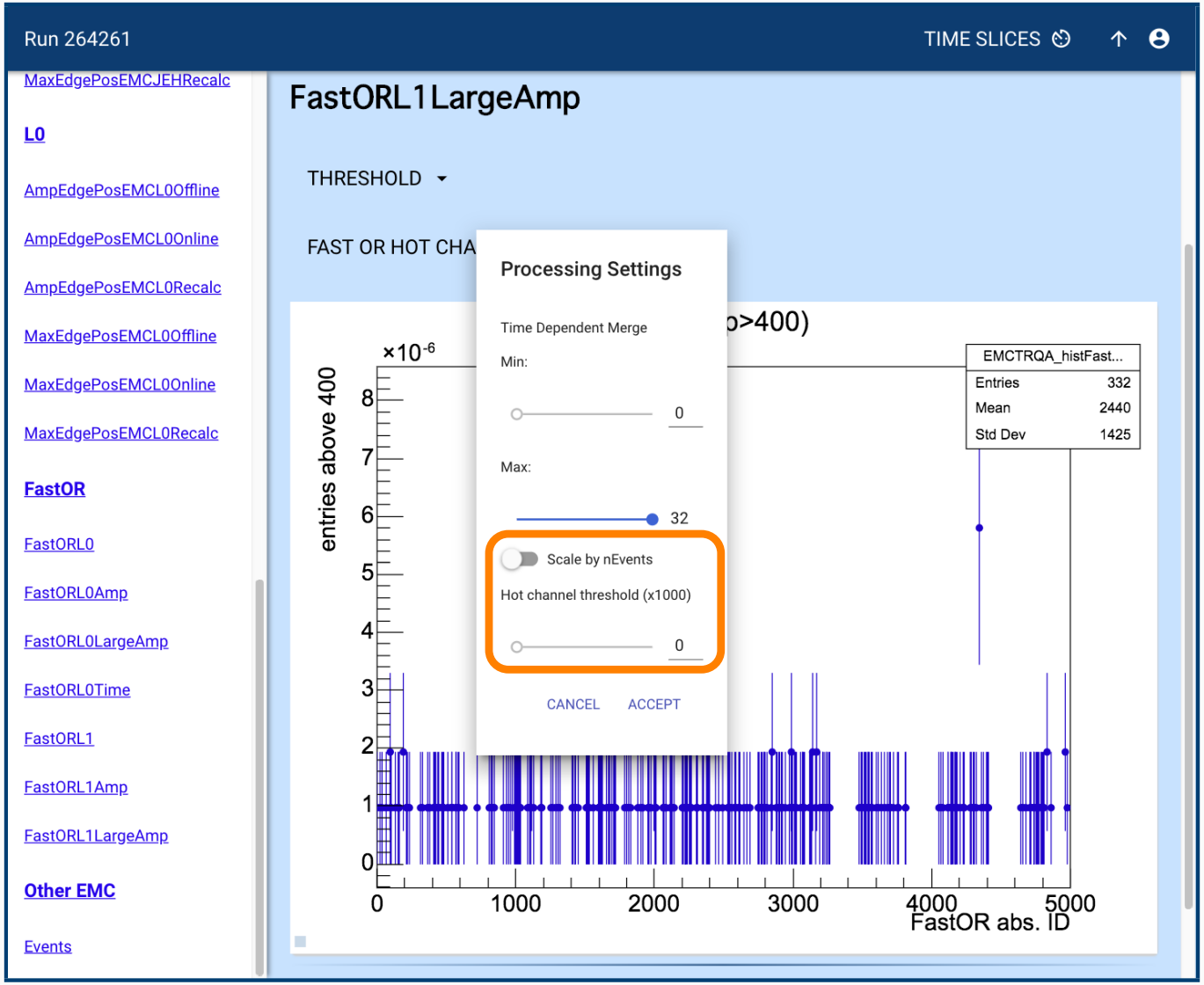

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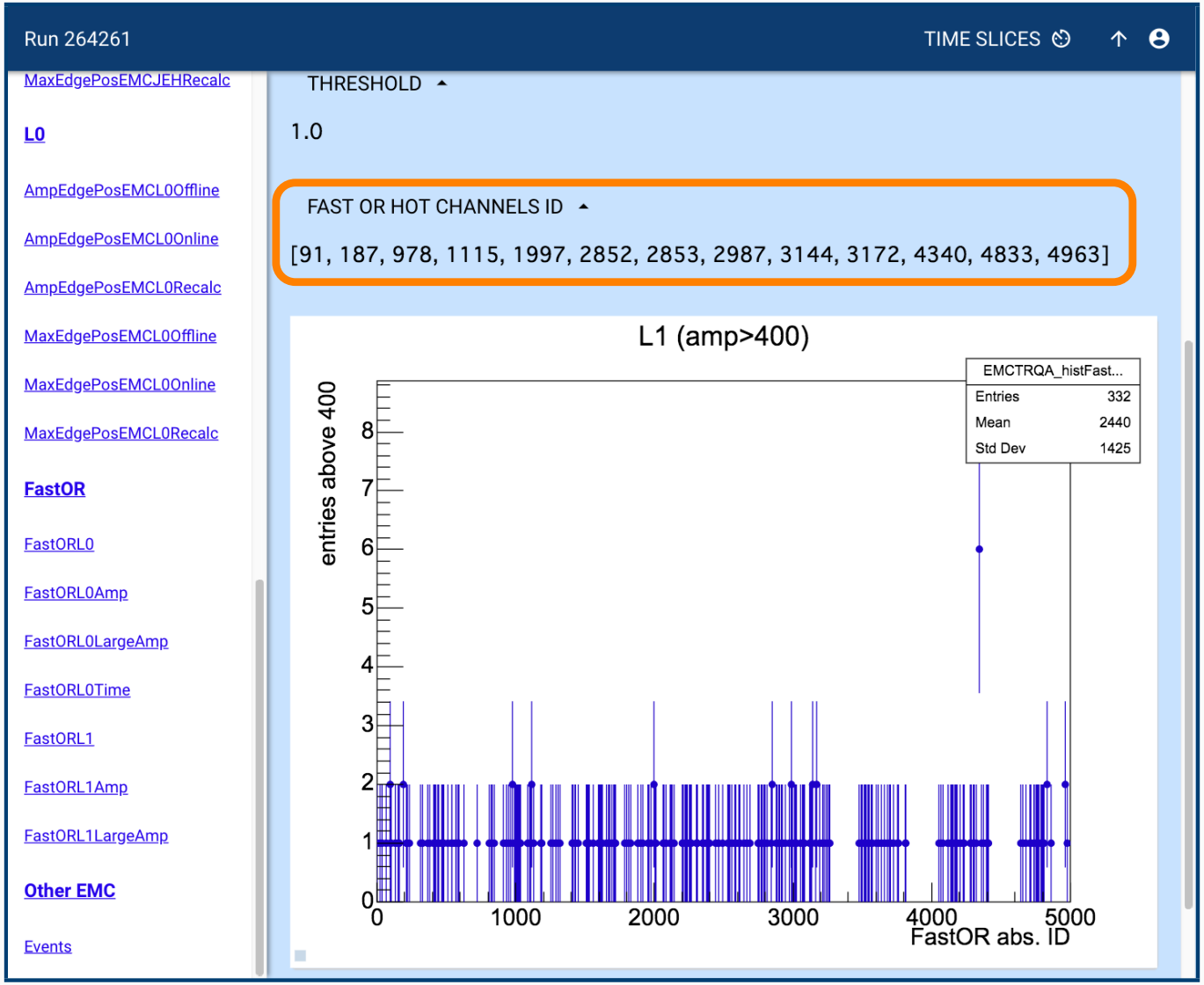
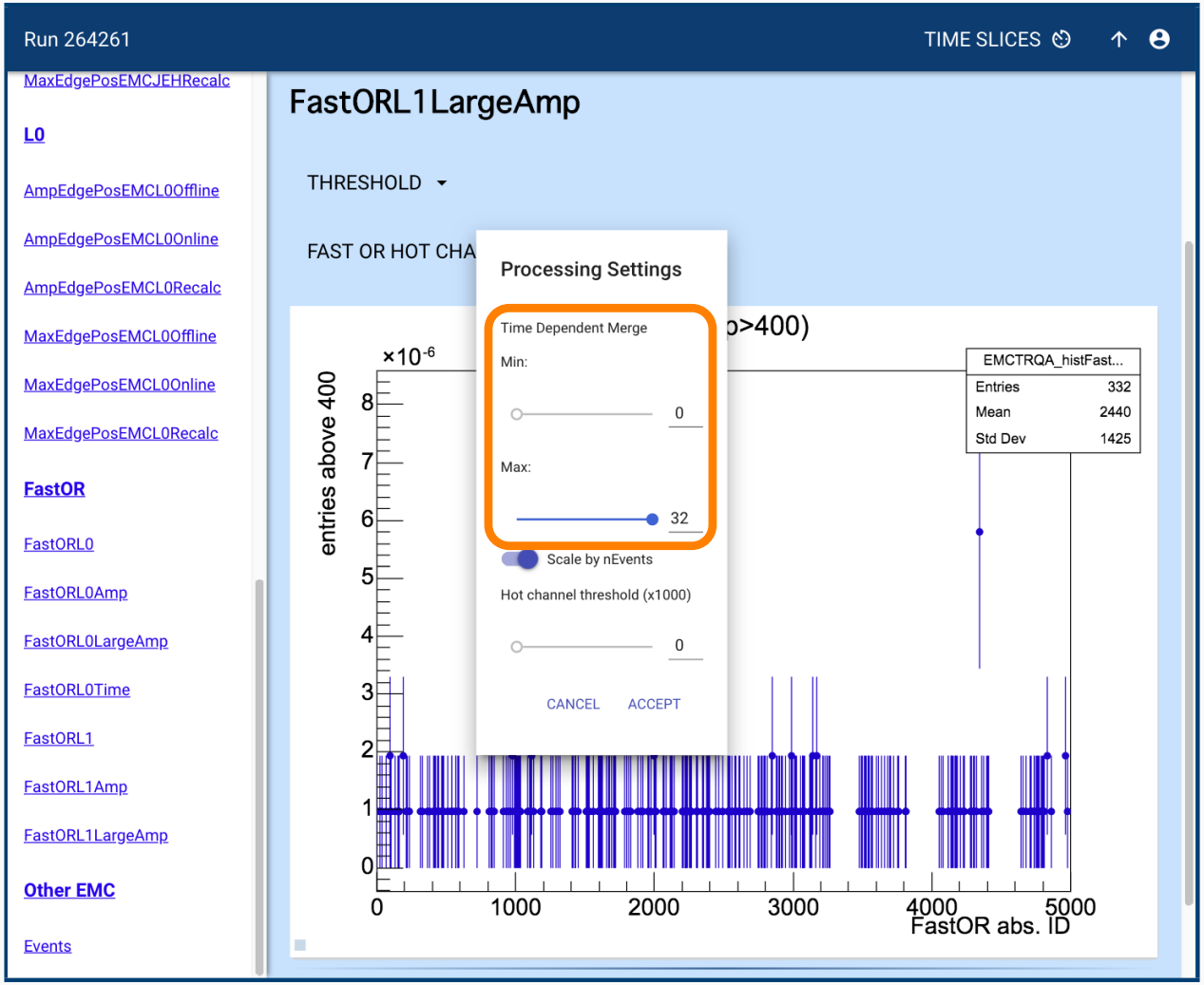


Time slices

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 .. 32



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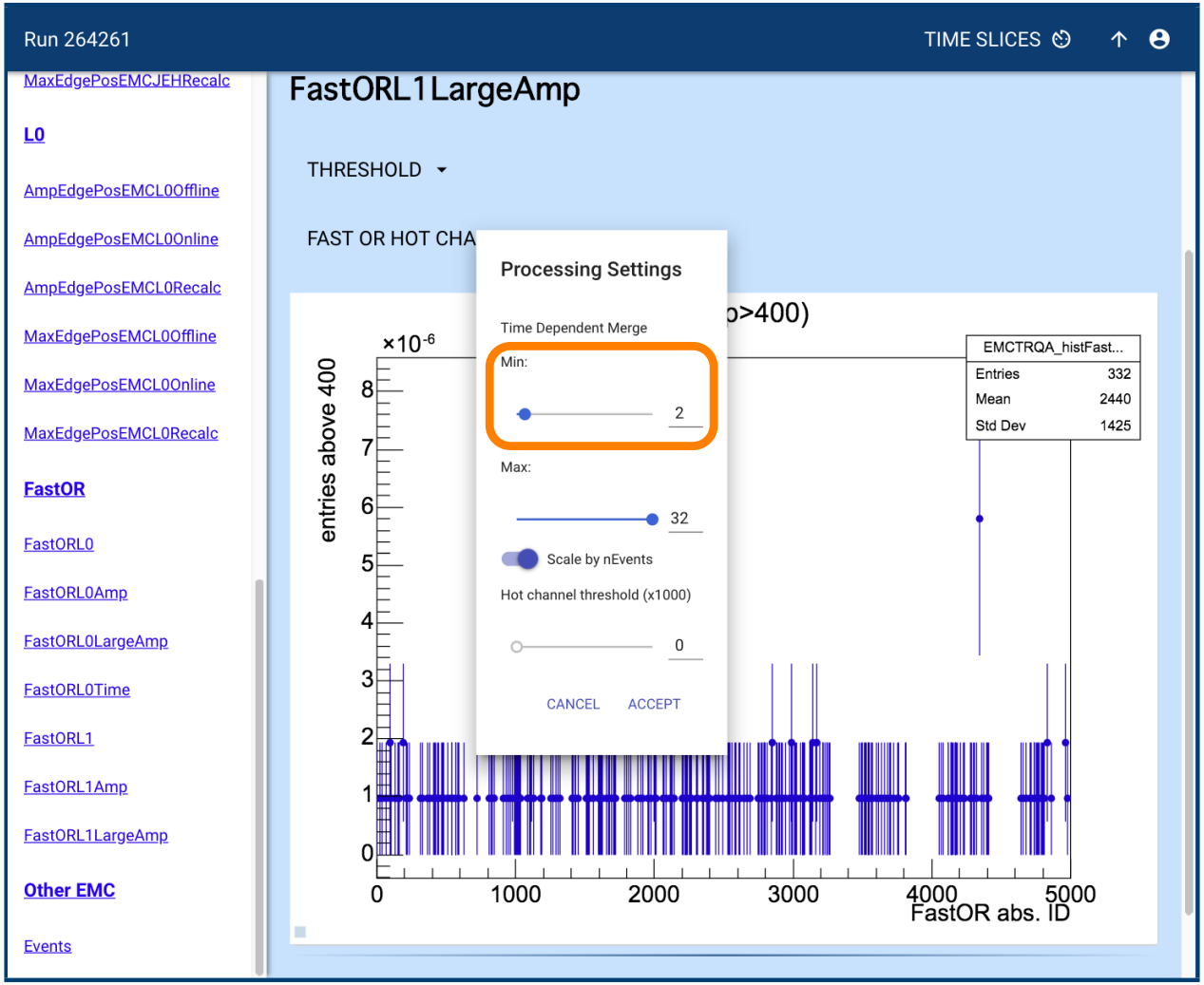

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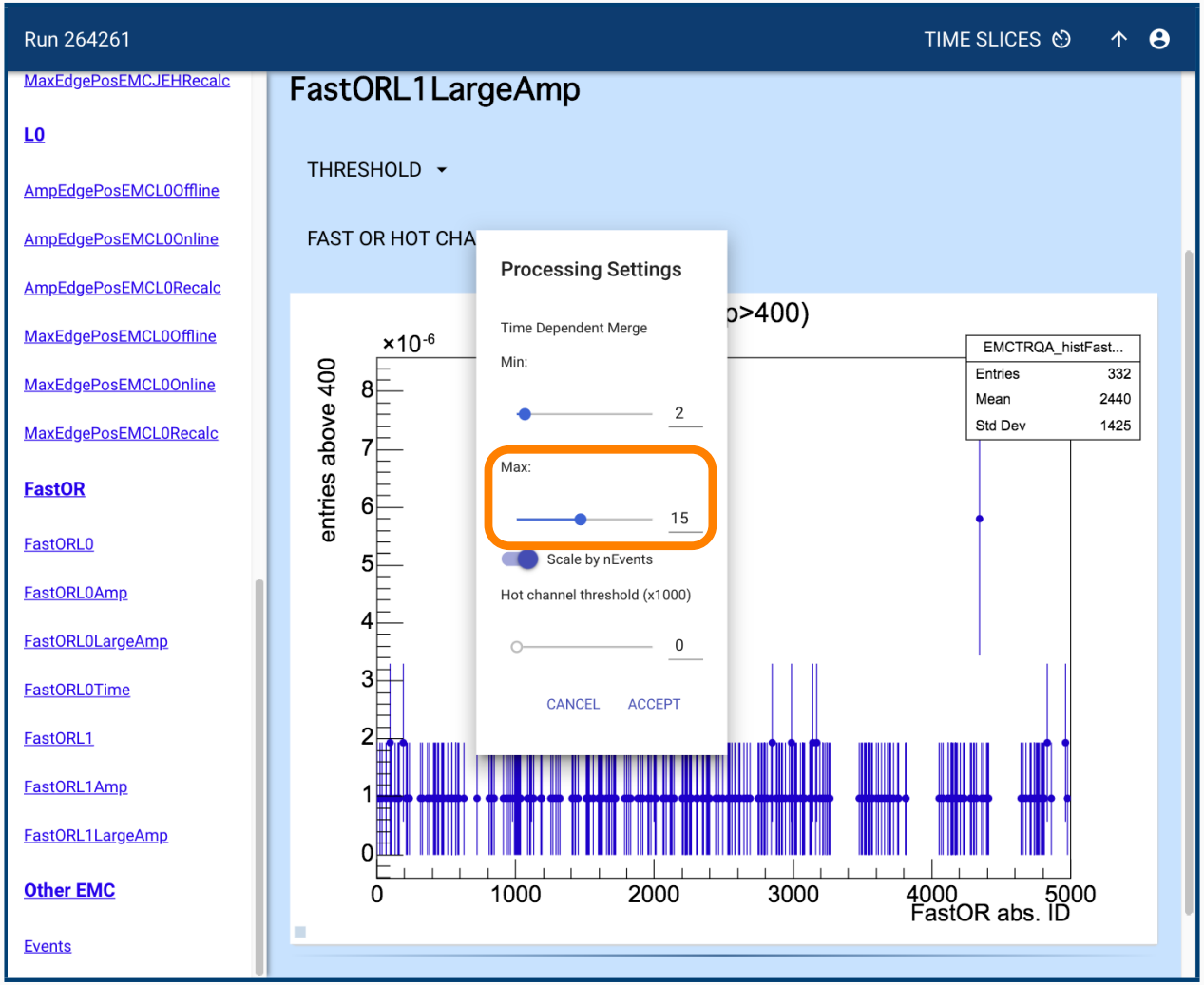

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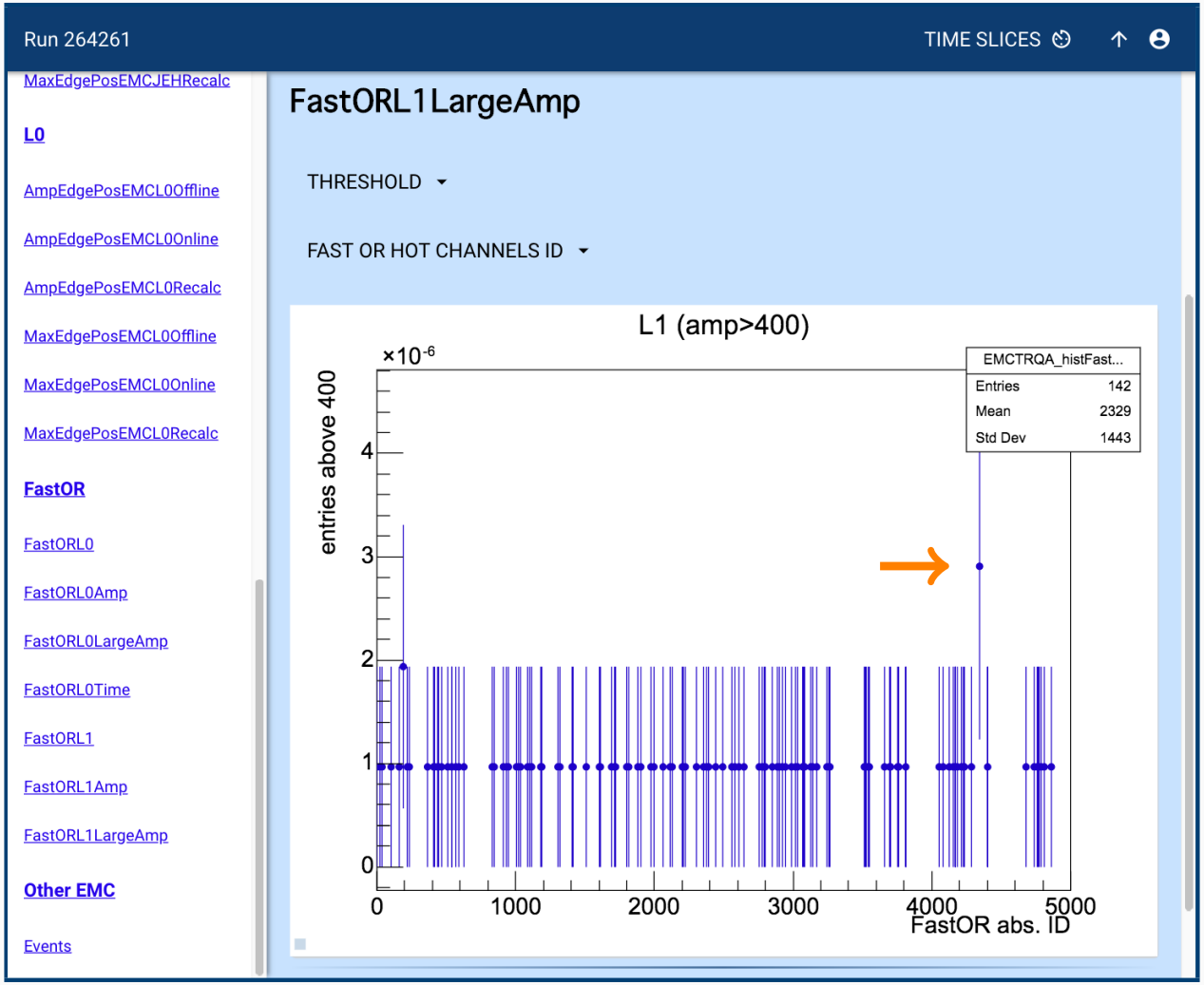

Towards Run 3

- Looking towards O2 and Run 3, what contributions can Overwatch provide?
  - The HLT in Run 2 operates similarly to Event Processing Nodes (EPNs) in ALICE O2.
  - Overwatch processing architecture is similar to that of ALICE O2 Quality Control.

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→ Use Overwatch as a testbed for O2 QC developments.

Trending and Alarms

- Trending and alarms system in Overwatch is being developed with an eye towards the future.
- For O2 in Run 3, we need to monitor data quality in real time.
  - Alarms must be triggered quickly to allow adjustments to be made.
- The framework is being developed modularly, so developments can be moved to O2 QC project with minimal effort.

Conclusions

- Overwatch provides monitoring and visualization of data quality using information provided by the ALICE HLT.
  - Using time stamped, persistently stored information provides unique capabilities for real-time and post-mortem data exploration.
- It facilitates the development of capabilities and experiences for O2 QC while still in Run 2.
  - Some parts of Overwatch will be directly moved over to the QC project.

- Code available on GitHub and package available on PyPI.

Backup