

# Update of the Offline Framework for AugerPrime

## Executive Summary



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### What is this contribution about?

This contribution describes the changes that had to be done to the Offline software framework of the Pierre Auger Observatory as part of the AugerPrime upgrade.

### Why is it relevant/interesting?

The development of the Offline for the Pierre Auger Observatory software started almost 20 years ago, with a design for a hybrid observatory consisting of a surface detector overlooked by fluorescence detectors. We consider it useful to study the consequence of the original design decisions for maintaining and extending the software. Doing so will reveal important design criteria and possible pitfalls when selecting or designing a software framework for a future experiment.

### What has been done?

The Offline framework has been extended many times during its lifetime. Previous extensions only added new detectors without changing the existing ones. The AugerPrime upgrade, however, modifies the individual detector stations, thereby breaking some assumptions made in the original software design. It was still possible to implement the required changes without the need of a major redesign of any of the existing pieces of code.

At the same time, the collaboration decided to move to the recent C++ 14 language standard. The code was reviewed and updated globally to benefit from this decision.

### What is the result?

Thanks to the flexible design and the use of state of the art software engineering technology, it was possible to update the Offline framework with limited personpower. Extensive, automatic testing helped to make sure that problems could be detected and fixed quickly, avoiding lingering bugs that could jeopardize the upgrade project.