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## Overview

The ATLAS experiment is starting major upgrades for the High-Luminosity LHC. For the Inner Tracker (ITk) this involves the production of detector modules and other components for Pixels and Strips.

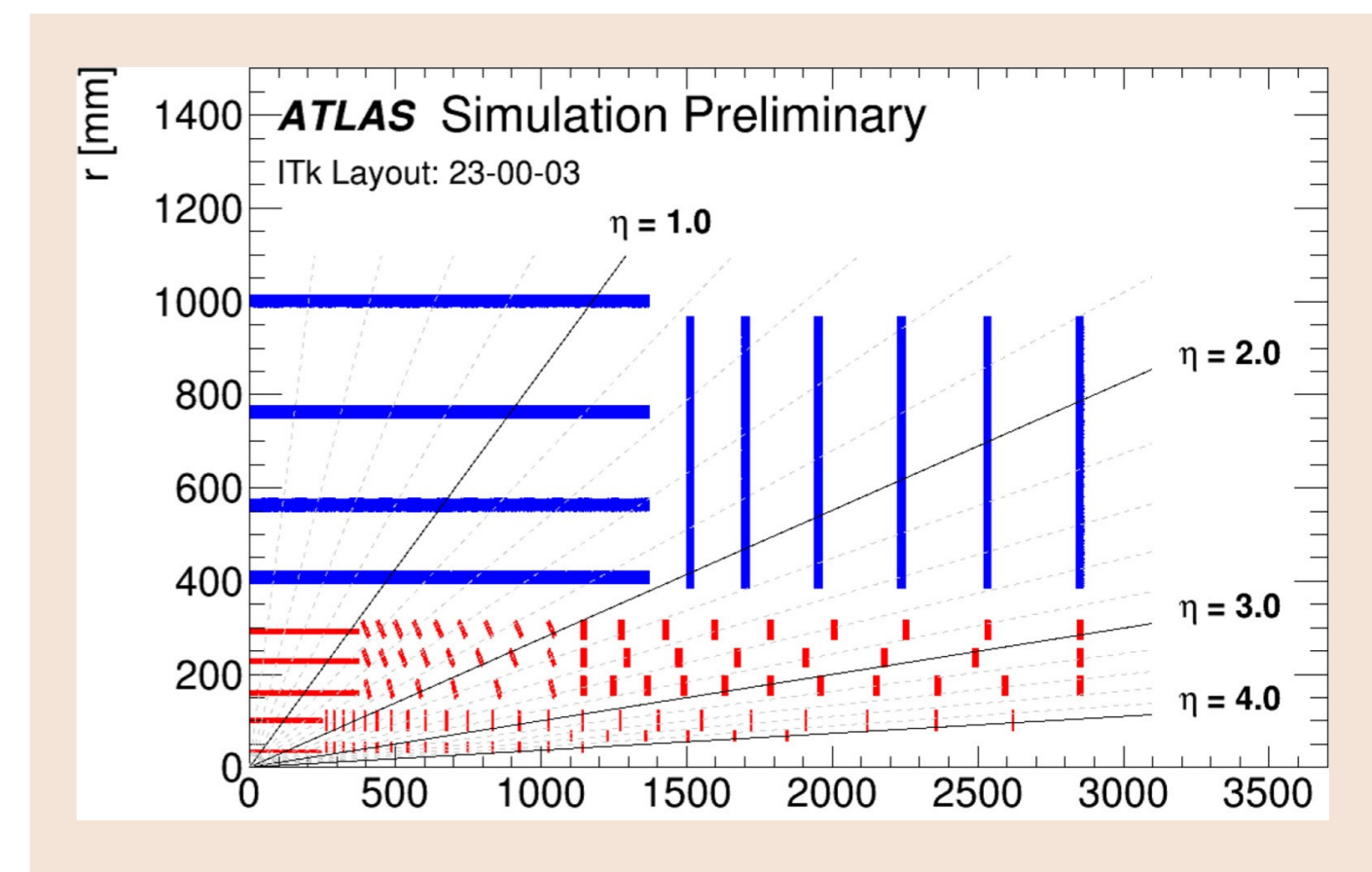
### Pixels

- 5 layers of barrel, 5 layers in each endcap
- 9596 sensor modules with 5000M channels and 14 m<sup>2</sup> detector area

### Strips

- 4 layers of barrel staves, 6 layers of endcap discs per endcap.
- 17888 modules with 60M channels and 165 m<sup>2</sup> detector area

All of these (O(1M)) components need keeping track of during production



## Database Specification

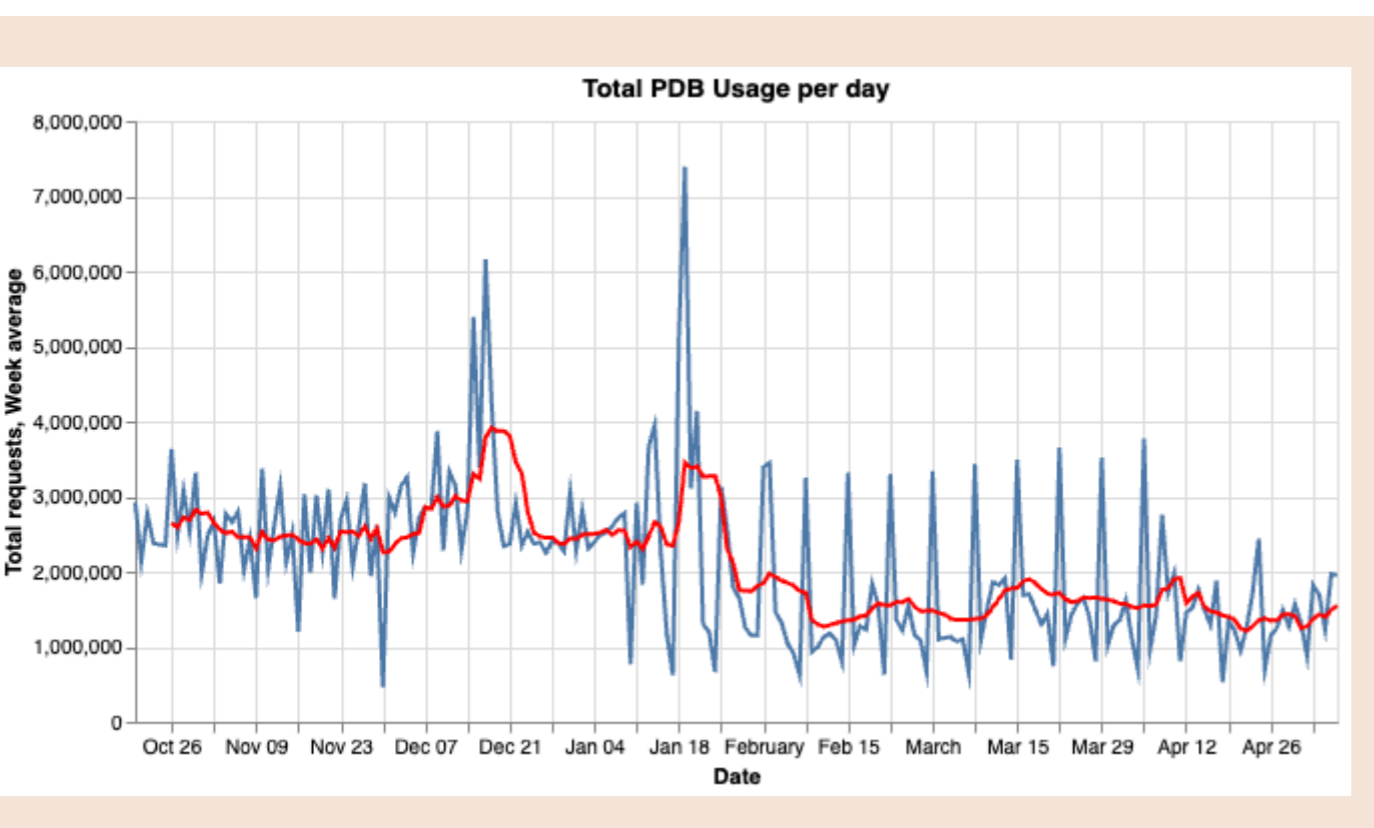
The database stores information on components

These components are associated with:

- Properties, Test runs, Stages, Component hierarchy, Shipments, Batches

The associated test runs store:

- Pass/fail information, Parameters (measurements) and Properties (information)



## Backend Database

The backend PDB software is provided by Unicorn University, Prague.

The base web application provides user actions for schema design, component registration, test data upload, shipment and attachment management.

Baseline reporting is provided

- Viewing individual components, test runs.
- Searches and filtering based on various properties can be carried out.

Data is made to be available until end of ITk operation (>10 years)

Access is also provided via a web API

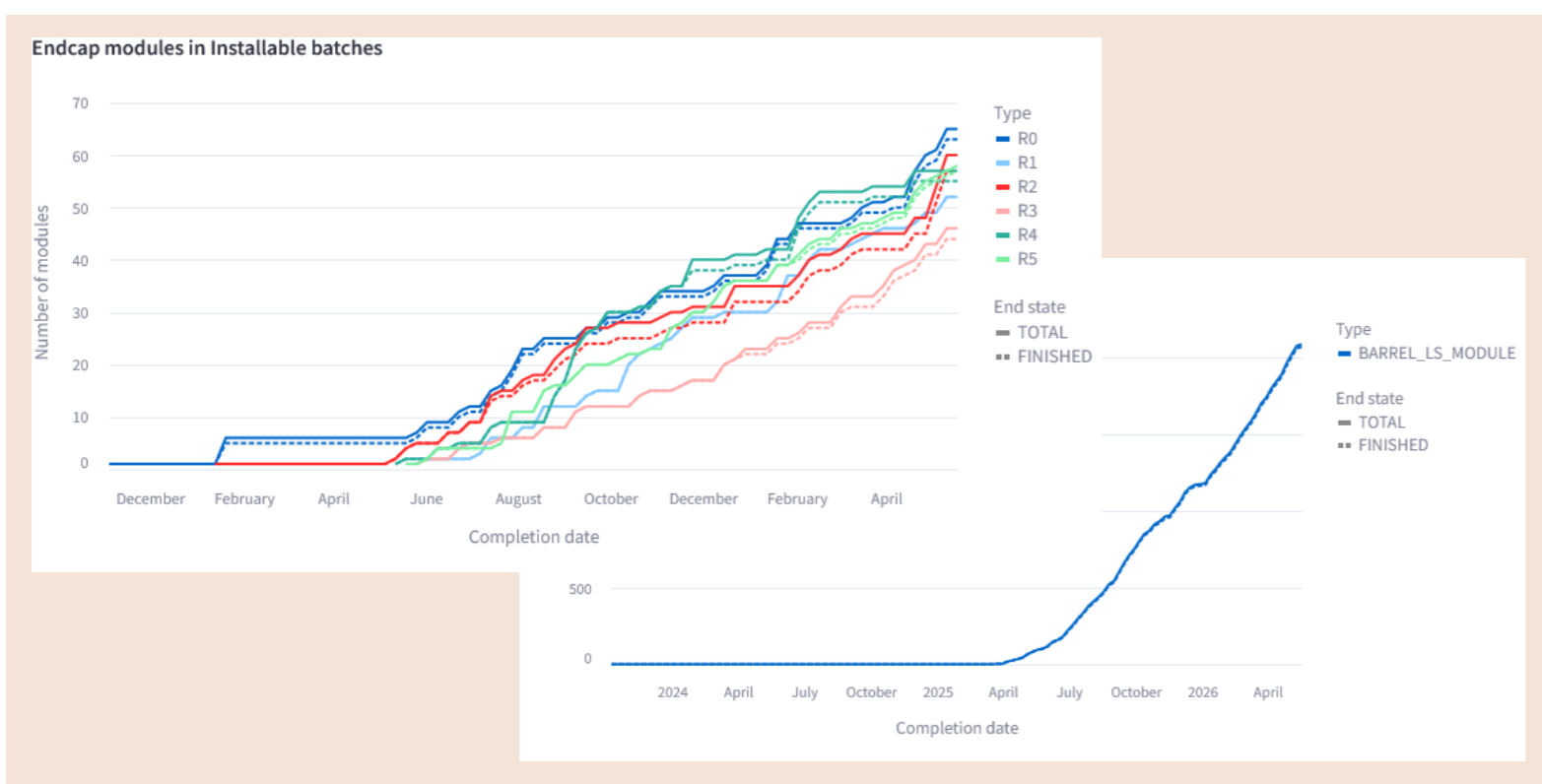
## Database Interactions

The full range of actions can be invoked as appropriate using the API.

Custom interfaces have been built for:

- Dealing with bulk components (eg ASIC wafers, hybrid panels)
- Registering components
- Uploading test data
- Reviewing data

Basic Information	
ATLAS Serial Number	20USGAA1999340
Alternative Identifier	ABC5f3954
Component Type	ABC Chip ABC
Type	ABCStarV1
Current Stage	ON WAFER
Current Location	Faculty of Mathematics and Physics, Charles University CUNI
Shipment Destination	No current shipment destination
Home Institute	STFC Rutherford Appleton Laboratory RAL



## Reporting

Reporting on the database contents is done by python scripts

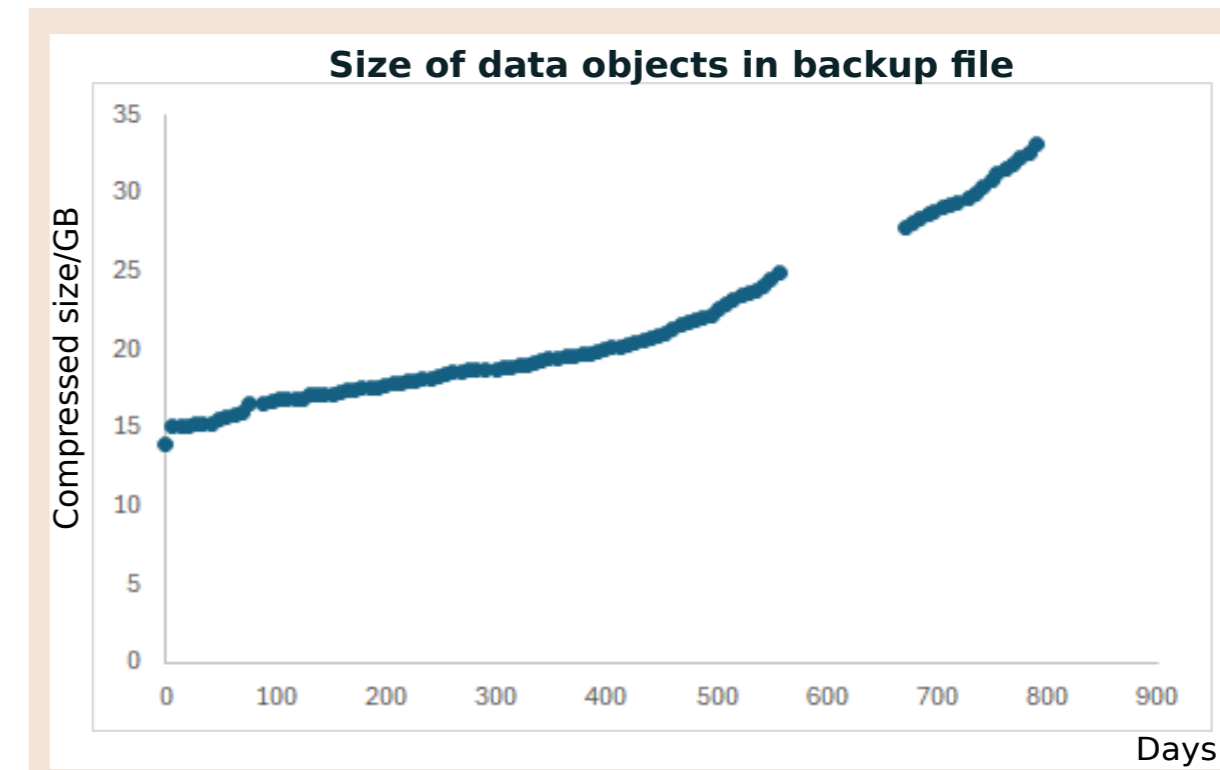
- Production progress
- Data integrity
- Yield calculations
- Used for comparison with production flow simulations

## Backup Database

A regular backup of the cloud database is provided to use CERN infrastructure.

This makes available the full dataset in a read-only mongo database.

It can be used for reporting tasks which run on the full dataset.



Components	
GET	/api/listComponents List Components
GET	/api/getComponent Get Component
Institutions	
GET	/api/listInstitutions Simple List Institutions
GET	/api/getInstitution Simple Get Institutions
TestRuns	
GET	/api/listTestRunsByComponent List Test Runs By Component
GET	/api/getTestRun Get Test Run

## Reporting Web API

For access to the backup data a web API is provided.

Where appropriate, this implements the same interface as the main database.

However, it can be extended to support specialised reporting tasks.

- Add custom indices
- Filter data to extract individual test properties