

An Interactive Metrics Dashboard for the Keck Observatory Archive

<https://koa.ipac.caltech.edu>

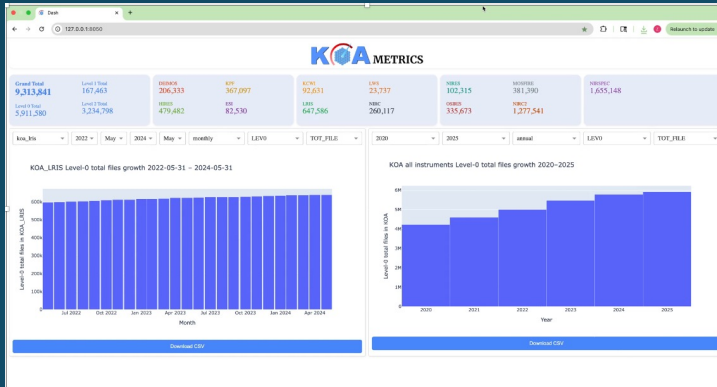
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The Dashboard In Action: Reporting the Total Number of Files in KOA

Dashboard updates every 5-7 seconds to capture data ingested in near-real time



See dashboard video at <https://youtu.be/QU-67CJNfw>



→ Data loading spinner

→ Number of files per instrument and archive total—updated every 7 seconds

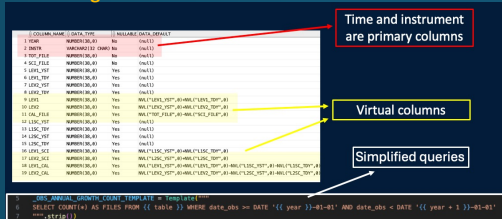
→ Select instrument, date range, & data type from pull-down menu

→ Histograms of cumulative number of files: selected instrument and archive total

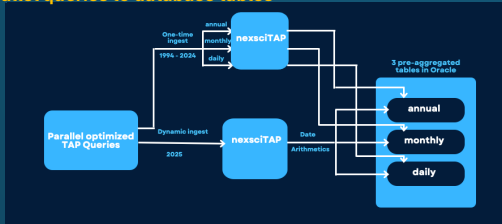
→ Download histogram data in CSV format

Optimizing Performance for Updates at a 7-second Cadence

Databasesign minimizes data transferred

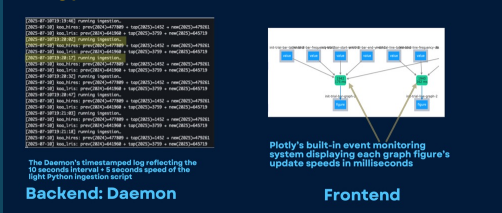


Parallel queries to database tables



- Only 2025 data are dynamic
- 1994-2024: Create pre-aggregated DBMS tables for these years
- Parallel calls to nextscITAP (NExSci's Python Table Access Protocol server)

Monitoring performance



Dashboard Architecture Choices

- Emphasis on Open-Source technologies (where feasible).
- Integration into new KOA infrastructure — see Focus Demo by Moseley et al.
- Front End: Back End: SQL Alchemy.
- Database: Oracle.
- Dashboard operates with callbacks that use Jinja 2 templating engine to build dynamic queries.
- Color-coded Key Performance Indicator (KPI) cards summarize archive contents.
- Designed for maintainability.

Why Do This and What's Next?

- Prepares KOA to manage upcoming high-cadence, high-volume data sets
- Apply to protected data
- Migrate DBMS to Postgres
- Measure full collection of quantities:
 - data volume, number of queries, download volume...
- New functions as needed, e.g., overlays of multiple instruments

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Acknowledgments: The Keck Observatory Archive (KOA) is a collaboration between the NASA Exoplanet Science Institute (NExSci) and the W. M. Keck Observatory (WMO). NExSci is sponsored by NASA's Exoplanet Exploration Program and operated by the California Institute of Technology in coordination with the Jet Propulsion Laboratory (JPL). Zac Zaw developed this dashboard as a 2025 Caltech Summer Undergraduate Research Fellow (SURF).

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