From ZTF to Rubin

What we learned in the last 5 years

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28/11/2024

Fink in a nutshell

Brokers are software serving the scientific community by **ingesting**, classifying, filtering, and **redistributing** alerts from telescopes and surveys.
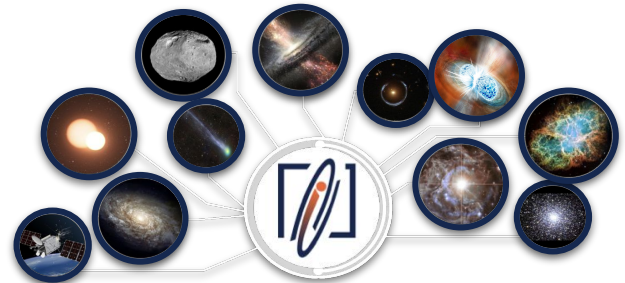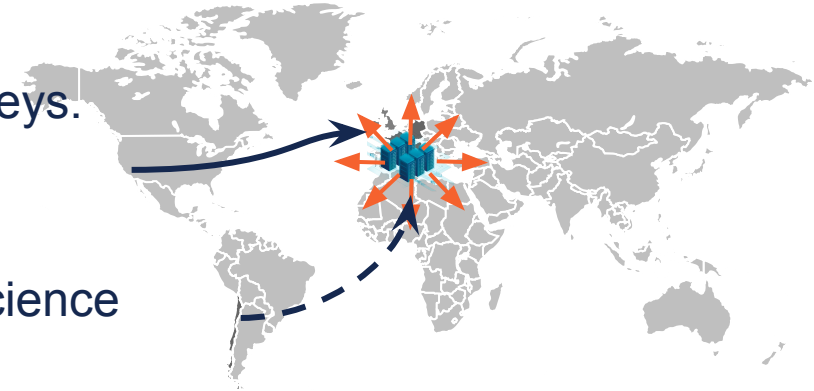
60+ members, 15+ scientific topics covered
- Solar system, galactic and extragalactic science

Services deployed on large OpenStack clouds (UPSaclay & CC-IN2P3)
- Scalable to millions of alerts per night

Operating 24/7 since 2019, serving 100+ unique users per day (scientists, follow-up facilities & amateurs)

Fink turned 5!

- We started processing ZTF data in November 2019
- As of now, 1235 observing nights
  - 262M/178M alerts received/processed
- Many versions of the broker thanks to **community** contributions!
- 14 science publications from Fink members, (way) more indirectly using Fink tools!

Fink activity chart: number of ZTF alerts processed per night

First Fink PhDs

First students working in Fink successfully defended in 2024:

Roman Le Montagner (IJCLab) : High-Energy Transient Universe in the Era of Large Optical Surveys

Etienne Russeil (LPCA) : Feature engineering and machine learning for 21st century astronomy

Biswajit Biswas (APC) : Designing Novel Machine Learning Techniques to Address the Volume and Complexity of the Rubin LSST Data: Separation of Blended Galaxies and Transients Classification in Alert Streams

Science corner

We started in 2019 with SN Ia. We end-up being useful for others as well:

- Satellites & debris detection
- Solar System science
- Galactic science: microlensing events, cataclysmic variables, Young stellar objects…
- Extra-galactic science: supernovae, gamma-ray bursts, AGN, Blazars, kilonovae, tidal disruptive events, …

Jul 2024 → Nov 2024

Community

- **2024 Organised workshops**
  - *Fink collaboration workshop (IJCLab)*
  - *Fink@Brazil (CBPF, Rio de Janeiro)*

- **2024 Invited talks**
  - *LSST@ESO, CTAO Science Symposium, LSST SSSC, XMM2ATHENA, Annual meeting of the Brazilian Astronomical Society - 50th anniversary, Astro-COLIBRI Multi-Messenger Astrophysics Workshop, Exploring the Dark Side of the Universe Tools 2024 - 5th World Summit*

EU project: *ACME (INFRA SERV)*

Industry conference : *Kubecon 2024*

Outreach: *Rencontres Ciel et Espace 2024*

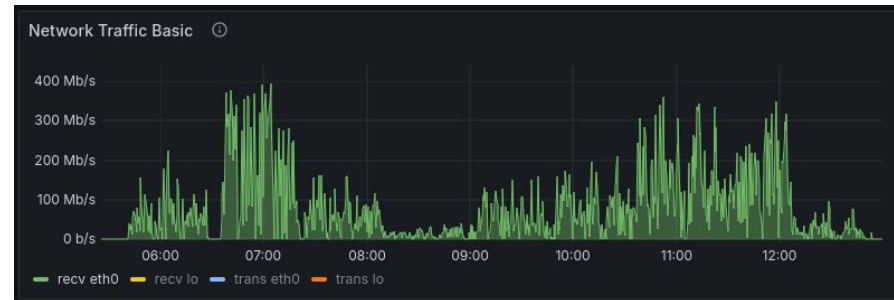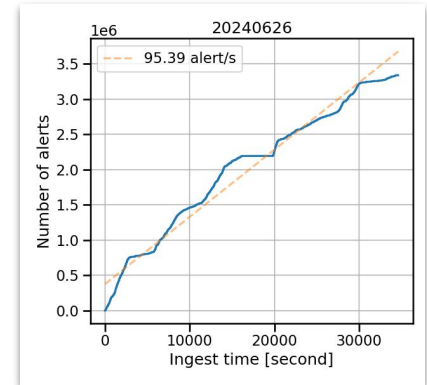… But now it is time to open a new chapter with LSST data!

Road to LSST

- 100+ users o

Road to LSST

- 100+ users on services (>**10k requests/day**)
- Migration to **CC-IN2P3** almost done
  - Machines & (almost) all services deployed
  - 500 vCPU, 1TB RAM, 1PB disk
  - Fink/ZTF stays at Paris-Saclay (2027)
- **Large-scale tests mid-2024** (OR4)
  - End-to-end real-time simulation, from telescope to brokers
  - 10 millions alerts processed & transferred from USDF to CC-IN2P3
  - No major difficulties

Fink data services

https://fink-broker.readthedocs.io

Thank you

https://fink-broker.org