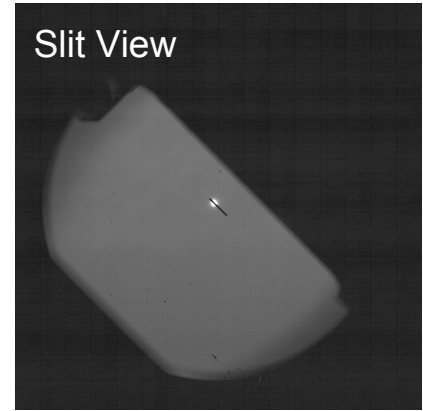


Reducing 600 nights of IGRINS data

Jae-Joon Lee
And
IGRINS Team

IGRINS Summary

- Simultaneous H & K w/ R ~ 45,000.
- Two detector: H & K
- ~25 orders per each detector
- Slit characteristics w/ 2.7m telescope
 - Slit length = 15"
 - Slit width = 1"
- Optimized for **stellar sources**. Works reasonably well for **compact extended sources**.



Developed by KASI & UT

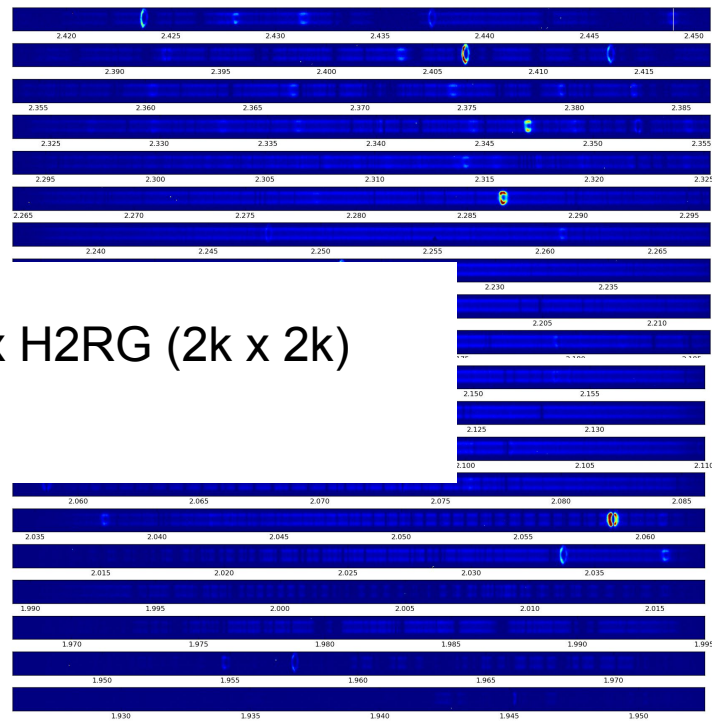
NGC 7027 (Planetary Neb.)

Rectified 2D Spec.



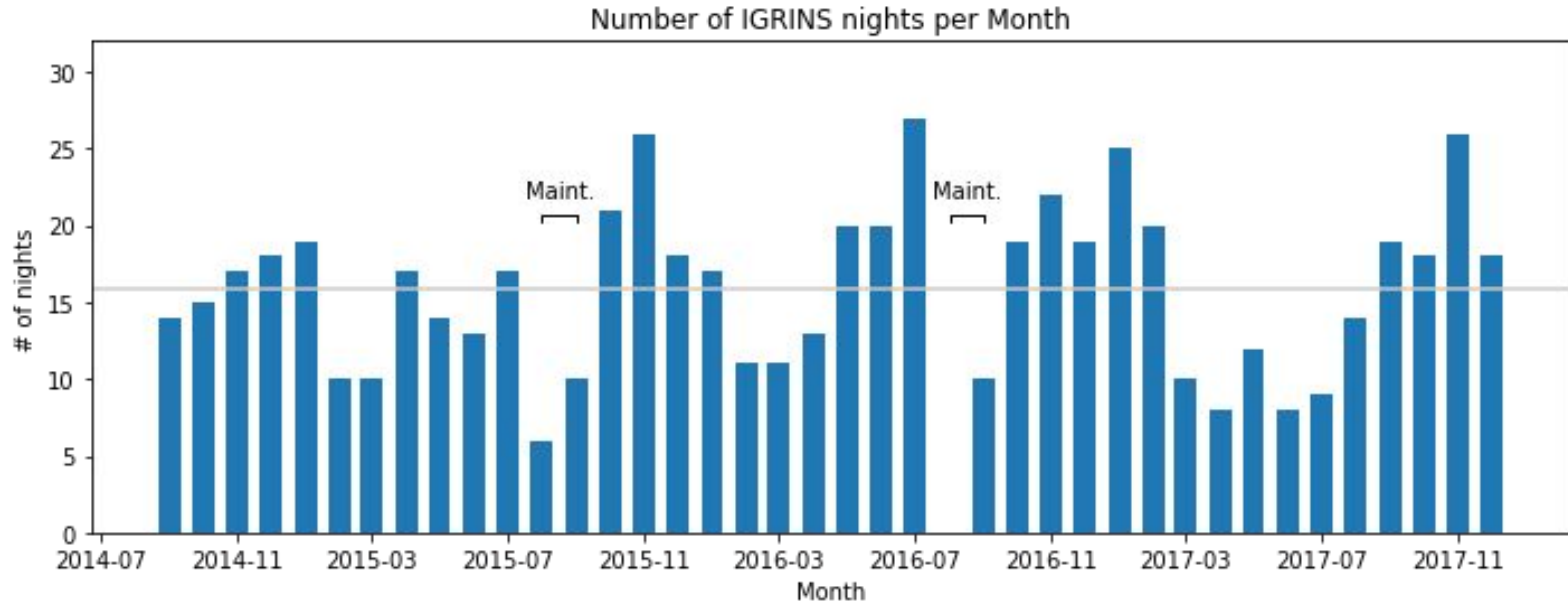
H band

- SDSS4 APOGEE : 3 x H2RG (2k x 2k)
- IGRINS : 2 x H2RG



K band

IGRINS Night statistics



- > 600 nights
- > 2.5 TB raw data
- > 40,000 science images so far
- > 30,000 calibration images

Reducing 600 nights of data

2.5 TB of raw data

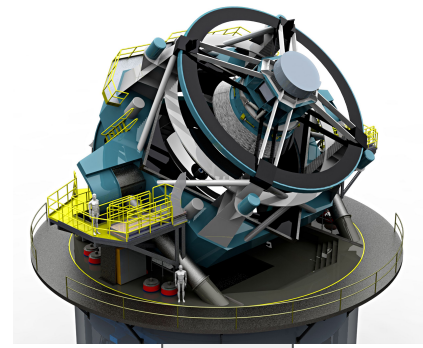
> 10 TB of process data

How can we “effectively” reduce it?

Framework

- Mass-processing of all the previous data
 - Scalability
- (Interactive) re/processing on demand
 - Interactivity
 - real-time operation
- Easy access to the results from the collaborators
 - E.g., Jupyter
 - Interactive visualization of data on the web

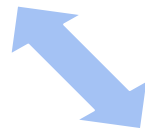
Data analysis in the era of big survey



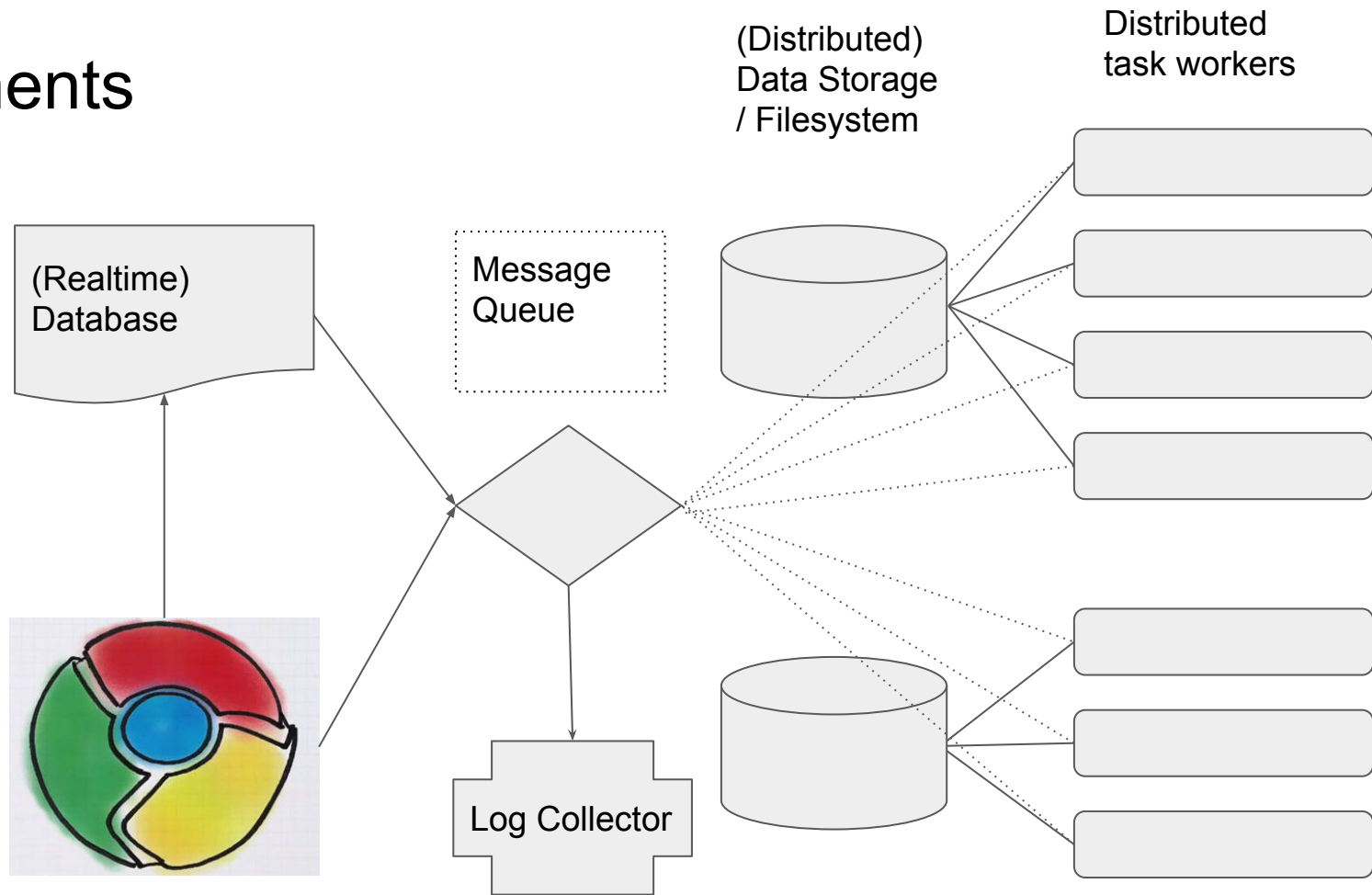
- **Cloud Computing**
- **HPC Cluster**

**Processed
(Big)
Data**

- **Dedicated computing resource**



Components



Implementation

- Distributed task runner : **Wrapper to the IGRINS pipeline using Celery**
- Message queue - RabbitMQ
- RethinkDB : **Broker between realtime DB and message broker (written in Python)**
- Storage : Filesystem / MinIO (S3-compatible)
- Logging : ELK stack

Bring Code to Data

- Docker (container)!
 - Build, Ship, and Run Any App, Anywhere
 - Version-controlled lightweight virtual machine
- Iaas/PaaS/SaaS
 - E.g., JupyterLab from LSST

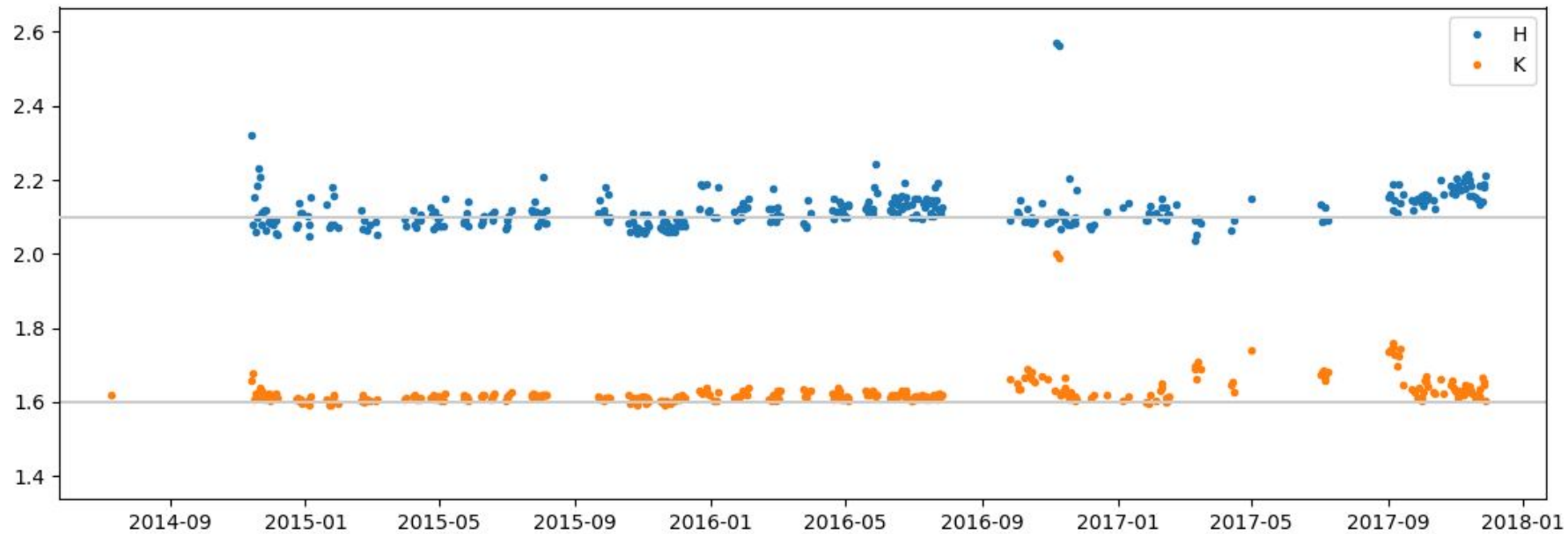
At the end of the day

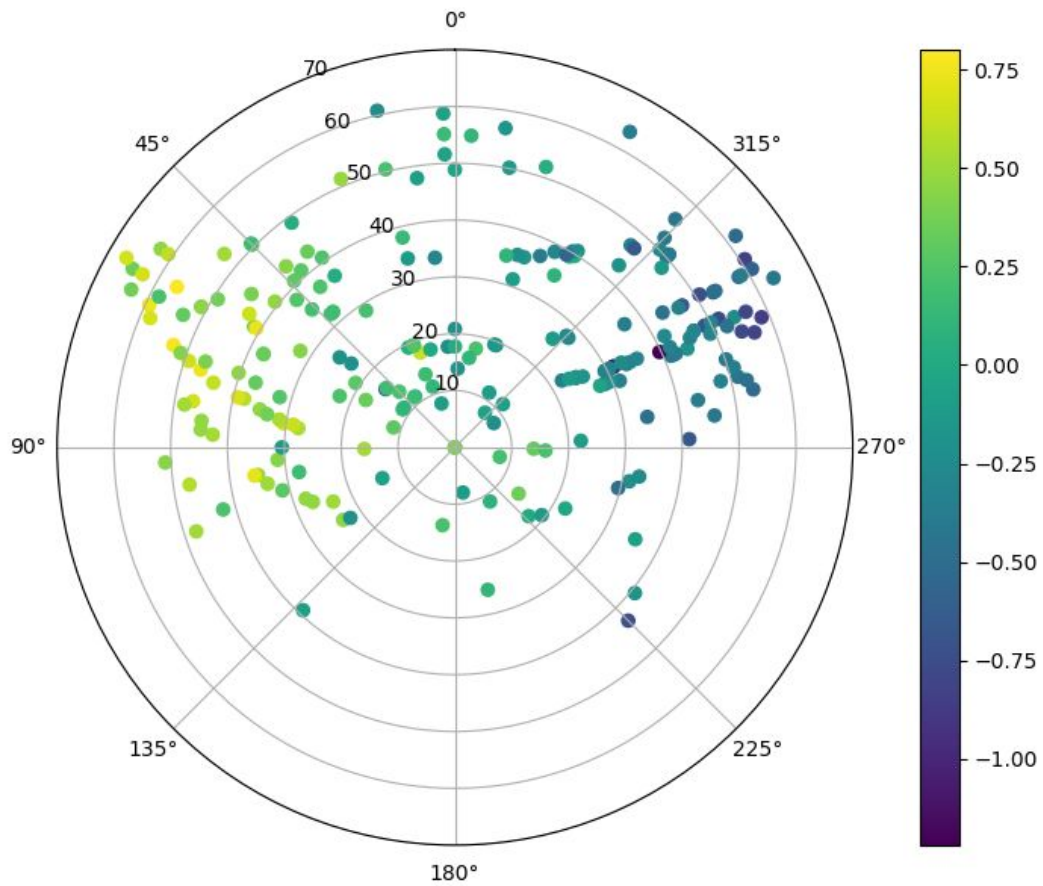
Housekeeping
(during data taking)



Logging
(during processing)

Some initial results





IGRINS

- Primary role of IGRINS is not doing the survey = PI-type observations.
- Most of the IGRINS data is still proprietary
- Small-scale surveys
 - Standard star library
 - YSO survey
 - PAGB survey
- Telluric stars (A0V) / Atmospheric characteristics

Discussion

- There are several number of Korean-led survey projects (e.g., KMTNet), but I don't think there has been many discussion on how we can / or **let other astronomers to use those data most effectively.**
- Wanted to draw attention about the role Korean community as a **producer of the survey data** not just as a consumer.
- Not just using established software products, there are lots of room for improvement where you can **contribute!**
 - Role of the institute
 - Role of junior members (grad. students)