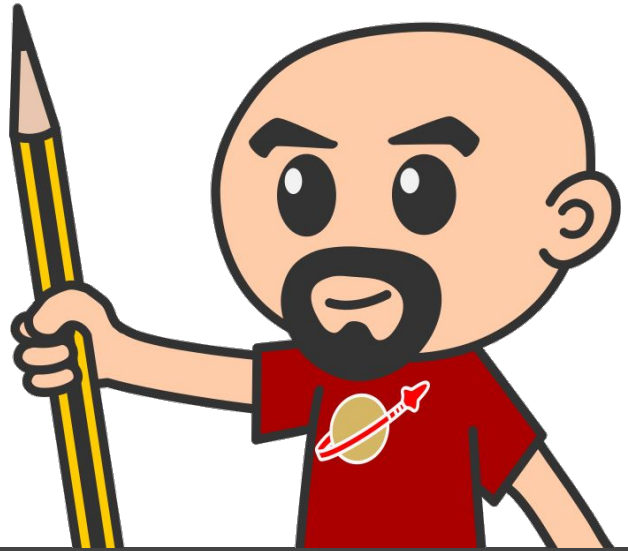
SNOWCAMP 2019

Rediscover the known Universe with NASA dataset

Horacio Gonzalez
@LostInBrittany

Emmanuel Feller
@moyowi

Horacio Gonzalez



@LostInBrittany

Spaniard lost in Brittany, developer, dreamer and all-around geek

OVH
Team DevRel

DevFest du Bout du Monde

Finist Devs

WARP 10 MEETUP

Google Developers Experts 2015
Web Technologies GDE

Emmanuel Feller

@moyowi

Développeur passionné

Pierre & Aurélien

we ♥ you

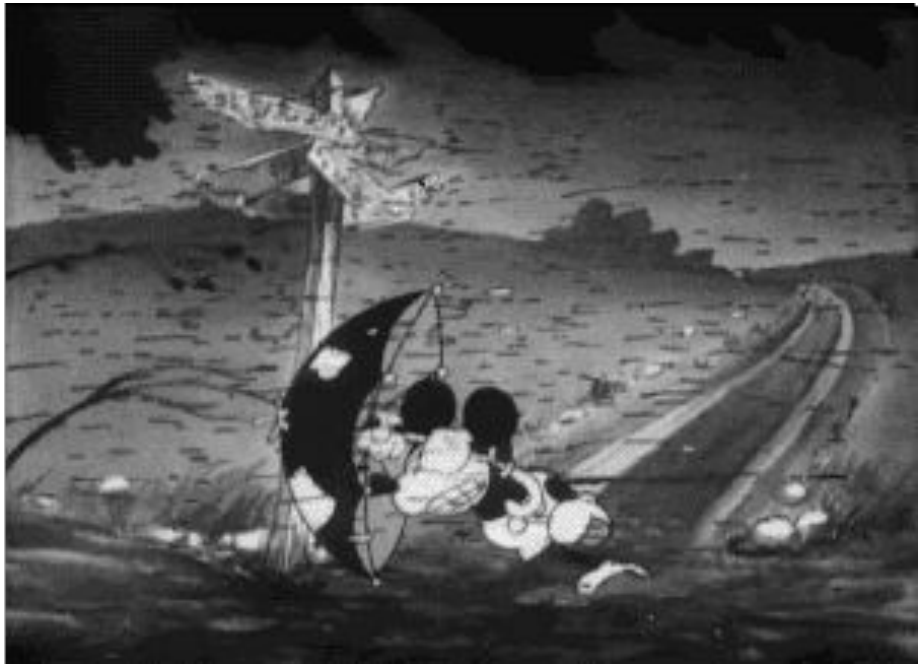
HelloExoWorld

Looking for exoplanets in NASA datasets

HelloExoWorld

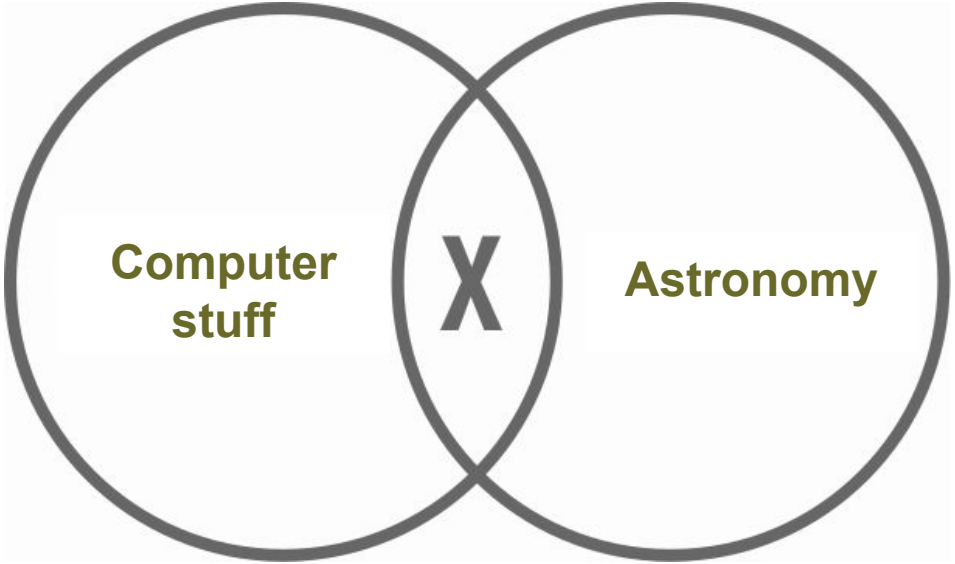
Once upon a time...

What not to do if you love astronomy



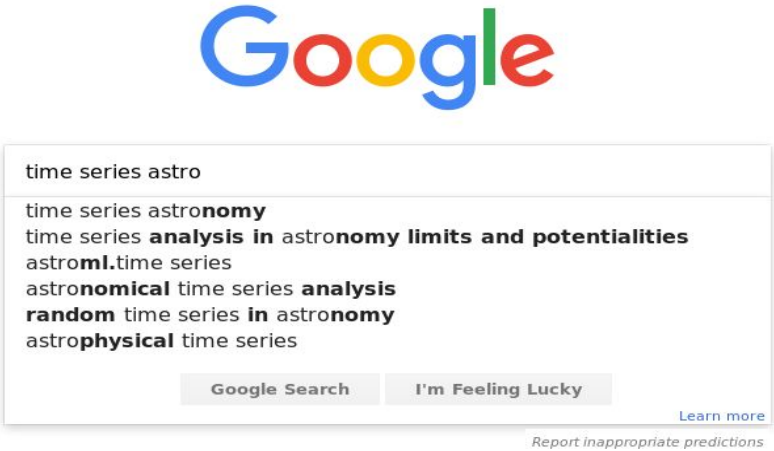
To live in Brest

Looking for solutions



Mixing passions

Google is your friend...

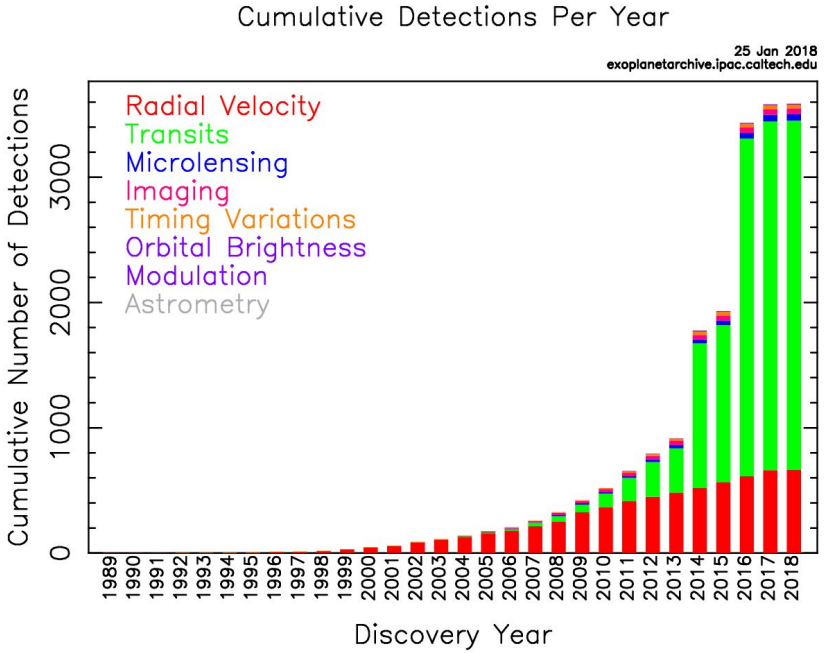


Let's find a project

Exoplanets?

Planets orbiting stars far away

How do we find them?

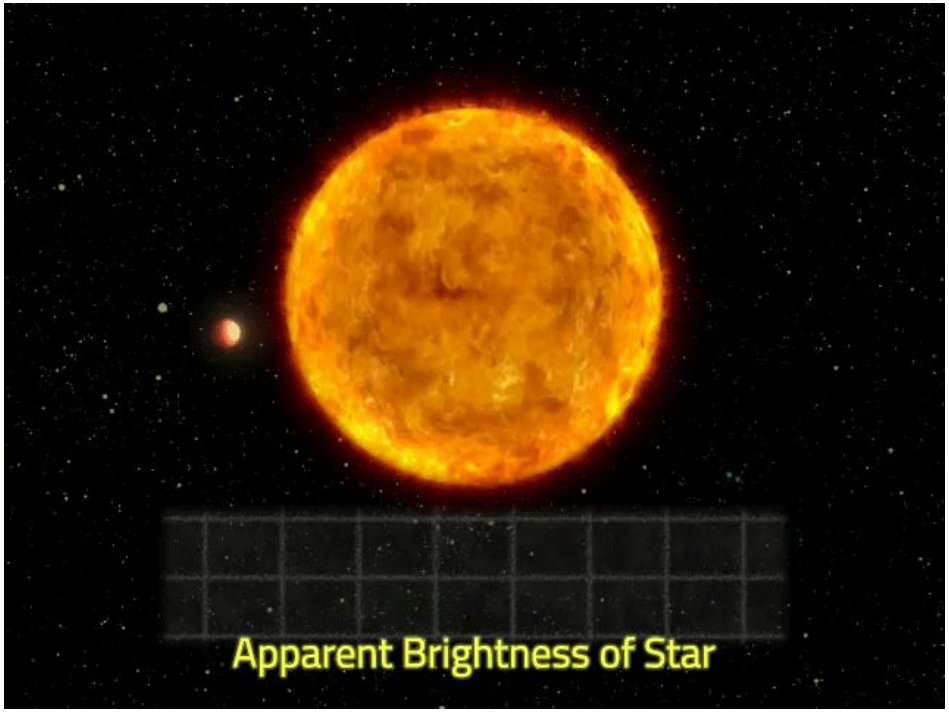


The transit method seems the best

Exoplanets detection

From theory to practice

The transit method



Credits: NASA’s Goddard Space Flight Center

How do we look for transits?

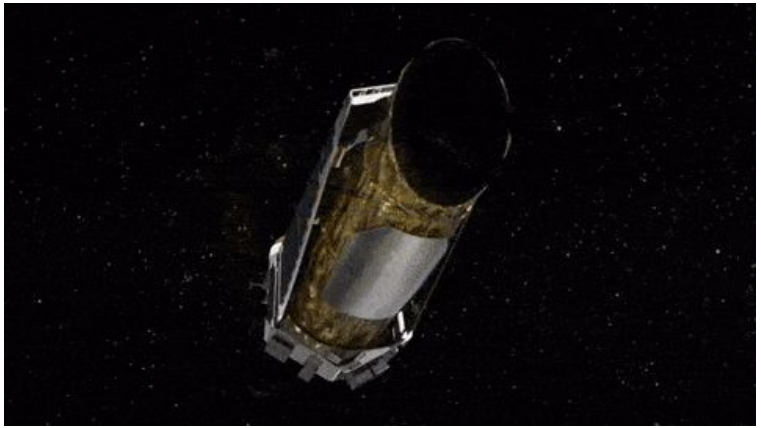
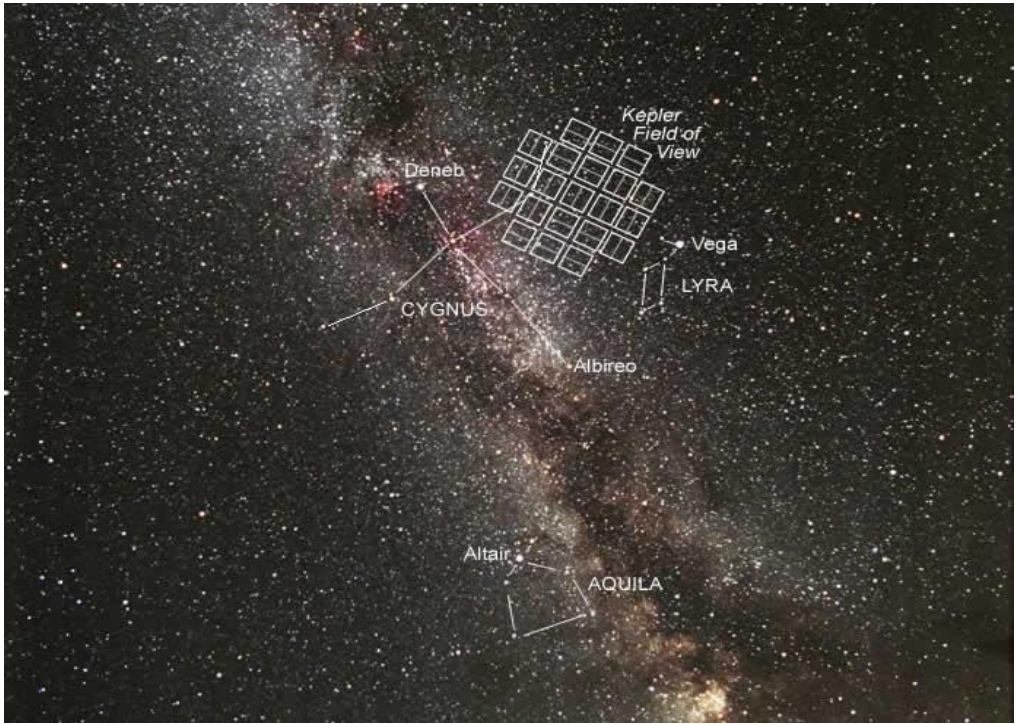


Image credits : NASA
Kepler

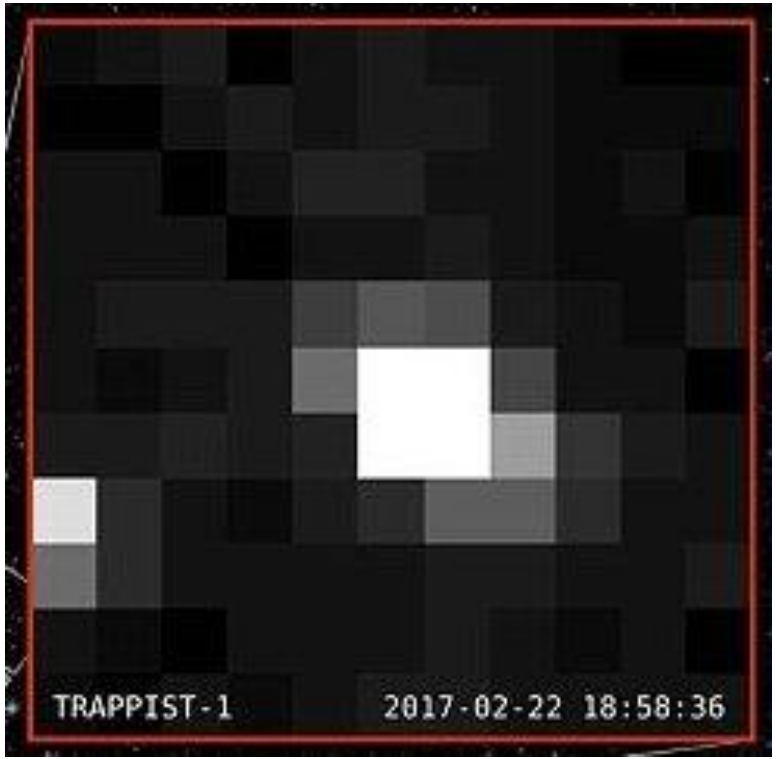
Image credits : NASA
Tess

Watching the sky

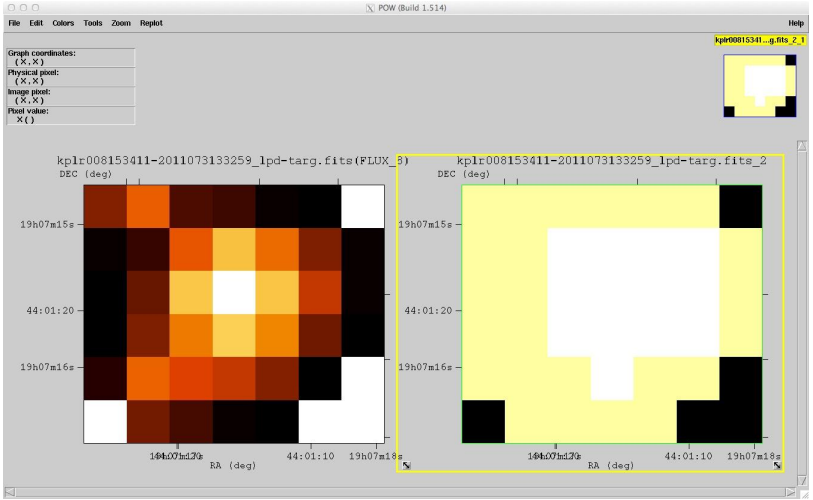


By Carter Roberts [Public domain], via Wikimedia Commons

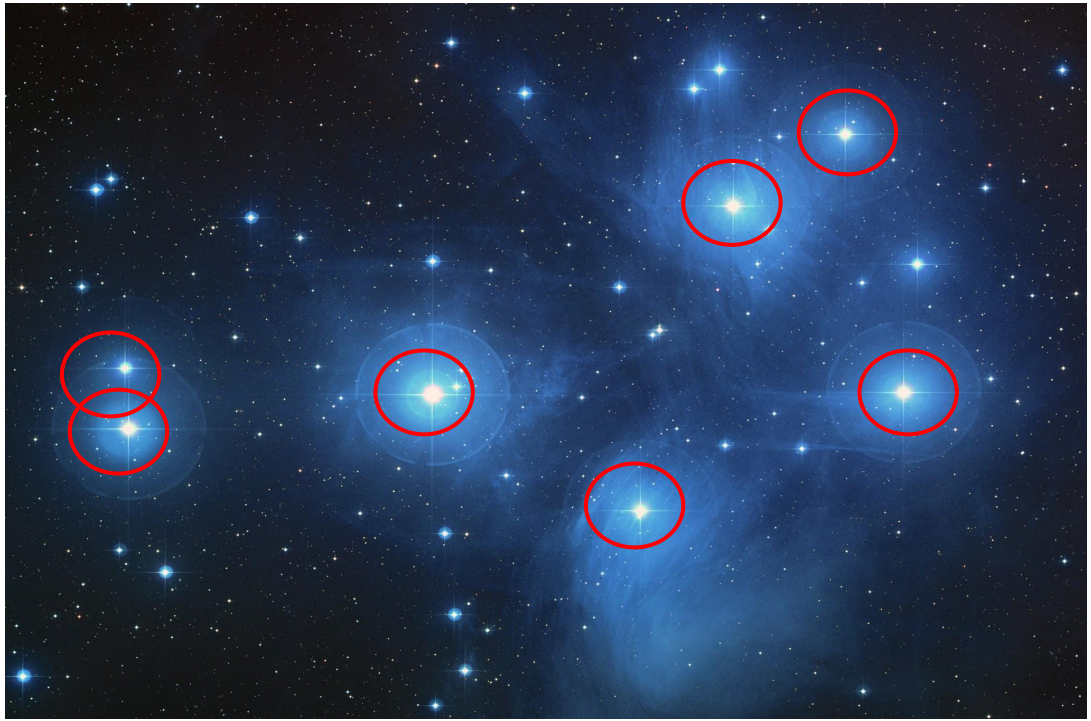
Kepler image



A star : 12*12px

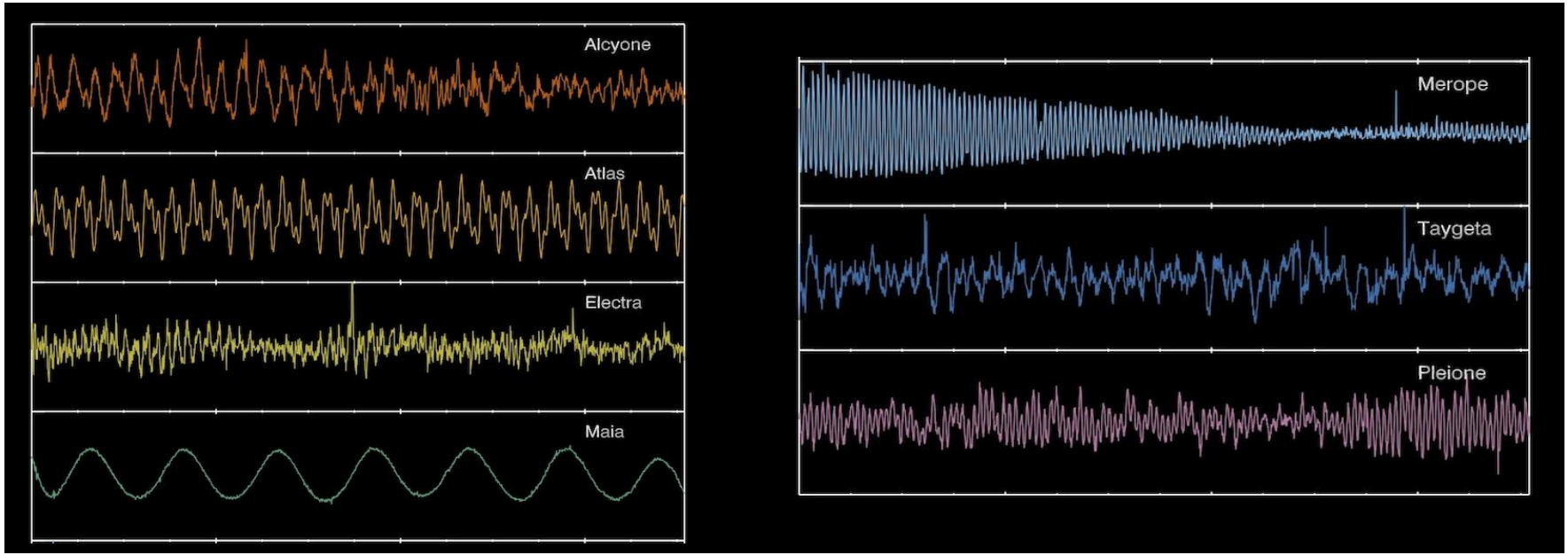


And what kind of data we get?



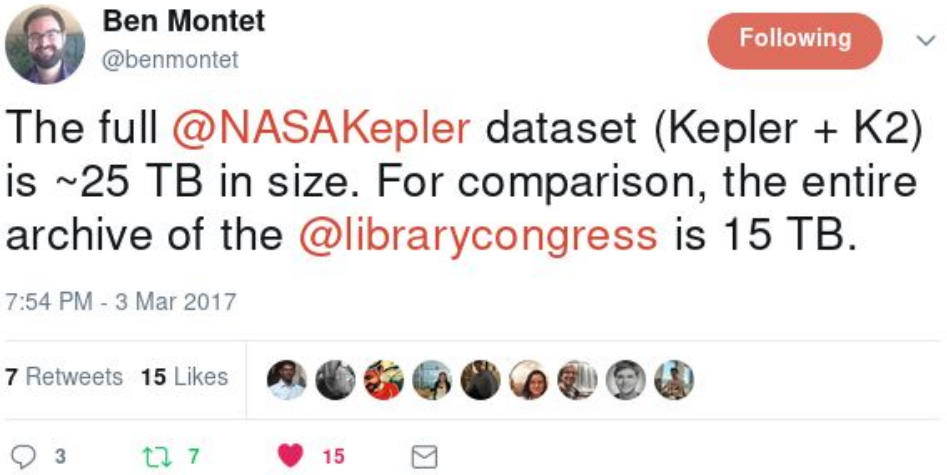
Pleiades By NASA, ESA, AURA/Caltech, Palomar Observatory. Via Wikimedia Common

Well, that's the problem



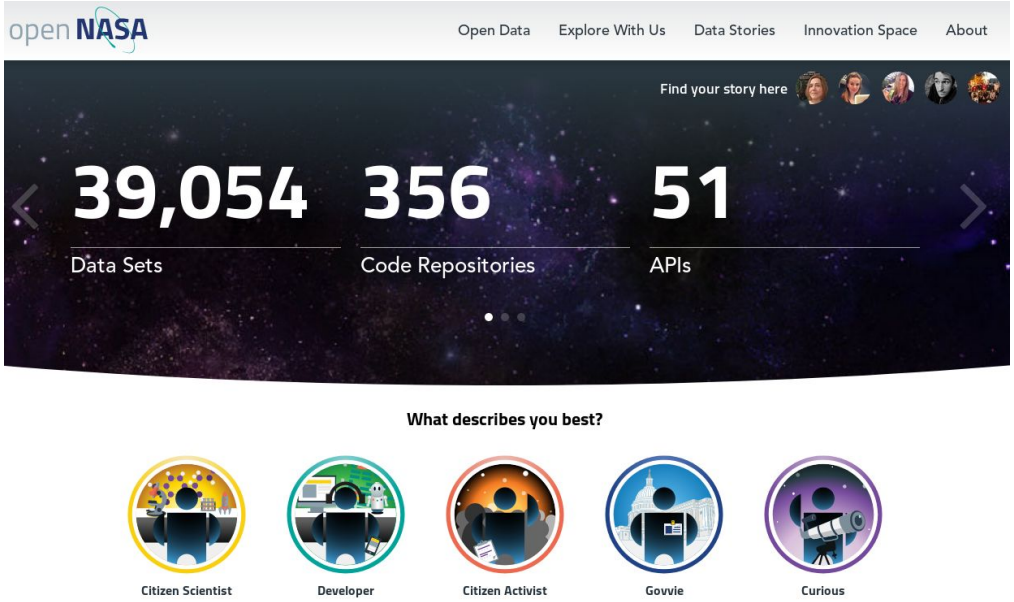
Seven stars, seven different profiles

Kinda big data



Over 40 million light curves

Big AND open data



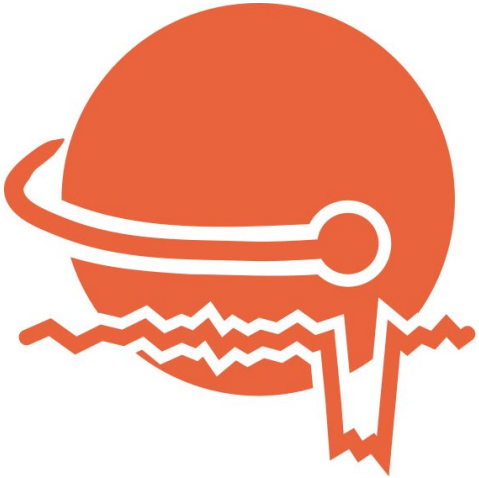
Lots of datasets in #opendata

And we can help with that!

Let's use our tools to analyse the data

Time Series

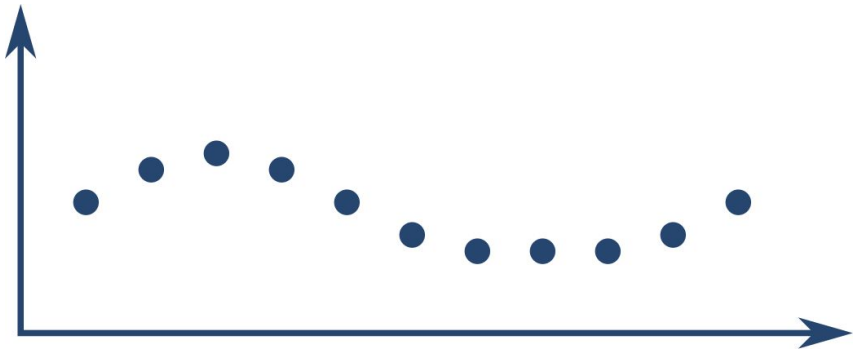
To analyse Kepler datasets



Kepler: spatial Time Series

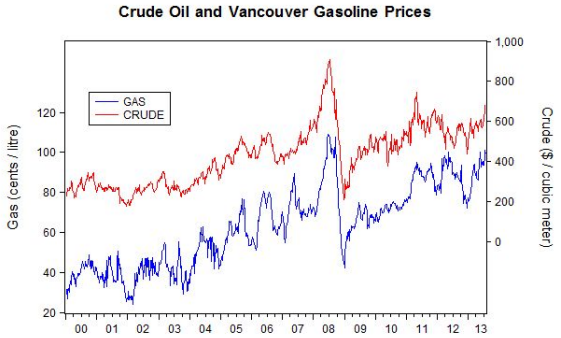
Definition of Time Series:

A series of data points indexed in time order



Time Series

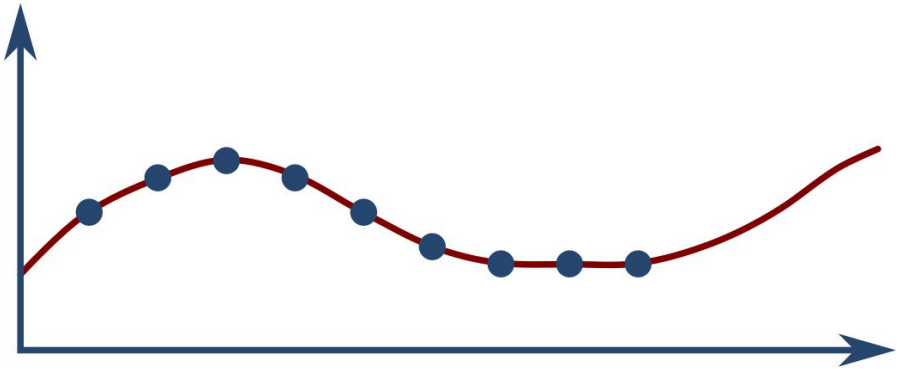
- Stock Market Analysis
- Economic Forecasting
- Budgetary Analysis
- Process and Quality Control
- Workload Projections
- Census Analysis
- ...



Time Series

Applications:

- Understanding the data
- Fit a model
  - Monitoring
  - Forecasting



Time Series

Stock market Analytics

Economic Forecasting

$$$

Study & Research

Time Series

Many specific analytical tools:

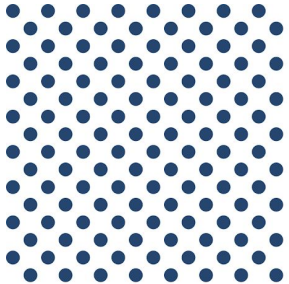
- Moving average
- ARMA (AutoRegressive Moving Average)
- Multivariate ARMA models
- ARCH (AutoRegressive Conditional Heteroscedasticity)
- Dynamic time warping
- ...

Time Series

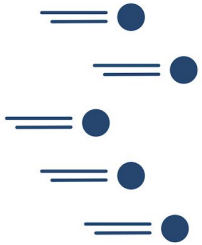
Specific application of general tools

- Artificial neural networks
- Hidden Markov model
- Fourier & Wavelets transforms
- Entropy encoding
- ...

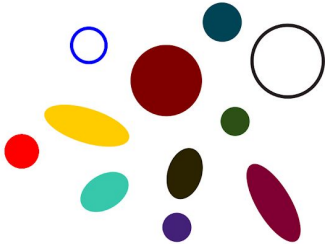
Dealing with Time Series



Volume



Velocity



Variety

The 3 'v'

Monitoring OVH with Time Series

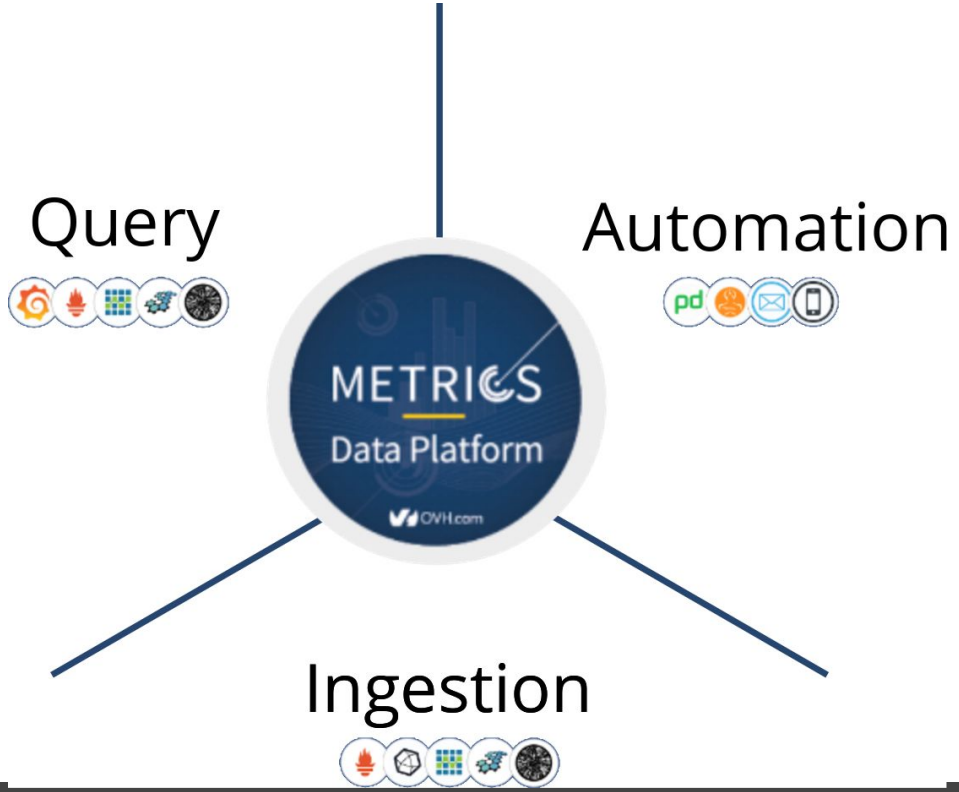
OVH Metrics

A metrics data platform

Tools to deal with Time Series

Many options

Metrics Data Platform



Metrics’ metrics

- 1.5M datapoints/s, 24/7
- Peaks at ~10M datapoints/s
- 500M unique series

Metrics Data Platform

Why Warp 10?

Warp 10 is a software platform that

- Ingests and stores time series
- Manipulates and analyzes time series

Analytics is the key to success

Fetching data is only the tip of the iceberg

Manipulating Time Series with Warp 10

A true Time Series analysis toolbox

- Hundreds of functions
- Manipulation frameworks
- Analysis workflow

Anatomy of a time series

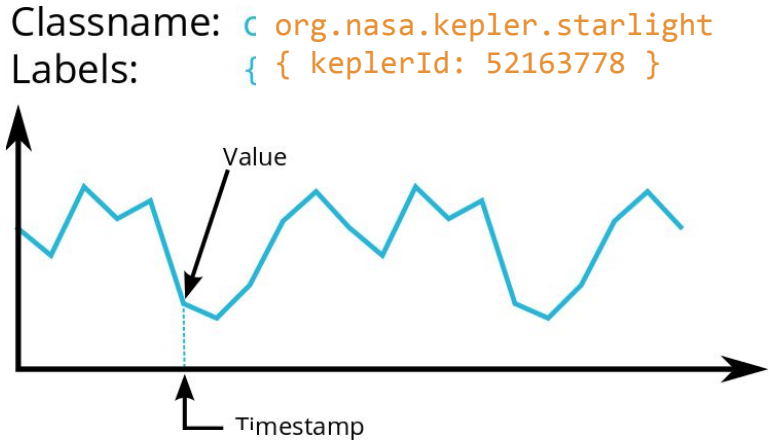
Each time series is composed of:

Metadata

- Class name
- Labels

Datapoints

- Timestamp
- Value



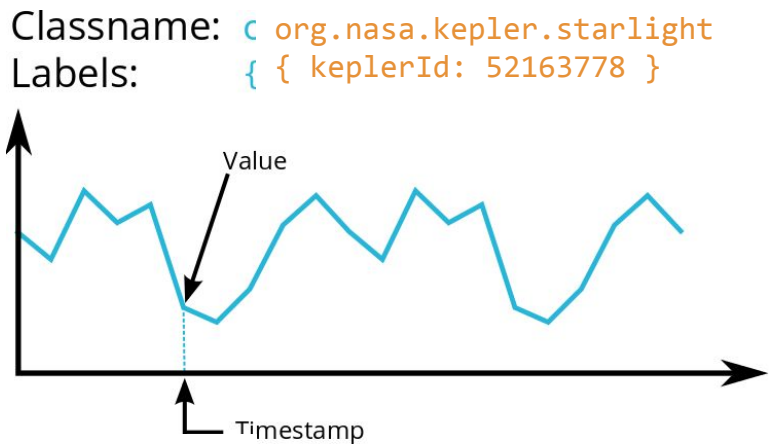
Class names and labels

Class names define the kind of measure

- Starlight, heart rate, speed…

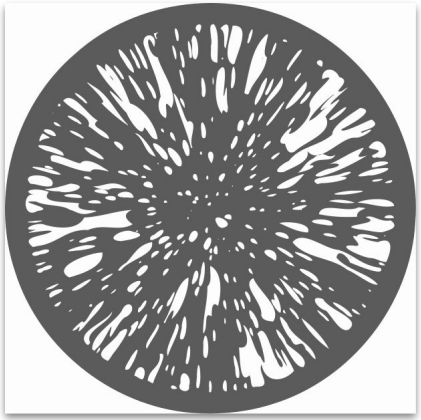
Labels define particular traits of a TS

- Device Id, Device Type, Private User Id...



A match made in heaven

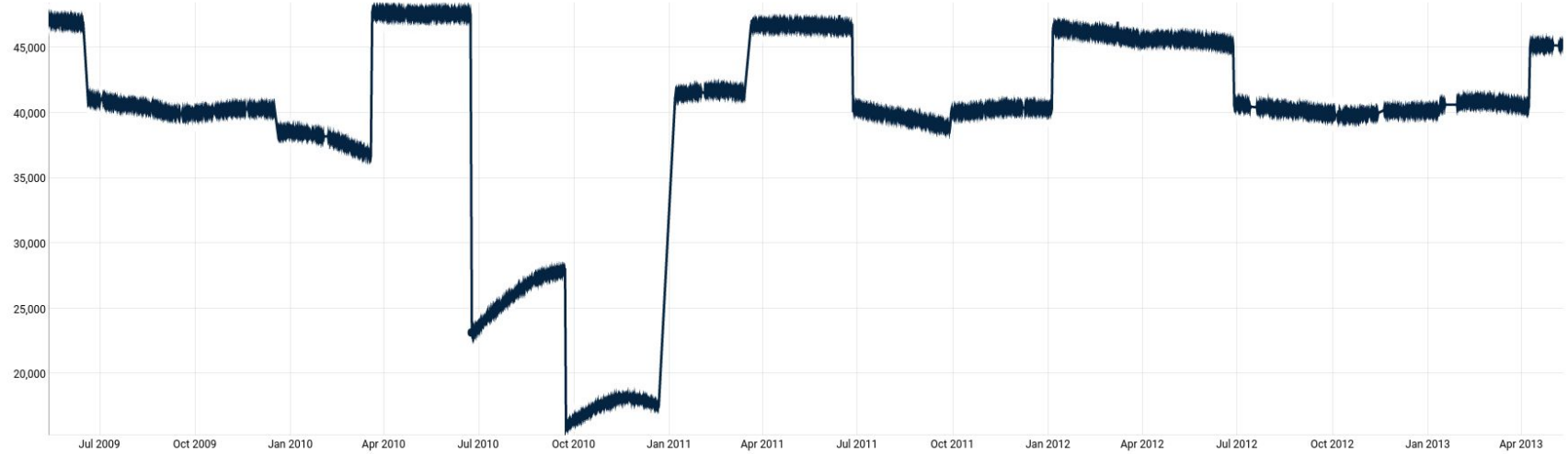
Warp 10, OVH Metrics and HelloExoWorld



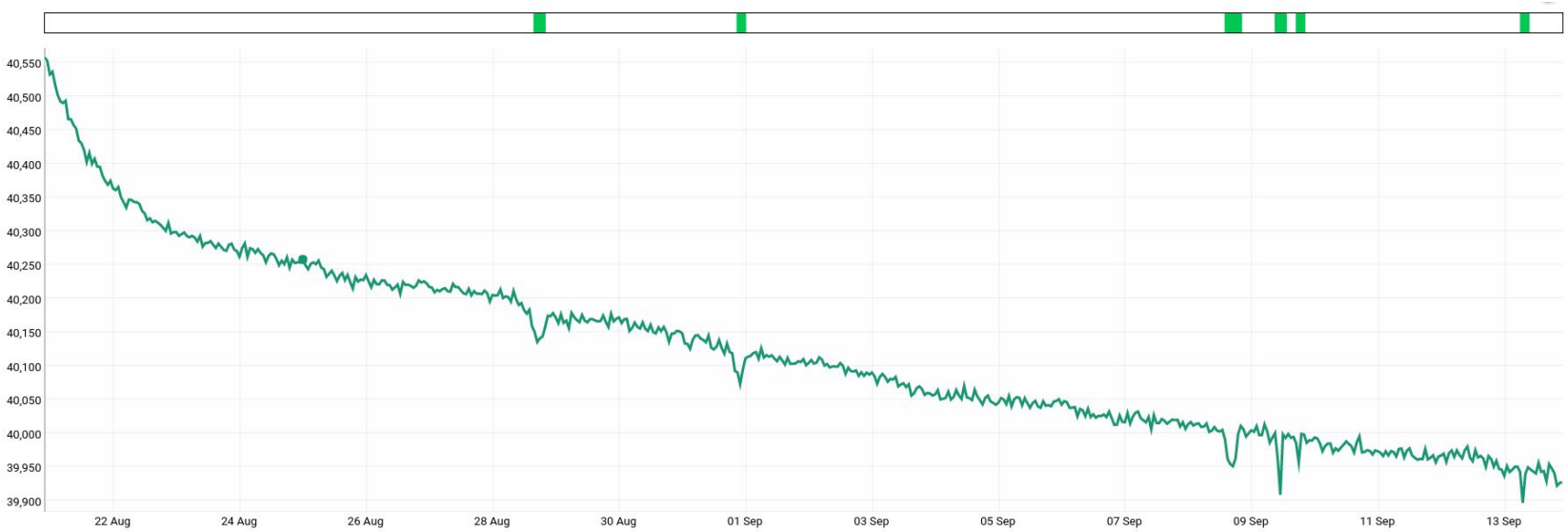
What we have done

- Downloaded and parsed 40 millions of FITS files
- Pushed it to OVH Metrics
- Select a cool subset as training set
- Verified we could find the same planets as NASA

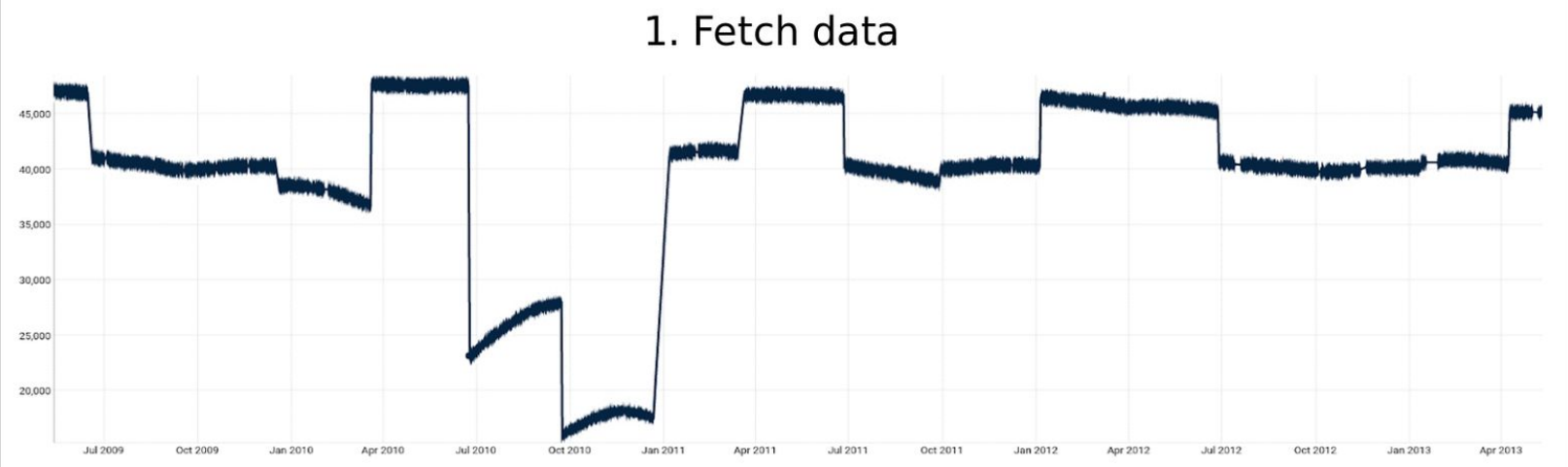
From kepler-11 raw data



To (candidates) exoplanets



Your job


1. Fetch data
45,000
40,000
35,000
30,000
25,000
20,000
Jul 2009
Oct 2009
Jan 2010
Apr 2010
Jul 2010
Oct 2010
Jan 2011
Apr 2011
Jul 2011
Oct 2011
Jan 2012
Apr 2012
Jul 2012
Oct 2012
Jan 2013
Apr 2013

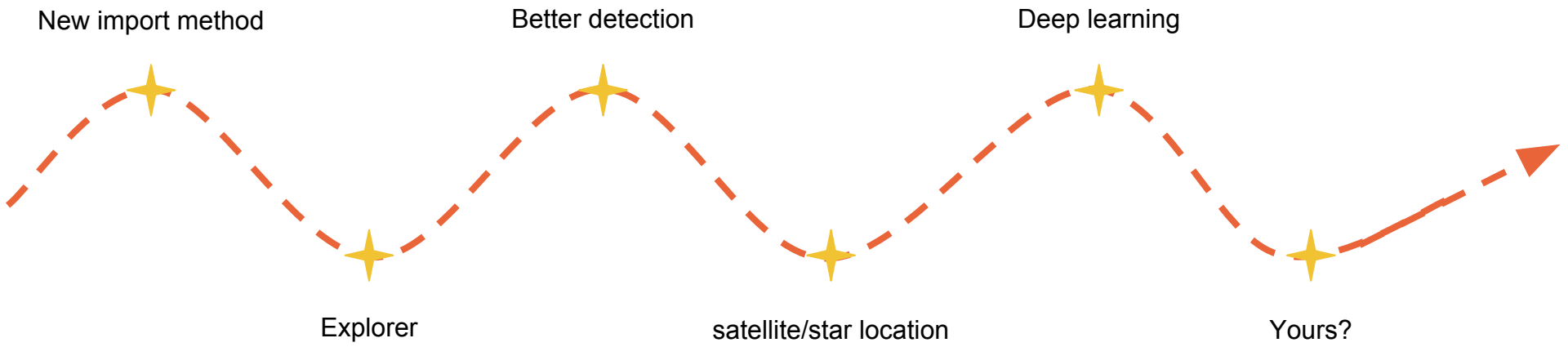
Let's get started!

1. Connect to https://bit.ly/2H7Z5b3
2. Enjoy!

What's next?

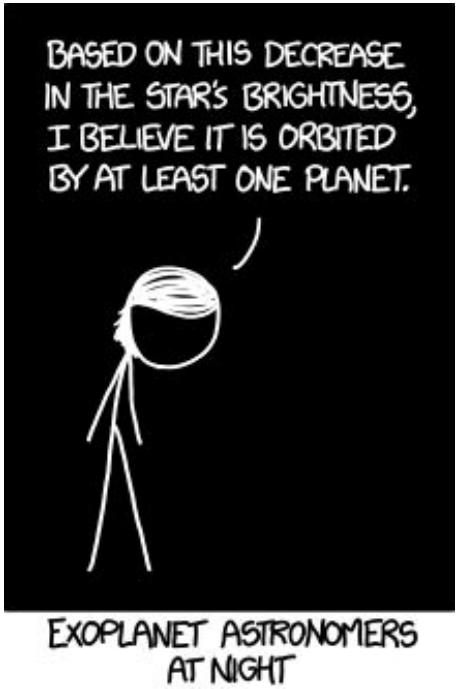
Where do we go from here?

Only the beginning



A growing team

And you!



https://xkcd.com/1371/

Join us!

https://helloexo.world

OVH Platform

Come speak with us about your kubernetes, time-series or observability projects and OVH Platform

Thank you, dear sponsors!

Thank you!


thank you
danke
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ngiyabonga
شكراً جزيلاً
рахмат
Баярлалаа
спасибо
teşekkür ederim
gracias
merci
obrigado
dziękuję
bedankt
sukriya
kop khun krap
go raibh maith agat
mochchakkeram
tapadh leat
arigatô
dakujem
grazie
terima kasih
감사합니다
ありがとう
мерси
takk
taiku
sagolun
hvala
maururu
dank je
blagodaram
faafetai lava
kiitos
dankie
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nandri
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bayarlalaa
gràcie
köszönöm
vinaka
спасибі
mersi
kia ora
barka
welalin
tack
spas
misaotra
matondo
paldies
grazzi
mahalo
хвала
asante
manana
obrigada
tenki
murakoze
chokrane
djiere dieuf
tau
дякую
mamnun
trugarez
chnorakaloutioun
gratias ago
gràcies
sulpáy
akun
dankon
ačiū
sobodi
dêkuji
mèsi
didi madloba
najis tuke
kam sah hamnida
rahmat
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rahmet
xièxie
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diolch
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