

HEPiX

Welcome to Barcelona



HEPiX Autumn-Fall 2018

Barcelona, 08-12 October 2018

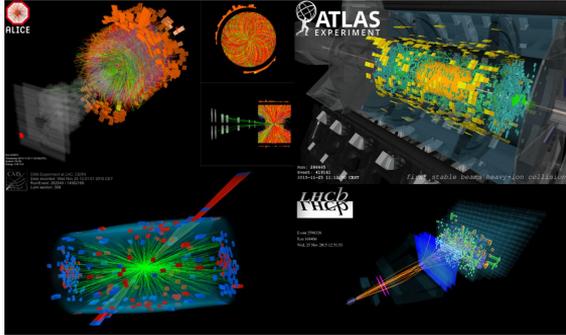
G. Merino

Hosted by

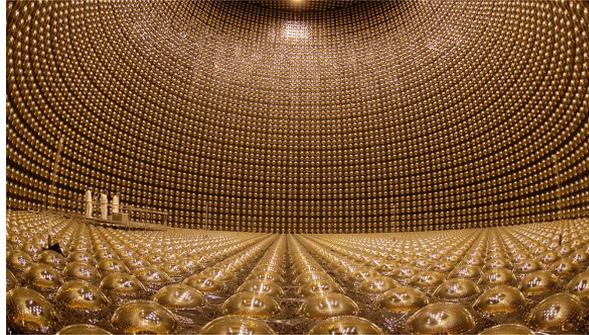


PIC
port d'informació
científica

PIC activities



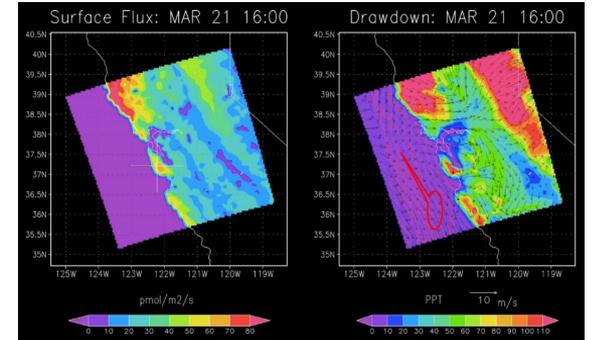
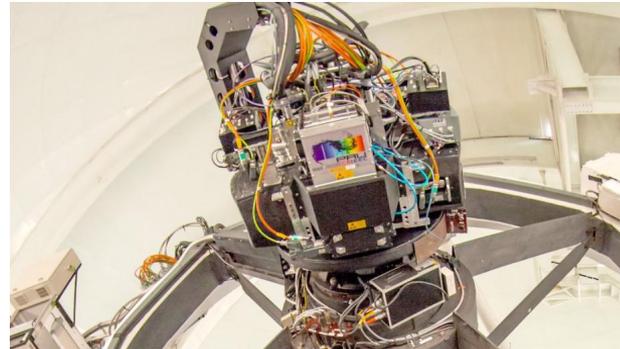
Particle physics



Astrophysics



Cosmology



Earth sciences, climate change

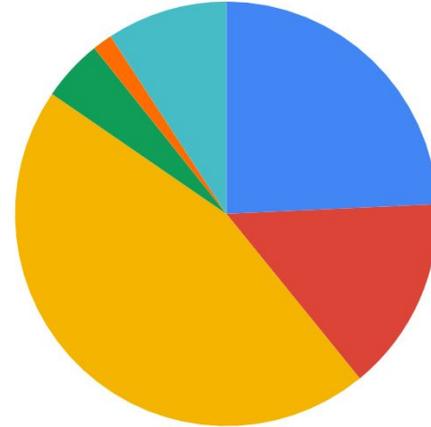
Main asset: the people

F. Lopez
J. Flix
J. Casals
A. Vedaee
P. Tallada
C. Neissner
B. Rodriguez
F. Torradeflot
A. Pacheco
M. Delfino
M. Borstad-Erikson
A. Perez-Calero
J. Carretero
J. Delgado
E. Acción
M. Porto
G. Merino
C. Perez
C. Acosta
E. Planas
R. Cruz
V. Acín

PIC Overview

PIC: CIEMAT and IFAE
collaboration agreement -
coordinated funding effort

~ 1.85 MEur avg yearly budget,
22 people



- Base budget IFAE • Base budget CIEMAT
- Spain competitive R&D • EU competitive R&D • PIC services
- Universitat Autònoma de Barcelona

A Virtual Universe

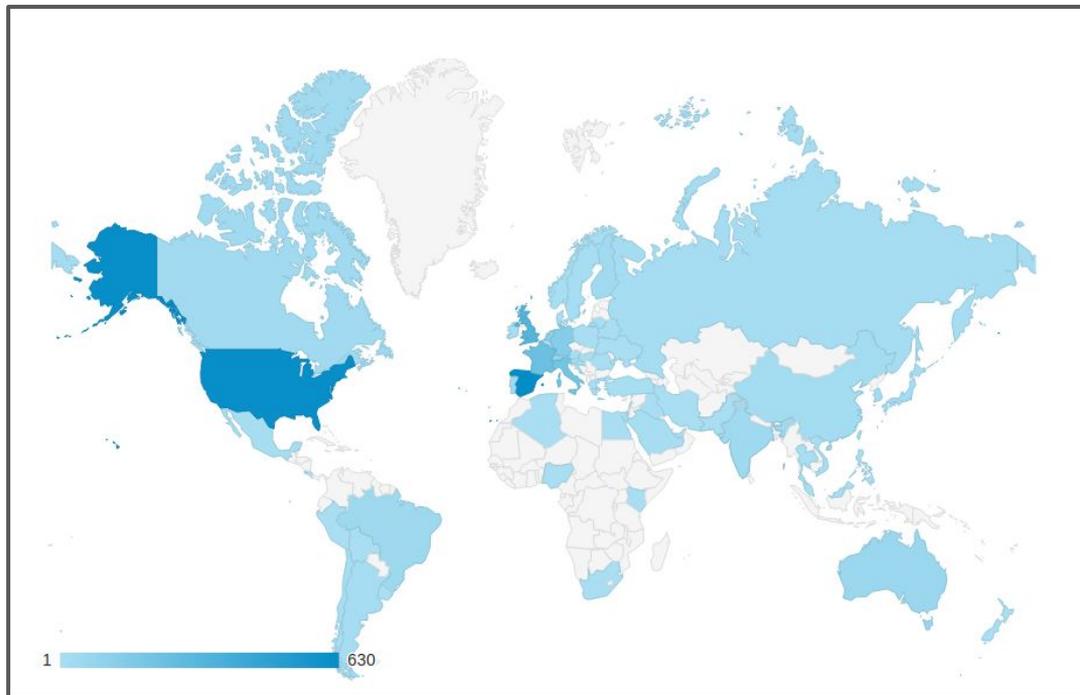
PIC Hadoop platform computed the EUCLID Flagship mock galaxy catalogue

- Input: a record-setting supercomputer simulation of 2.3 trillion DM particles - 44 billion DM haloes catalogue (5.5 TB)
- SciPIC pipeline based in Spark, developed and executed at PIC
- Output: the largest simulated galaxy catalogue ever produced: 9 billion galaxies covering $\frac{1}{3}$ of the sky (~3TB)
- Both datasets hosted at CosmoHUB, a platform for data access and analysis

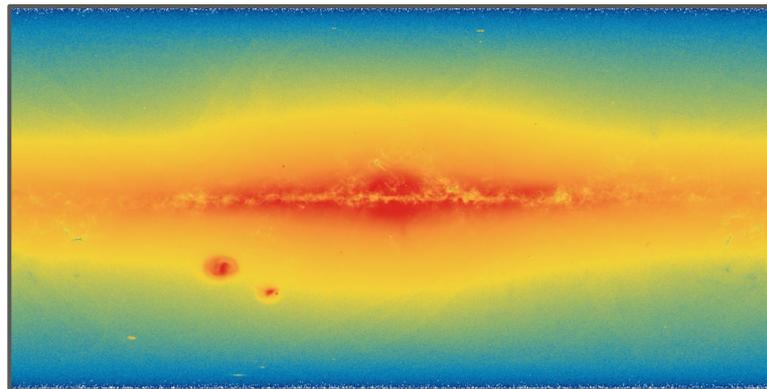


<https://cosmohub.pic.es>

Data access and analysis platform backed by Hadoop/Hive



Over 3,500 catalogs
generated by more than 250
users from all over the world

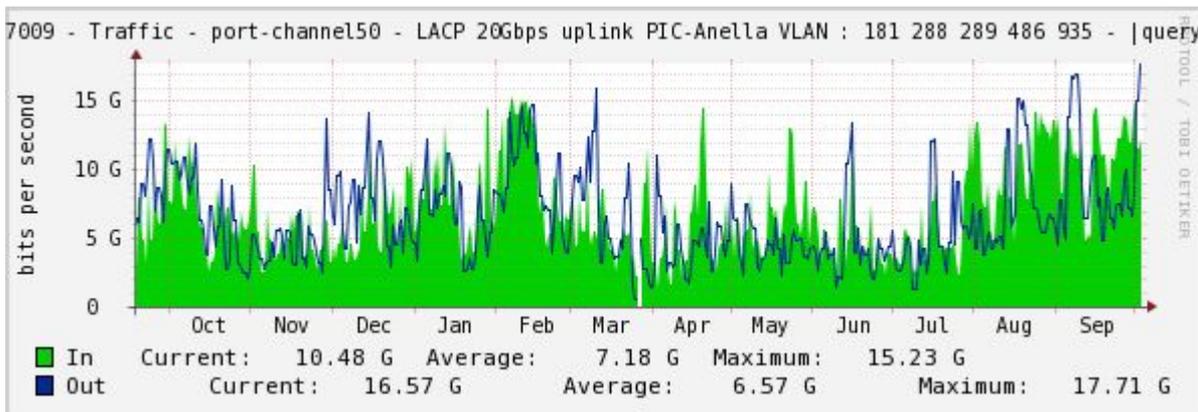


Data-intensive Science

Network connection to RREN (Anella/CSUC) upgraded in 2016

1x 10Gbps → 2x 10Gbps

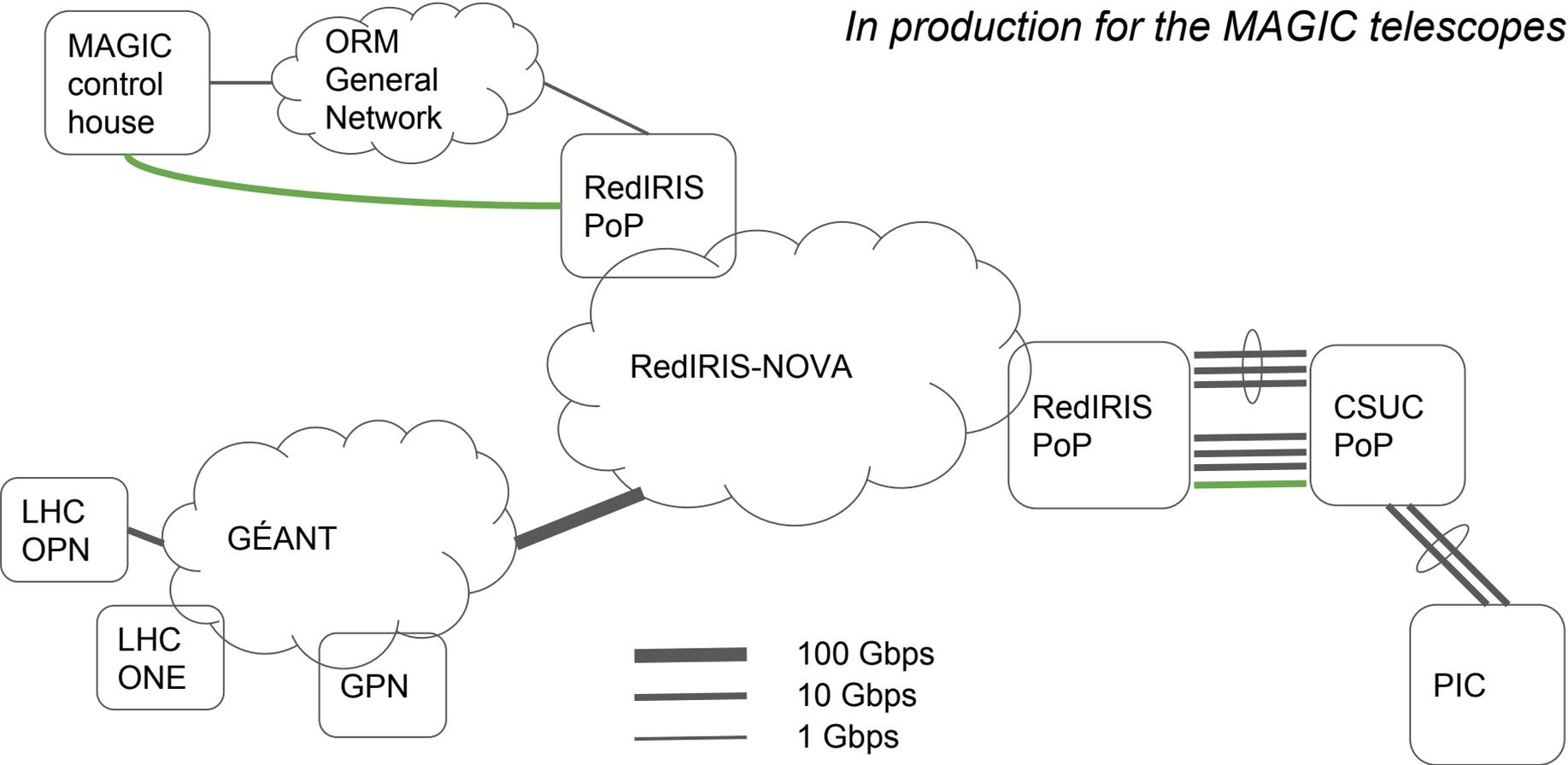
PIC is the largest data mover node in the Spanish research network



last year - 27 PB in, 24.7 PB out

Direct network connection to ORM

In production for the MAGIC telescopes



Observatorio Roque de los Muchachos

Hosting several other data-intensive instruments:

PAUcam, Large Scale Telescope prototype for CTA ...



Server immersion cooling

Energy efficiency: measured PUE 1.13 in August

Servers running for 3 years

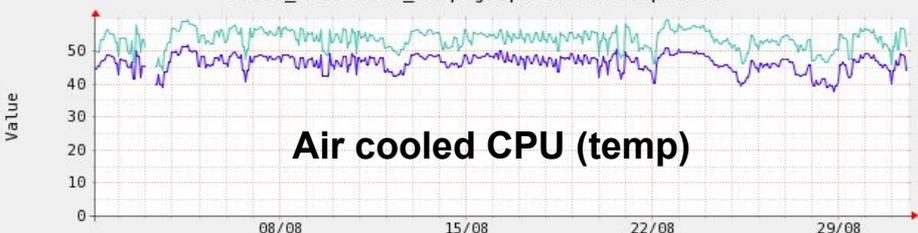
- No hardware incidents

Auxiliar facility easy to operate (pump module, intercooler, water circuit)



C6100_Processor_Temp graph on td728.pic.es

Air cooled CPU (temp)

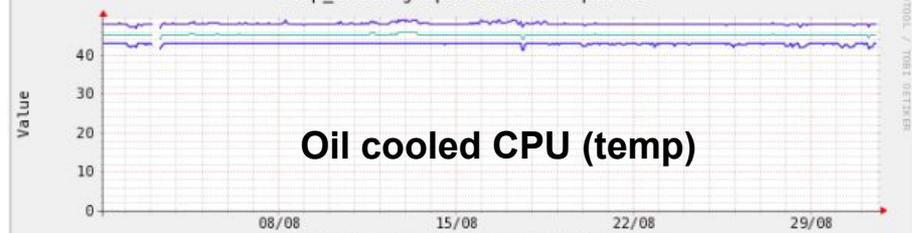


From 2018/08/01 1:29 to 2018/08/31 13:29

Processor2	Last: -nan	Min: -nan	Max: -nan	Average: -nan
Disabled;Processor2	Last: -nan	Min: -nan	Max: -nan	Average: -nan
No;Processor2	Last: -nan	Min: -nan	Max: -nan	Average: -nan
Processor1	Last: 43.92	Min: 37.59	Max: 51.78	Average: 46.43
Processor2	Last: 51.30	Min: 44.02	Max: 59.36	Average: 53.58

temp_intel graph on tds208.pic.es

Oil cooled CPU (temp)



From 2018/08/01 1:29 to 2018/08/31 13:29

CPU2_Temp	Last: -nan	Min: -nan	Max: -nan	Average: -nan
Inlet_Temp	Last: -nan	Min: -nan	Max: -nan	Average: -nan
CPU1_Temp	Last: 48.04	Min: 46.91	Max: 49.00	Average: 48.07
CPU2_Temp	Last: 45.00	Min: 44.02	Max: 46.00	Average: 45.04
Inlet_Temp	Last: 43.00	Min: 41	Max: 43	Average: 42.90

Server immersion cooling: lessons learned

Difficult to manipulate the servers

- A hoist is needed. Deployments without a raised floor would ease operation.

Network optics can not be immersed

- Option: patch panels near the tanks and network gear in a standard rack
- Difficult to deploy the switches and PDUs and handle the cabling
- Important to have space between tanks and racks and structures to hold them

Room temperature about 38°C in a 20 m² almost hermetic enclosure

- Better to deploy in an open room with enough air to dissipate the tanks heat.

New immersion systems

Advantages:

- Fibers can be immersed
- Easy retrofitting (Barcelona based company)
- Shorter oil circuit (less oxidation)
- Eco-friendly coolant

Disadvantages:

- New solution - unknown
- Still difficult to manipulate servers and switches



(being tested by LHCb at CERN)



HEPiX

Thanks to all our sponsors
and

special THANKS to the local
organizing team:

J. Flix and M. Porto

Welcome to Barcelona - enjoy

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