

# GERSolar

stream processing

Federico Taddei

[pincelletum@hotmail.com](mailto:pincelletum@hotmail.com)

Eloy Adonis Colell

[ecoell.github.io](https://github.com/ecoell)







Three people are standing in a grassy field, examining solar water heating equipment. The man on the left is wearing a brown t-shirt with a white geometric logo and shorts. The woman in the middle is wearing a purple top and grey pants. The woman on the right is wearing a beige jacket and a colorful scarf.

The central cylindrical tank is labeled "ORBIS SOLAR". It is connected to two large rectangular solar collectors with blue tubes. A smaller collector is visible on the right. The equipment is mounted on a metal frame.

A tall water tower is visible in the background, supported by a blue and red metal structure. The tower has a white cylindrical tank at the top.







**utopía**

**predecir**

**la irradiancia solar**

**1 hora antes**

para cada punto de la **argentina**

con refrescos de **30 min**



# procesos

1. Descargar **imágenes**.
2. Obtener **mediciones de tierra**.
3. **Estimar** utilizando **heliosat2 (GPU)**.
4. Calcular **errores** contra las **mediciones en tierra (CPU)**.

# heliosat2 (GPU)

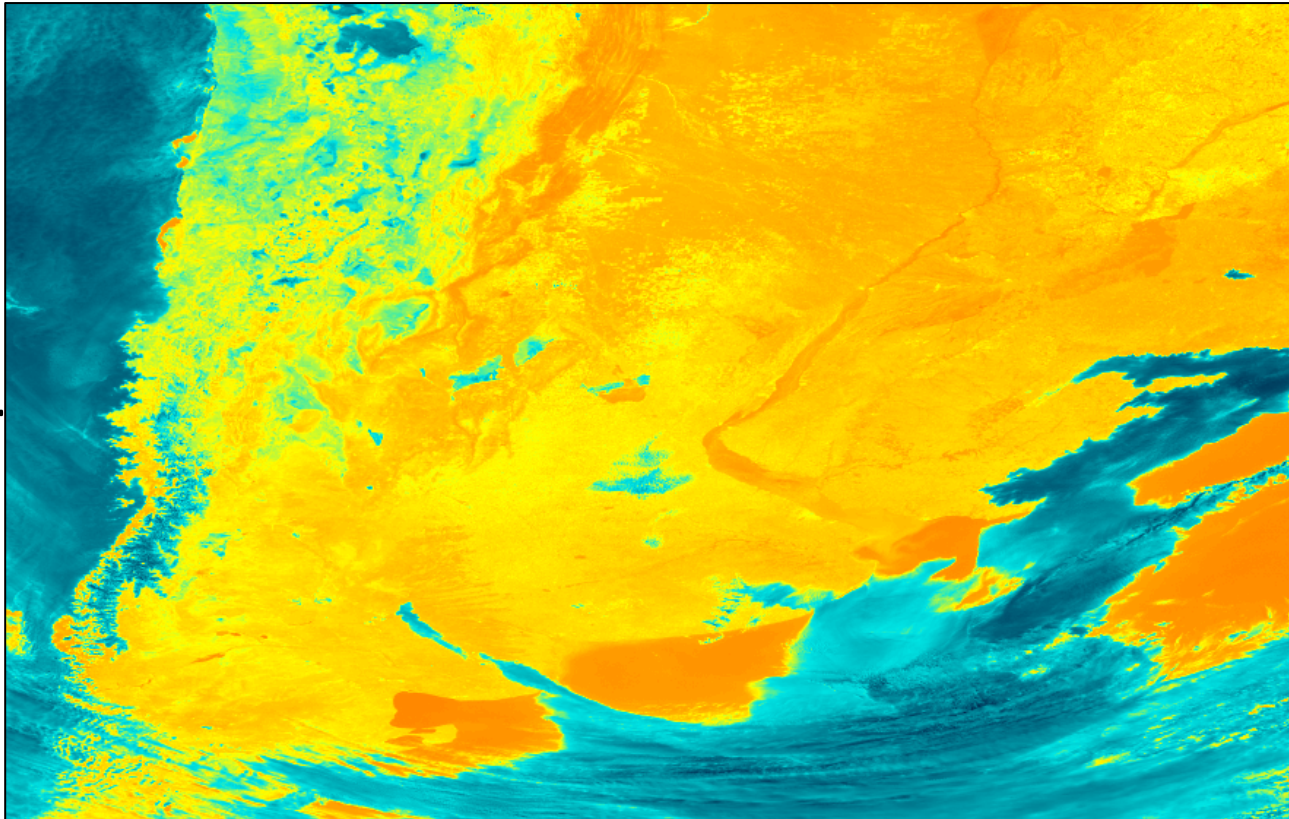
1. **calibración** de las imágenes (**paquete** de 1 mes).
2. estimar la **irradiancia global** a nivel del suelo  
para cada **pixel**.

# area geográfica

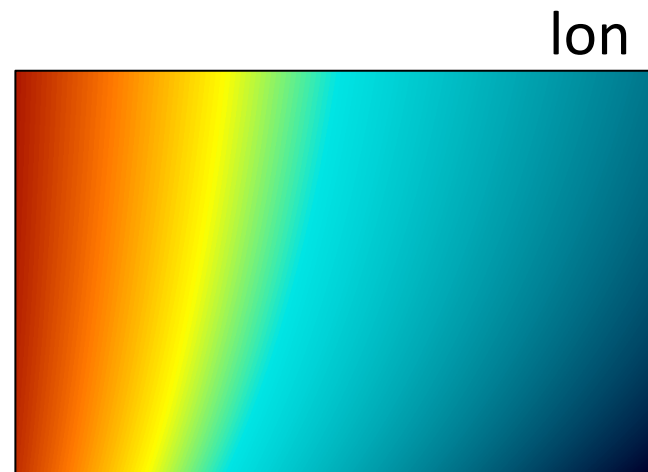
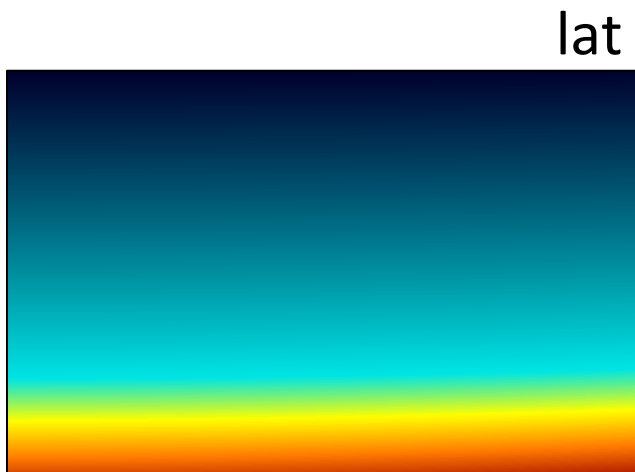
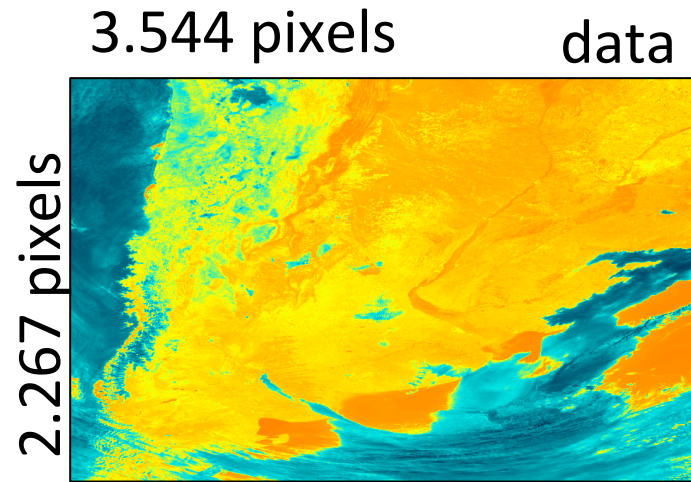
3.544 pixels

data

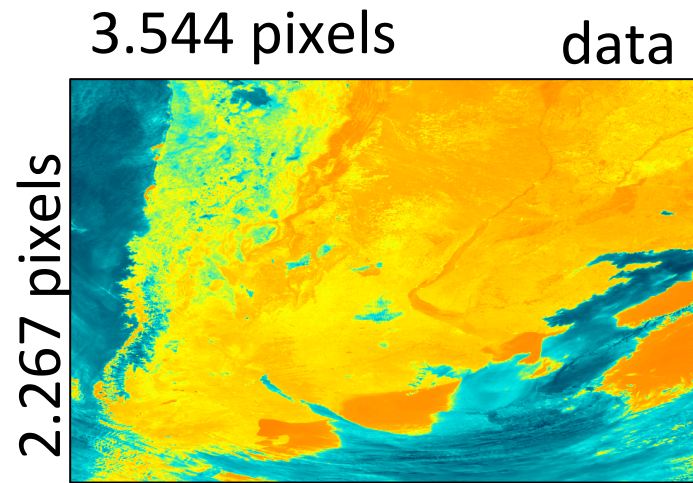
2.267 pixels



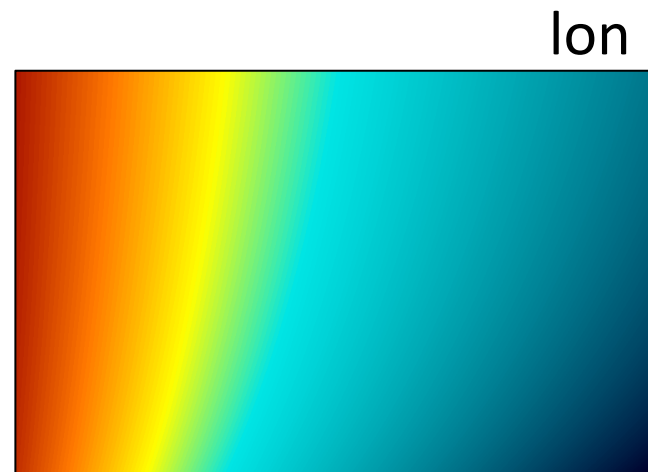
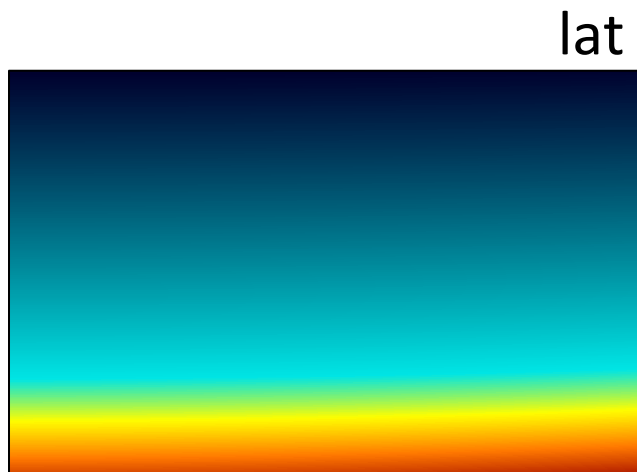
# area geográfica



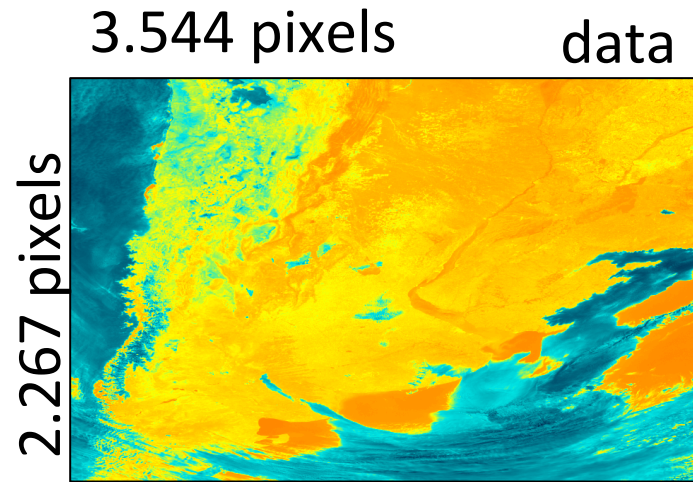
# area geográfica



Ej: **353,23134** W/(m<sup>2</sup> \* sr)

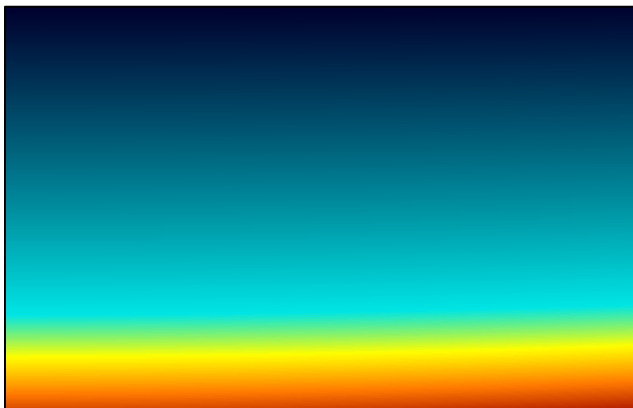


# area geográfica



Ej: **-45,23131417°** (Sur)

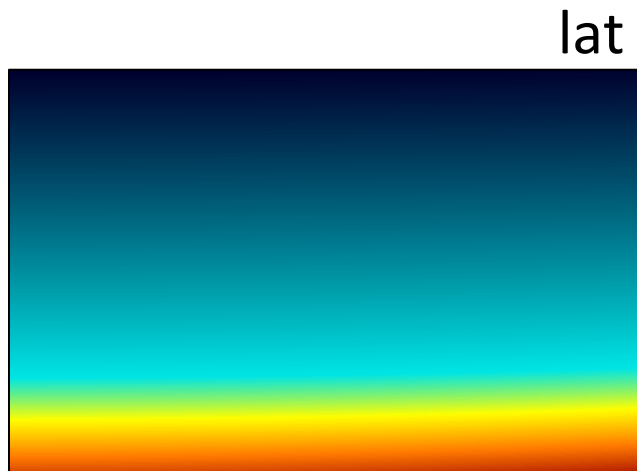
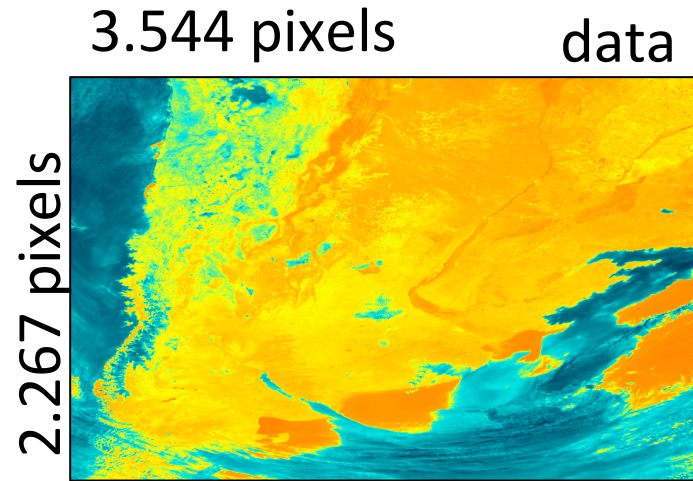
lat



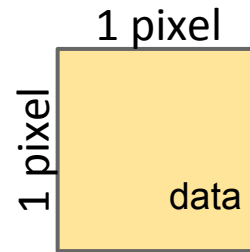
lon



# area geográfica



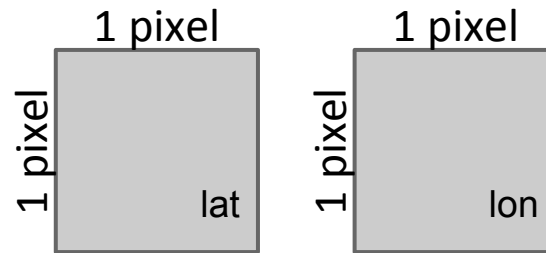
# pixel



data calibrada: float 32 bits:  $W/m^2$   
**4 bytes/px**



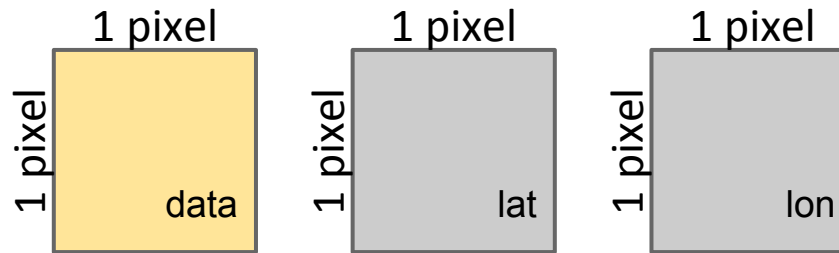
# pixel



lat: float 32 bits: grados  
**4 bytes/px**

lon: float 32 bits: grados  
**4 bytes/px**

# pixel

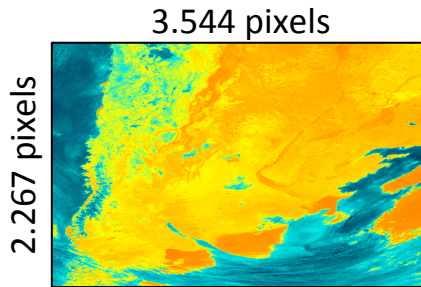


data calibrada + lat + lon

**4 bytes/px \* 3**

**12 bytes/px**

# imagen

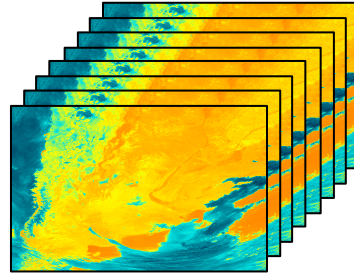


**8.034.248 px/imagen**

12 bytes/px \* 8.034.248 px/imagen

**97 MB/imagen**

# paquete



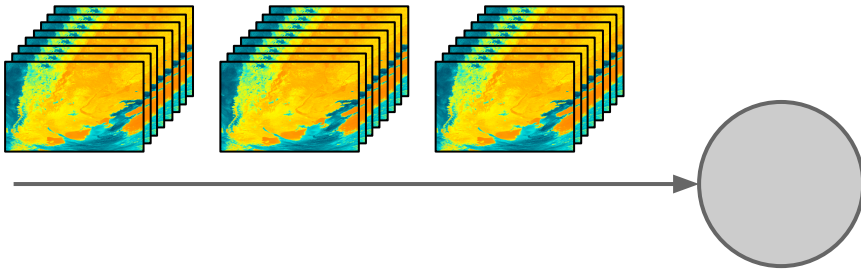
2 imagen/hora \* 12 hora luz/dia \* 30 dia/mes

**720 imagen/mes**

97 MB/imagen \* 720 imagen/mes

**70 GB/paquete**

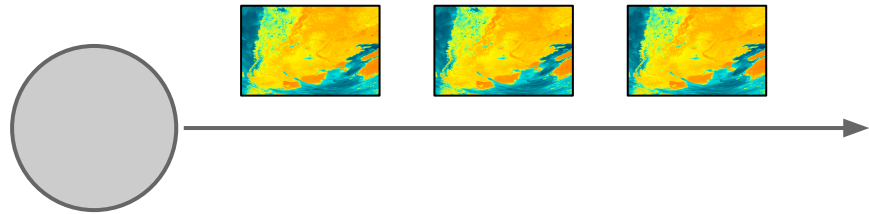
**stream de entrada**



**70 GB/30 min**

**2,3 GB/min**

# stream de salida



8034248 px/imagen \* 4 bytes/px

**321 MB/30min**

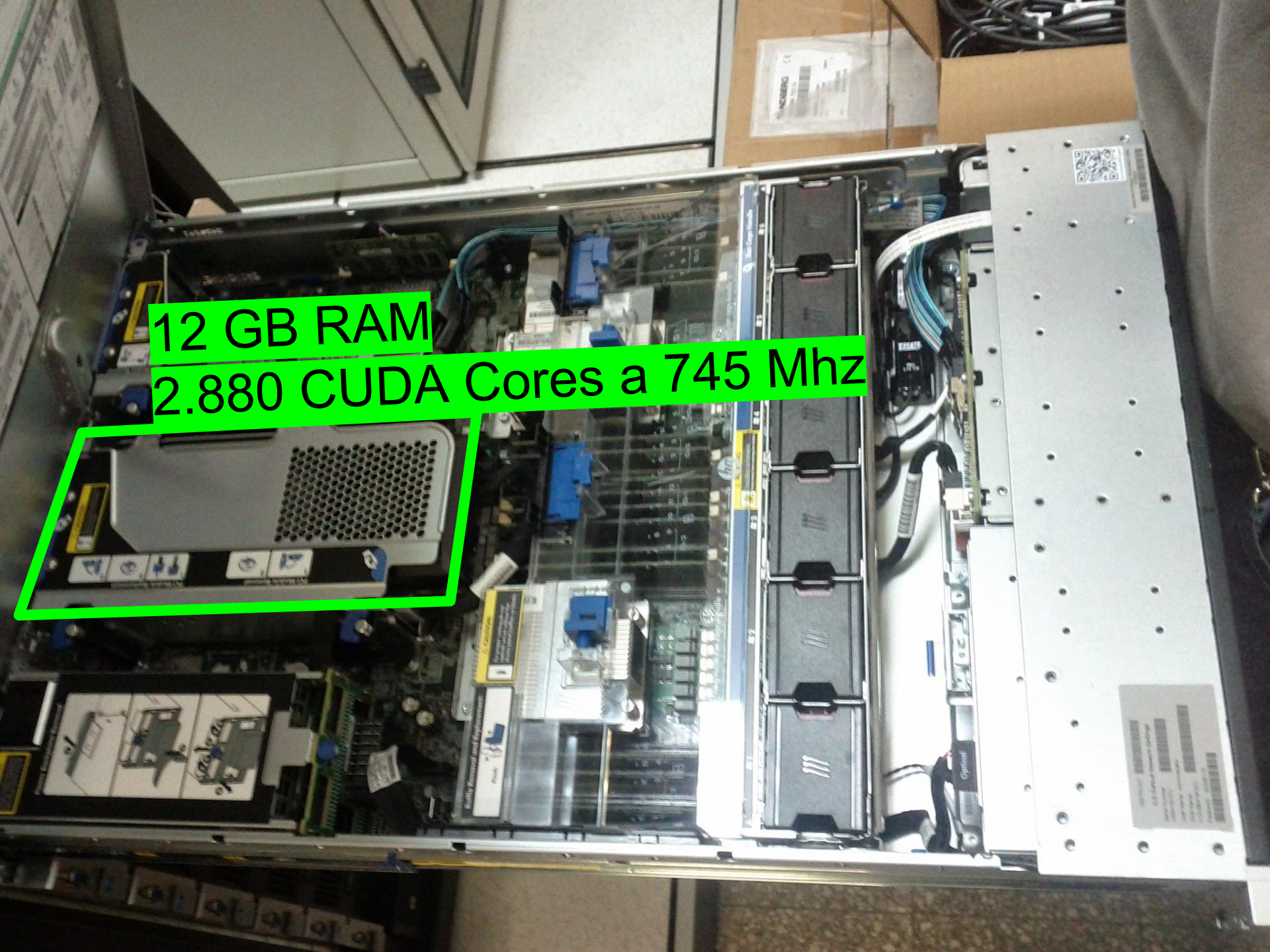
**10,7 MB/min**

# hardware

CentroTIC

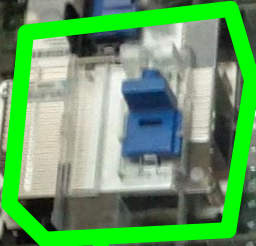
12 GB RAM

2.880 CUDA Cores a 745 Mhz

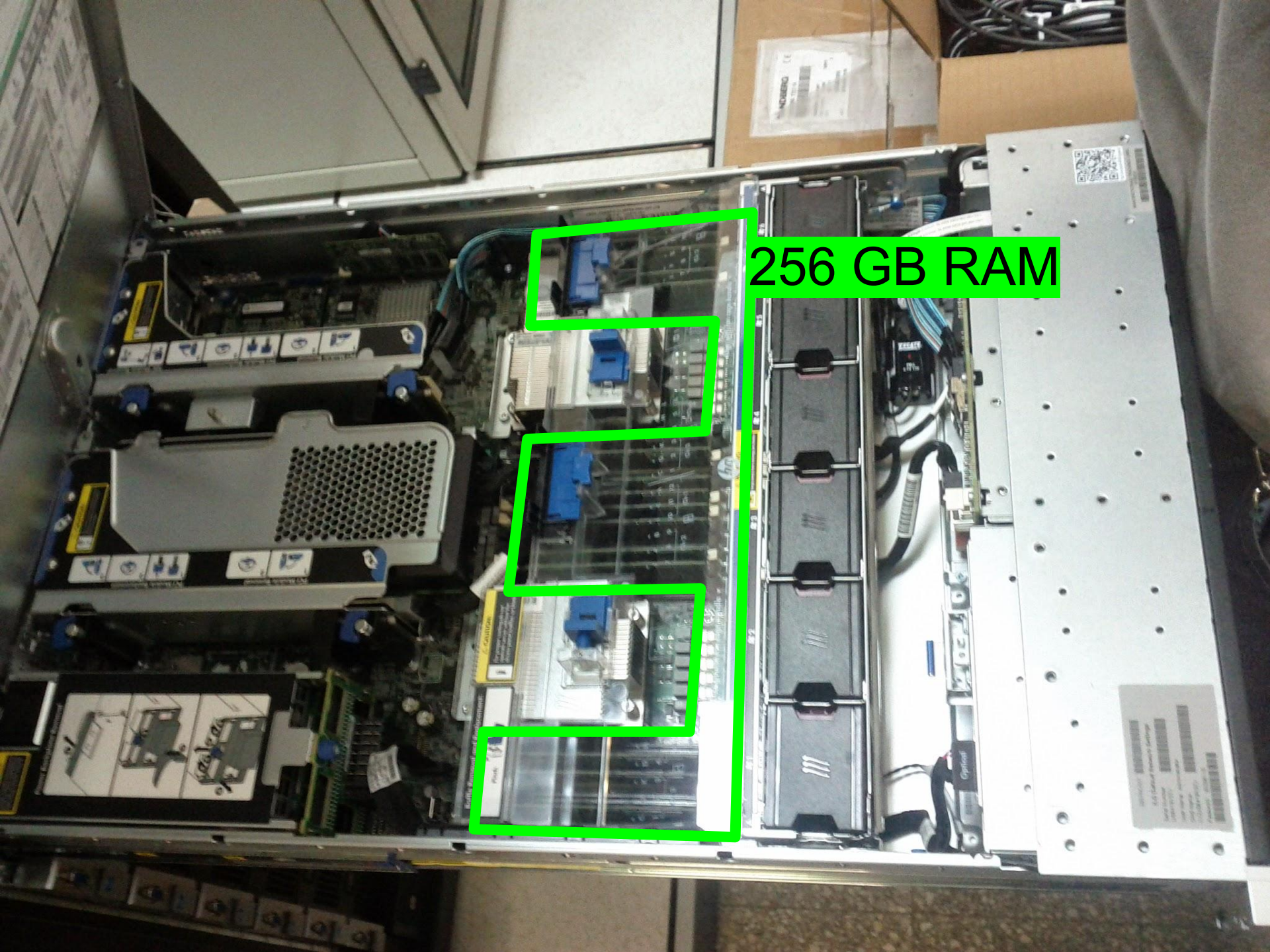


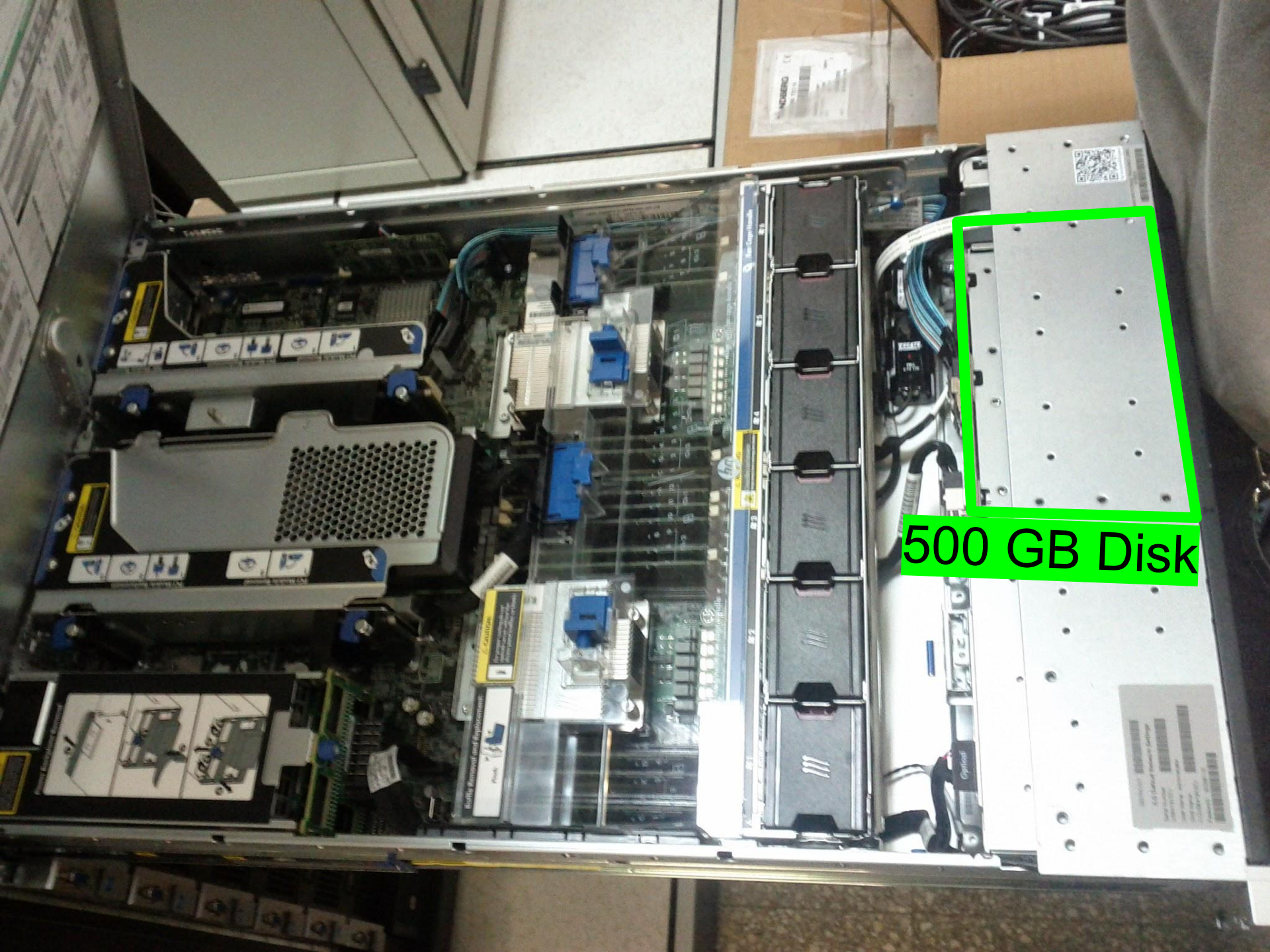


2 CPUs x 6 Cores a 2,3 Ghz



256 GB RAM

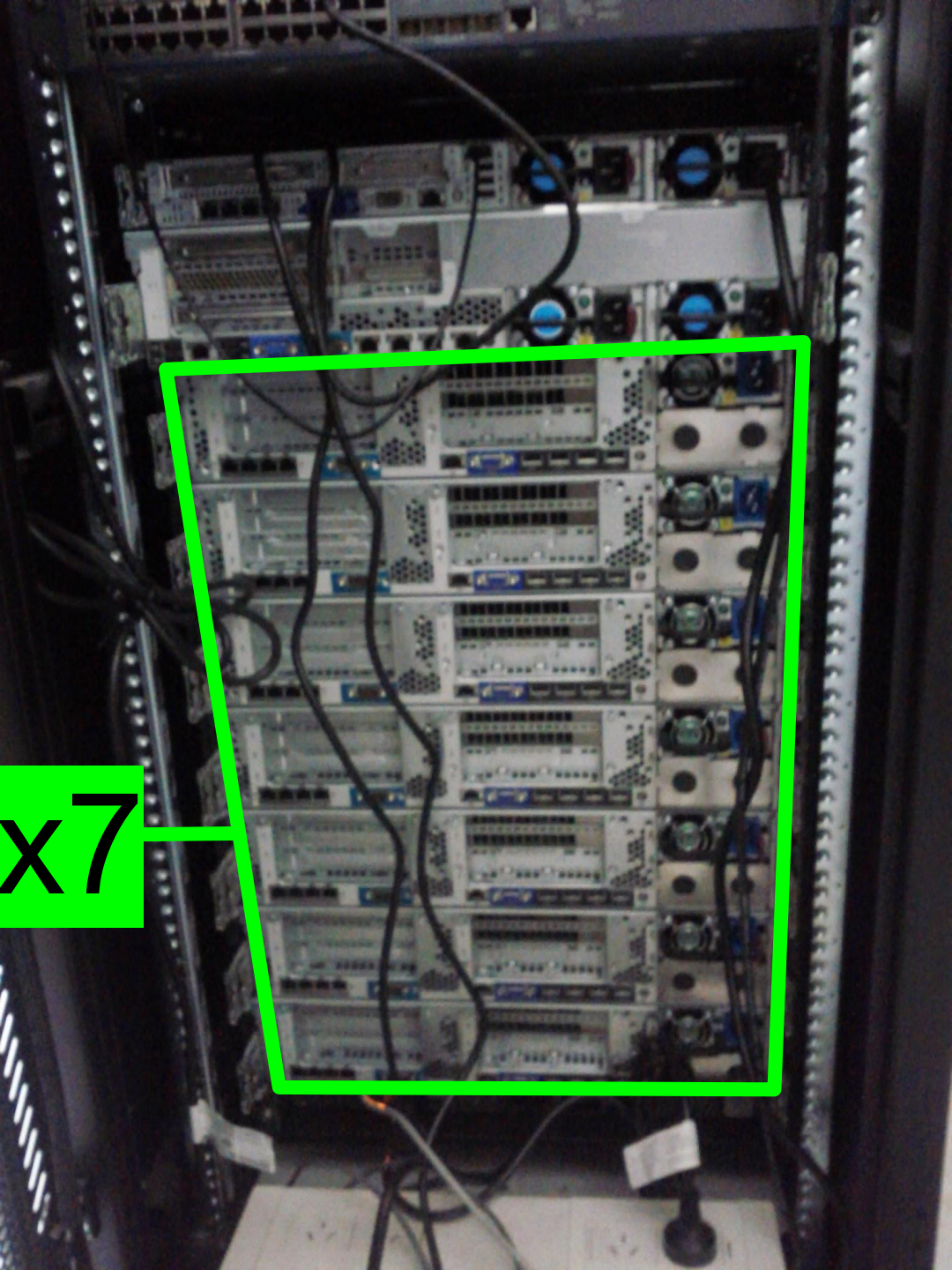




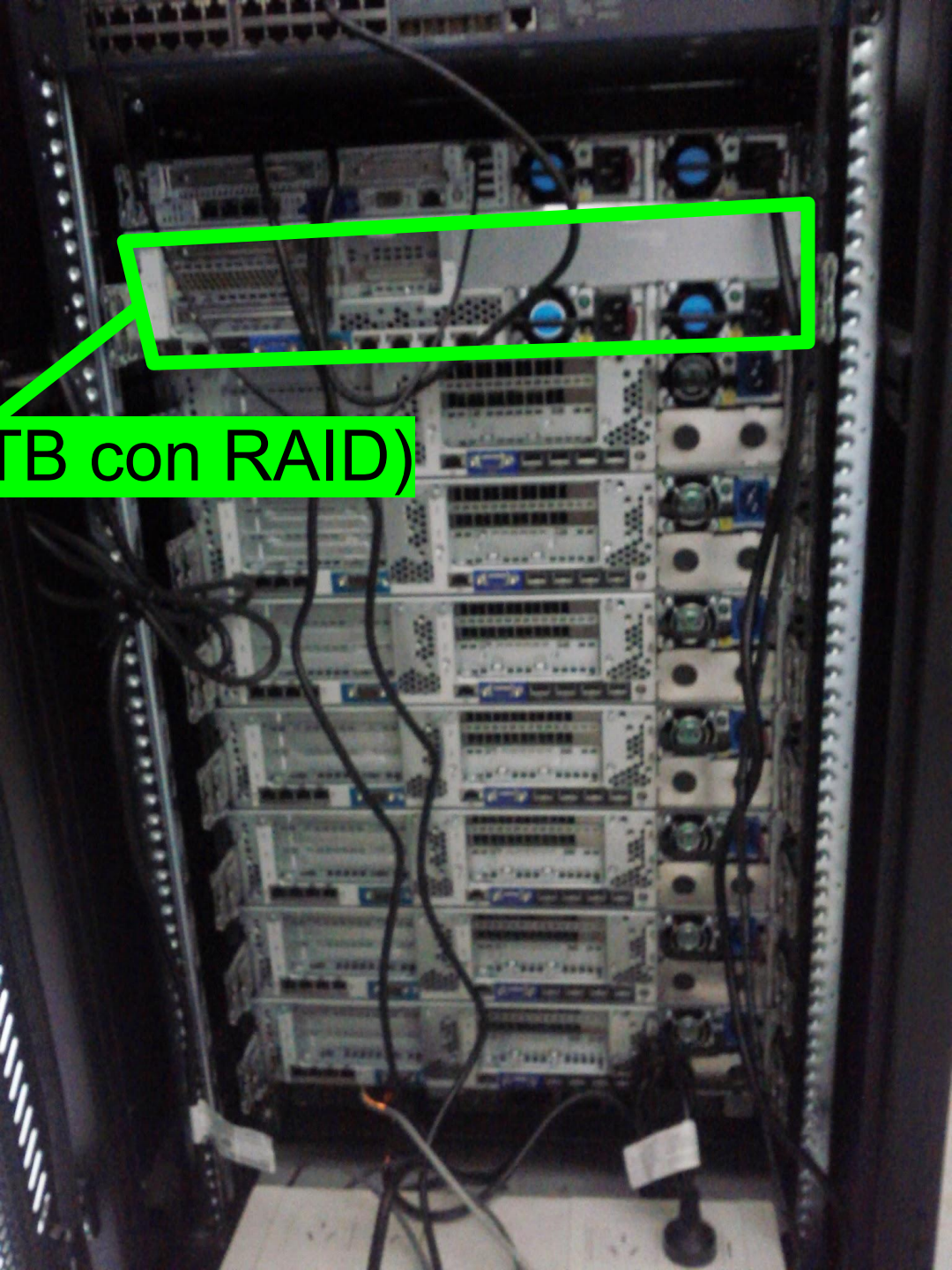
500 GB Disk



x7



24 TB Disk (12 TB con RAID)



# desafíos

estrategia de **tiles o mosaicos**

**normalización** de mediciones en tierra

**distribución de carga** en el Cluster

optimizaciones **en GPU**

**generar una arquitectura de  
procesamiento**

# codigo fuente

repositorios github

[gersolar/netcdf](#)

[gersolar/noaaclass](#)

[ecolell/goesdb](#)

[rossant/playdoh](#)

[ecolell/solar\\_radiation\\_model](#)

**¿preguntas?**



**gracias**