LOFAR data: from archive to arXiv

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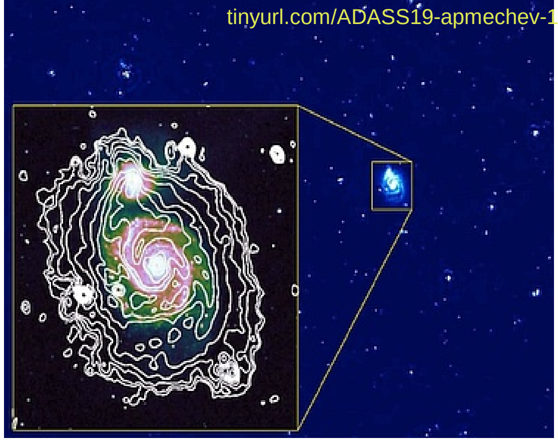
ADASS 2019, Groningen

The LOFAR

The Science

Different window

Complimentary Science



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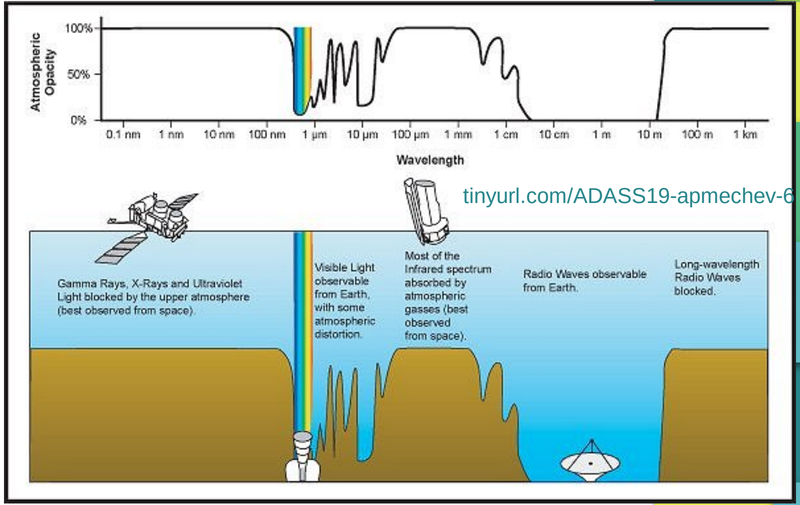

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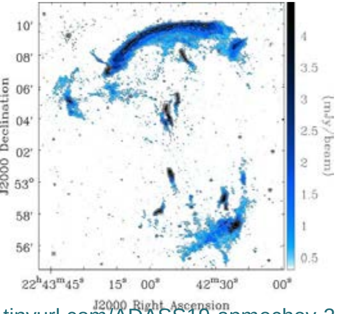

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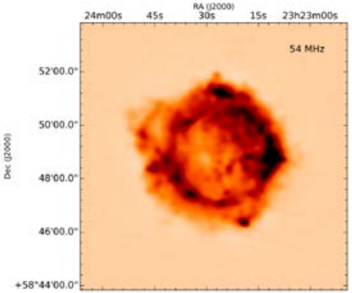


tinyurl.com/ADASS19-apmechev-3

The Array

7000 Antennas

1900 km baselines

10 Tbps raw data

80 Gbps correlated

10 - 240 MHz

The Survey

Map of northern sky

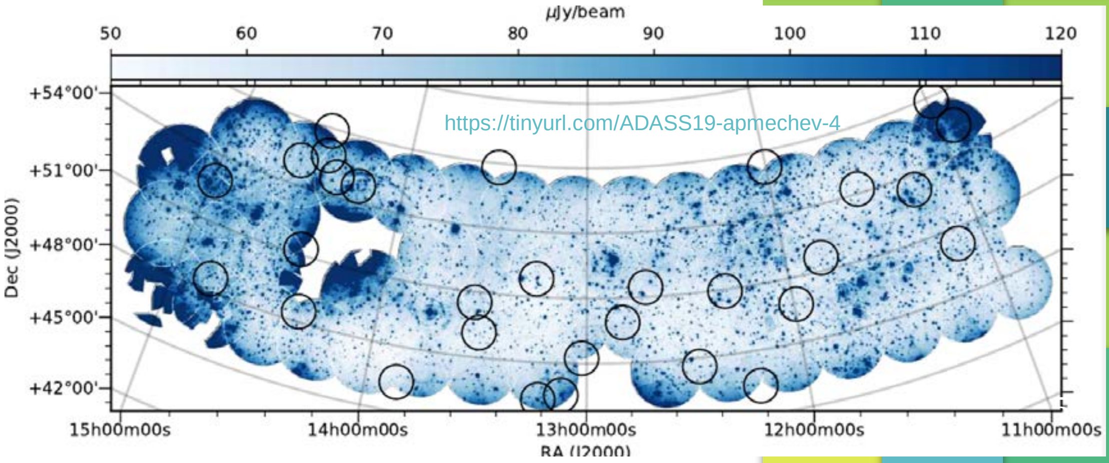
3000+ observations

8TB each

>20 PB

-Hacky Playground?

-Stable Workflow?



https://tinyurl.com/ADASS19-apmechev-4

The Dream

“Science Ready”

Not ‘one and done’

Requires iteration

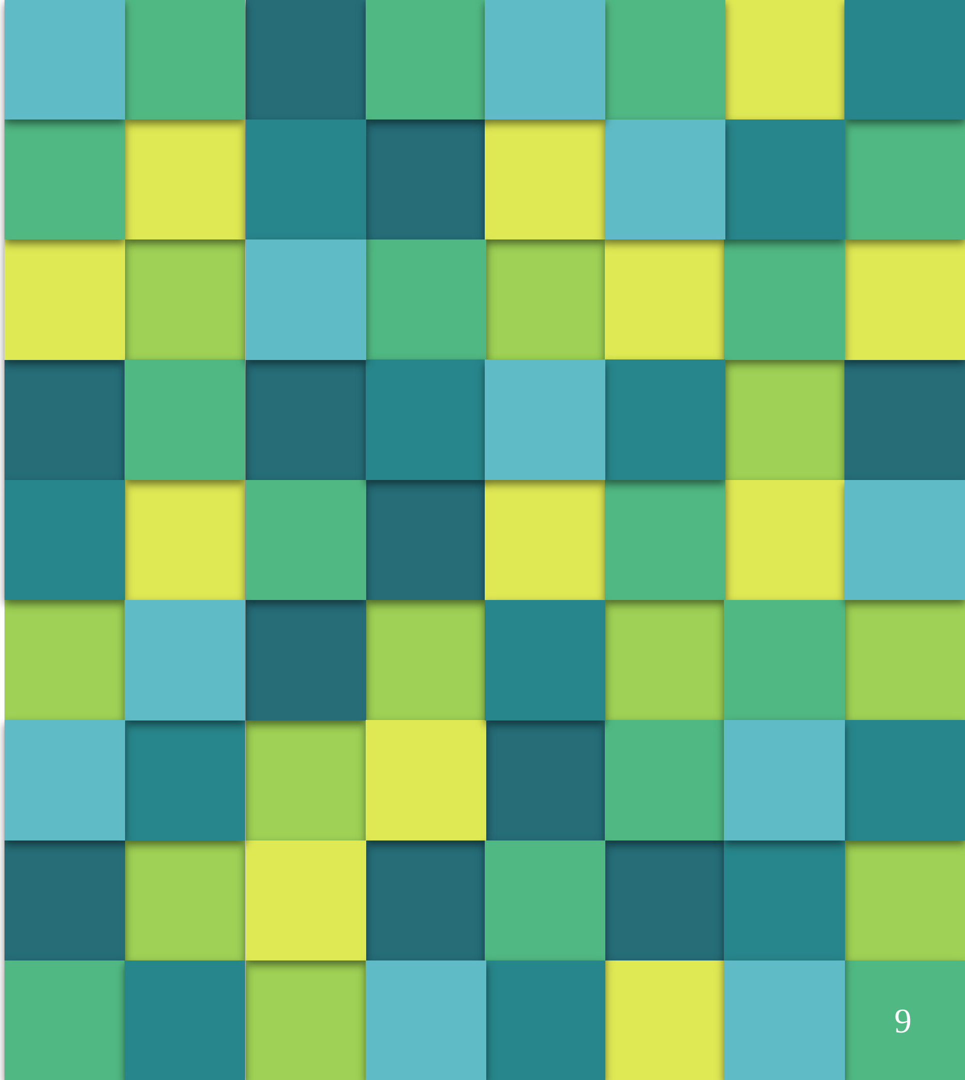
Questions harder than answers

The Reality

LOFAR Data

- Large data sets
- Extensive archive
- Development pace
- Small playground!

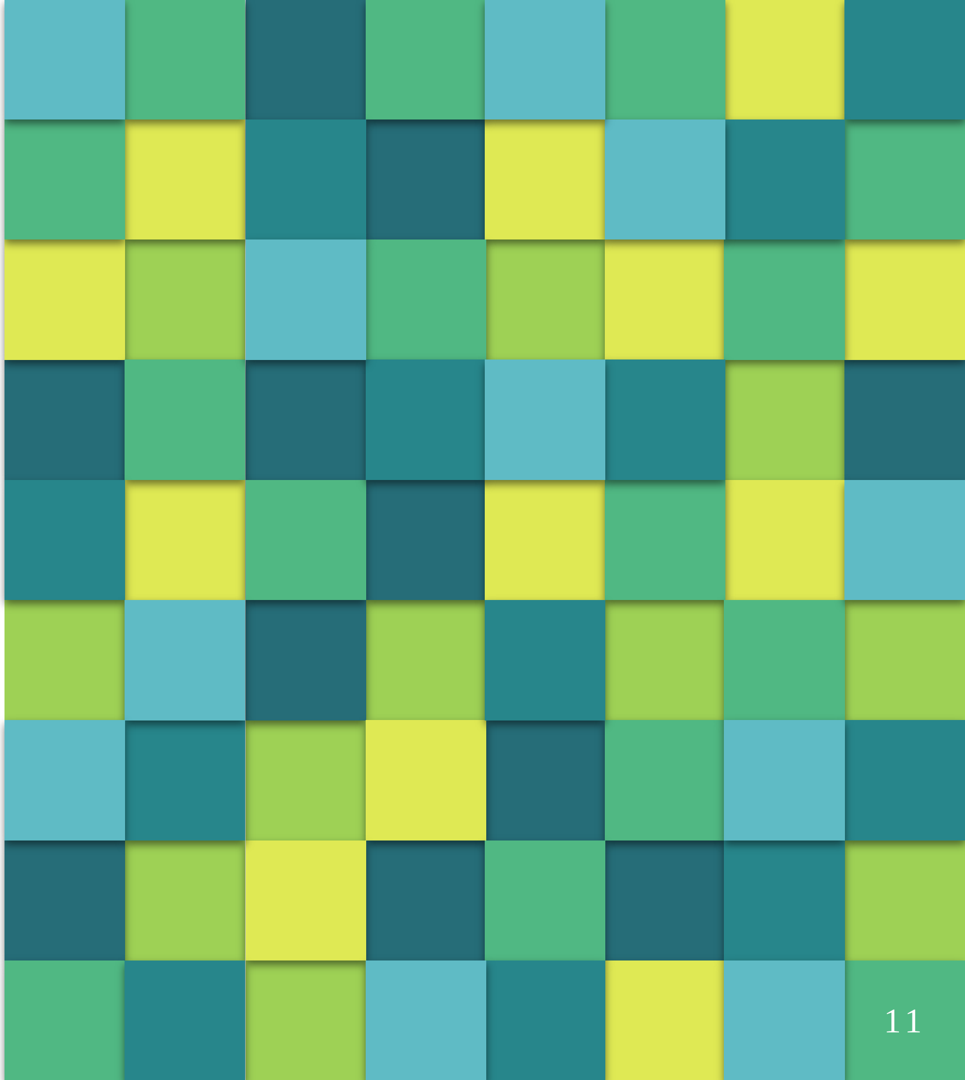
Not just being FAIR!



Fighting EVIL

What is EVIL?

- Esoteric
- Versionless
- Irreproducible
- Laborious

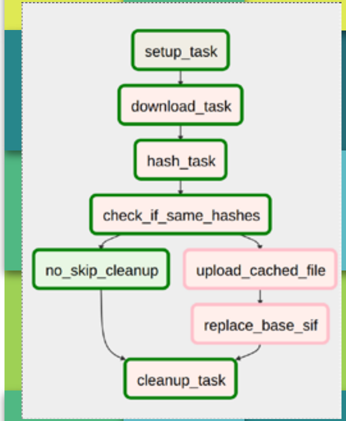


We fight the Esoteric

- Define Scientific Workflows
- Make it runnable ‘at home’

We fight the Versionless

- Use (singularity/docker) images
- Version and even test them!



We fight Irreproducibility

- Well defined data lineage
- Trivial re-processing

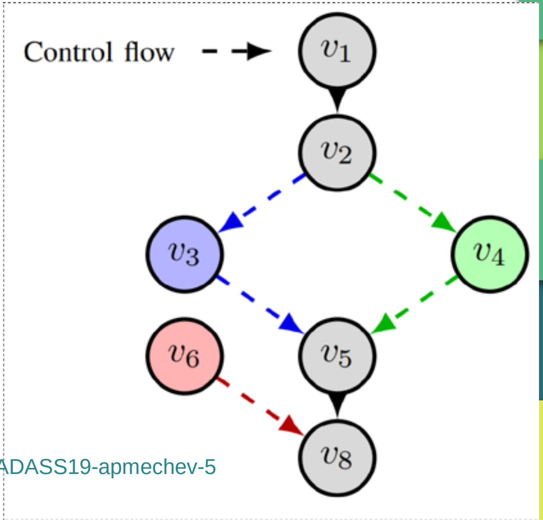
We fight Laboriousness

- Automate processing
- Automate fault detection

The Solution

Processing setup

- Distributed Processing
- Apache Airflow
  - Automate testing
- Infrastructure independent jobs
  - ‘self-contained/defined’
  - Can use clouds♣☐♣☐
- Or Jupyter

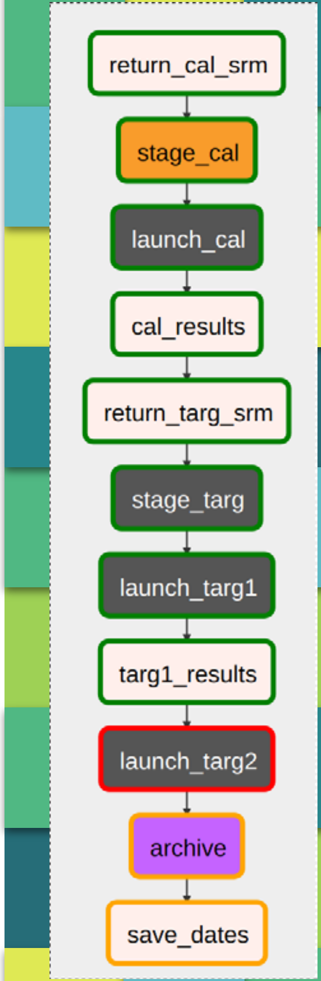


tinyurl.com/ADASS19-apmechev-5

Archive -> arXiv

- Data triggers <- Data Archive
- Pipeline launch (NL-grid)
  - □ Diagnostics->HTTP(CouchDB)
- Data delivery (http/macaroons)
- Imaging (Wherever)
- Images published <- Science arXiv

- Reproducible: Just run it again



return_cal_srm

stage_cal

launch_cal

cal_results

return_targ_srm

stage_targ

launch_targ1

targ1_results

launch_targ2

archive

save_dates

The Future

Successes

>1000 Datasets

Two Archive locations

As fast as Observing

Easy to Use

Easy to parallelize

Reproducible!

Challenges

The users problem

The authentication

The interfaces

The processing resources

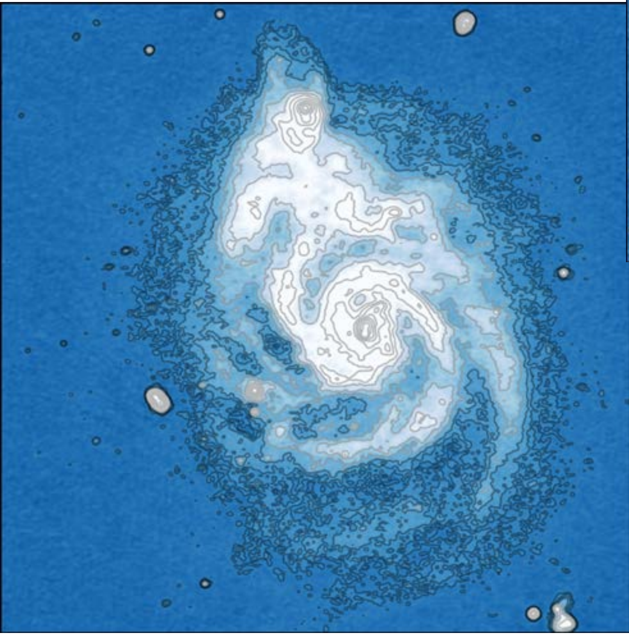
The Questions

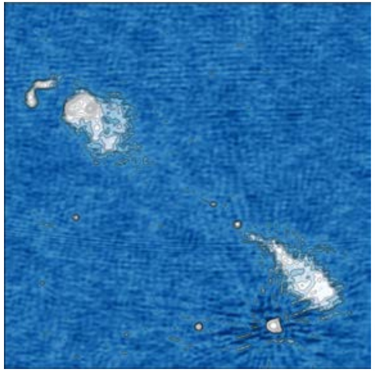
What good are computers? They can only give you answers.

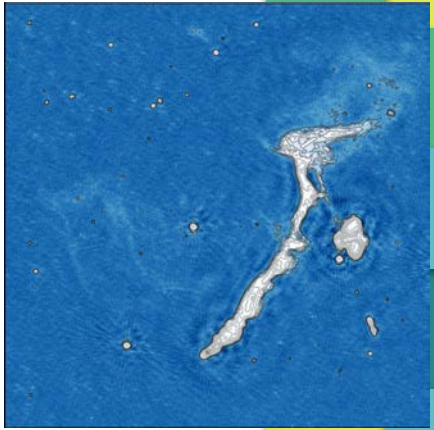
-Picasso

That’s why we have scientists.

Thank you!







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github.com/apmechev/{GRID_LRT,AGLOW}