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LOFAR data and processes

Yan Grange, Vishambhar Nath Pandey

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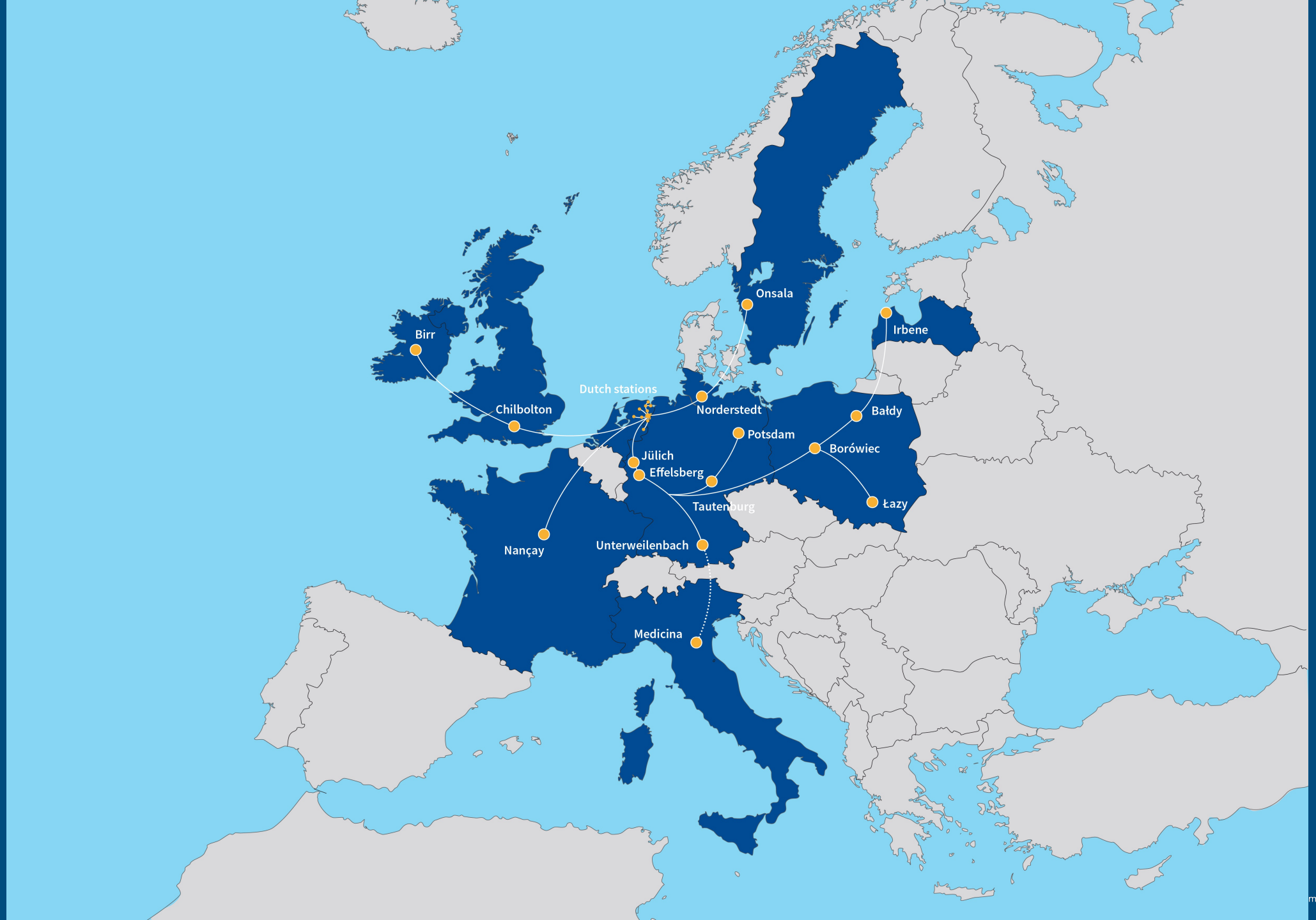

Onsala
Irbene
Birr
Dutch stations
Chilbolton
Norderstedt
Bałdy
Potsdam
Borówiec
Jülich
Effelsberg
Łazy
Tautenburg
Nançay
Unterweilenbach
Medicina

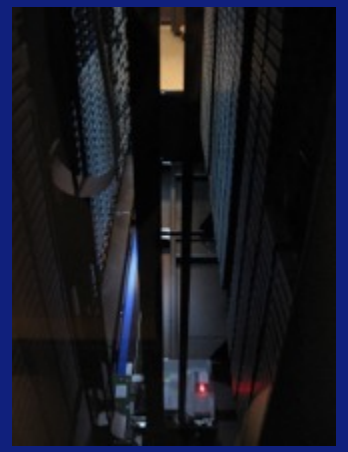
LOFAR data flow

Stations

Realtime system

Offline processing

Long Term Archive



240 Gbit/s

110 Gbit/s

2 Gbit/s

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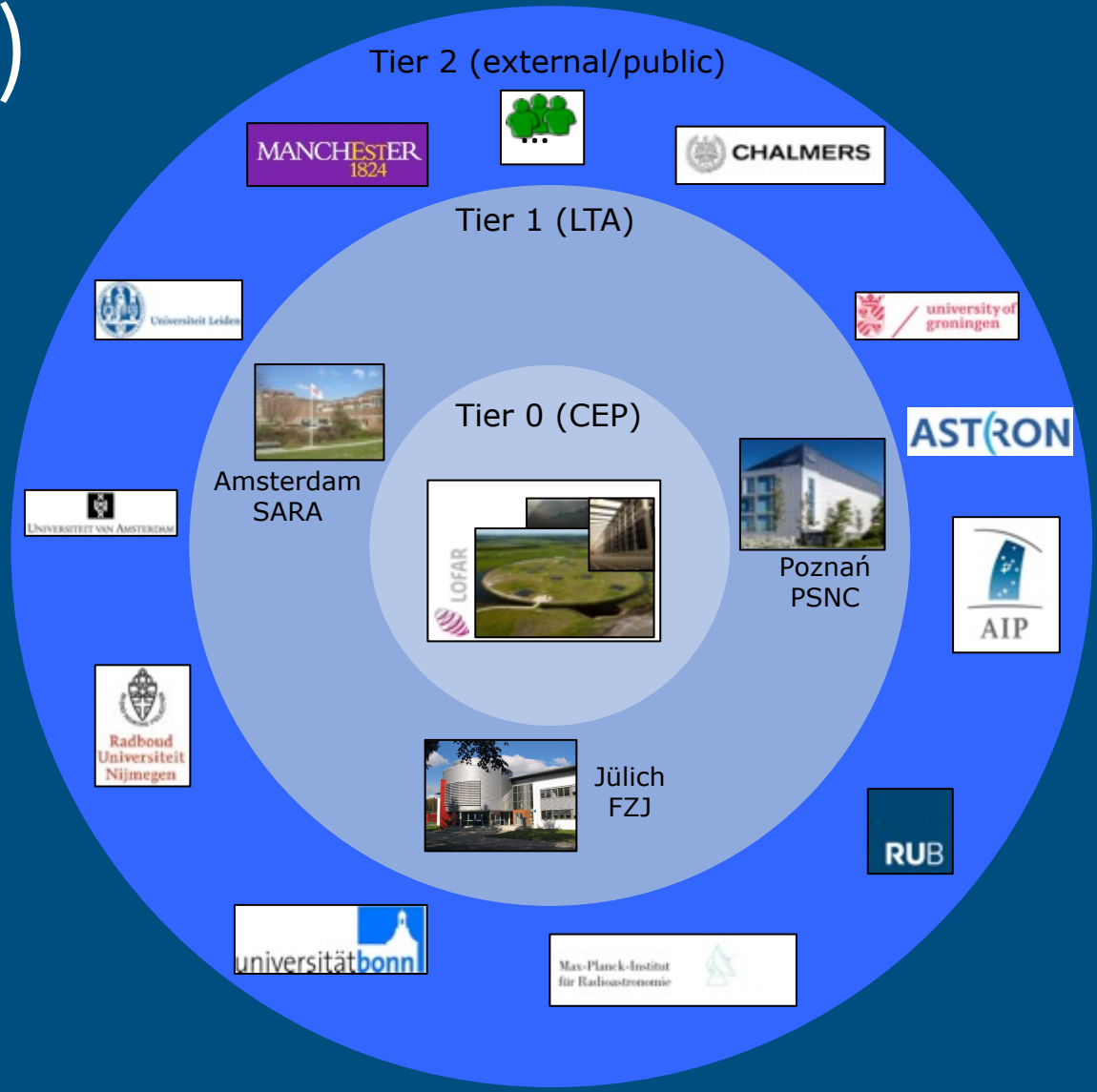
Long-Term Archive (LTA)

- 10 Gbit/s connectivity between Tier 0 and 1
- Networking infra shared with stations
  - Currently very little data movements within a tier.
- Rucio would map quite well here.
- All locations happen to use dCache.
  - We use gridftp for transfers
  - User access through http (either wrapped, or webdav with macaroons)



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LOFAR data flow

- Telescope generates data => pre-processing (**Groningen**)
- If processing is successful, data ingested in archive
  - If ingest is ok, data deleted (in some cases this may be need a manual action though).

- Central processing would be a Rucio Agnostic RSE? Or just a location with ingests?
- LOFAR LTA -> Read-only RSE (but with staging capacity). Is that Rucio Agnostic?
  - Anyhow current LTA locations as read-only RSE for DAC21 could be useful (but this would need to have a way to move data between VO's ☺)

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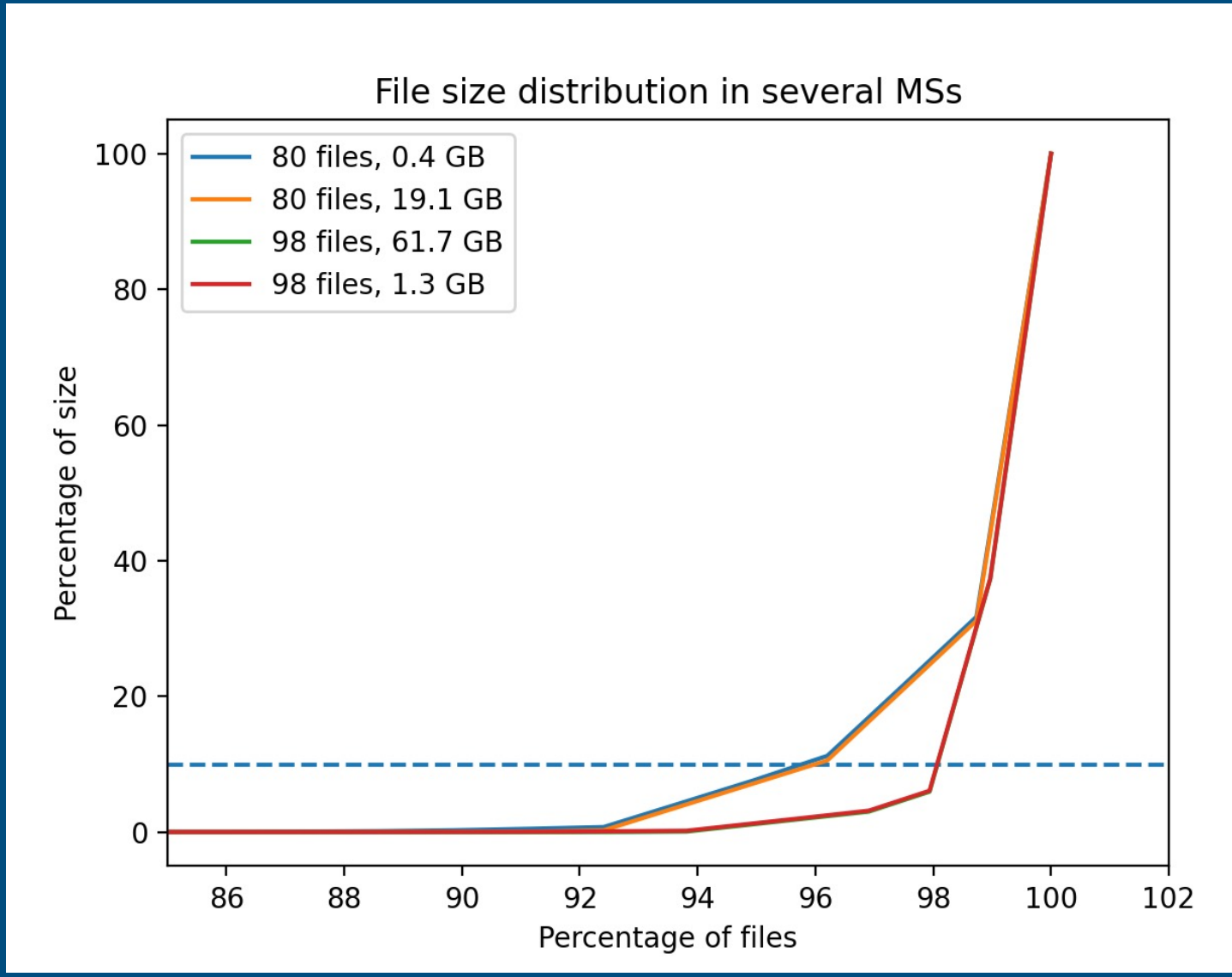
Data properties

- Instrument (lower level, until now)
- Higher level (target 2021-2023)
- Currently: Measurement set (MS)
  - Not a file, but a directory
  - In essence a database format. Main table is a list of antenna combinations and voltages for each time step.

- One observation (‘**dataset**’) consists of hundreds of measurement sets (‘**dataproducts**’). Each is a wavelength range.



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Data organisation in the LTA

- Each granted observation proposal gets assigned to a **project**. Each observation gets and **obsID**. Each **dataproduct** in the observation will be assigned a **SubArrayPointing** and **SubBand** (wavelength band) number. Path in the archive then becomes:
- **project/obsID/**L**obsID**_SAP**SubArrayPointing**_SB**SubBand**_uv.MS_**hash**.tar
  (e.g. *lc0_012/152082/L152082_SAP000_SB138_uv.MS_243ca743.tar*)
  - Adding a hash to filename as poor mans AAI
  - Tarring files because of Tape storage
- Looks pretty much non-deterministic.
  - Non-deterministic RSE would make the structure visible in its own respect, seems more future proof.

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Data Life Cycle and AAI in general

- After data goes into the LTA, it is guaranteed on disk for a set period. Then disk copy is removed and only 1 copy on disk exists.
- For data access, data needs to be staged first (through our staging service.
  - Then again, data is pinned to disk for a set period.
- First year: only accessible for the PI (i.e. The person who wrote the proposal) has access. After the first year data is public (though staging and access based on basic authentication).
  - In principe the PI should be able to decide who has access to their data.

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ActivityOne

- Current LTA -> read-only RSE -> is that what we want to call rucio-agnostic? Only thing that counts is that we can have data in there that we can read.
- Data transfers using current tooling, registering only later using Rucio (should be easy with non-deterministic RSE, but not impossible with deterministic either). *(Looks quite similar to the MAGIC use case).*
- We already have our own dir structure, advantage of non-deterministic RSE is that it makes our main data location to behave like we expect. Disadvantages?
- Data life cycle does strongly connect to QoS and AAI.

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