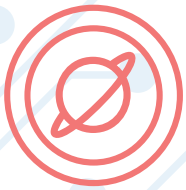
HELIX NEBULA THESCIENCECLOUD

HNSciCloud User Groups



Astronomy

LOFAR

ASTRON Low Frequency Array

LOFAR (Low Frequency Array) is the first of a new kind of telescope that uses an array of simple omni-directional antennas as opposed to a dish antenna for mechanical signal processing. The electronic signals obtained from the antennas are digitized and transported to a central digital processor. The antennas are simple enough, but there are a lot of them – and indeed about 7,000 in the full LOFAR design. To make radio pictures of the sky with adequate sharpness, the antennas will be arranged in clusters spread out over an area of 100 km in diameter within the Netherlands and over 1500 km in diameter throughout Europe. Data transport requirements are in the range of numerous Tera-bits/sec and the processing power needed is tens of Tera-FLOPS.

Goal

The main goal of the LOFAR use case is to test, and later put into production, separate location of data storage and computing resources. Storage of LOFAR is already distributed throughout Europe. The Helix Nebula science cloud would grant this opportunity due to the availability of the highspeed network connections of the Geant Cloud VRF infrastructure, and the pricing model based on compute and storage alone. The transparent data access functionality would even increase ease of use.

Preconditions

1. High speed data transfer to keep the compute pipelines saturated

   Preferably connected not only to the main data site (SURFsara), but also to the secondary sites
2. Errorless dcache communication
3. SLURM (Simple Linux Utility for Resource Management) or similar scheduling capabilities

Steps to get to a working solution

1. Test communication with the dcache storage.

   a. Test directly from the VM

   b. Compare the first test with testing through data transparency mechanism provided by the suppliers

   c. Retest with the secondary storage sites
2. Test communication data rate
3. Try to run compute pipelines on Helix Nebula cloud, using the offered SLURM solutions, or our own SLURM solution if needed
4. Do a price comparison between running in Helix Nebula and locally within the SURFsara resources

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European Commission

Helix Nebula - The Science Cloud (HNSciCloud) with Grant Agreement number 687614 is a Pre- Commercial Procurement Action funded by the EU Framework Programme for Research and Innovation Horizon 2020.

Benefits and impact

If the computing location is independent from the storage location then the use of computing resources can be more flexible. In addition, it could be easier to set up extra secondary storage locations, using of the Geant Cloud VRF protocol. The results of these tests can also give insight on the use of commercial cloud providers for the upcoming SKA resource needs.

Procurer sponsoring the use case: SURFsara

SURFsara brings together research and advanced ICT. We do this with a passion for scientific research in our DNA and the extensive expertise provided by our high-performance infrastructure. This enables us to facilitate scientific research while developing initiatives for the business community.

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