Elastic Node Service (ENS)

Collaborative Ground Segment Workshop
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Agenda

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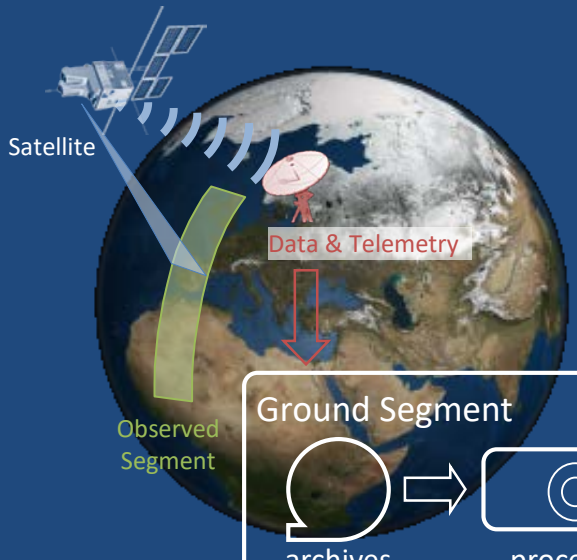
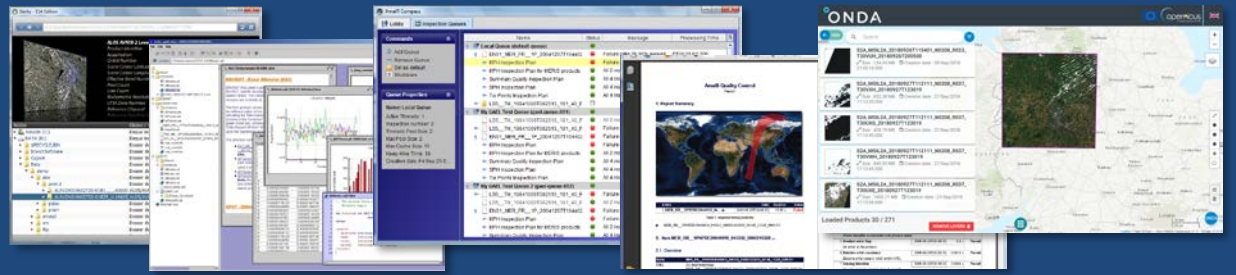
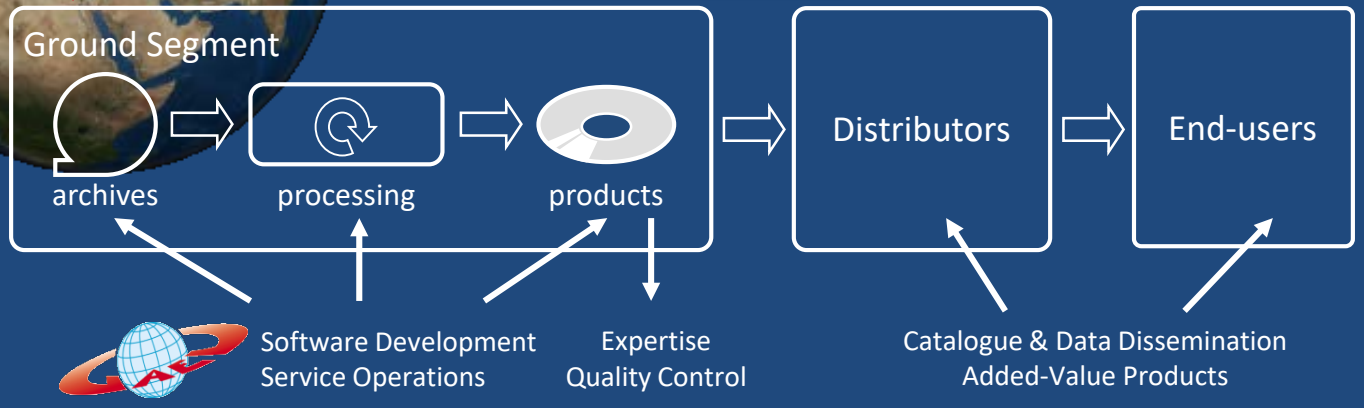
About GAEL Systems

Founded in 1990, GAEL Systems is a French innovative company developing Earth Observation Applications and running Operational Services.







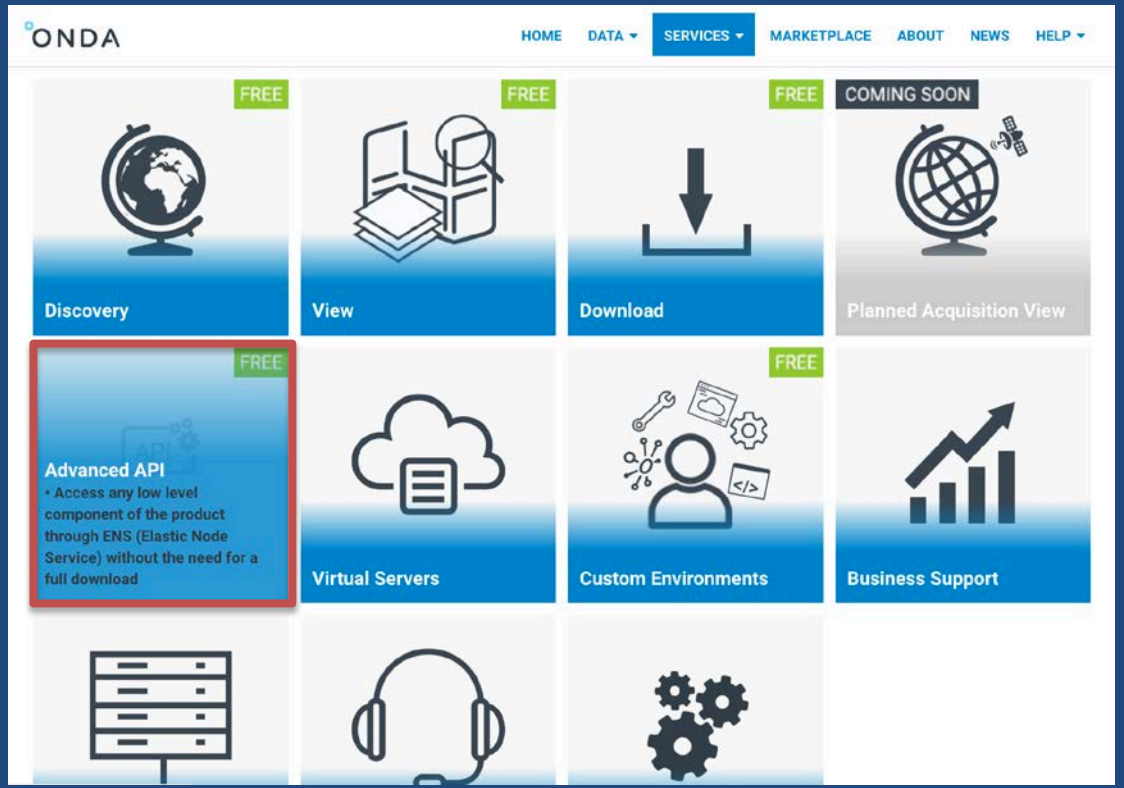
What is ENS ?

- A scalable front-end to **discover** and to **access** large archives of **heterogeneous data** (geospatial or any other)
- A catalogue UI and API to **browse** data **collections**, to **query** metadata and to **download** products
- A **virtual file system** to expose backend data through **standard interfaces**, breaking down data structure into a logical **tree of nodes**, up to the **tiniest** piece of **information**

ENS in ONDA

ENS is accessible on ONDA platform www.onda-dias.eu

The service is **free of charge** for users who order a Virtual Server



ENS Features and Benefits

Standard interfaces

Access data via
HTTP, **OData** and **NFS**
No need for specific library

Unified Data Model

XML-like **Tree of Nodes** with
Logical Path to data elements,
types and values

Multi Storage

Transparent support of
Object Storage and
regular file systems

Cost effective & performance

Seamless access to native and
compressed data
More science, less data access
engineering

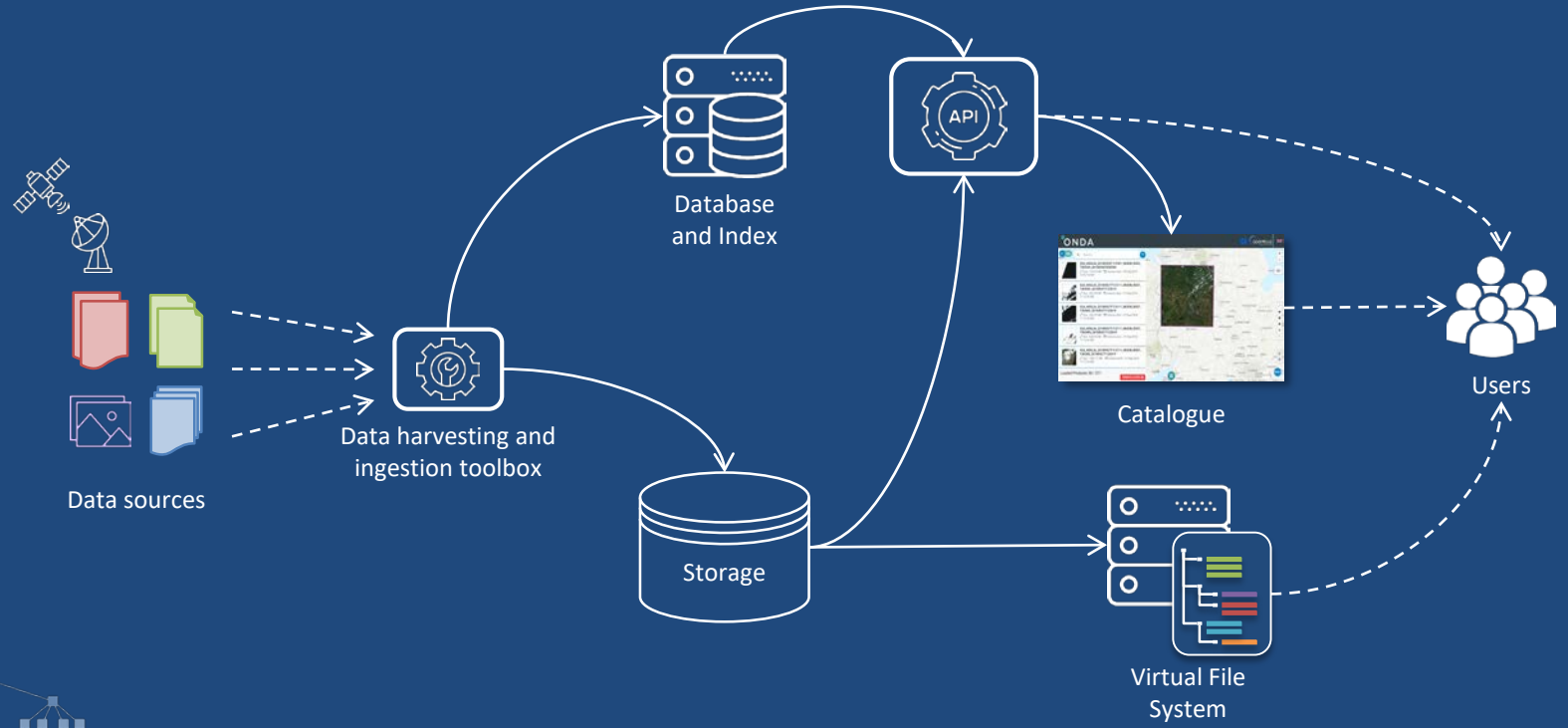
Scalable & Reliable

High-Availability architecture
with **multiple front-ends**,
database **replication** & **sharding**

Open & Secure

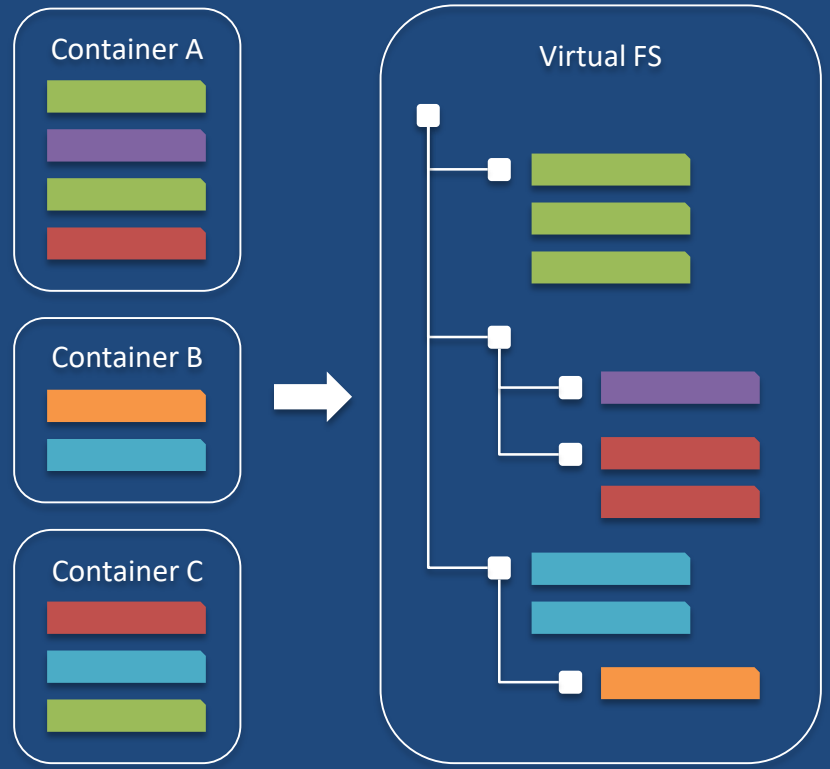
Data agnostic engine with **add-ons**
No direct and **read-only access**
to storage backend

ENS Architecture Overview



ENS Virtual File System

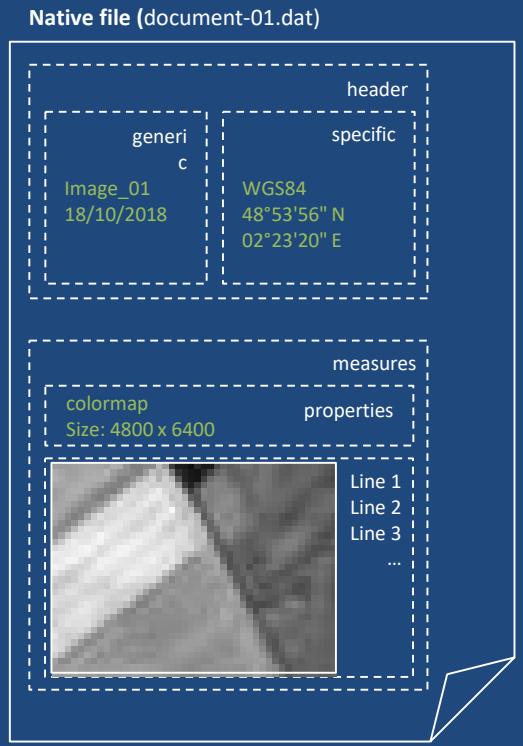
- From storage containers to organized directories
- Logical path based on data types & metadata
- Customizable views

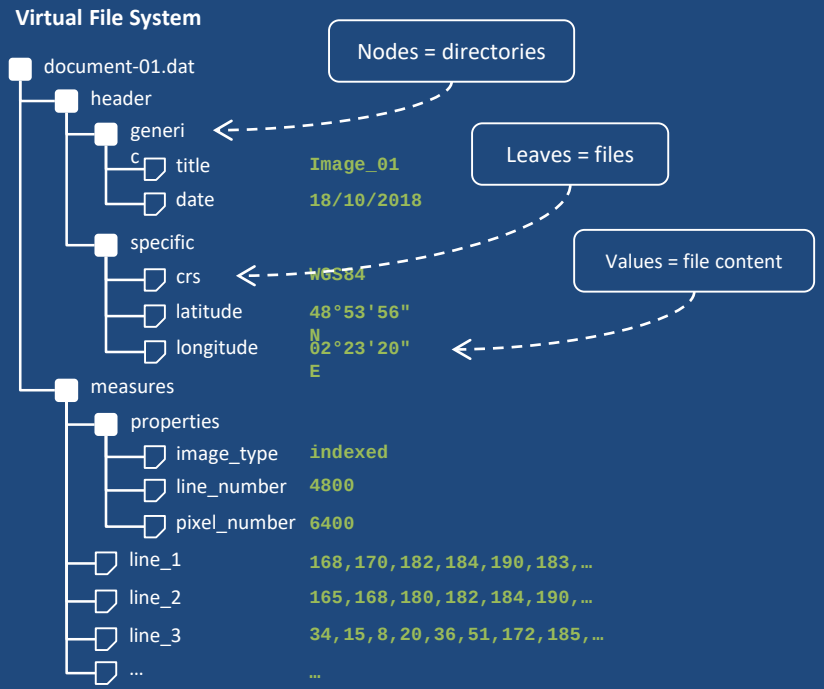


Breaking down data structure into nodes

- **ENS** extends traditional data access by exposing the *File* or *Object Storage* content as a tree of nodes, presenting it like a File System
- **ENS** manages underlying complexity of using heterogeneous datasets, format-specific libraries and compressed packages
- Seamless and optimized access to zip files
- Easy discovery of the data inner content with logical path

Breaking down data structure into nodes





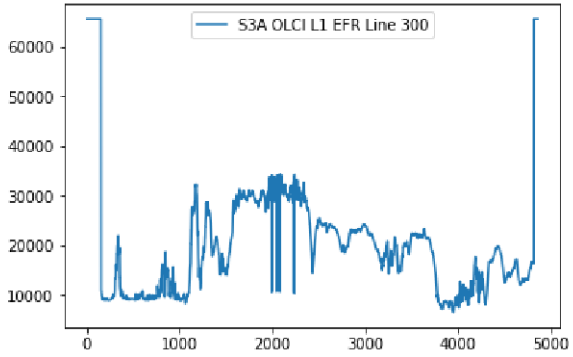
Example of ENS logical path to the '**latitude**' file :

/ens_mnt/images/france/2018/10/document-01.dat/header/specific/latitude

Simplified data extraction

- Large set of data types already supported
- Access from all programming languages
- Straightforward integration into Jupyter notebook
- Fewer lines of code
- Stay focused to science or business, less data access engineering

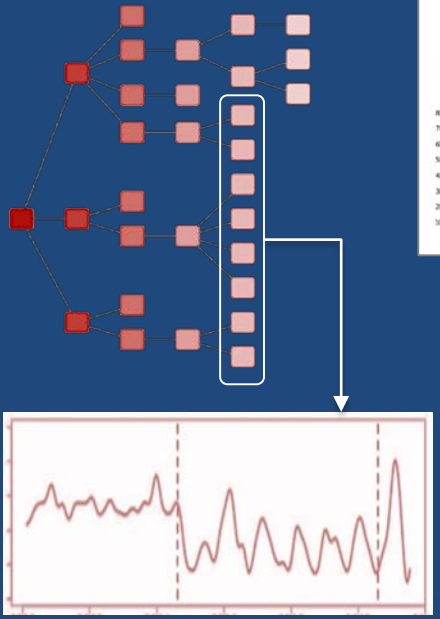
```
1  import glob
2  import pandas
3  import matplotlib.pyplot as plt
4  ens_path = '/home/debian/ens_mnt'
5  s3_path = ens_path + '/S3/OLCI/LEVEL-1/OL_1_EFR___/2018/10/16'
6  prod_pattern = s3_path + '/S3A_OL_1_EFR____20181015T233714_20181015T23401
7  prod_path = glob.glob(prod_pattern)
8  line_path = prod_path[0] + '/Oa01_radiance.nc/root/dataset/Oa01_radiance/
9  pandas.read_csv(line_path,sep=' ',header=None).T.rename(columns={0:'S3A C
10 plt.show()
```

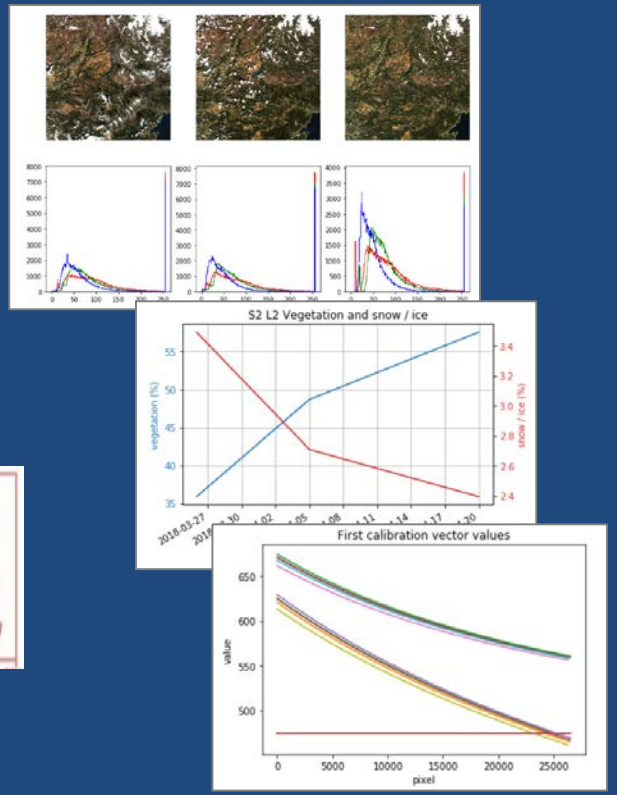


Seamless access to netCDF datasets inside a zip file

Cross objects analysis

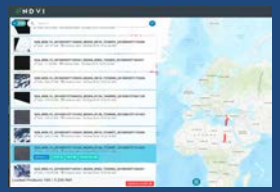
- Extract values from multiple objects, time series, area of interest…
- No need to read fully or copy the objects, only access the required content
- Easy to monitor changes, to compare, superimpose and merge values
- Make reports faster

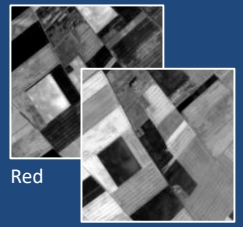


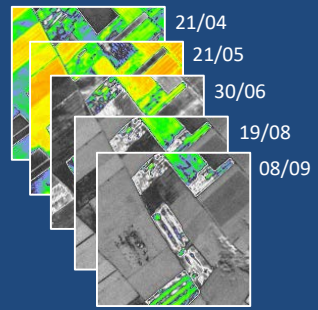


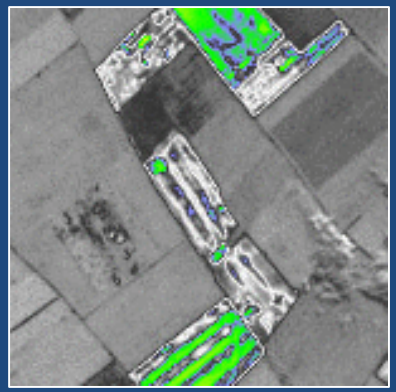
NDVI processing chain

Use a virtual server in ONDA → Customize UI using ONDA Catalogue API → Access to archive via ENS VFS → Only read needed data subset → Compute NDVI → Apply custom color palette









Thanks to the huge archive, processing can be applied to time series with multiple products covering the same area:

- Filter unwanted cloud coverage
- Monitor crops growth and harvest
- Change detection
- Precision agriculture

Online demo service will be available soon !

Further Evolutions

- Enrich data offer supporting new datasets
- Values with multiple flavours (raw, text, CSV…)
- Customized NFS mount point (user's selection)
- Auto-scaling
- Data cube interface

Ready for your own Business

- Open to any data format
- Innovative data mining
- Customizable to your needs
- Dedicated deployment
- Platform as a Service

Thank you !

Find more:
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