Scalable and High performance infrastructure for Ocean data discovery and visualization

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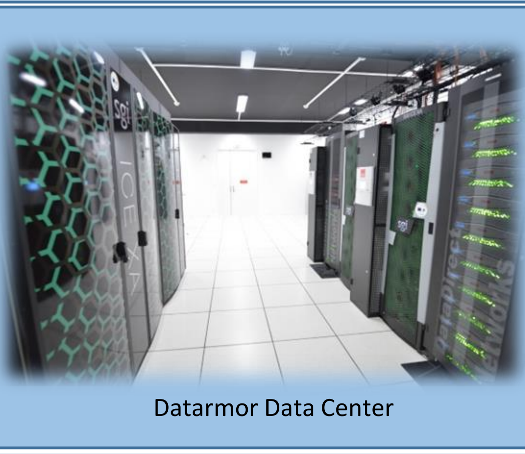
Context

The **Coriolis "in-situ" dataset** is historically stored in **Oracle** and represents terabytes of data. While the dataset grow, reaching billions of measures, Oracle has shown **limitations** to address **innovative use-cases**. IFREMER has built a **Big Data solution** to face modern challenges. Those challenges include interactive and complex **metadata search-engine**, sub second **data plotting**, robust and high performance **subsetting** and innovative **Copernicus diffusion** with large NetCDF4 files.

Clustered infrastructure

In a **clustered architecture**, data is automatically **replicated** to multiple **nodes** for **fault-tolerance**. Replication across multiple data centers is supported. Failed nodes can be replaced with **no downtime**. One of the great features of clustered architecture is that it's designed from the ground up to be **horizontally scalable**, meaning that adding more nodes to the cluster we are capable to grow the capacity of the cluster.



Datarmor Data Center

Processing and Databases Stack

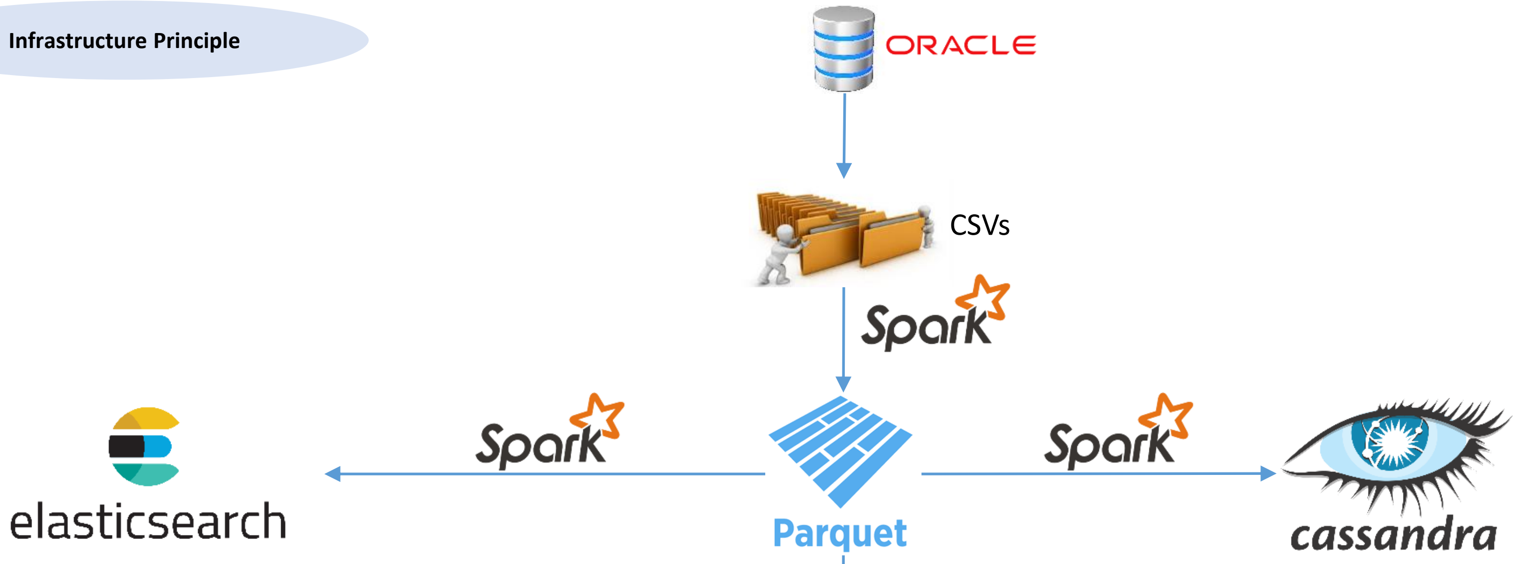
Spark is an open-source unified analytics engine for **large-scale data processing**. Spark provides an interface for programming entire clusters with implicit **data parallelism** and **fault tolrence**.

Parquet is an open source **file format** available to any project in the **Hadoop** ecosystem. Apache Parquet is designed for **efficient** as well as performent flat columnar storage format of data compared to row based files like CSV.

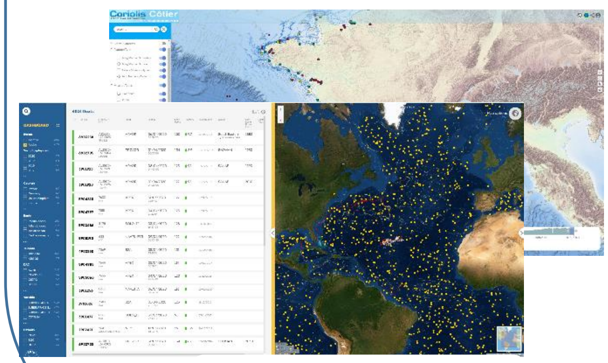
Elasticsearch is a free and open distributed search and analytics engine for any type of data, including **text, numeric, geospatial, structured and unstructured data**. Elastiseach was built on top of Apache Lucene. Elasticsearch is famous for its simple **REST APIs**, **distributed nature**, **speed** and **scalability**.

The **Apache Cassandra** database is the right choice for our needs regarding **scalability** and **high availability** without compromising **performance**. **Linear scalability** and proven **fault-tolerance** on our infrastructure make it the perfect platform for mission-critical data. Cassandra is supporting **replication** across multiple datacenters, providing lower latency for our users.

Infrastructure Principle



DATA DOWNLOAD



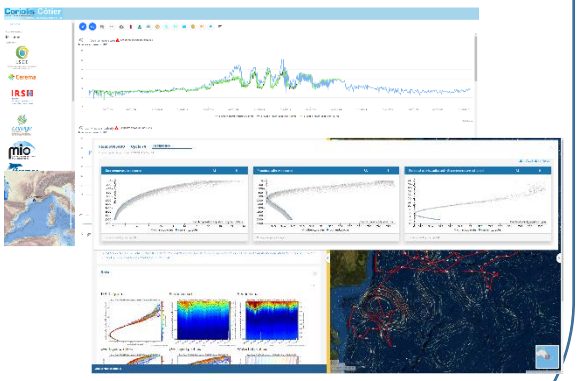
DATA DISCOVERY

2 Thematic Websites

5 Billions Measures

52 000 platforms

5 To Data



DATA PLOTTING

https://data.coriolis-cotier.org/ https://fleetmonitoring.euro-argo.eu/