# Turnkey appliances for biological use cases on federated clouds

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What is Cyclone

- Goal : To provide **production-quality platform** that facilitates the deployment and management of cloud-based applications.

- CYCLONE integrates and improves **mature**, open-source **cloud solutions**, such as StratusLab, OpenStack, OpennNaaS, SlipStream, and TCTP

- Two **applications areas guide** the initial development of the CYCLONE tools:
  - Academic cloud platform and associated services for **bioinformatics** research
  - Commercial deployment for smart grids in the **energy** sector
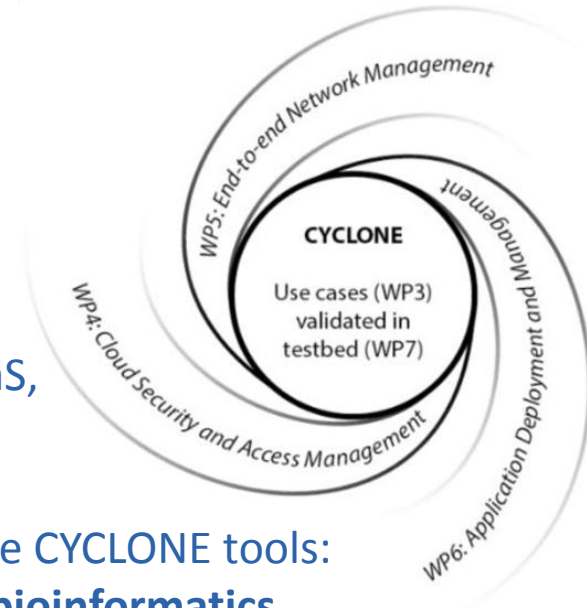
  Key research and innovation challenges :
  1. High Performance Heterogeneous Cloud Infrastructures,
  2. Federated Cloud Networking,
  3. Dynamic Orchestration of Resources,
  4. Automated Discovery and Service Composition,
  5. Inter-cloud Security Infrastructure.
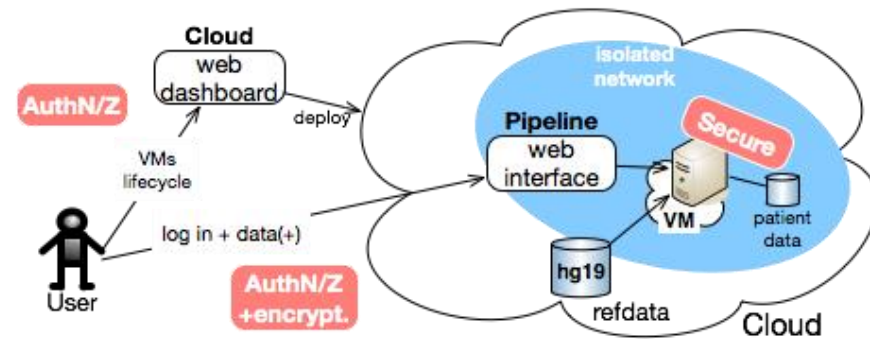

Cyclone

http://www.cyclone-project.eu

French Institute of Bioinformatics - IFB

- French Institute of Bioinformatics
  - national service infrastructure in bioinformatics
  - ELIXIR French Node
  - www.france-bioinformatique.fr

- 35 platforms grouped into 6 regional centers

- 4 running clouds in 4 IFB's platforms

- Using different cloud system (StratusLab, OpenStack, OpenNebula)

- CYCLONE will help to deploy common bioinformatics applications on all of them, and in a secure manner when needed.
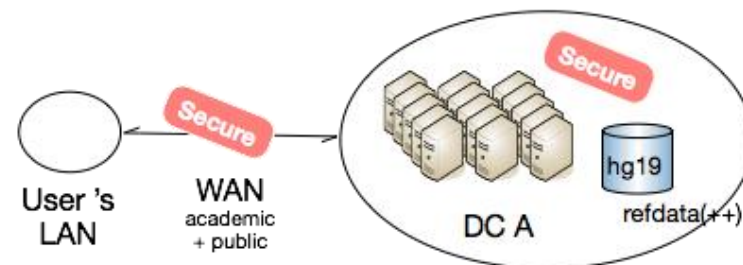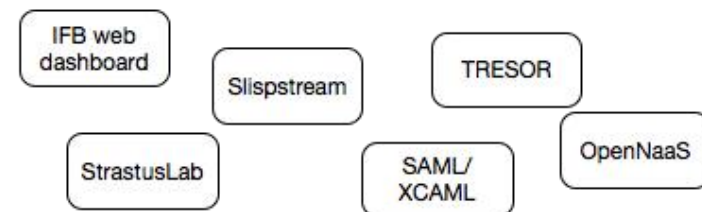
- **Some of the genomic data processed on the IFB cloud platform will concern human biomedical data and will thus be subject to strict privacy restrictions.**
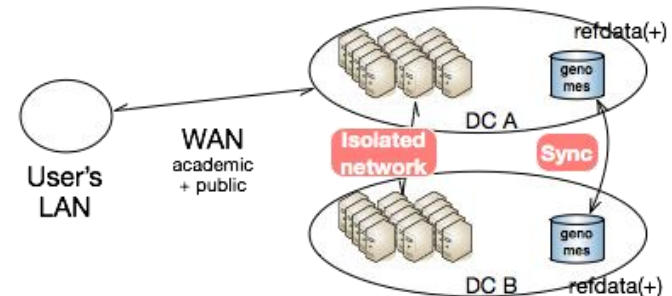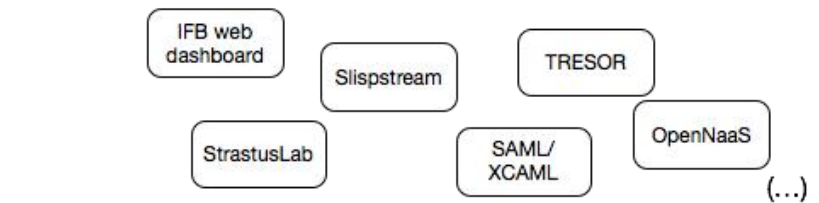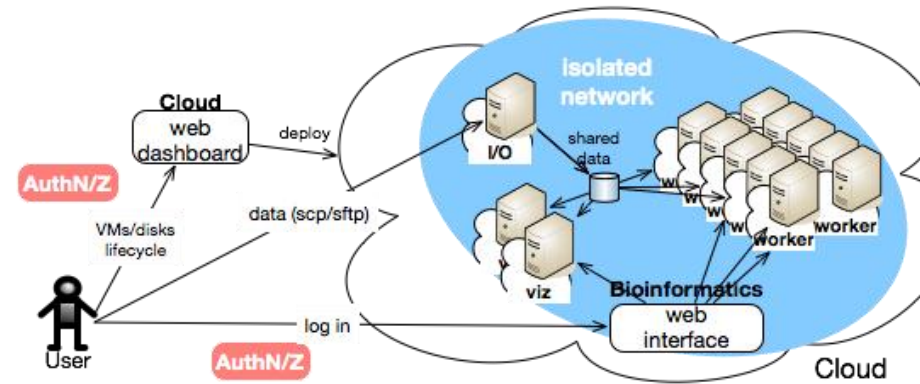
- **Main CYCLONE adds-on**
  - **EduGain authentication**
  - End-to-end encryption of data
  - Isolated environment

The cloud appliance NGS-Unicancer is developed by the bioinformatics platform, http://www.synergielyoncancer.fr/ of the Centre Léon Bérard (Lyon, France) in the context of the project NGS-Clinique (INCA - Institut National du Cancer).

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UC2 - Cloud virtual pipeline for microbial genomes analysis

- In the post NGS area, genomes are cheap (few hundreds €) from many sequencing providers.

- A pipeline (sequence of data analysis stages) for the annotation of microbial genomes

- A tool for the visualization of the syntenies (local conservation of the gene order along the genomes)

- **Main CYCLONE adds-on**
  - **One-click deployment of several VMs**
  - **EduGain authentication**
  - Isolated environment
  - Elasticity

The appliance Bacterial genomics (Insygth) is developed by the platform IFB-MIGALE, http://migale.jouy.inra.fr/ (Jouy-en-Josas, France)

Conclusion

- Federated clouds brokering
- Federated identities for Web and SSH connections
- One-click deployment of complex applications

- Bioinformatics appliances and pipelines helping scientists in their work.

→Spare times for scientist in setting up those pipelines
→Obviate cost of maintaining such pipelines and infrastructure