Lessons learnt from OneLab Facility

the first opened federation of heterogeneous testbeds

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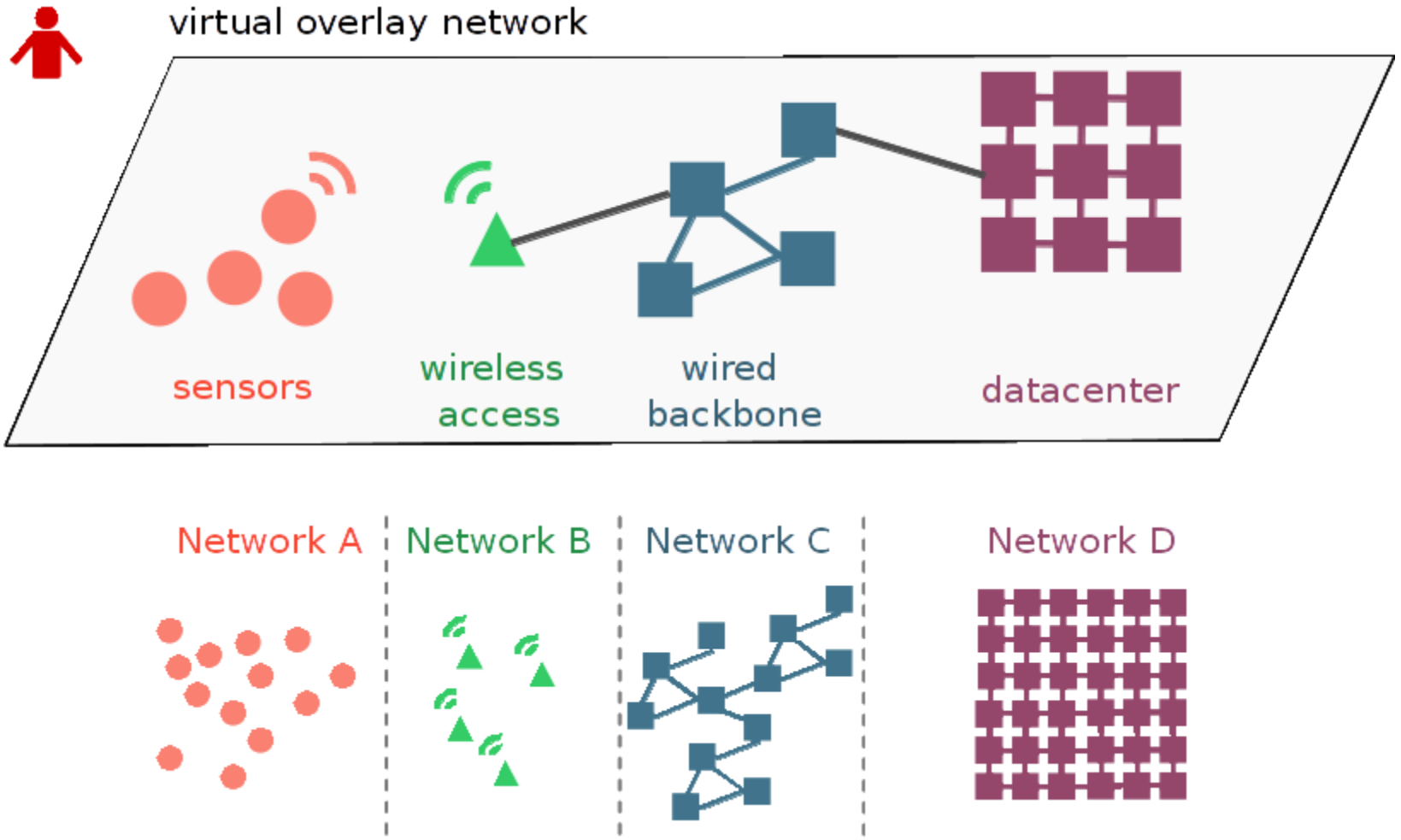
Main Objective

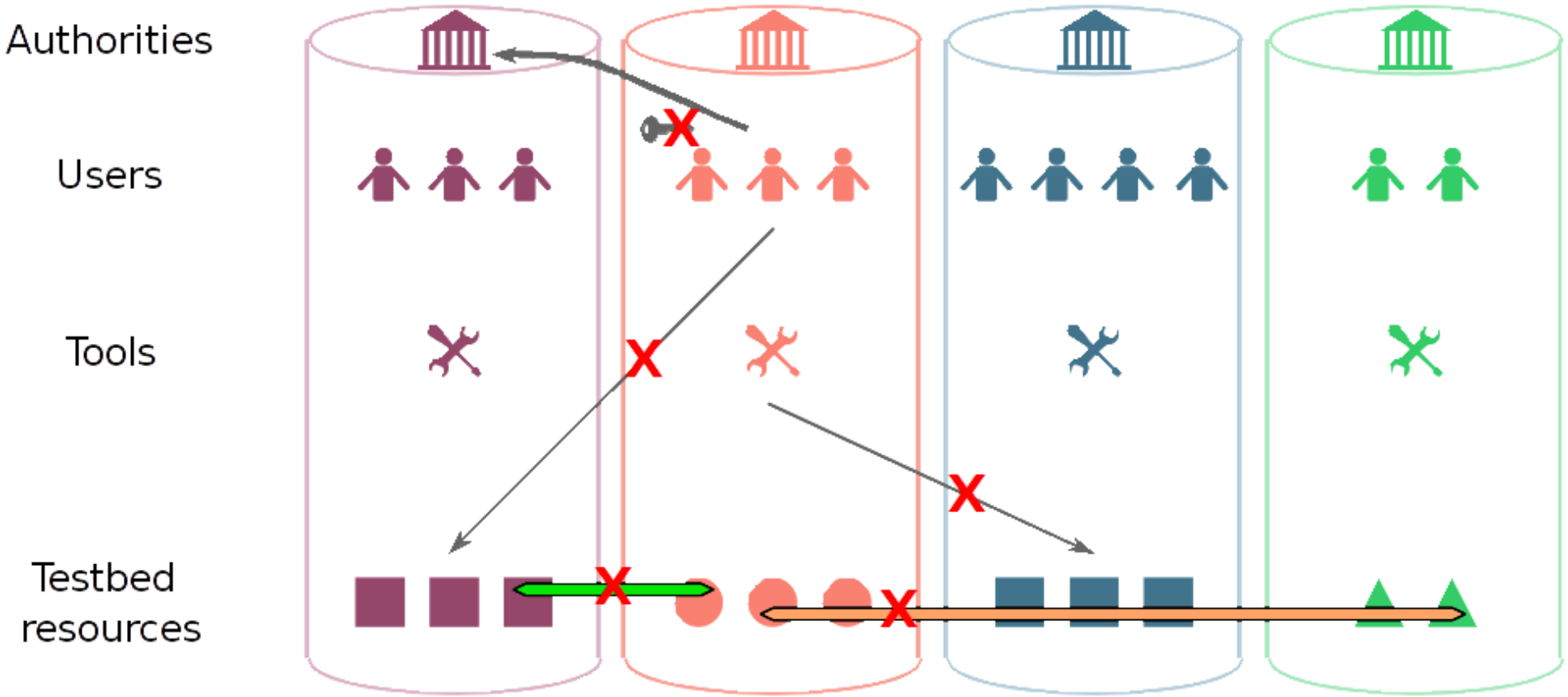
A playground for the future Internet

Federation empowers to run **services (and tests)** using resources provided by **autonomous** networks



How to federate?

The issue with testbed isolation



Experimenters and tools

- User from an authority
  - Must be trusted among federated authorities
  - Should get access to federated resources
  - Need to execute an experiment across testbeds

- Tools
  - Have to enable these functionalities
  - Should provide a common interface for heterogeneous resources

Heterogeneous Resources

Federation of heterogeneous testbeds needs to

- Expose the diversity of resources to users
  - Description of the characteristics and capabilities of resources
  - Visualization and configuration of resources
- Provide a unified way to interact with resources
  - Discovering
  - Reserving
  - Configuring
  - Experimenting

Experiment Lifecycle

❶ **User account & slice creation**

❷ **Authentication**

❸ **Resource discovery**

❹ **Resource reservation & scheduling**

❺ Configuration/instrumentation

❻ Execution

❼ Repatriation of results

❽ **Resource release**

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Control Plane

Experiment Plane

Control Plane

Experiment Lifecycle

1. **User account & slice creation**
2. **Authentication**
3. **Resource discovery**
4. **Resource reservation & scheduling**
5. Configuration/instrumentation
6. Execution
7. Repatriation of results
8. **Resource release**

SFA / MySlice

OMF / scripts

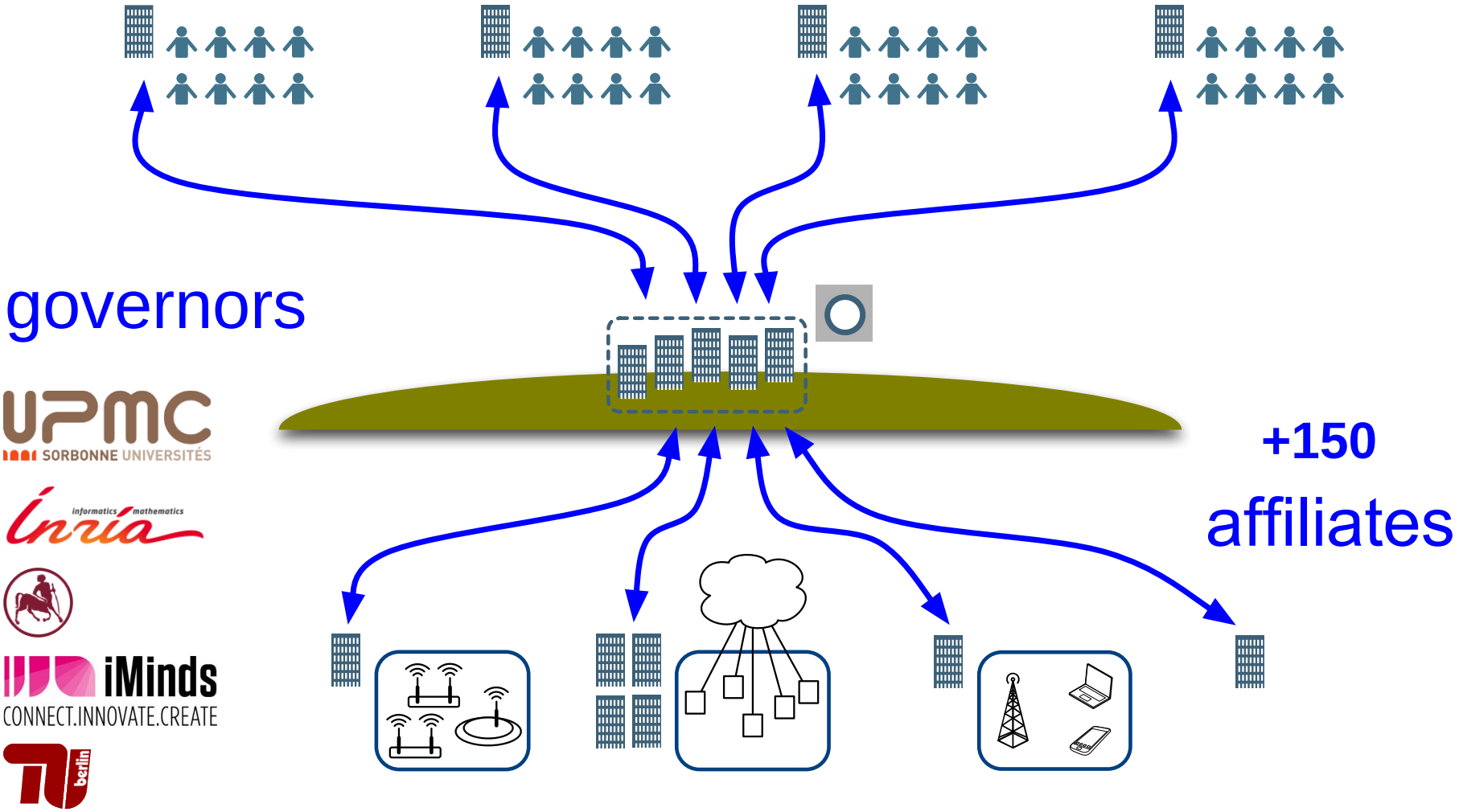
SFA / MySlice

Software components For Federation

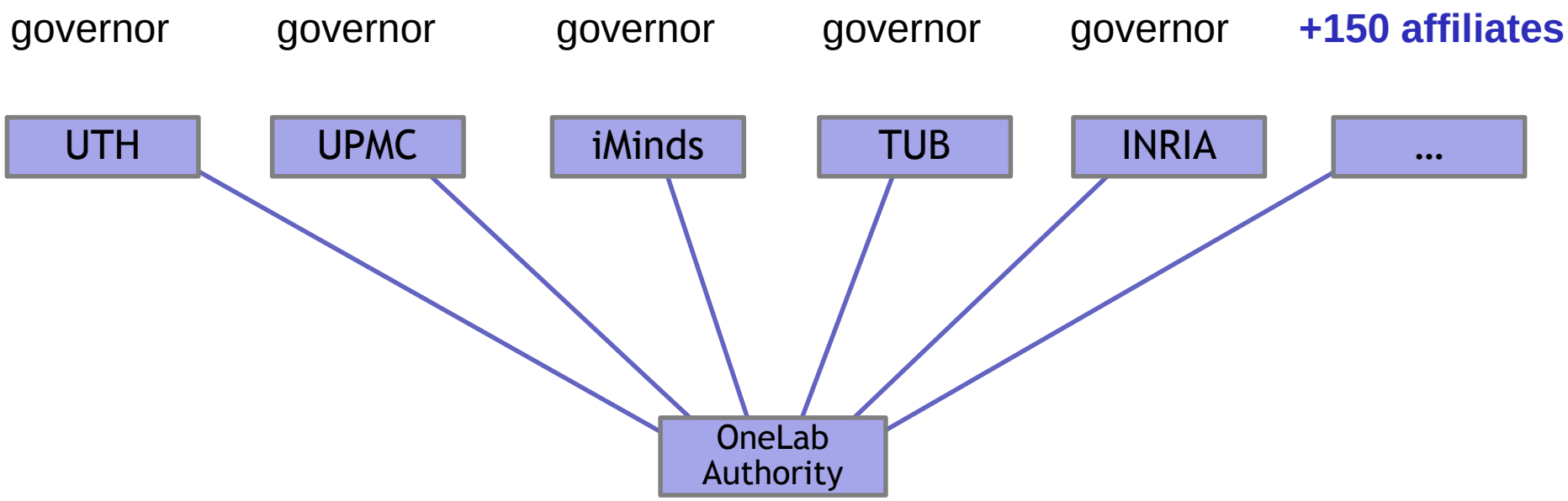
Slice-Based Facility Architecture (SFA)

- A **secure and distributed thin waist** to enable a global federation :
- **Naming** : uniquely identifies objects ; links ; requires sharing of namespace ;
- **Identity / Authentication** : X509 certificates ;
- **Authorization** : Non standardized credentials ;
- **Control plane API** : Manipulate objects and their associations ; authorization + policies ;
- **Data model** : Resource description; Independent from SFA.

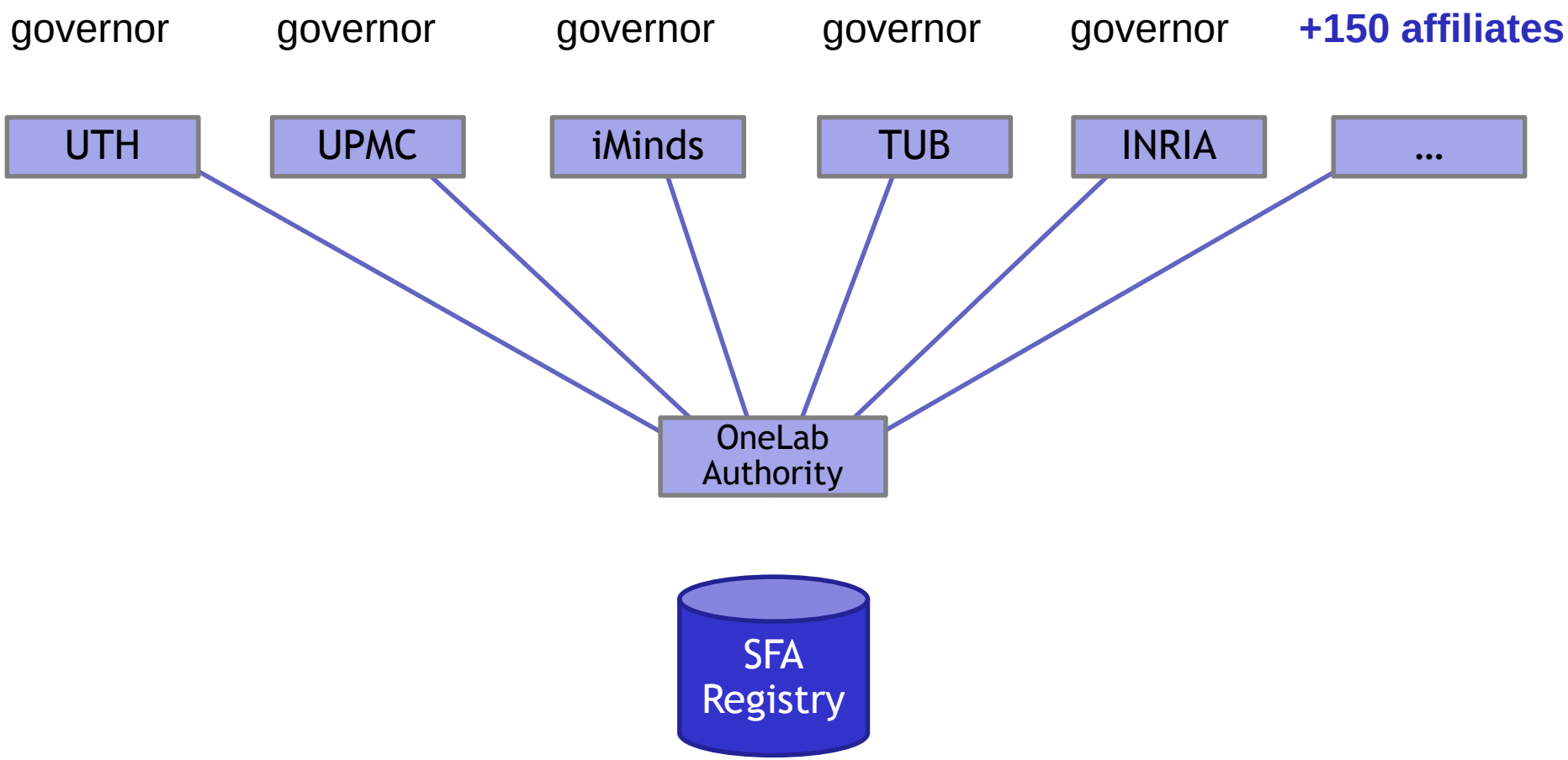
OneLab Legal Framework



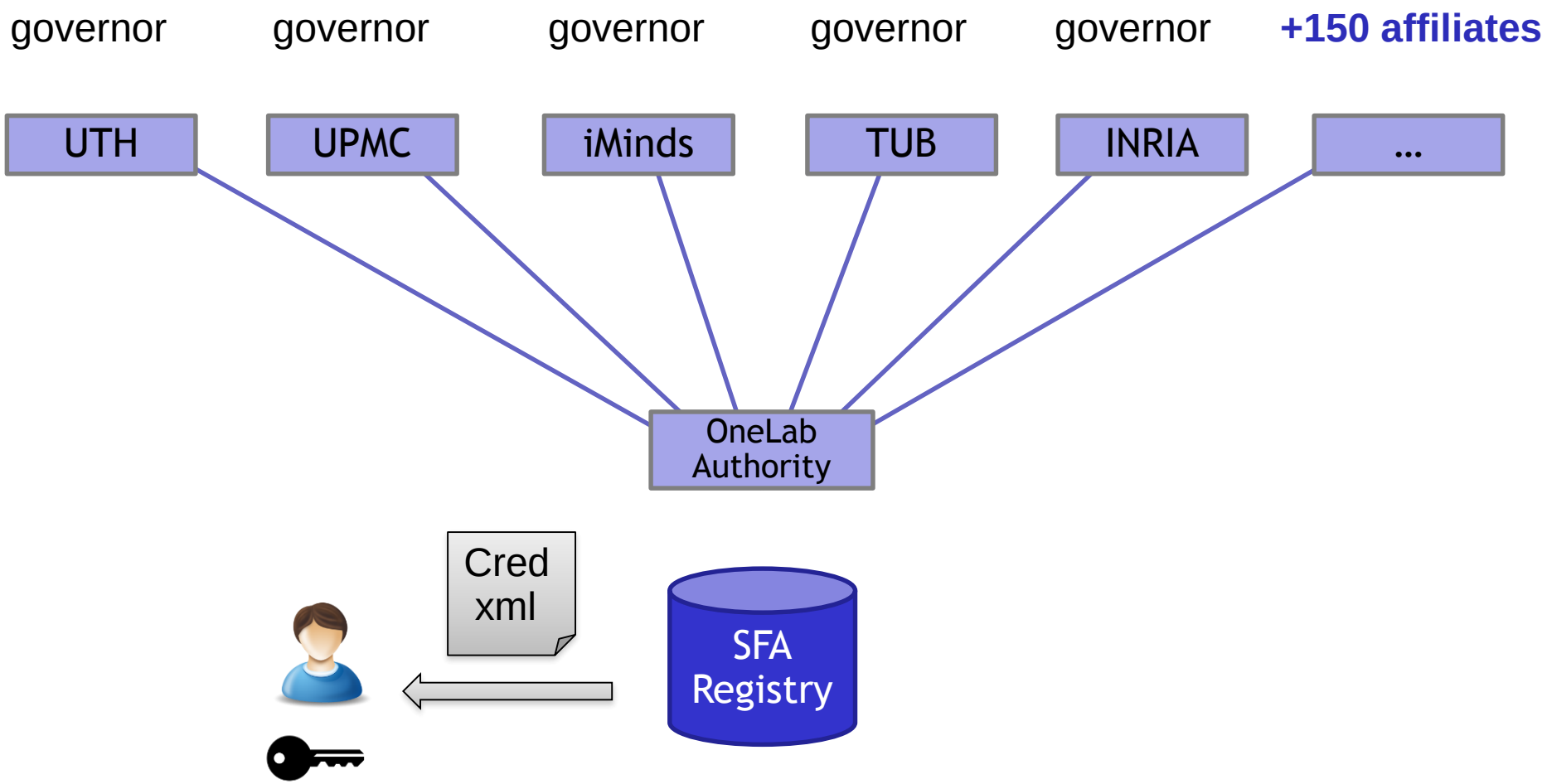
OneLab Authorities



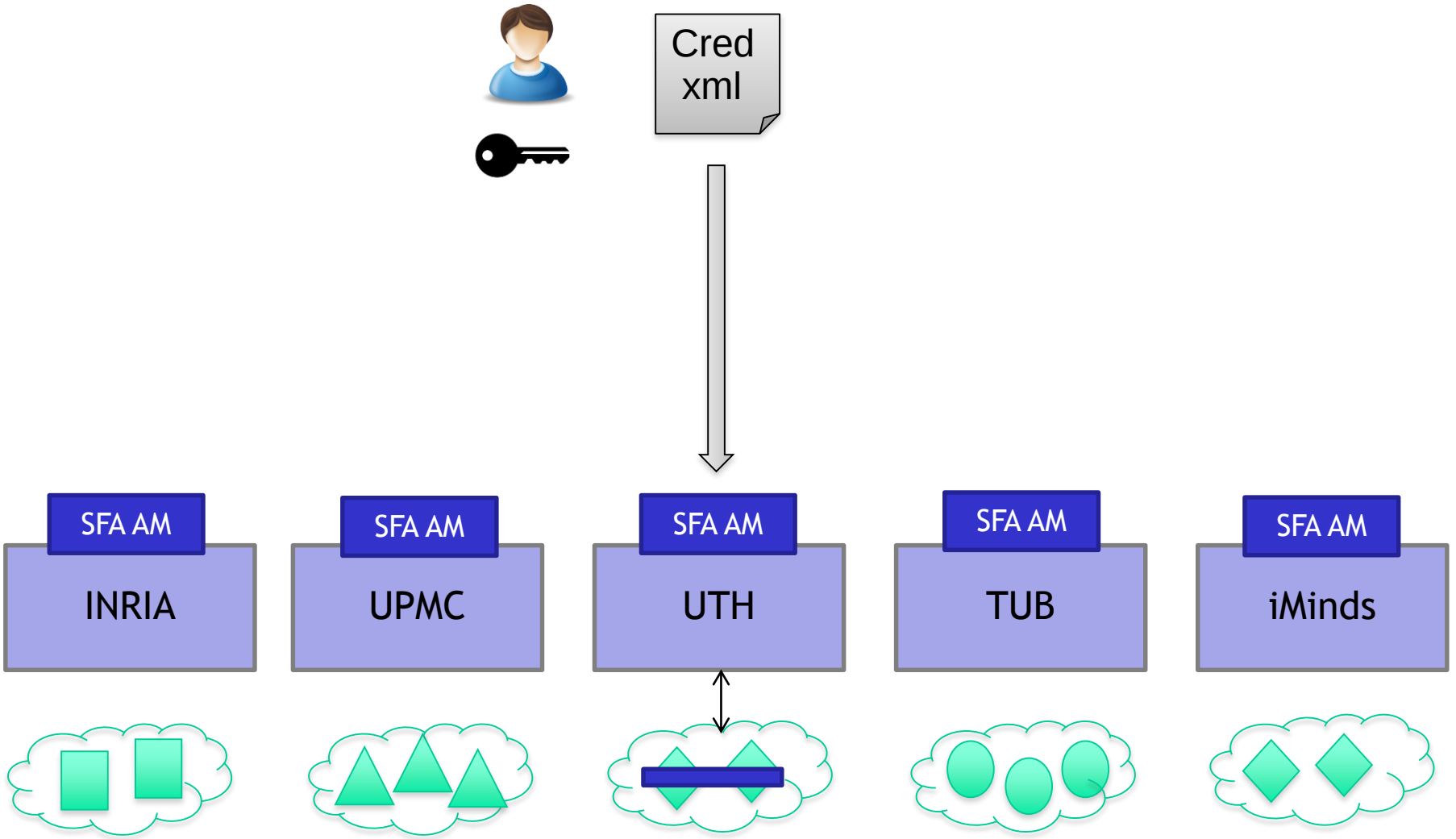
OneLab SFA Authorities



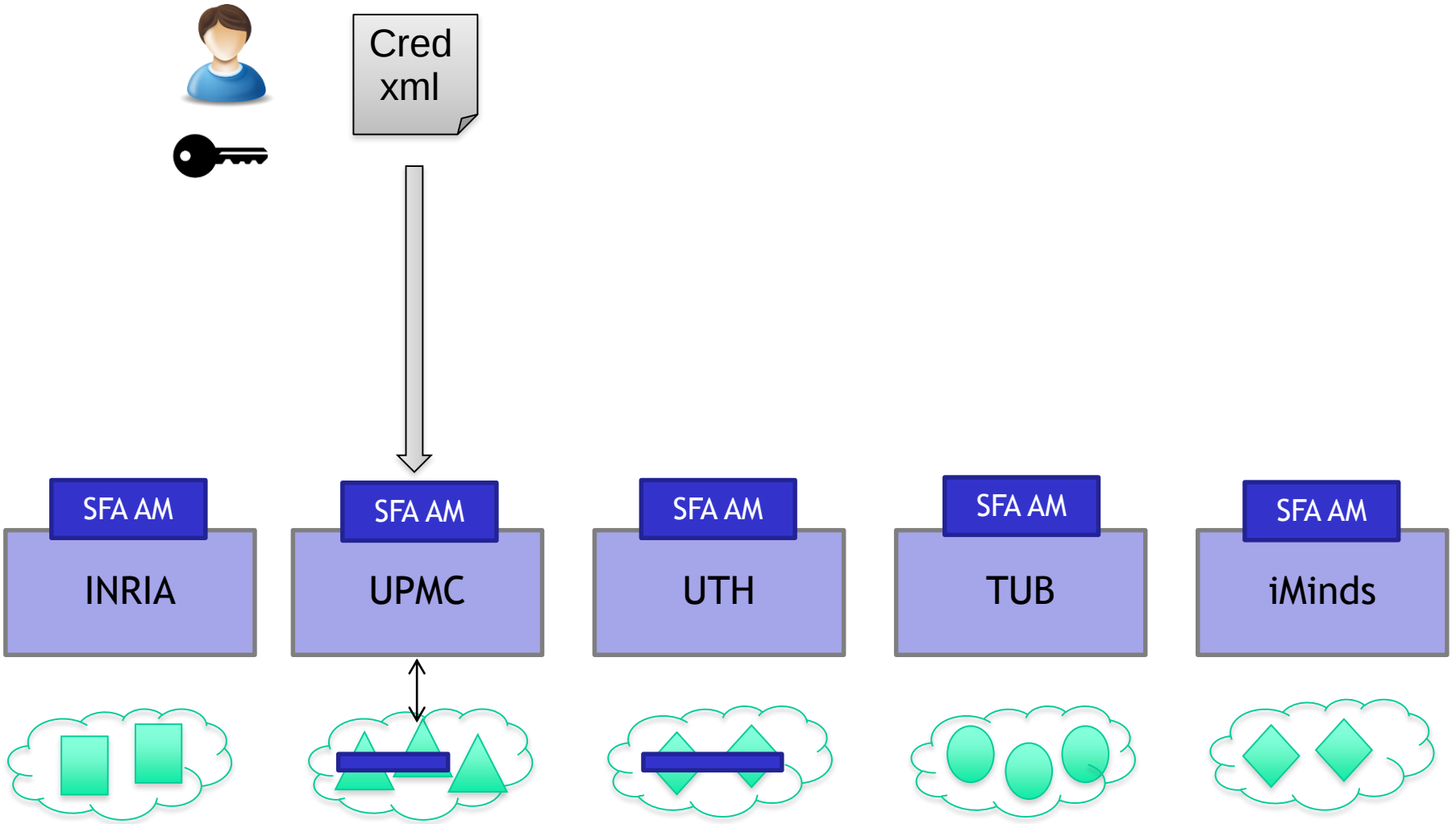
SFA authentication of users



SFA access to resources



SFA access to resources



SFAWrap - http://www.sfawrap.info

- **Federate your testbed with the SFA community**

- Handles most of the complexity (crypto, etc.)
- Testbeds focus on their specificities
  - Wrap an existing testbed
  - A base to build a new testbed
- Open community development model
  - Free software - Mutualized developments

Federate Heterogeneous Resources

SFA provides a common API for diverse resources

Heterogeneity of resources is expressed in **RSpecs** (xml files)

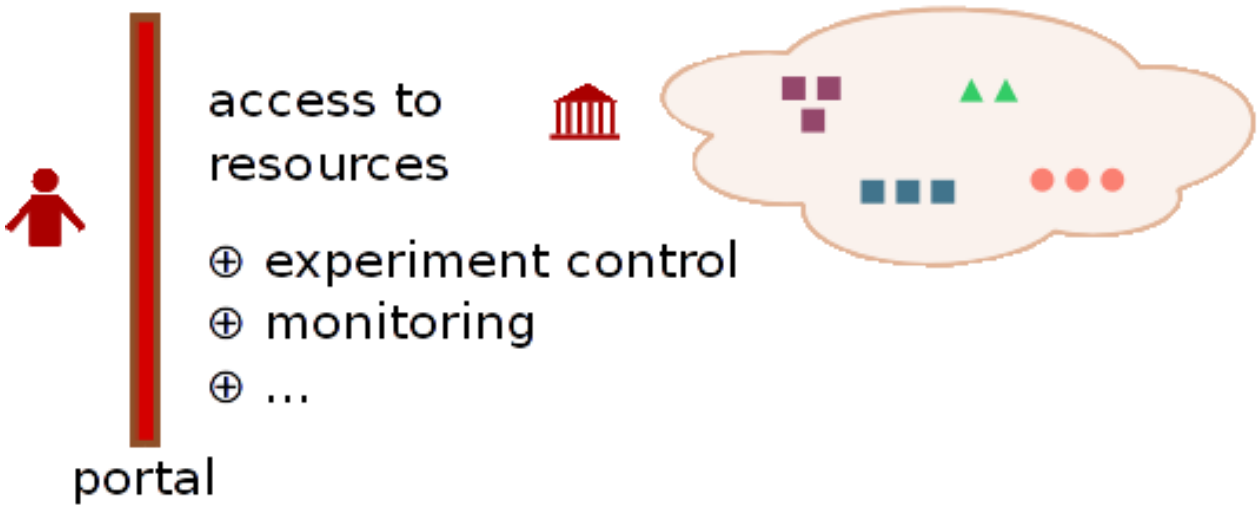
MySlice provides a single point of access to federated testbeds. It allows to browse, filter and reserve resources over these heterogeneous testbeds

OMF provides a common framework to describe, orchestrate, run and retrieve results of an experiment using heterogeneous resources

ONELAB PORTAL

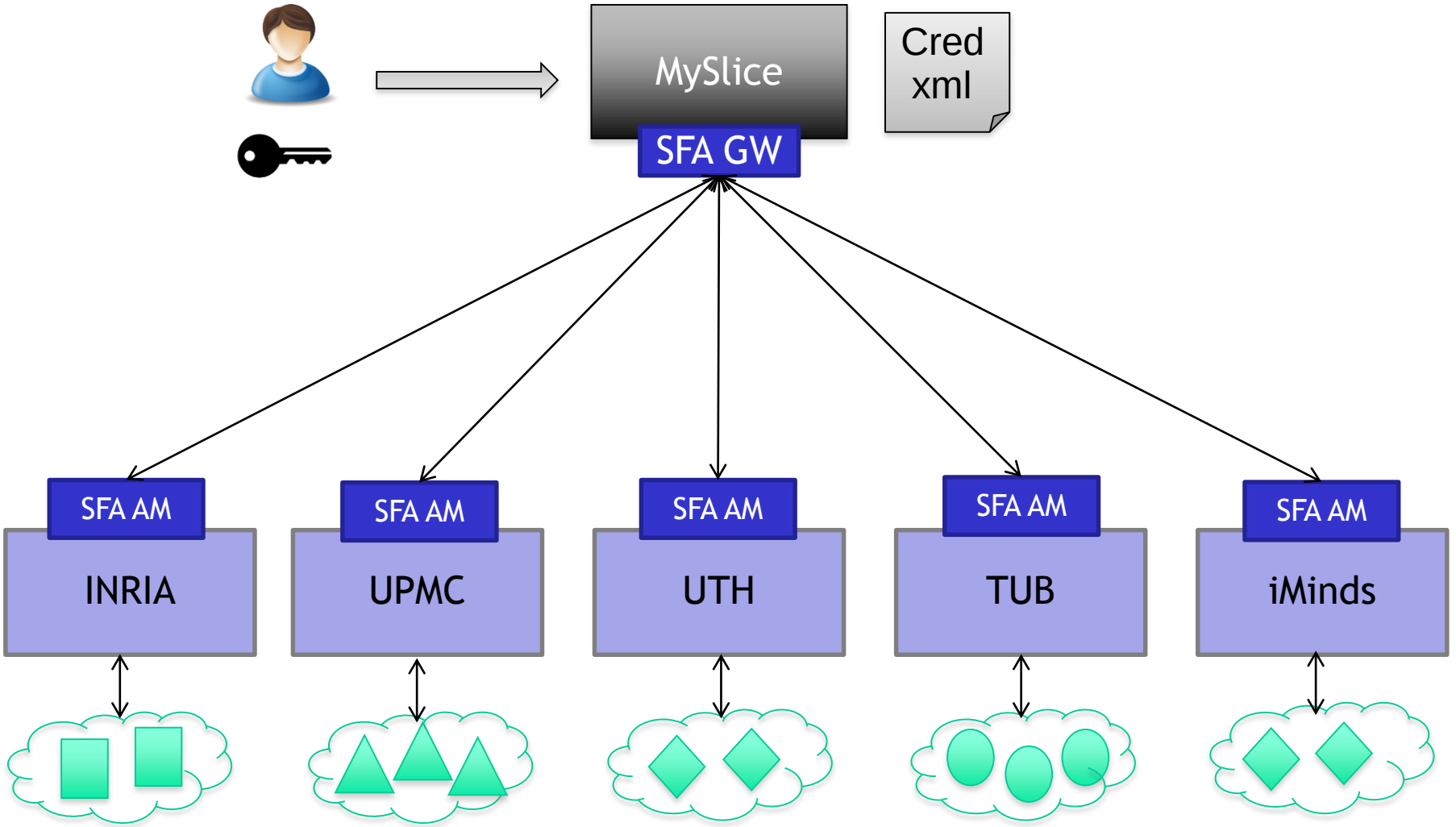
UI : The MySlice portal

A **portal** integrates the various tools and services



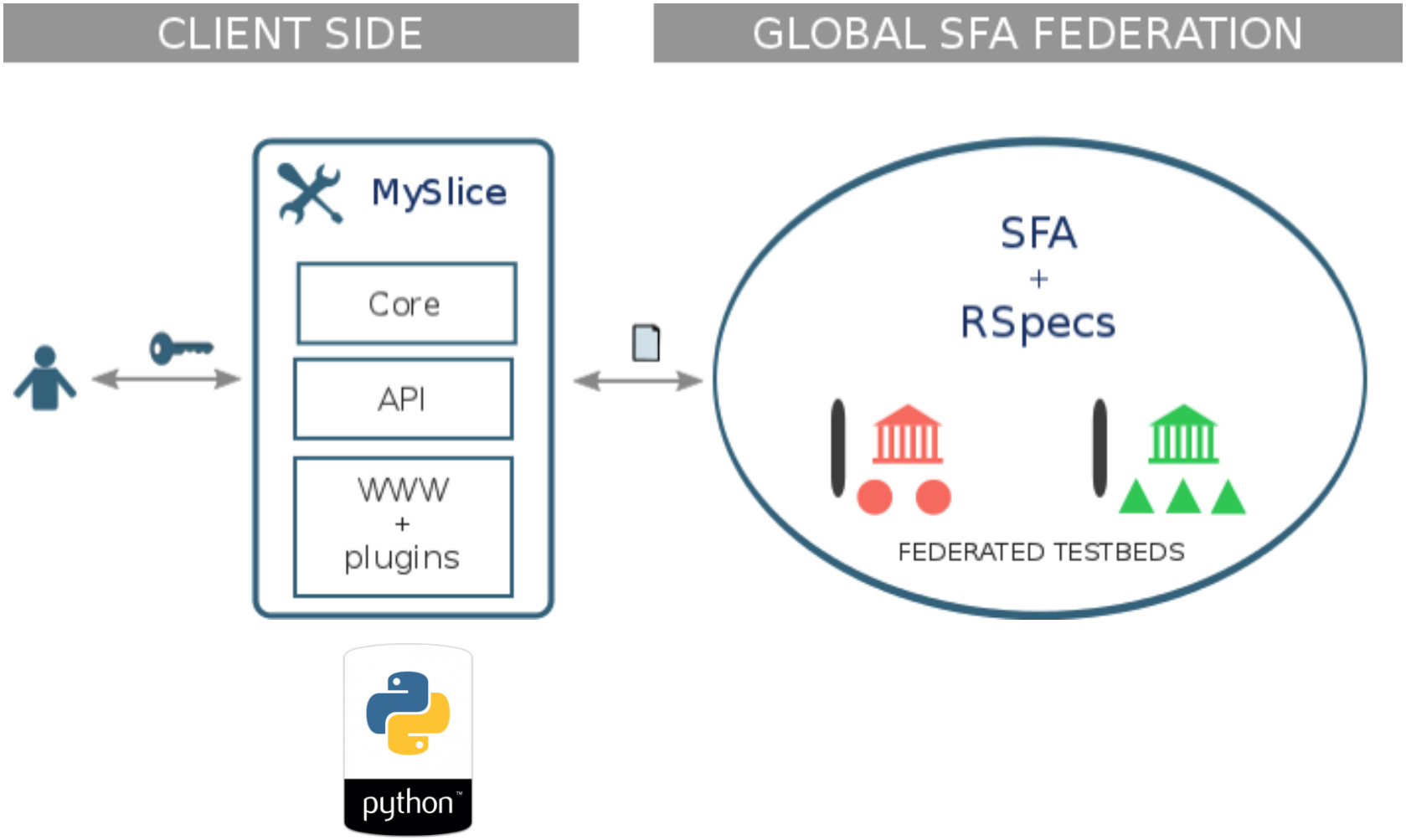
- organize and visualize data
- Designed to support the full **experimental lifecycle**
- Tight integration with **monitoring**

MySlice access to resources



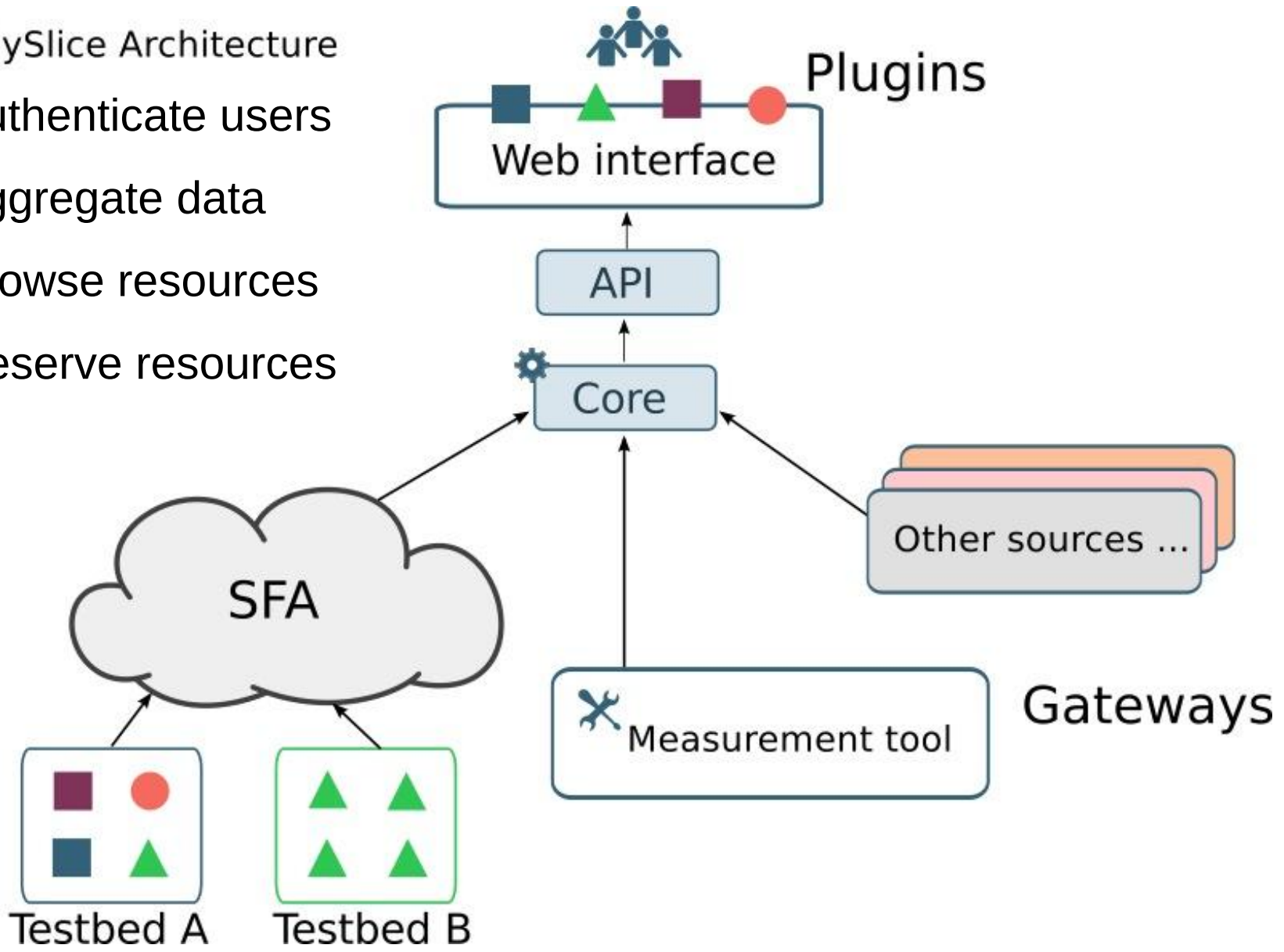
OneLab Portal

- Access resources through a Portal

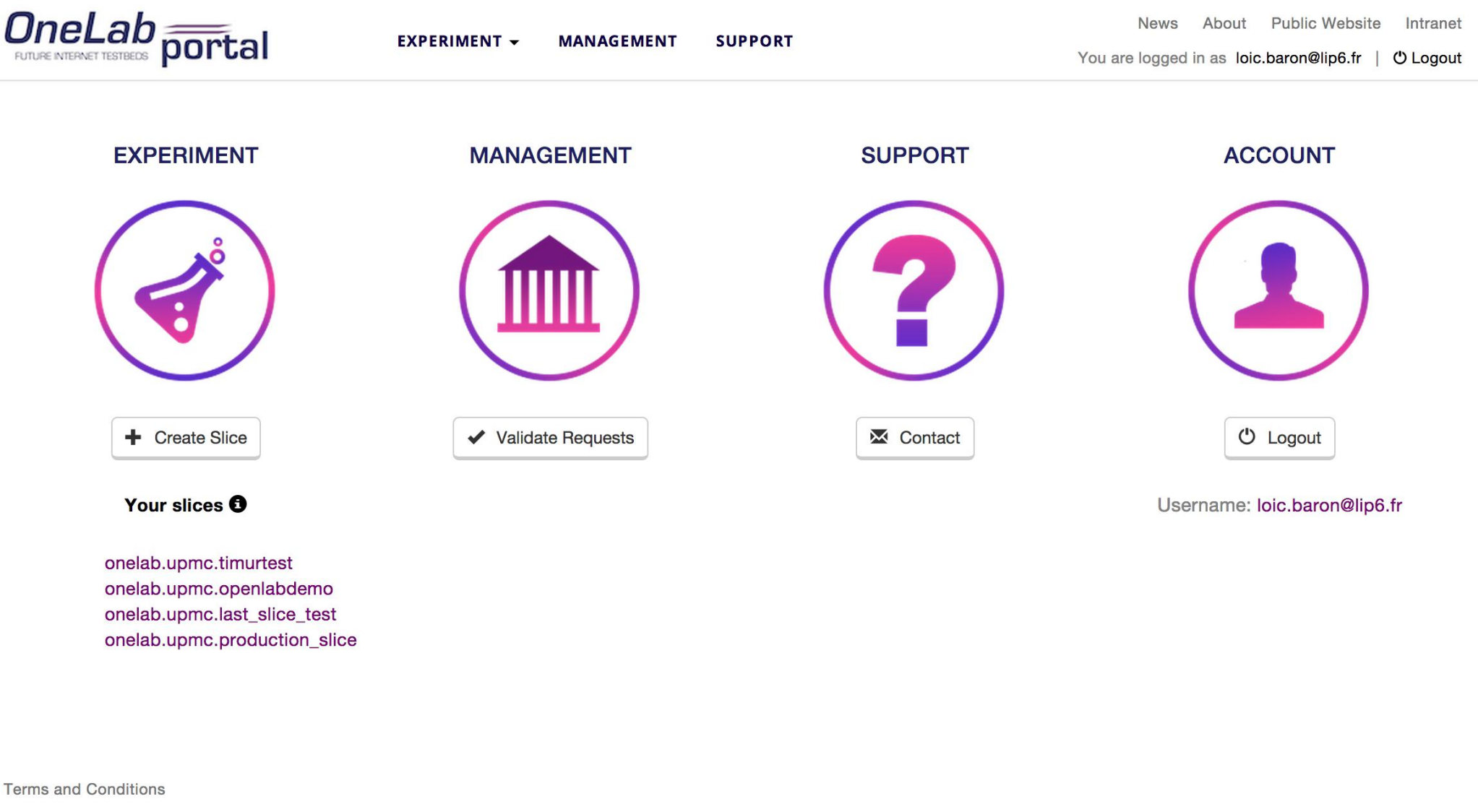


OneLab Portal in Federation

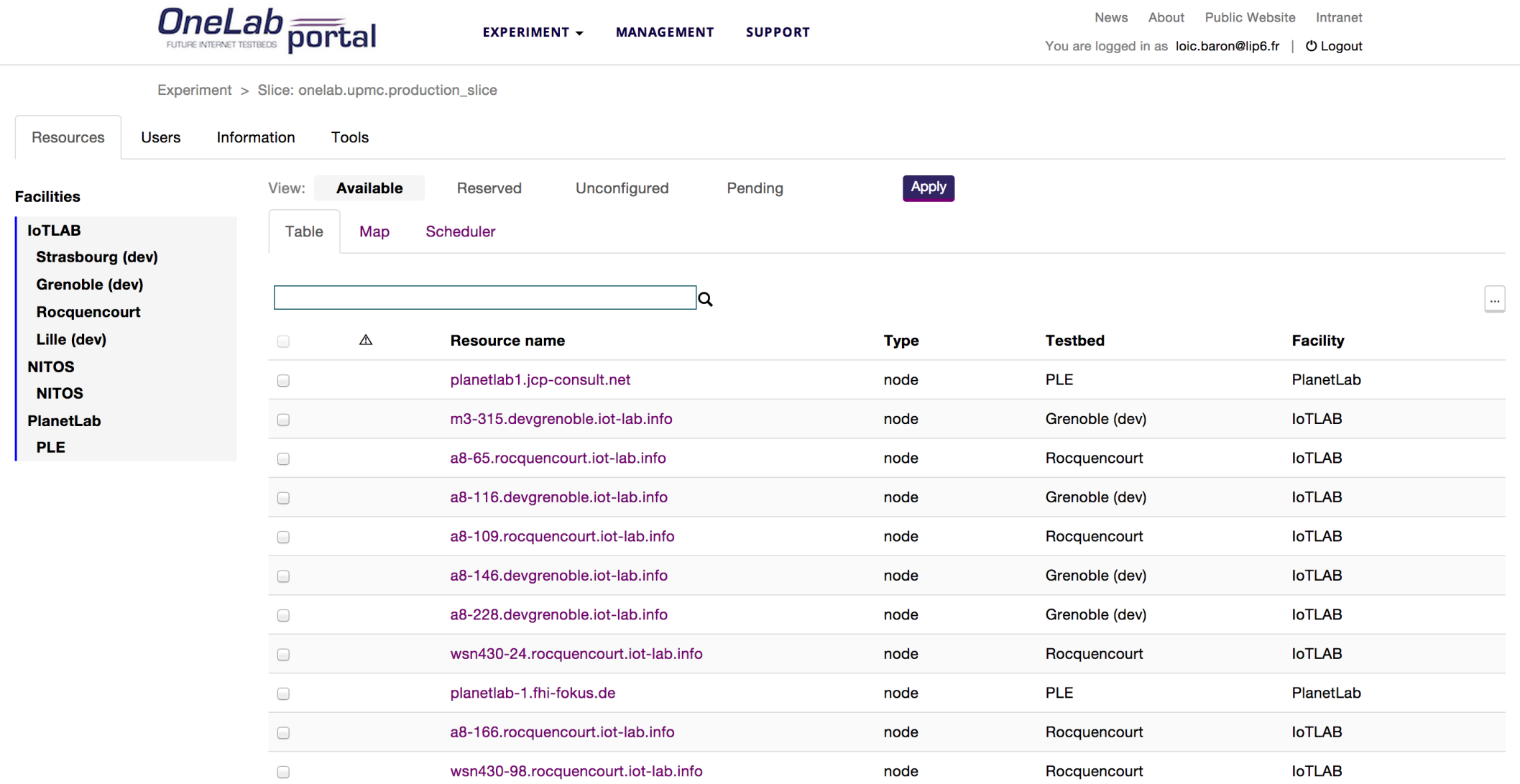
- Authenticate users
- Aggregate data
- Browse resources
- Reserve resources



OneLab Portal: Dashboard

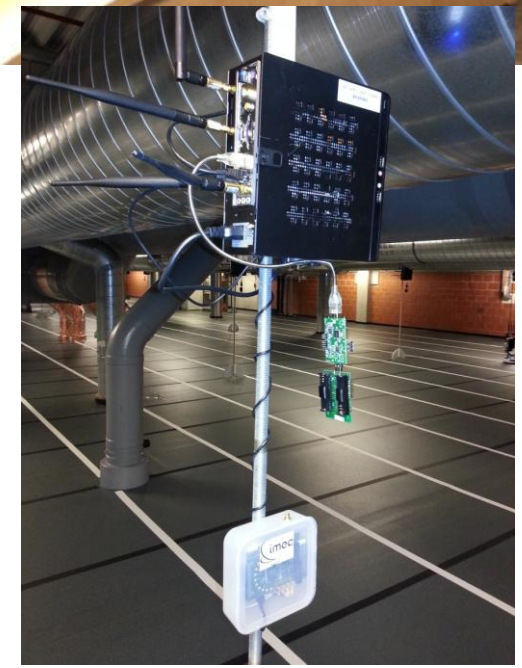


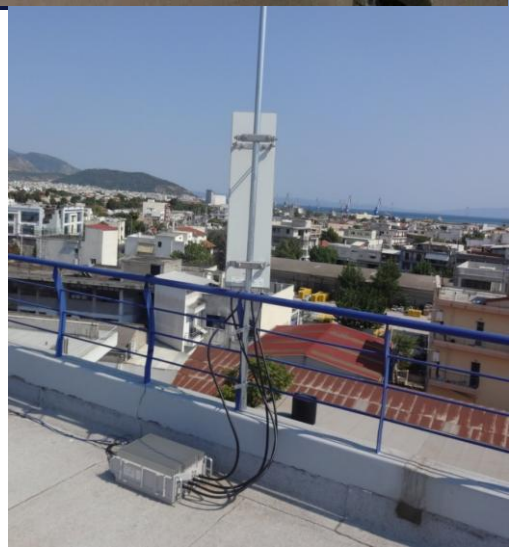
OneLab Portal: resources



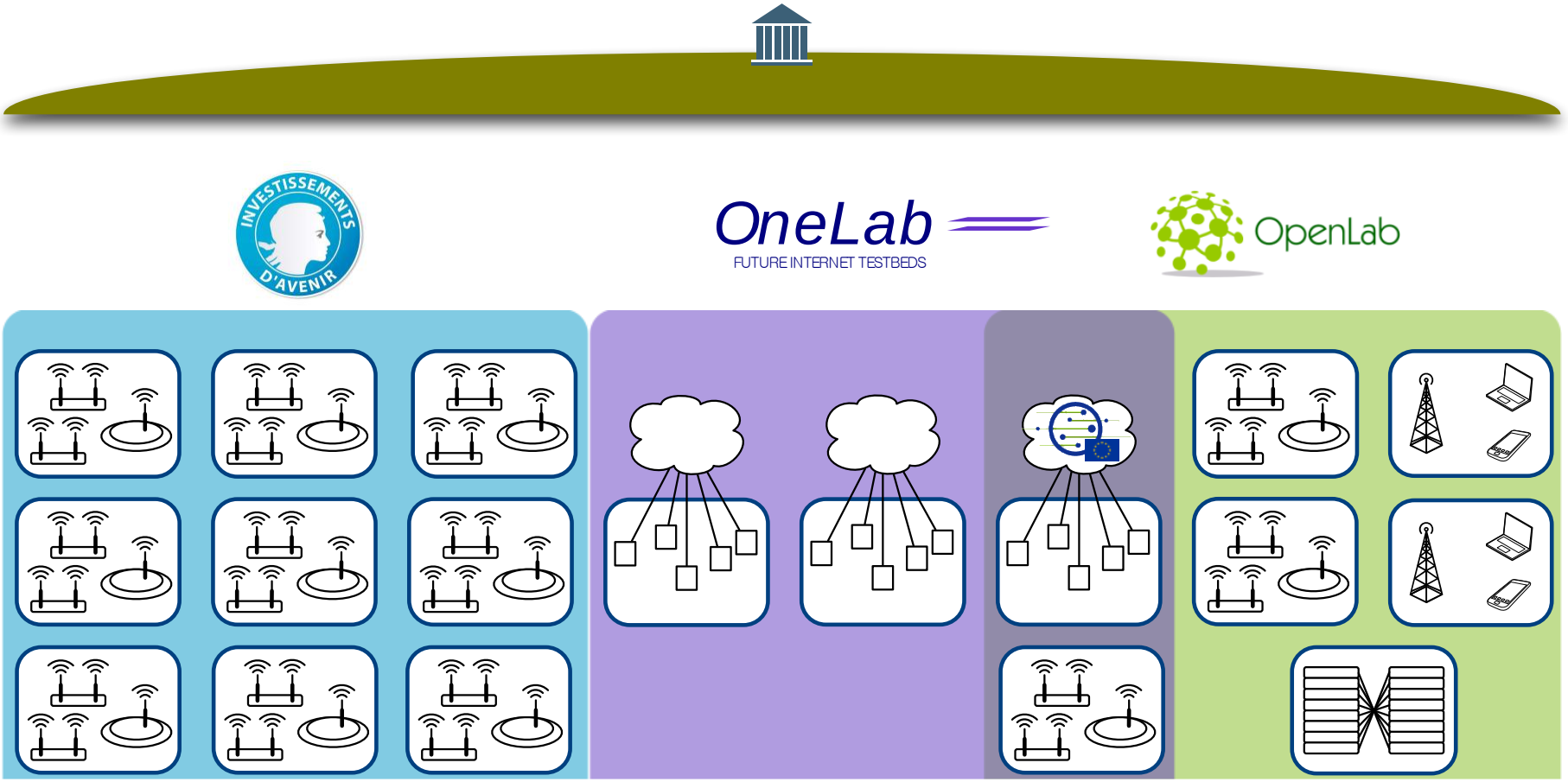
THE ONELAB EXPERIMENTAL FACILITY

The OneLab NOC

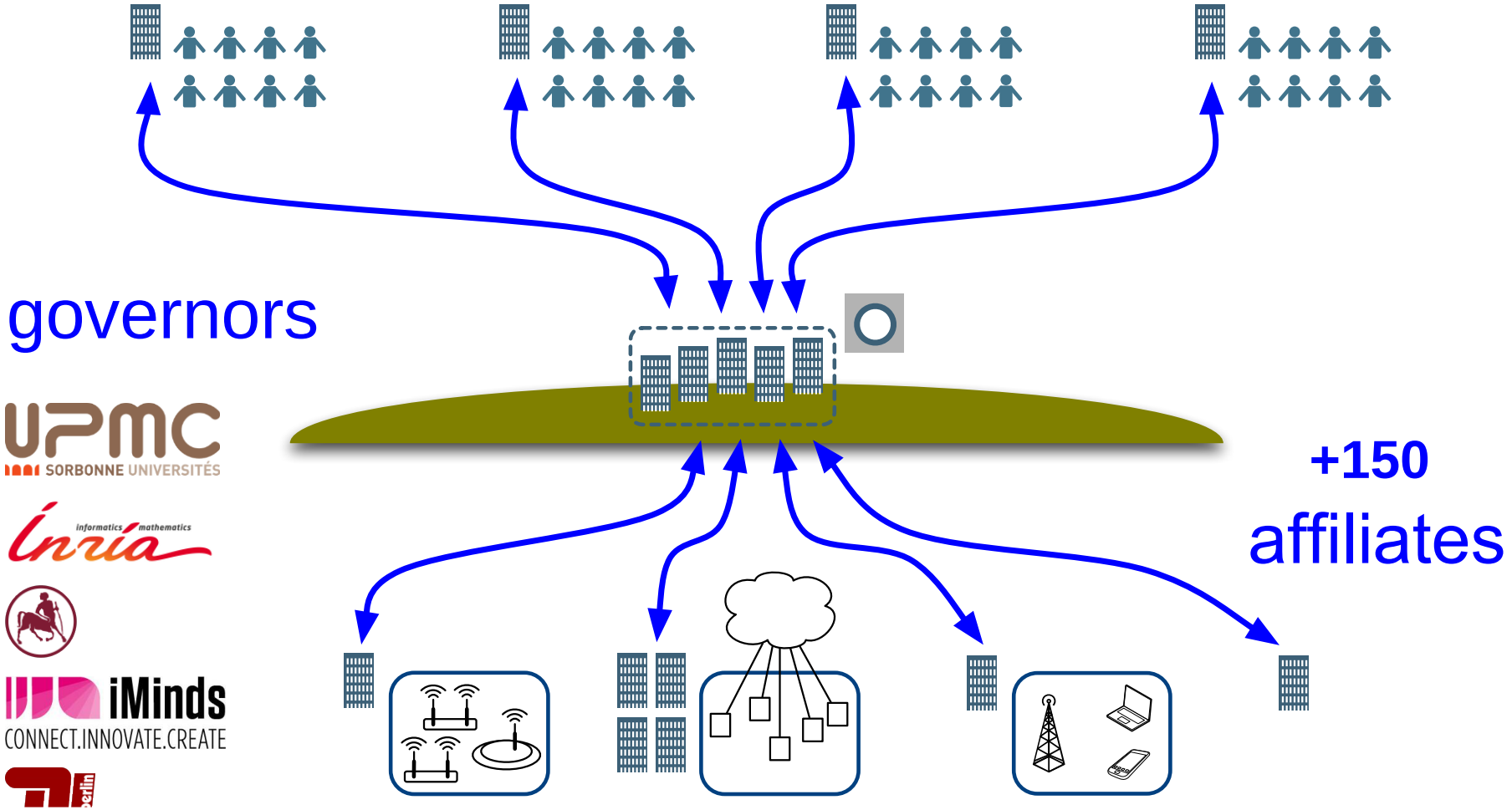




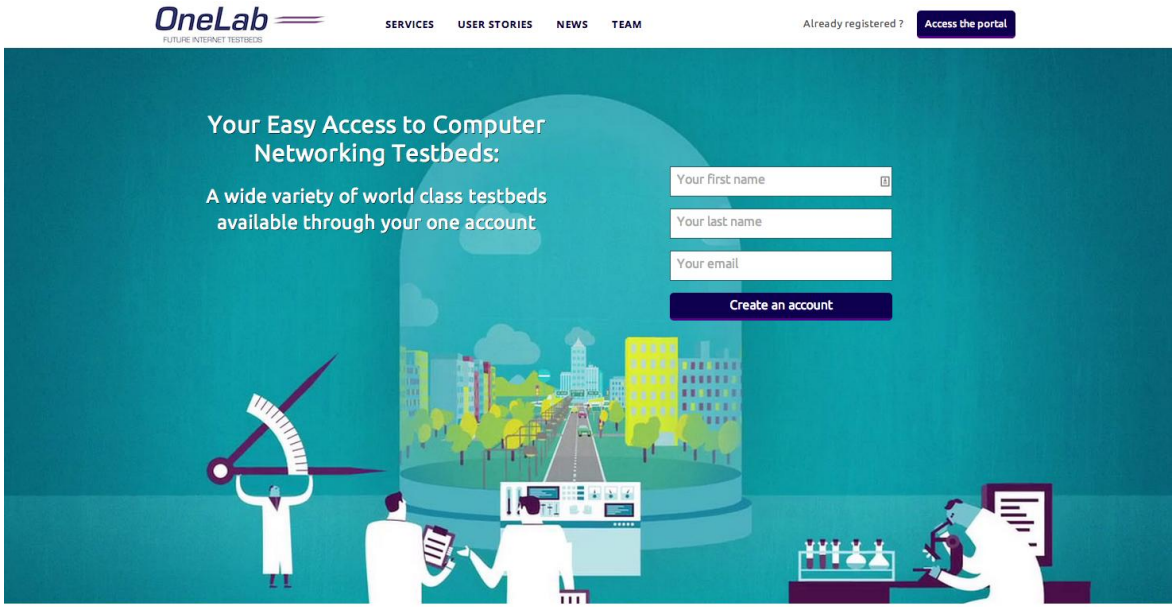
OneLab governance



OneLab Legal Framework

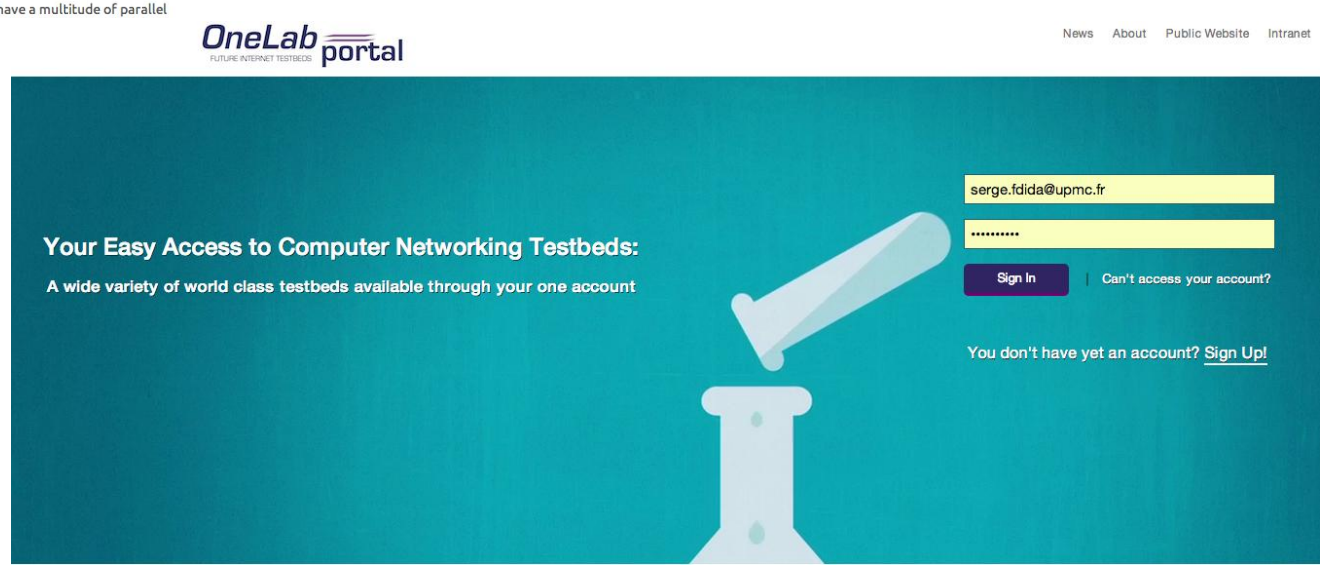


OneLab Web site and Portal

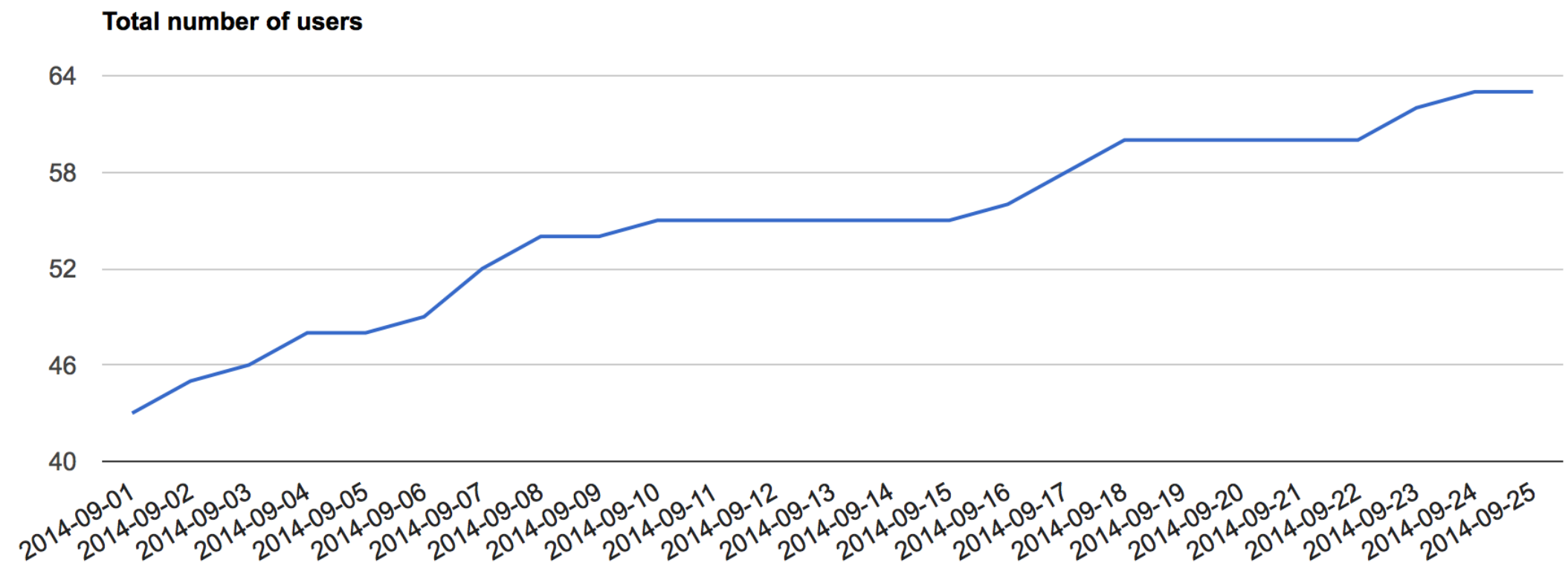


The OneLab Vision

We are approaching the era of the Multinet. Instead of the one Internet, we will have a multitude of parallel



Usage


Total number of users
64
58
52
46
40
2014-09-01
2014-09-02
2014-09-03
2014-09-04
2014-09-05
2014-09-06
2014-09-07
2014-09-08
2014-09-09
2014-09-10
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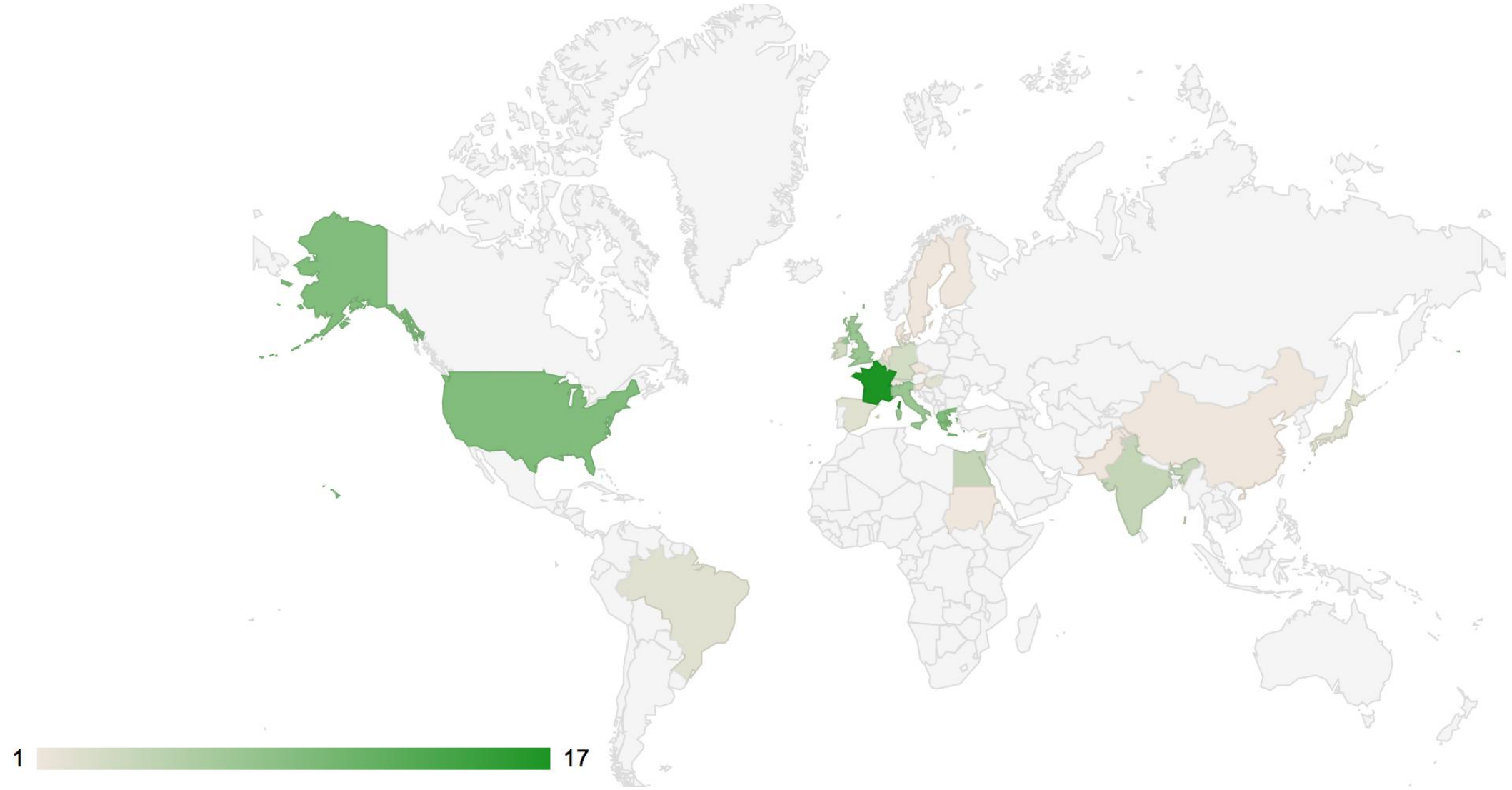
Usage



LESSONS LEARNED

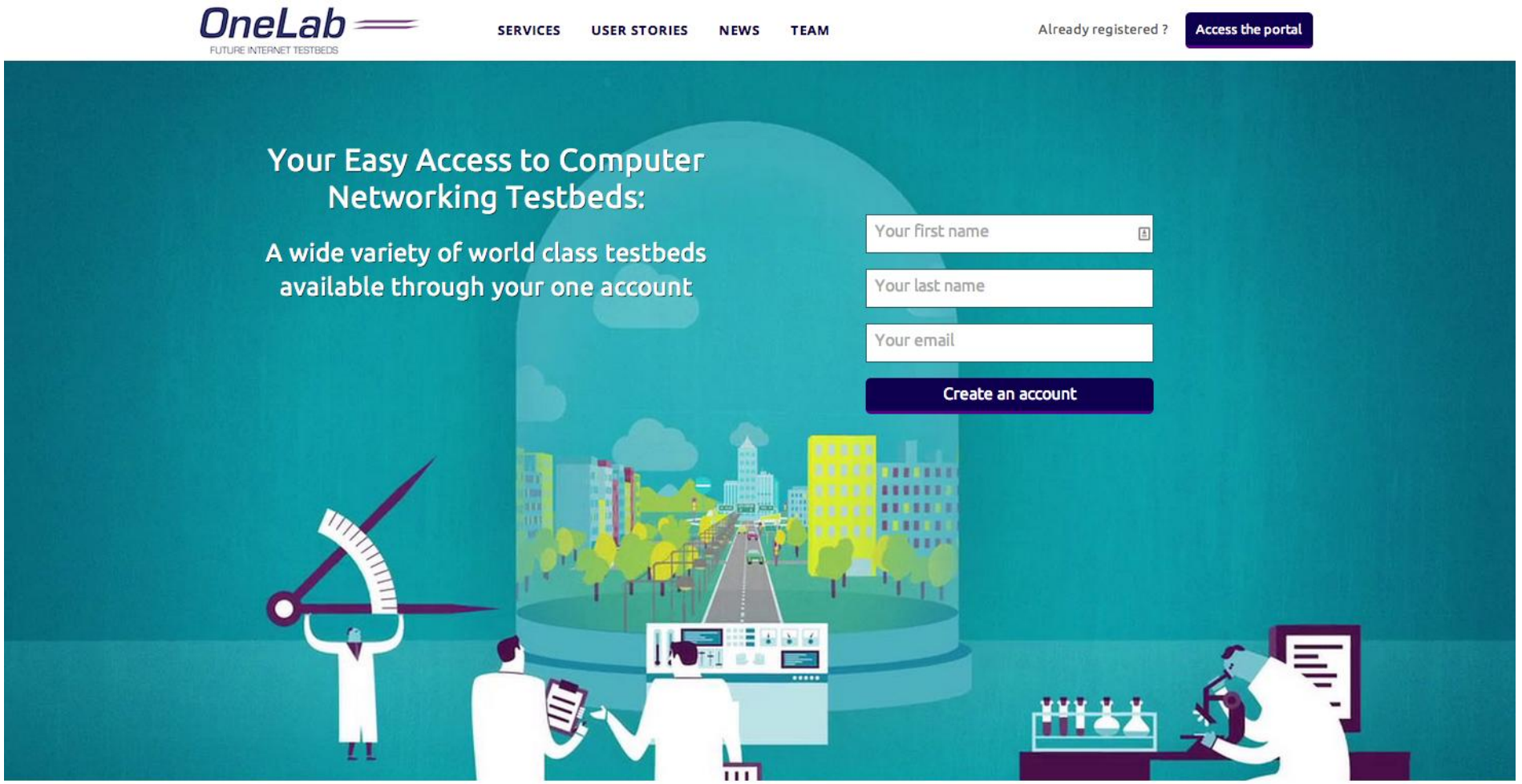
Lessons learned

- Understanding what is nice to have and must have, for the architecture and components was achieved mostly by doing, and was therefore a stepwise process,
- Elaborating a consensus de facto standard was a hard and tedious process but has finally been successful tanks to the effort of the community,
- Phasing the different developments to be able to demonstrate some values at each phase was instrumental but created a difficult coordination process among all activities,
- Convincing various communities about the benefit of the federation approach and incentivizing them to develop their own compatibility with the SFA architecture was time consuming
- Having to face different questions, that we understand, related to serving all needs, including industry, SMEs, having a clear business model in mind with well identified revenues, disseminating towards all communities from researchers to public agencies is a hard task for a project that, at the end, has to deliver a service.

감사합니다

Thank you

Questions?



www.onelab.eu **contact@onelab.eu**