



TVB-EBRAINS

GDPR compliant EBRAINS Cloud Simulator

25 November 2021

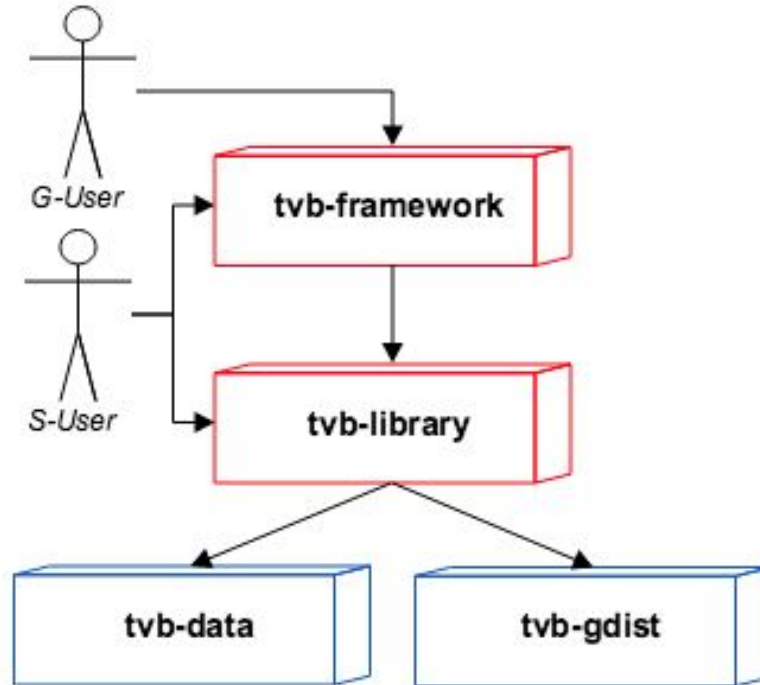
Paula Prodan



TVB PACKAGES

TVB - Core Packages

TVB - first level of detail

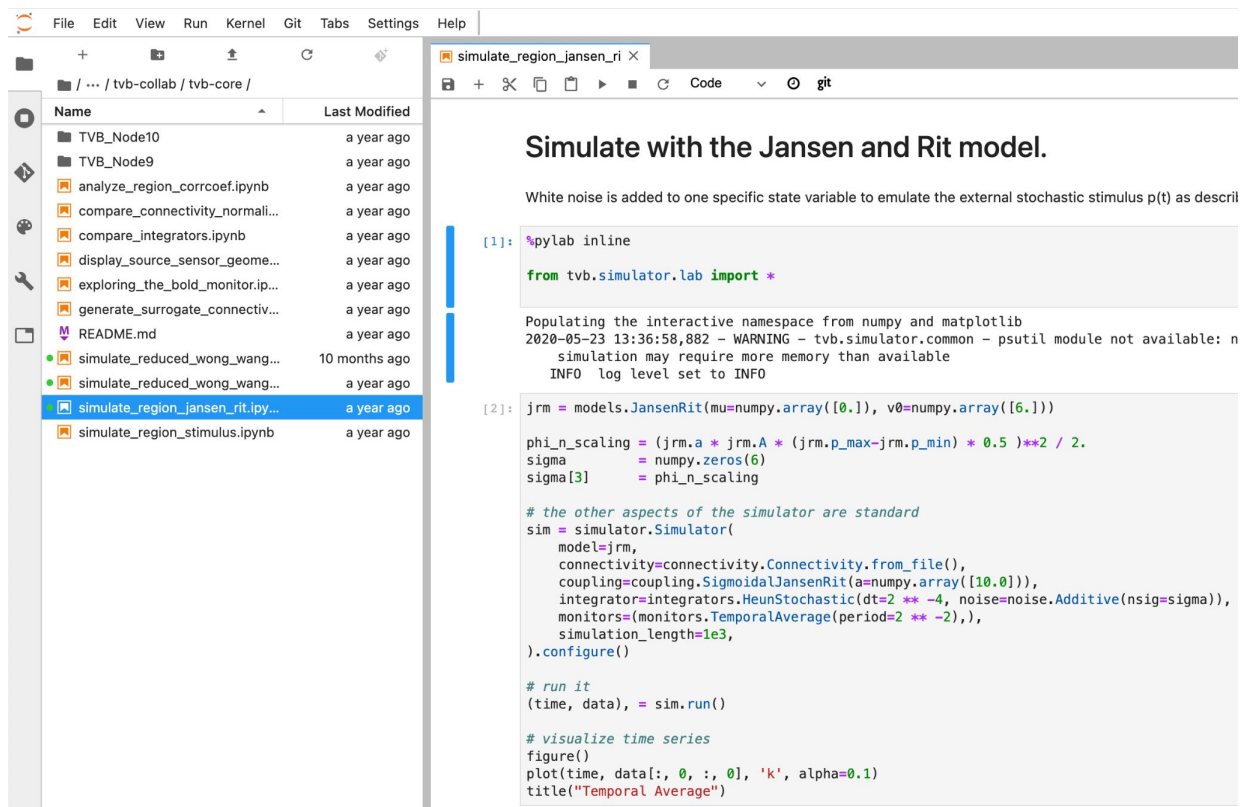




TVB - EBRAINS

Tvb-library on lab.ebrains.eu

Spack packaging



The screenshot shows a JupyterLab environment. On the left, a file browser displays a directory structure under `tvb-collab / tvb-core /`. The files listed include `TVB_Node10`, `TVB_Node9`, and several IPYNB files, with `simulate_region_jansen_rit.ipynb` selected. The main area is a code editor for `simulate_region_jansen_ri`. It contains the following code:

```
[1]: %pylab inline
from tvb.simulator.lab import *

Populating the interactive namespace from numpy and matplotlib
2020-05-23 13:36:58,882 - WARNING - tvb.simulator.common - psutil module not available:
simulation may require more memory than available
INFO log level set to INFO

[2]: jrm = models.JansenRit(mu=np.array([0.]), v0=np.array([6.]))

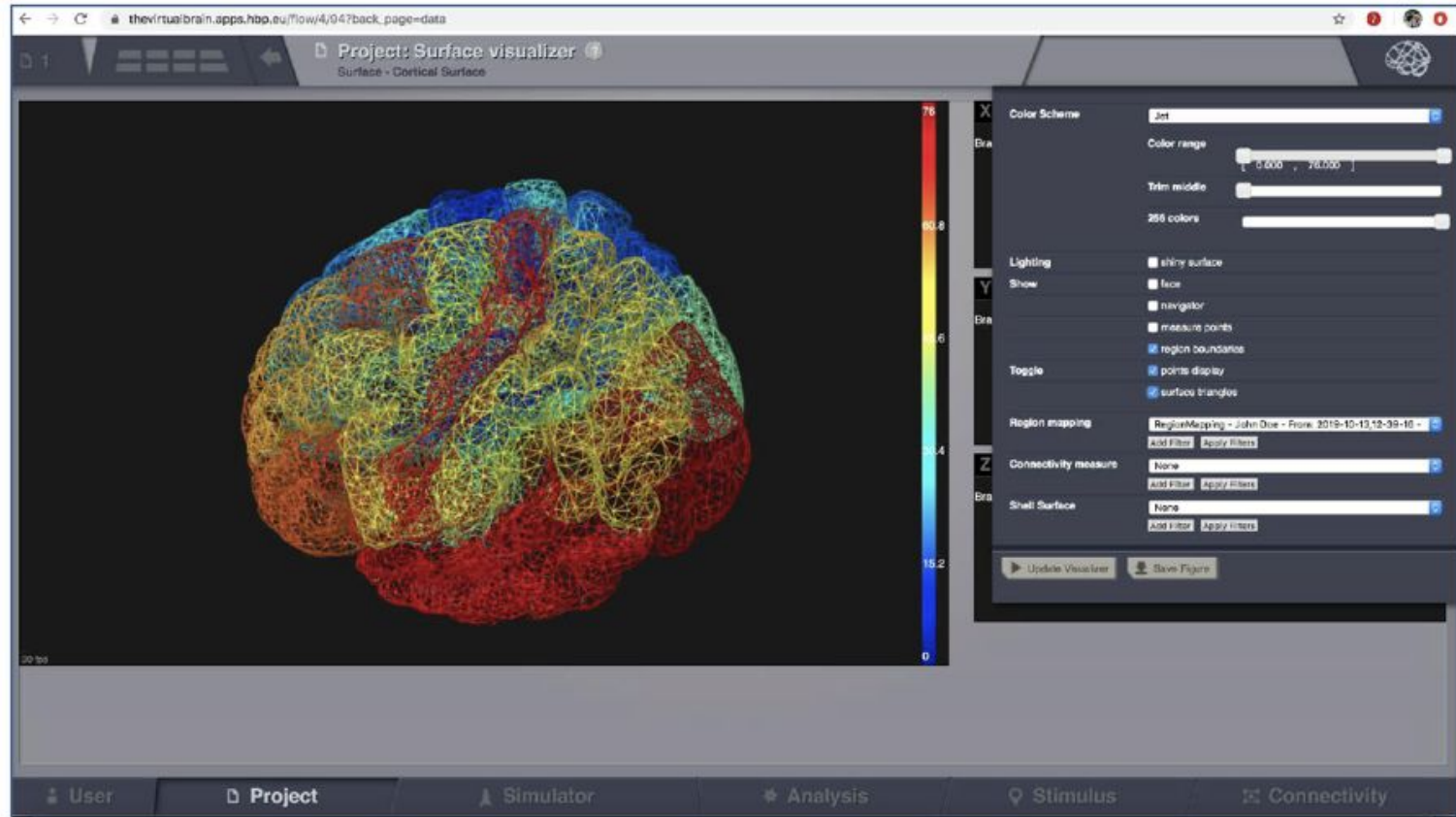
phi_n_scaling = (jrm.a * jrm.A * (jrm.p_max-jrm.p_min) * 0.5)**2 / 2.
sigma          = numpy.zeros(6)
sigma[3]       = phi_n_scaling

# the other aspects of the simulator are standard
sim = simulator.Simulator(
    model=jrm,
    connectivity=connectivity.Connectivity.from_file(),
    coupling=coupling.SigmoidalJansenRit(a=np.array([10.0])),
    integrator=integrators.HeunStochastic(dt=2 ** -4, noise=noise.Additive(nsig=sigma)),
    monitors=(monitors.TemporalAverage(period=2 ** -2)),
    simulation_length=1e3,
).configure()

# run it
(time, data), = sim.run()

# visualize time series
figure()
plot(time, data[:, 0, :, 0], 'k', alpha=0.1)
title("Temporal Average")
```

TVB Web App



Objectives TVB Web GUI

- reliable and scalable deployment of TVB web GUI
- respect GDPR, as we are dealing often in TVB with personal data
- possibility to distribute jobs on HPC backed in a secure manner

TVB - OpenShift

The screenshot displays the OpenShift Application Console interface. The top navigation bar includes the 'okd' logo, 'Application Console', a search bar for the catalog, and a user profile for 'Paula Popa'. The left sidebar contains navigation options: Overview, Applications, Builds, Resources, Storage, Monitoring, and Catalog. The main content area is titled 'The Virtual Brain' and shows a list of 'Other Resources'. A search filter is set to 'Application'. The resource list includes:

Name	Mib Memory	Cores CPU	Kib/s Network	Count	Unit
DEPLOYMENT CONFIG operations-assigner, #6	--	--	--	1	pod
DEPLOYMENT CONFIG pg-bouncer, #2	--	--	--	1	pod
DEPLOYMENT CONFIG process-operations, #6	--	--	--	4	pods
DEPLOYMENT CONFIG thevirtualbrain, #9	Mib Memory	Cores CPU	Kib/s Network	1	pod
DEPLOYMENT CONFIG tvb-postgres, #9	--	--	--	1	pod

Authorization with EBRAINS IAM

The screenshot shows a web browser window with the URL <https://thevirtualbrain.apps.hbp.eu/>. The page features a colorful geometric background and a navigation bar at the bottom with icons for User, Project, Simulator, Analysis, Stimulus, and Connectivity. The main content area is divided into three sections: LEAD INSTITUTIONS, USER DETAILS, and ABOUT THIS VERSION.

LEAD INSTITUTIONS

- Aix+Marseille université
- Baycrest
- CHARITÉ UNIVERSITÄTSMEDIZIN BERLIN

Your current working project is: Default_Project

USER DETAILS

DISPLAY NAME	Paula Popa
USERNAME	paulapopa
ROLE	administrator manage other users
SETTINGS	TVB Settings
DATA	448.1 MIB
ACCOUNT	Account management console

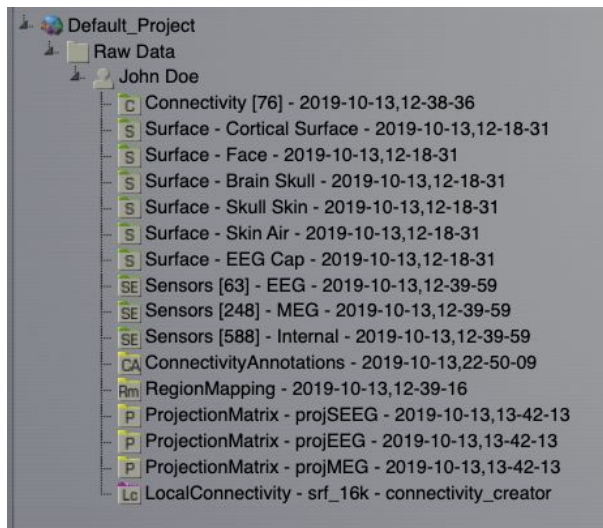
ABOUT THIS VERSION

- ★ You are running TVB version **2.0.8-9404**
- ★ You may use this version on your **personal computer**.
- ★ You may also install it on a **server** and make it accessible to an unlimited number of users.
Please make sure that your server has appropriate hardware resources like a decent multi-core CPU and at least 16 GB of RAM.
- ★ You may also install it on a **cluster** (similar to a server installation but with parallelization support).
Please note that for cluster installations, OAR is expected to be configured separately from TVB.

Logout

User Project Simulator Analysis Stimulus Connectivity

Projects



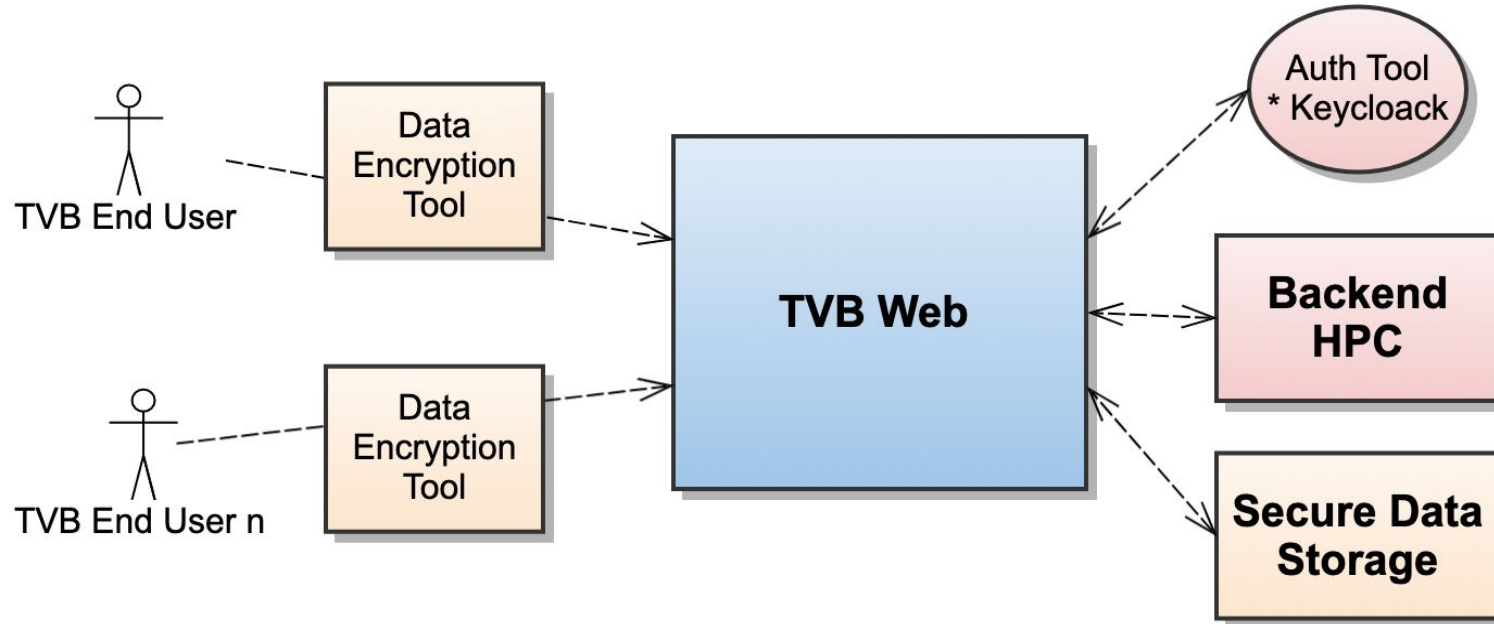
2

Project: List ?

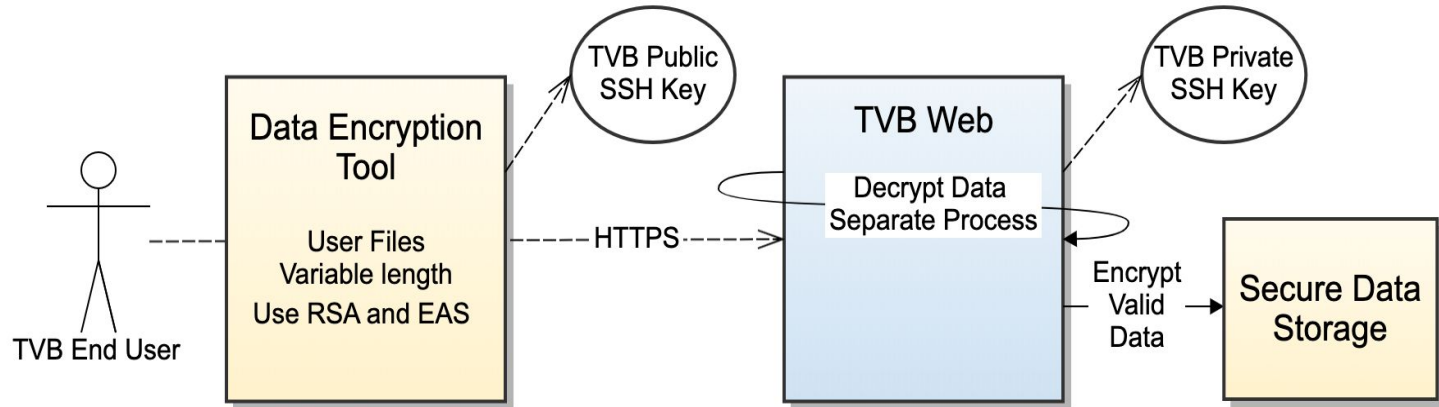
Available TVB Projects

ID	The Virtual Brain project	Owner	Operations
★ 2	personal_project	Paula Popa	3 0 1 0 0
☆ 1	Default_Project	Administrator	7 0 0 0 1

Architecture



Upload encrypted data



Upload encrypted data

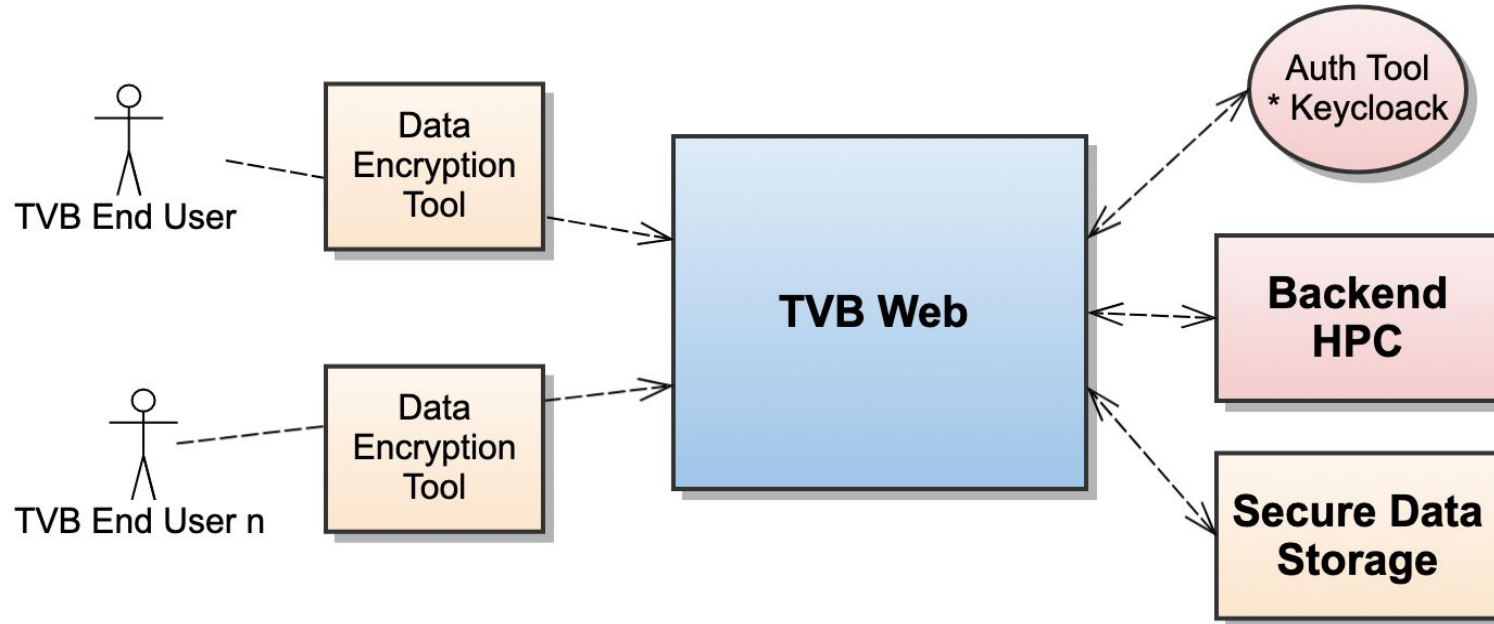
Public key:

https://www.thevirtualbrain.org/tvb/bin/upload_encryption_public_key

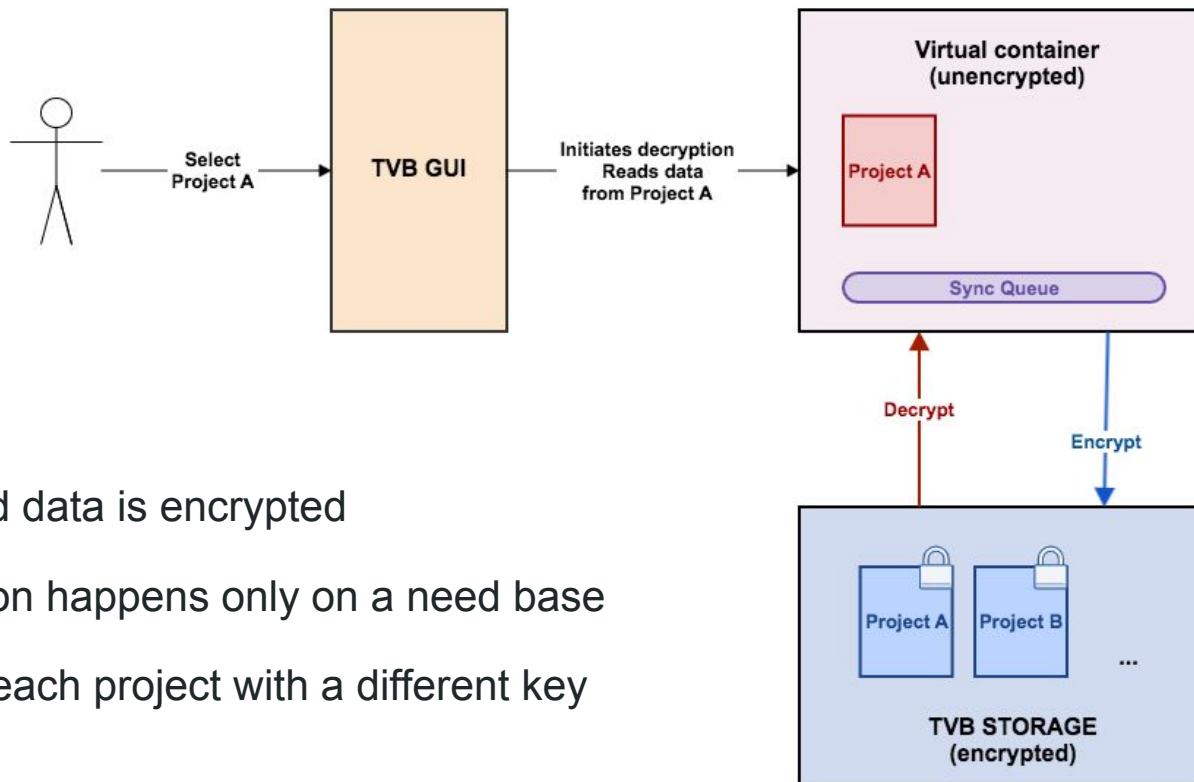
Procedure for encrypting data before uploading in TVB Web GUI:

http://nbviewer.ipython.org/url/docs.thevirtualbrain.org/demos/encrypt_data.ipynb

Architecture

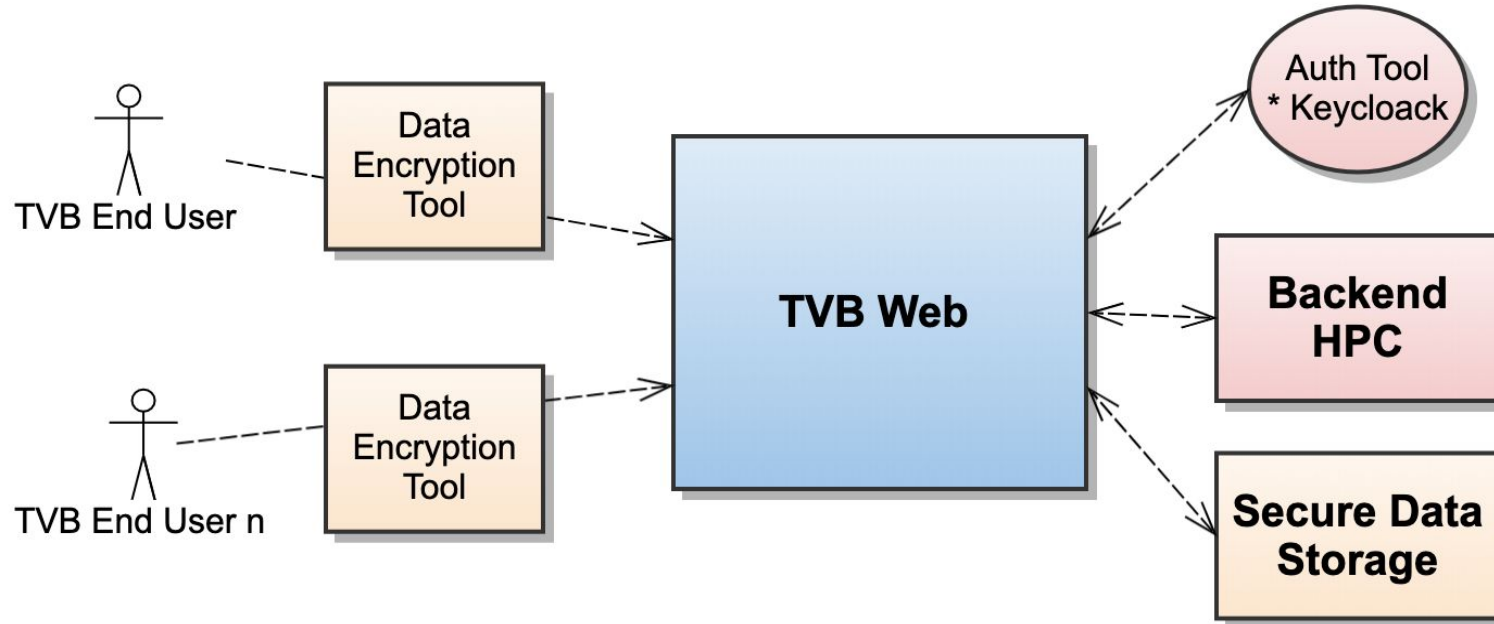


Encrypted TVB storage

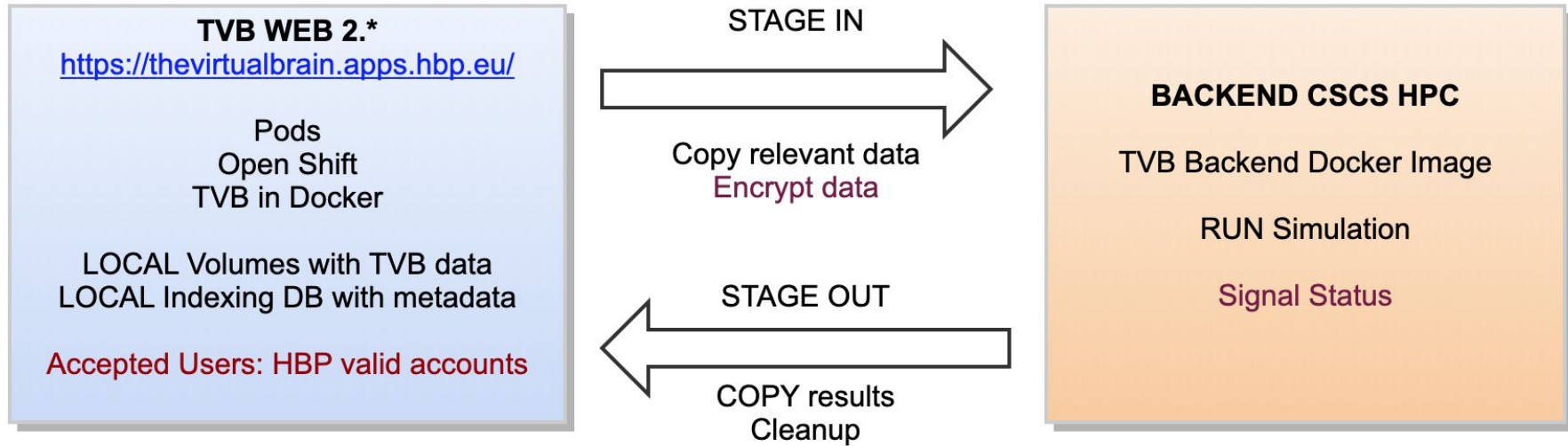


- persisted data is encrypted
- decryption happens only on a need base
- encrypt each project with a different key

Architecture



TVB - HPC Backend

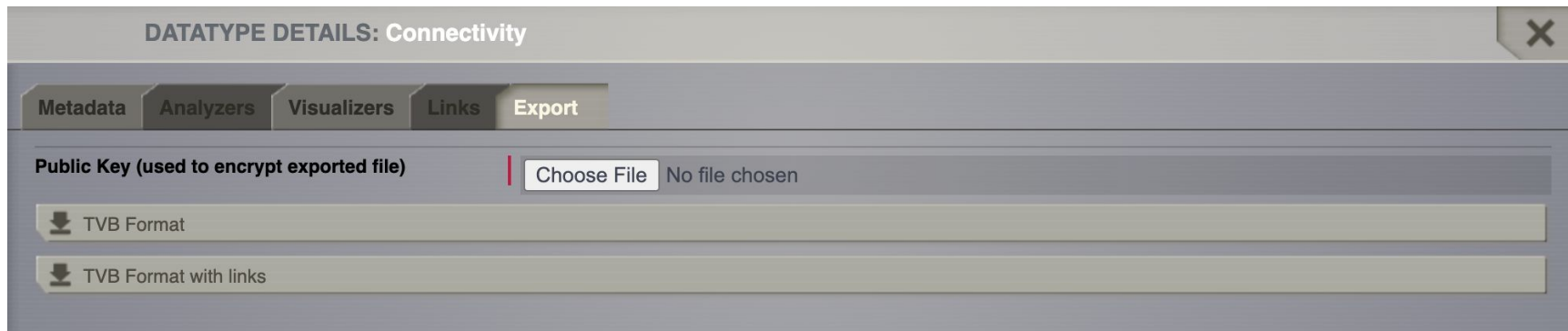


A white wireframe brain is centered on a dark background. The brain is composed of a complex network of white lines forming a mesh-like structure. In the center of the brain, the text "TVB PLANS" is written in a bold, sans-serif font. "TVB" is white, and "PLANS" is a light green color. A solid light green horizontal bar is located at the bottom of the image.

TVB PLANS

Recent work

- Encryption at export



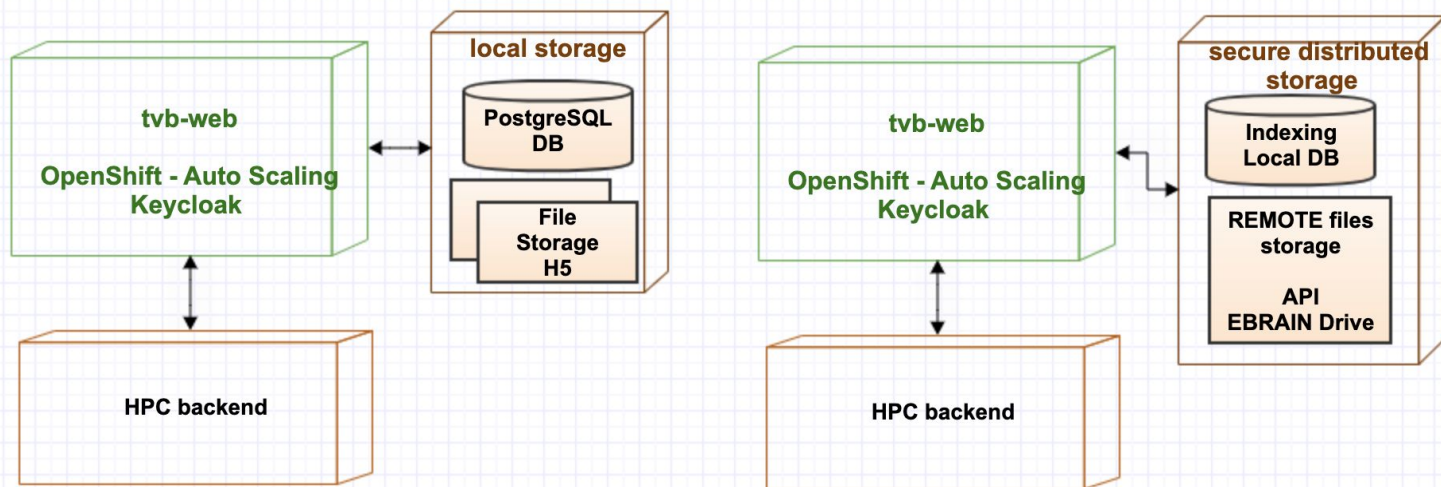
- Deploy at JSC Openshift:
 - **<https://thevirtualbrain.apps.jsc.hbp.eu>**
- Common landing page for both CSCS and JSC Openshift installations
 - <https://tvb.apps.hbp.eu/>

Plans

- Common storage for both CSCS and JSC Openshift installations (detached storage, EBRAINS Drive API)
 - Longer term
- Access to Preprocessing Pipeline via TVB Web GUI (setup, launch and monitoring)

Detached storage

TVB-C - Storage Details - Var A vs Var B





docs.thevirtualbrain.org
thevirtualbrain.apps.hbp.eu