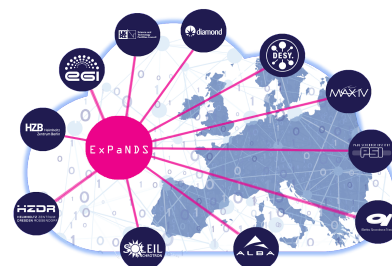





# Testing and validation framework

## Sustainability sheet



A framework for testing and validating ExPaNDs services against reference data sets. The process is demonstrated for the case of Jupyter notebook type services. This framework provides a path for delivering **analysis software as a service on shared infrastructure**, included but not limited to the EOSC and **shared HPC resources**.

	<p><b>Target audiences</b></p> <ul style="list-style-type: none"> <li>- Scientific software developers</li> <li>- Software engineers</li> </ul>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>- Provide a <b>functional testing framework</b> for software development teams</li> <li>- Make sure data analysis services are working correctly with <b>heterogeneous</b> compute infrastructures</li> <li>- Ensure long term <b>reliability</b> and sustainability of data analysis services</li> <li>- Ensure <b>repeatability</b> of scientific results</li> </ul>
	<p><b>Accessibility</b></p> <p>The code repositories are publicly available:</p> <ul style="list-style-type: none"> <li>- <a href="#">jnbv</a> (1): python module for testing Jupyter kernel and Jupyter notebooks against each other</li> <li>- <a href="#">Jupyter-notebook-validation</a> (2): repository using jnbv for automated validation of production-ready Jupyter kernels as well as:             <ul style="list-style-type: none"> <li>- the associated <a href="#">docker images</a> (3)</li> <li>- the <a href="#">code used to produce them</a> (4)</li> <li>- the <a href="#">HPC setup</a> (5) used</li> </ul> </li> </ul> <p><b>Feedback mechanism</b></p> <p>GitHub issue tracking in the <a href="#">appropriate repository</a> (9)</p>	<p><b>Documentation</b></p> <p><a href="#">Methodology</a> (6)</p> <p><b>Licence</b></p> <ul style="list-style-type: none"> <li>- <a href="#">CC BY 4.0</a> (7) for documentation</li> <li>- <a href="#">BSD 2-Clause "Simplified" Licence</a> (8) for code</li> </ul>
	<p><b>Competitors</b></p> <p><a href="#">Software Quality as a service</a> from EOSC-Synergy (10)</p> <p><b>Technology readiness</b></p> <p><b>Pilot:</b> in use at MAX IV, tested by other facilities (incl. ESRF) and could be easily configured to work in other infrastructures</p> <p><b>EOSC integration status</b></p> <p>Not onboarded</p>	



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## Plans and conditions for long-term sustainability

- MAX IV will maintain the framework for its own scientists
- It will continue to be hosted in [MAX IV's GitLab](#) (9)



## Exploitability potential

- ExPaNDs and PaNOSC facilities can reuse the framework for their own jupyter notebook-type services
- The testing framework could be deployed as part of a CI/CD pipeline, e.g. in the frame of [LEAPS-INNOV WP7 on data compression](#) (11)
- There may be interest within national projects; e.g the [DAPHNE4NFDI project](#) (12) has a validation task for data and software reuse
- PaN could be a use case in a follow-up project to EOSC-Synergy
- The testing framework could be integrated within a future PaN container registry developed e.g. in the frame of OSCARS

## Conditions to increase exploitability

- Extend the framework to non-jupyter based analysis services
- Add support for additional analysis workflows
- Allow users to upload their own analysis software, turning the framework into a “Testing as a Service” service
- Support integration with beamline data handling, allowing the framework to support near-real-time analysis

## Links

- (1) <https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jnbv>
- (2) <https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jupyter-notebook-validation>
- (3) [https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jupyter-docker-stacks/container\\_registry](https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jupyter-docker-stacks/container_registry)
- (4) <https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jupyter-docker-stacks>
- (5) <https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jupyterhub-hpc>
- (6) <https://doi.org/10.5281/zenodo.5718671>
- (7) <https://creativecommons.org/licenses/by/4.0/>
- (8) <https://gitlab.com/MAXIV-SCISW/JUPYTERHUB/jupyter-notebook-validation/-/blob/master/LICENSE>
- (9) <https://gitlab.com/MAXIV-SCISW/JUPYTERHUB>
- (10) <https://sqaas.eosc-synergy.eu/#/>
- (11) <https://www.leaps-innov.eu/wp-7>
- (12) <https://www.daphne4nfdi.de/english/index.php>



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