



HEAppE Middleware

From Desktop to HPC

High-End Application Execution Middleware

VSB TECHNICAL UNIVERSITY OF OSTRAVA

IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

[heappe.eu, it4i.cz]



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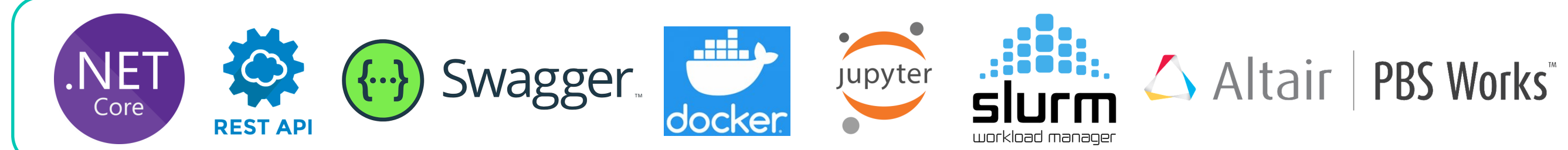
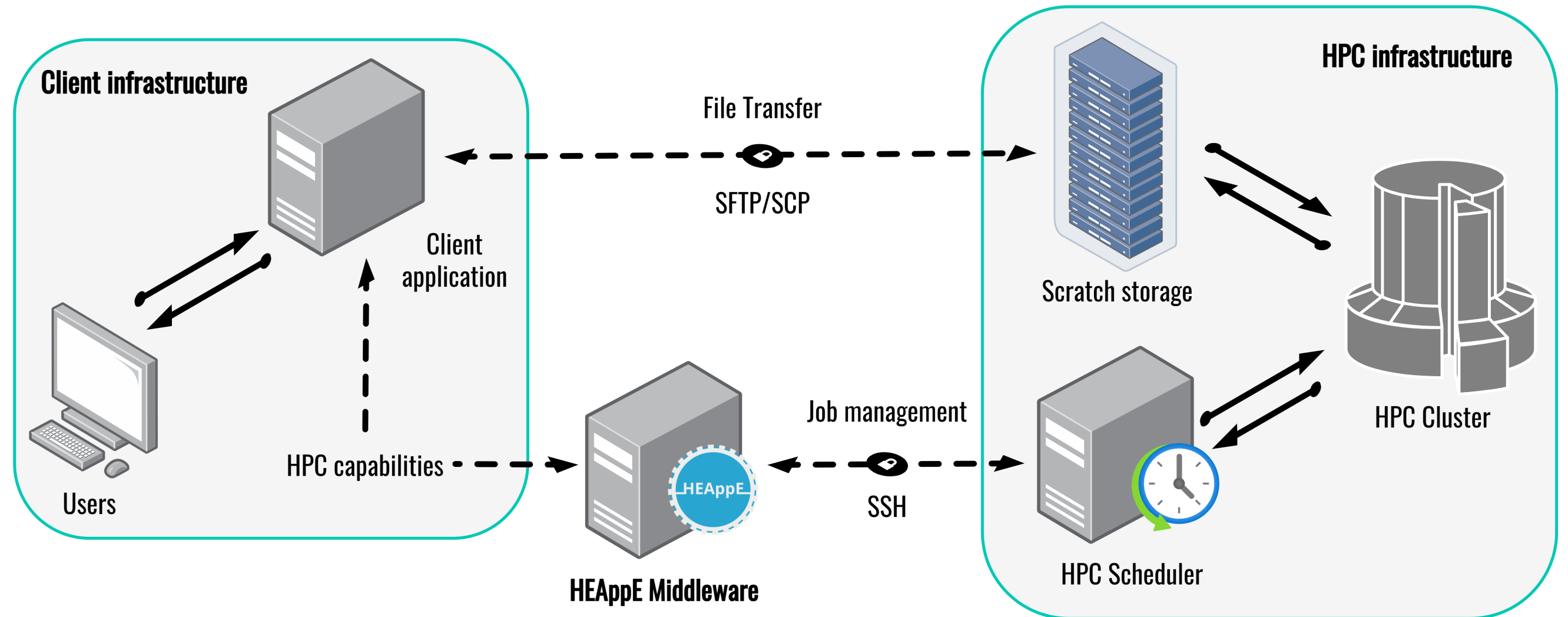
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Motivation

- To provide simple, secure and intuitive access to the supercomputing infrastructure
- HPC capabilities as a service
- Monitoring and reporting of executed jobs and their progress
- Current information about the state of the cluster

HPC-as-a-Service

- Service delivery and usage model
- Provides HPC resources, storage, and network infrastructure
- REST API interface
- Cost-effective solution for accessing the computing resources for scientific research, parallel computing, and doing complex simulations



Secure HPCaaS Middleware

- Account mapping between an external and internal accounts
- External user does not have direct access to the HPC infrastructure
- Cluster account selected from the pool is assigned to each job executed by the user
- Cluster account does not leave the HPC infrastructure

From Desktop to HPC

- Access to simulated cluster (localhost)
- Simulation of local HPC job life cycle and HPC scheduler
- Designed for local HEAppE testing in Docker container
- Easy switch from local environment to HPC infrastructure
- Fast & Easy way to try HEAppE Middleware
- Same level of security as production use (with HPC)

Key features of HEAppE

- HPC Job specification & management
- Restricted access to execution code
- Generic Command Templates for testing
- File transfer
- Reporting
- OpenAPI² REST API
- Support of multiple computational projects at one HEAppE instance



External Cyber Security audit

- Performed external security audit

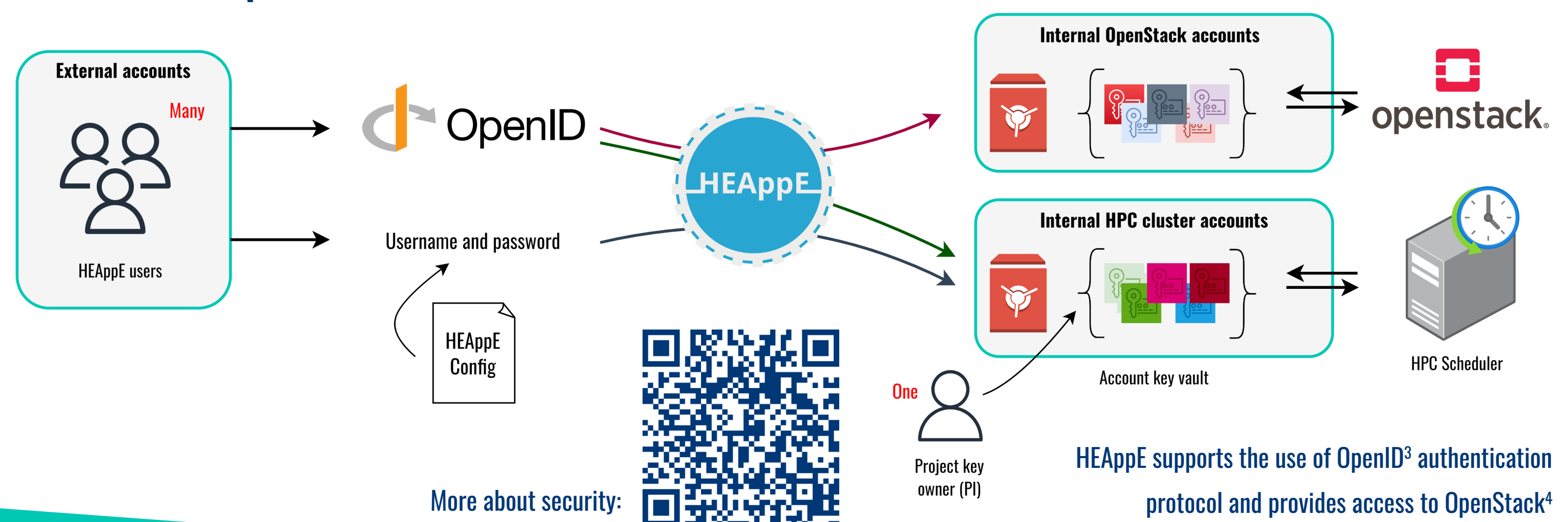
SSH Agent

- Cluster keys managed by the PI of the computational project

Command templates

- User is able to run only a set of pre-prepared job execution templates

Multiple authentication methods

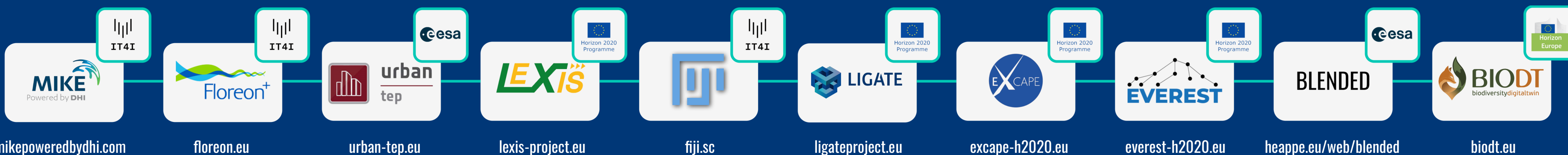


[²swagger.io]

HEAppE supports the use of OpenID³ authentication protocol and provides access to OpenStack⁴

[³openid.net, ⁴openstack.org]

Selected projects and use-cases



Institutions running HEAppE

