Platforms, Digital Infrastructure & Interoperability

Wed. Nov 11, 2026 4:00 PM - 5:30 PM JST | Wed. Nov 11, 2026 7:00 AM - 8:30 AM UTC | Room C (201) (2F)

Oral B1 Digital Infrastructure, Interoperability and AI-Enabled Platforms

Chair: Jon Blower, Naoki Hirose

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[eHvadpaV-02] A reuseable OSS Framework for building reliable and agentic digital twins

*Philipp S. Sommer (1. Helmholtz-Zentrum Hereon (Germany))

Agentic digital twins require more than conversational interfaces: they need reliable access to scientific methods, distributed infrastructures, and trusted data while remaining secure, maintainable, and reusable. We present an open-source framework for building such systems based on the Data Analytics Software Framework (DASF), a lightweight message-broker-based RPC framework that enables scientists to expose existing Python methods, workflows, and models as remotely callable services.

The approach is designed for interoperability across heterogeneous research environments. DASF-based agents can securely orchestrate tools and computations across institutional boundaries, including high-performance computing systems, local research infrastructures, and domain-specific services, without requiring inbound internet-facing ports. This allows agentic digital twins to combine distributed capabilities while keeping compute close to data and respecting institutional security policies.

A key strength of the framework is its open-source and reusable deployment model. DASF can be setup through standardized templates and Helm charts, supporting reproducible deployments across projects and institutions. This reduces implementation effort, encourages common architectural patterns, and enables scientific teams to build agentic systems without re-platforming existing applications.

We demonstrate the concept with iseapower.hereon.de, a decision-support tool for offshore wind farm maintenance, combining multiple infrastructures and frameworks. In this operational digital-twin context, a DASF-based AI agent can trigger analyses, plan maintenance workflows, and return results as native application views such as maps, plots, tables, and dashboards. The agent therefore becomes an additional interaction layer for science-based decision support rather than a detached chatbot.

The framework supports reliable, transparent, secure, and interoperable agentic digital twins that can be adapted to diverse scientific questions and stakeholder-driven decision processes.

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