

OCP Digital Twin Strategic Initiative

I. Purpose and Vision

The Open Compute Project (OCP) is launching a new strategic initiative focused on digital twin technologies. This initiative recognizes the revolutionary potential of digital twins to enhance the design, deployment, operation, and optimization of open hardware in data centers, leading to efficient and flexible scalable computing.

Our vision is to cultivate an open, interoperable, and community-driven ecosystem for digital twins within the data center and broader IT industry. By accelerating the adoption and practical application of these technologies, we aim to enable the OCP Community to achieve unparalleled levels of efficiency, resilience, and insight throughout the entire lifecycle of open hardware and data center infrastructure.

II. Core OCP Goals for the Digital Twin Initiative

This initiative aims to achieve the following core objectives, directly aligned with OCP's tenetsInitiative:

1. **Standardization for Interoperability:**

- To define, develop, and promote open standards and specifications for digital twin data interchange, data models, interfaces, and communication protocols.
- To create data models that can be freely exchanged and utilized across different digital twin software applications, preventing vendor lock-in and fostering a more open ecosystem.

2. **Enhancing Efficiency and Optimization:**

- To leverage digital twins for enhanced simulation, analysis, and predictive modeling across the external and internal data center environment, encompassing power, cooling, space, and IT equipment performance.
- To enable real-time optimization of operational efficiency, energy consumption, and resource utilization through the continuous integration of physical systems digital models

3. **Accelerating Sustainable Infrastructure:**

- To facilitate the design and operation of more sustainable data centers by enabling comprehensive lifecycle assessments, optimizing resource use (energy, water), and promoting heat reuse strategies through digital twin insights.
- Develop tools for modeling and validating green design principles, including circular economy practices, to aid in decarbonizing data center infrastructure.

4. **Driving Scalability and Resilience:**

- To empower the OCP Community to design, deploy, and manage hyperscale, edge, and AI/ML data centers with greater precision and speed.

- To enhance infrastructure resilience by enabling fault prediction, virtual testing of failure scenarios, and optimized disaster recovery planning using digital twins.

5. Fostering Collaboration and Innovation:

- Facilitate open collaboration among diverse stakeholders, such as data center operators, hardware manufacturers, software developers, and research institutions, to foster the creation and sharing of digital twin solutions.
- To accelerate innovation by providing open reference designs, white papers tools, and methodologies that lower the barrier to entry for digital twin development and adoption.

III. Scope and Focus Areas

The OCP Digital Twin Initiative will initially focus on, but not be limited to:

- **Data Center Facility Digital Twins:** White paper: Digital Twins for Data Centers
- **IT Hardware Digital Twins:**
- **Environmental and Sustainability Digital Twins:**

IV. Expected Outcomes

By achieving the goals outlined in this mandate, the OCP Digital Twin Strategic Initiative will empower the industry to build smarter, more efficient, and more sustainable digital infrastructure, ultimately driving innovation and delivering significant value to data center operators, solution providers, and end-users alike. First expected deliverable (white paper) expected to be ready for publication by Q4 2025.