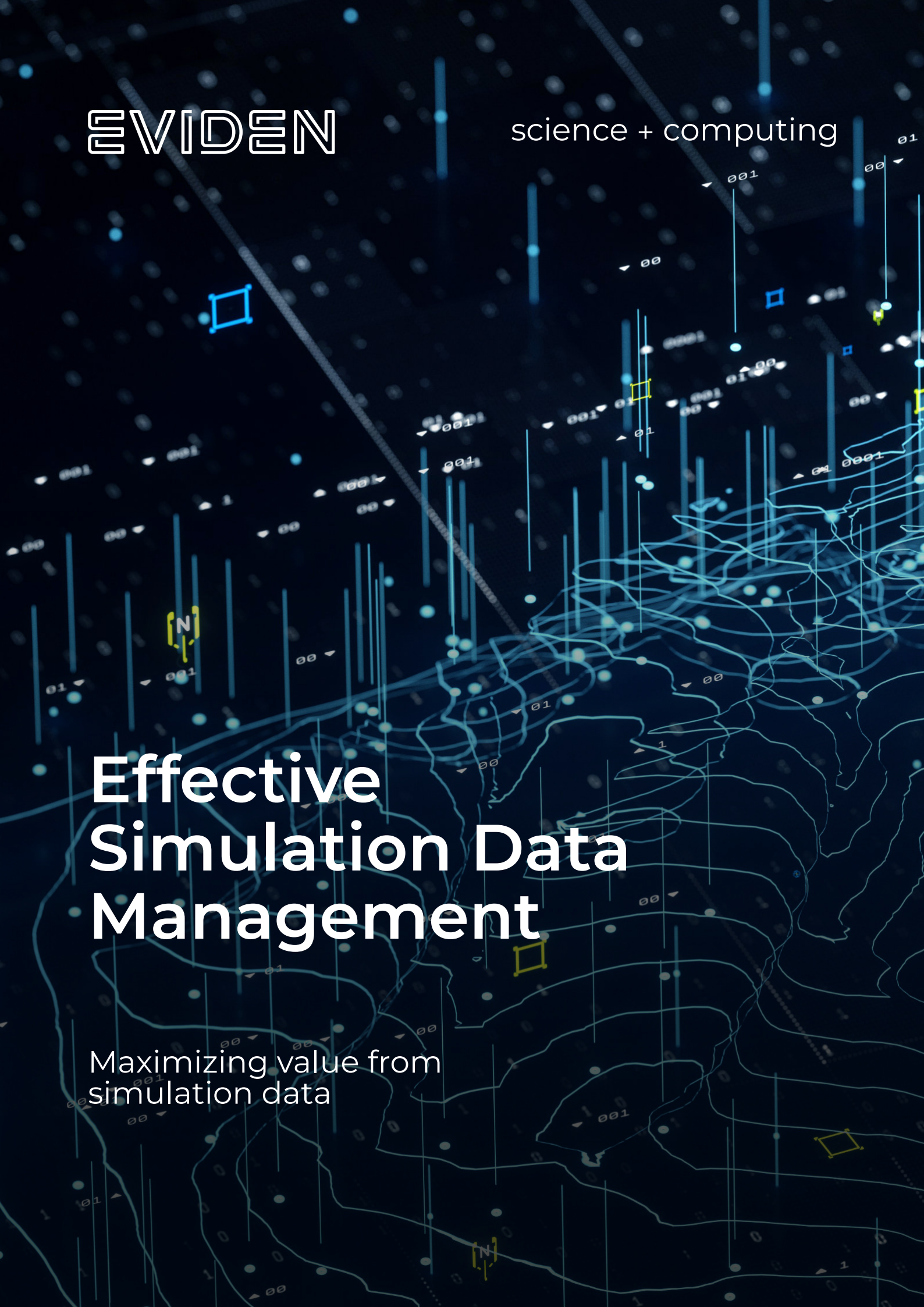
EVIDEN

science + computing



Effective Simulation Data Management

Maximizing value from simulation data

Maximizing value from simulation data

Effective management of simulation data in CAE environments

Simulation has become a cornerstone of modern product development, playing a vital role in the computer-aided engineering (CAE) process. As the volume and complexity of simulation data grow, managing this information efficiently is critical for ensuring innovation, quality, and speed in product development. This document explores strategies for realizing a secure and scalable IT platform, integrating ISV SDM software stacks in bespoke simulation IT landscapes.

Key objectives of simulation data management

Managing simulation data in CAE environments focuses on:

- **Optimized data usage**: Ensuring simulation data, models, and results are accessible and usable across projects and teams.
- **Improved organization**: Maintaining structured and traceable records of simulation processes and outputs over the product lifecycle.
- **Compliance**: Effective fulfillment of legal & regulatory requirements to enable digital-only product homologation and conformity assessment
- **Enhanced collaboration**: Facilitating seamless communication and data sharing among engineering teams.

Approaches to managing simulation data

Single Source of Data Truth

A Single Source of Data Truth (SSOT) ensures that all simulation data is unified and consistent, providing one authoritative version accessible to all stakeholders. This guarantees transparency, traceability, and alignment throughout a project lifecycle.

Even if the technical setup is decentralized, such as in a follow-the-sun model, data from all locations synchronizes into this single trusted repository. This approach enables seamless collaboration across time zones while maintaining data quality and accelerating decision-making.

Integrating simulation data with broader processes

Linking simulation data to other CAE and product lifecycle management (PLM) tools enhances alignment between simulation results and overall project objectives. This integration also enables advanced reporting and analytics capabilities.

Automation and standardization

Standardizing workflows for data input, simulation execution, and result storage reduces errors and improves consistency. Automation helps streamline repetitive tasks, enabling engineers to focus on innovation.

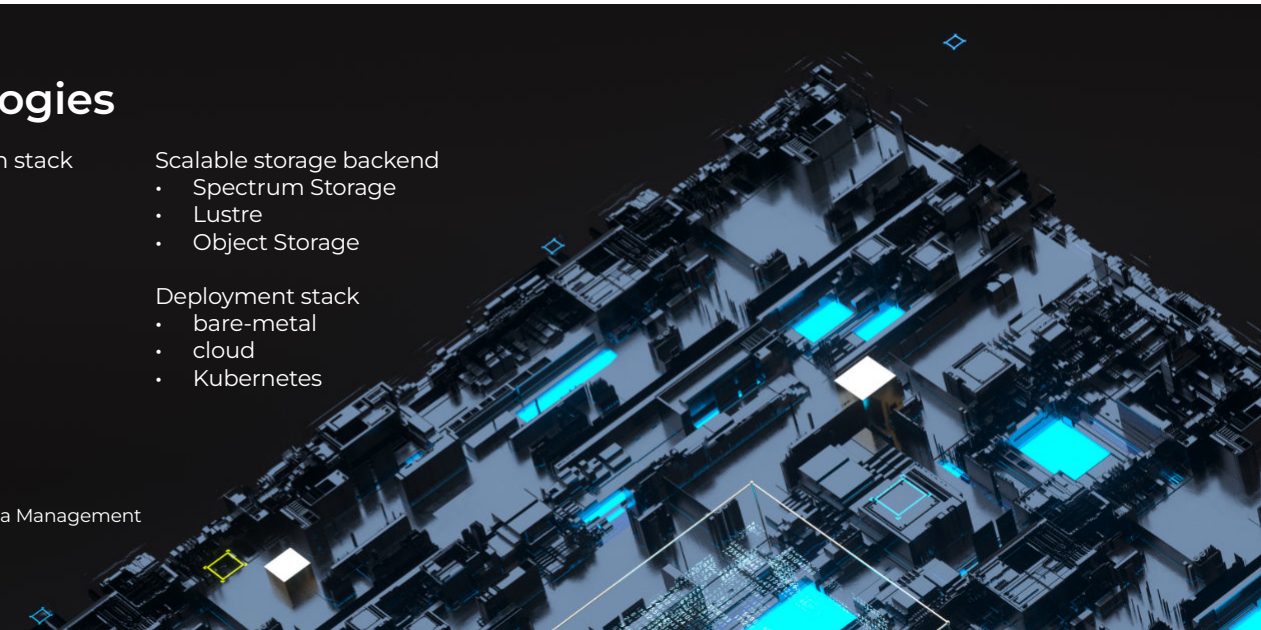
Technologies

SDM application stack
- SCALE
- PDTech
- Hexagon

PDM platform
- 3DX
- Teamcenter

Scalable storage backend
- Spectrum Storage
- Lustre
- Object Storage

Deployment stack
- bare-metal
- cloud
- Kubernetes



Challenges in SDM

Data and toolchain complexity
Integrating diverse file formats, data types and APIs used across tools and teams.

Scalability
Adapting management practices to accommodate ever-growing volumes of simulation data.

Data security
Ensuring sensitive data remains protected while enabling collaboration especially with external suppliers and in hybrid cloud scenarios.

Benefits of effective SDM

Higher efficiency
reducing time spent searching for and duplicating simulation data

Informed decisions
leveraging historical simulation data to improve design accuracy and performance

Risk mitigation
identifying potential issues early through better data accessibility and analysis

Cost savings
minimizing redundant simulations and optimizing resource utilization

Our Insights: Scalable Kubernetes solution with scale.SDM

Our solution, serving as the foundation for container-based CAE simulation data management, can be tailored to the specific needs and individual requirements of each customer situation. For one of our clients in the automotive industry, this is achieved using a “lightweight” Kubernetes distribution and open-source tools deployed on virtualized servers. This approach enabled the cost-efficient implementation of a highly available and scalable Kubernetes environment for simulation data.

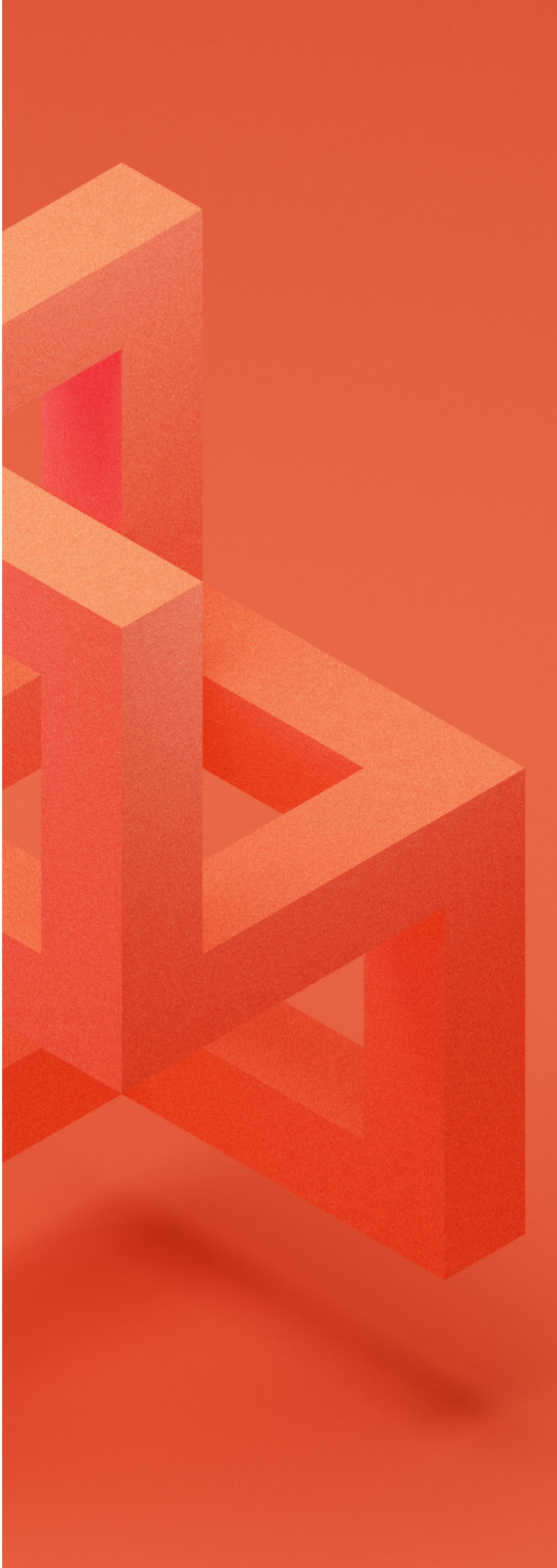
As resource demands increase or requirements evolve, our solution facilitates a seamless transition to a fully supported Kubernetes platform on dedicated physical hardware or, alternatively, to a highly scalable, managed cloud environment, ensuring maximum flexibility and future-proofing.

Conclusion

Effective simulation data management is an essential aspect of the CAE environment, driving innovation, improving collaboration, and reducing costs. By adopting strategies that emphasize data accessibility, organization, and integration, engineering teams can fully leverage their simulation efforts to create superior products. With a strong focus on managing the complexities of simulation data, organizations can ensure a competitive edge in today’s fast-paced industries.

For more information please contact:
hpc-sales@eviden.com

Visit our website:
science + computing
Consulting and Services



science + computing

science + computing ag, a 100% subsidiary of Eviden, offers IT services, solutions and software for the efficient use of complex computer environments in research, development and computation. Our long term customers include manufacturers and suppliers in the automotive, microelectronics, aerospace and pharmaceutics sectors as well as scientific research institutes. We help our customers focus on their core business objectives by providing an efficient, cost-effective and resilient IT infrastructure.

EVIDEN

Eviden is a next-gen technology leader in data-driven, trusted and sustainable digital transformation with a strong portfolio of patented technologies. With worldwide leading positions in advanced computing, security, AI, cloud and digital platforms, it provides deep expertise for all industries in more than 47 countries. Bringing together 47,000 world-class talents, Eviden expands the possibilities of data and technology across the digital continuum, now and for generations to come. Eviden is an Atos Group company with an annual revenue of c. € 5 billion.

Connect with us

science-computing.com