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Cadence Reality DC Design

Cadence Reality DC Design enables engineers to design the next generation of data centers, inside and out, with physics-based simulation powered by computational fluid dynamics(CFD).

Cadence Reality DC Design enables the creation of fast and accurate data center digital twin models. These models are a virtual representation of an existing or future data center. They can be used to explore multiple design configurations and failure scenarios to fine-tune the overall approach to new data center design or reimagine existing legacy data centers. Companies can reduce costs and minimize failures while pursuing their sustainability goals by working in a virtual environment to maximize data center resilience, physical capacity, and cooling efficiency.

Designers can study the implications of different power and cooling scenarios using advanced functionality within the software suite to create multiple infrastructural layouts of power and cooling systems. These can be simulated through different model iterations and analyzed to define the most economical and energy-efficient data center design.

Figure 1: Example of a results plane showing cabinet inlet temperatures

Benefits

- Streamline modeling, solving, and reporting with intelligent items, solver automation, and single-click reporting
- Ensure data center resilience by simulating component failure in your cooling or power infrastructure reporting

Features

- Cooling strategies and data center metrics
- Flow network, model controls and, power
- Transient simulation, failure and what-if analyses
- Compehensive library and automated reporting
- External modeling

Cadence Reality DC Design Configurations:

- Essential – This entry-level software package is for conceptual data center design and offers data center modeling to cabinet-level with eight-core solving capability.
- Advanced –This package is for advanced users who model complex data center environments to the cabinet and IT level using time-based simulations, 3D CAD integrations, and building information modeling (BIM). This option can simulate both the internal data center space and the external environment.
- Pro – This fully comprehensive software suite offers best-in-class design software for simulating the complete data center ecosystem from chip to chiller with 32-core solving capability. This package provides all prior package functionalities, adding power, flow, data network, and weight modeling capability

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Cadence Reality DC Asset Twin

Data center management solution for capacity planning and resource management to maximize operational performance

Cadence Reality DC Insight consists of two modules. This datasheet covers Cadence Reality DC Asset Twin.

Cadence Reality DC Asset Twin functions as a searchable archive of all IT assets that can be used to manage power, space, weight, and network port capacity (Figure 1).

Cadence Reality DC Asset Twin provides tools to manage IT moves, installs, and decommissions. The software includes customizable, automated reports that offer actionable insights to all data center business units. The software uses live data visualization and reporting tools to help data centers control cost, reduce risk, utilize capacity, align teams, and effectively manage the lifecycle of key assets.

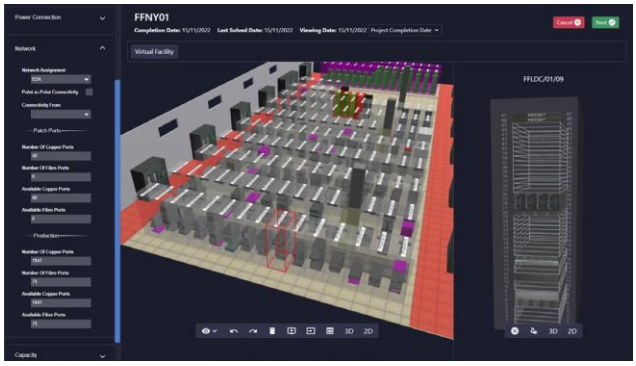

Figure 1: The network property sheet for a cabinet displayed within Cadence Reality DC Asset Twin

Benefits

- Oversee an up-to-date view of all IT deployment plans from all users in one place
- Manage power and data port connectivity, including the impact of future plans on panel phase balance, breaker loading, and failure analysis of critical components
- Identify and troubleshoot potential data center layout issues, such as mismatches in zone IT load
- Effortlessly populate the model with smart library items as IT and cabinets are deployed to accurately reflect the data center

Features

- Operational insights
- Smart operations
- Connectivity matters
- Effortlessly populate the model with smart library items as IT and cabinets are deployed to accurately reflect the data center

Upgrade from Cadence Reality DC Asset Twin to Cadence Reality DC Digital Twin and Enable CFD Physics-Based Simulation

When safeguarding data centers, CFD analysis offers data center operators additional insight in making informed capacity planning decisions and assessing long-term effects on data center resiliency. Physics-based simulation, powered by CFD, allows the cooling load and airflow to be accurately considered in capacity utilization and deployment decisions. Cadence Reality DC Asset Twin users can opt to engage in additional project-based simulation services or upgrade to the fully calibrated Cadence Reality DC Digital Twin module to run regular simulations and maximize data center performance.

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Cadence Reality DC Digital Twin

Cadence Reality DC Digital Twin combines a detailed digital twin model with a powerful CFD solver. The digital twin model is calibrated to reflect its physical counterpart accurately.

Cadence Reality DC Insight consists of two modules. This datasheet covers Cadence Reality DC Digital Twin.

Cadence Reality DC Digital Twin uses physics-based simulation to provide the visibility and foresight necessary to take control of data center performance (Figure 1).

To ensure it is automatically updated, it can be connected to live data and customer workflows from existing building management systems (BMS) and data center infrastructure management (DCIM) systems. Crucial data center insights are accessed via one user-friendly platform to enable teams to collaborate.

Figure 1: Cadence Reality DC Digital Twin showing simulation results of the cabinet thermal temperature plane

Benefits

- Streamline individual and collective efforts to manage data center operations and reduce response time
- Test deployment options and failure scenarios to study the implications of different power, loading, and cooling scenarios
- Make sustainable decisions with carbon usage analytics and energy efficiency report
- Integrate the digital twin model with environmental monitoring systems, ticketing software, multiple DCIM tools, and more for smooth operations and easy reporting

Features

Cadence Reality DC Digital Twin is an extension of Cadence Reality DC Asset Twin and includes all the features offered within it.

- Cadence Reality DC Digital Twin automatically calculates capacity, utilization, and resource availability across a wide range of metrics, including power, space, cooling, network availability, and weight. These calculations are used to visualize data center capacity, validate IT placement, and optimize data center space.
- Cadence Reality DC Digital Twin can also simulate modern control systems, including variable frequency drives (VFDs), primary/secondary configurations, and group or staged controls using temperature, pressure, humidity, or velocity sensors.
- Cadence Reality DC Digital Twin can schedule or automate tasks, such as running simulations, generating reports on current/future data center projects, creating custom reports and dashboards for different teams, and synchronizing updates between existing customer tools and the digital twin model.
- The intuitive traffic light deployment assistance tool includes a “go or no-go” assessment system for IT deployment in the form of a traffic light system. This system considers the user’s power, cooling, and space requirements, helping to identify suitable locations for deployment.

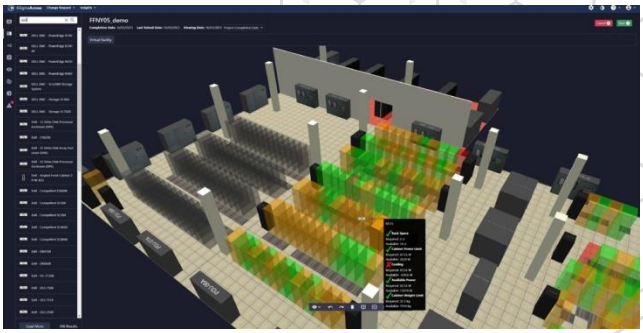

Figure 2: Traffic light system showing limited availability in the selected cabinet for deployment

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Celsius EC Solver Targets Electronics Cooling Applications

Electronics cooling simulation software for accurate and fast analysis of the thermal performance of electronics systems.

Cadence® Celsius™ EC Solver technology[1] is designed specifically to enable electronics system designers to quickly and accurately address today's most challenging thermal/electronics cooling management problems. The Celsius EC Solver utilizes a powerful computational engine and meshing technology that enables designers to model and analyze complex designs to reduce the risks of product failures and optimize thermal solutions to maximize performance.

The Celsius EC Solver analyzes the fluid flow and heat transfer of even the most complex electronics systems. The software solves for convection, conduction, and radiation using a proprietary multi-level unstructured (MLUS) meshing technology. It can analyze airflow, temperature, and heat transfer in electronics assemblies, enclosures, and power electronics for natural convection, forced convection, solar heating, and liquid cooling.

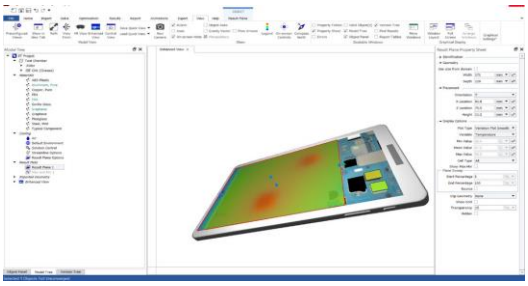

Figure 2: A basic model showing a thermal simulation of a tablet computer.

[1] *Formerly 6SigmaET by Future Facilities; acquired by Cadence in July 2022.*

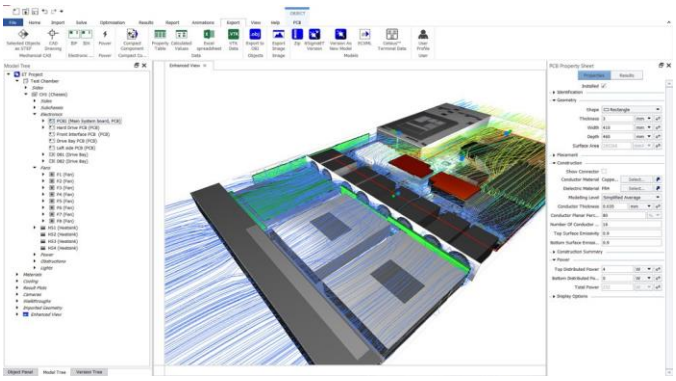

Figure 1: Air-cooled sever modeled and simulated with Celsius EC Solver, highlighting hotspots and the surrounding airflow pattern.

Benefits

- Addresses thermal/electronics cooling challenges in the earliest stages of a design
- Reduces costly design respins and engineering delays
- Improves product performance and reliability
- Scales to hundreds of cores for addressing high-complexity systems

Features

- Intelligent modeling objects
- CAD and PCB modeling
- Automatic mesh generation
- Powerful solver and optimization
- Automatic reporting

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