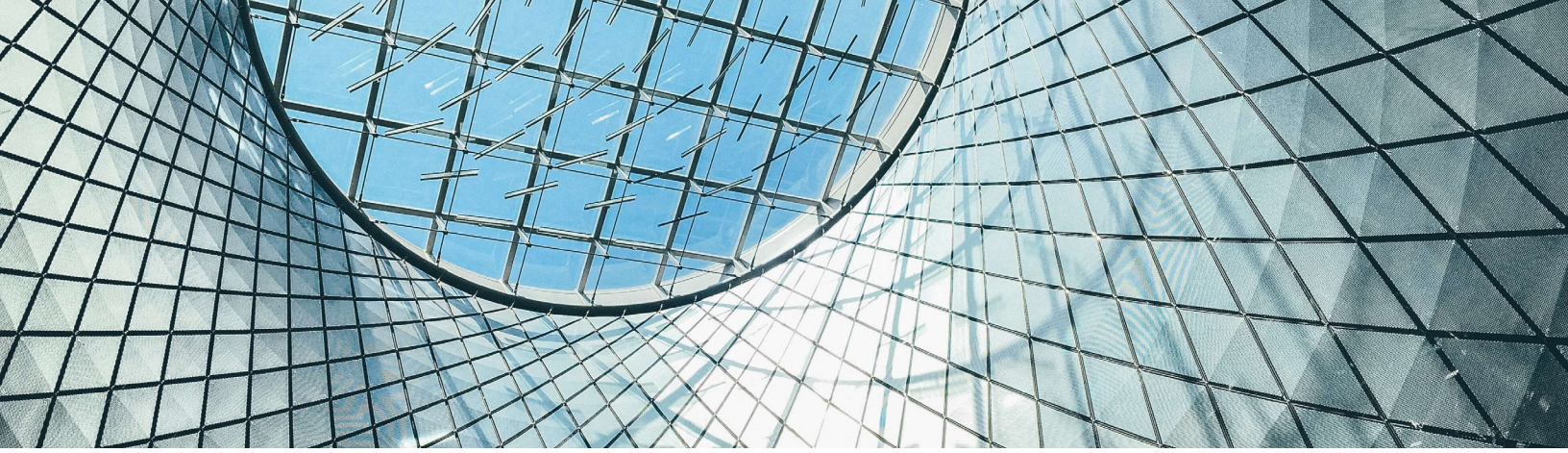

451 Research Market Insight Report Reprint

GE Vernova's GridOS aims to bring zero trust to power operations

June 28, 2024

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Most security strategies are aimed at providing the ability to recover from security incidents and robustness by increasing the ability to resist cyberattacks. GE Vernova charges at the energy market with GridOS, a full end-to-end orchestration suite based on zero-trust architecture.

S&P Global
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Introduction

GE Vernova Inc. launched GridOS in 2023. Its software platform is designed to enhance grid orchestration by providing utilities with advanced tools to manage and optimize the electric grid. The GridOS portfolio brings together the platform, applications and partner ecosystem to orchestrate a more sustainable grid and includes GridOS Data Fabric, which was introduced in February 2024 as part of ongoing efforts to improve data management and grid resilience.

With GridOS, GE Vernova has put a significant focus on security. GridOS introduces zero-trust principles within the platform level to make its software more resilient to cyberattacks as the utility industry faces an increasing number of threats.

THE TAKE

Most security strategies are aimed at providing resilience — the ability to adapt and recover from security incidents — by increasing the ability to resist cyberattacks. An emerging trend toward maturity is adopting an antifragility strategy that embraces stress and opposition to continuously improve robustness and resilience. Antifragile systems acknowledge that cyber threats are inevitable and aim to adapt, offering different pathways to complete business processes. Among other things, this encompasses a diversified security strategy, increased redundancy, decentralization, frequent stress-testing and long-term planning. GE Vernova's GridOS aligns with these principles; however, perhaps the most important element in antifragile systems is the human capital and a culture of embracing change and challenge. While GE Vernova cannot directly address the personnel aspect of a utility's security operations, GridOS provides industry-standard tooling (e.g., GitOps) as the framework and infrastructure for shifting to modern security strategies such as declarative computing. GridOS also enables utilities to integrate the platform into its existing security strategies instead of building a proprietary security layer specific to their application landscape.

Context

It has taken industrial giant General Electric Co. several years to reinvent itself. After a few rough years, GE announced in 2021 it would split itself into three new separate publicly traded companies: GE Healthcare, GE Aerospace and GE Vernova. The latter was established in February 2023 and incorporated in April 2024. With headquarters in Cambridge, Mass., GE Vernova was formed by the merger and spin-off of GE's energy divisions GE Power, GE Renewable Energy and GE Digital. The company now employs 80,000 people and is helmed by Scott Strazik, who spent more than 20 years in senior management roles across several business lines in the former General Electric. With roughly 54,000 wind turbines and 7,000 gas turbines operational, GE Vernova claims to help generate about 25% of the world's electricity.

Strategy

GE Vernova positions itself as "lean and green." As a brand-new enterprise, its mission statement is aimed at sustainability and decarbonization of the energy business. Its branding supports its mission statement: "Ver" comes from verde (green) and "nova" means new. However, it has retained the iconic GE monogram in its logo, like other GE spinoffs. Despite paying homage to its past in retaining the logo, it has shaken off some of its legacy by saying goodbye to its Predix offering. GE Digital, now the software arm of GE Vernova's electrification business, builds on its Digital Energy 2.0 strategy launched in 2020, where it was among the first of its peers to modernize the architecture of its monolithic platform and incorporate modern IT principles and modular architecture.

Technology

While GE Digital refocused its Predix strategy in the early 2020s, the GE Vernova Grid Software business started working on GridOS, a new software suite based on the Digital Energy 2.0 strategy and designed to manage grid operations while being mindful of years of investment in heritage products in utilities around the globe. During the past decades, the utility business has changed significantly. Distributed energy resources have been added to the grid, turning one-directional power flows into bi-directional flows and requiring more balancing capabilities. Other innovations include virtual power plants, the electrification of transport, and microgrid technology. Each of these innovations required new management capabilities, resulting in a patched and fragmented IT landscape. Traditional boundaries between transmission system operators and distribution system operators and power generation companies have blurred, and small independent energy service companies have penetrated the market in large parts of the world. With GridOS, GE Vernova understands that today's energy market is comprehensive, from generation to behind the meter, and requires an integral approach to orchestrate grid operations across the value chain, hence GridOS: Orchestration Software.

GridOS is built on modern-day architectural principles, supporting a hybrid cloud architecture, and offers federated grid data fabric based on a unified network model and introduces a zero-trust architecture for grid management software. From a cybersecurity standpoint, the move toward zero trust is an important one, with critical national infrastructure increasingly facing cyberthreats. The principles of zero trust have been firmly rooted in IT environments during the past few years as COVID-19 and remote operations provided strong tailwinds. Slowly, zero-trust principles are beginning to trickle down to OT environments, with several OT security-focused vendors offering zero-trust solutions. Based on the evolution of regulatory requirements, GE Vernova sees zero trust as the emerging de facto standard and is one of the first to move the principles from the network and security layer into the application level.

The combination of zero trust, containerized architecture, providing GridOS Evergreen incremental updates instead of big patches or new large destabilizing version releases, and hybrid cloud architecture with the ability to move from on-premises to cloud native fits a modern antifragility systems design. This design allows enterprises to be flexible in their deployment and create diversified security strategies. GridOS not only aligns with antifragility principles from a cybersecurity point of view, but also from an operational point of view by creating a grid system that not only withstands disruptions but also learns and improves from them. Its modular design, real-time monitoring, integration of diverse energy sources, enhanced security, data-driven decision-making and stakeholder engagement collectively contribute to a grid that becomes stronger and more resilient through challenges and changes.

Competition

GE Vernova competes with the traditional tier one industry vendors, ABB Ltd., Eaton Corporation PLC, Hitachi Vantara, Schneider Electric SE and Siemens AG. Most of these have revamped their software portfolios during the last years, moving toward a more IT-oriented architecture. Of the competitors, Schneider Electric probably has the most integrated suite, focusing on Schneider Electric Connect as central data repository (the revamped AVEVA Hub) with various EcoStruxure solutions revolving around this central hub. Siemens has made similar architectural choices, but still offers segment-tailored solutions such as LV Insights for the low-voltage network and Gridscale X. During the past years, Hitachi acquired ABB's Power business and funneled its capabilities via a temporary joint venture vehicle, Hitachi-ABB Power Grids into its Hitachi Vantara Lumada offering to provide a holistic power grid management suite, also based on IT architecture. A relative newcomer to the space is Kongsberg Digital. Hailing from an oil & gas background, the Norwegian company has entered the utility market with an installment of its KogniTwin suite tailored to LV grid management.

To each of the vendors, security is a theme and applies security controls such as secure product development and lifecycle management and multifactor authentication, but compared with its competitors, GE Vernova likely leads when it comes to zero trust and solutions integrated into the platform.

SWOT Analysis

STRENGTHS

Through its modern architecture, GridOS not only provides zero-trust access at the platform level but also fits an antifragility systems design incorporating more security controls in the application level. Additionally, its alignment under GE Vernova's Electrification business brings broader capabilities in products and services across Grid Solutions, Power Conversion, Solar and Storage businesses.

WEAKNESSES

Integrating security at the platform level instead of applying security solutions as an overlay is a strength but may complicate organizational matters as not only operations but also security engineers need to work with the platform and integrate it into their routines and security frameworks.

OPPORTUNITIES

GE Vernova will likely see most of its deployments come from its extensive global installed base, but with its end-to-end focus and its GridOS Data Fabric and GridOS integration engine capabilities, it can be used as a stand-alone data integration platform in utility ecosystems without any GE Vernova or GridOS applications. This flexibility means it also may prevail over competitors offering segmented solutions.

THREATS

The energy landscape is changing quickly. Not only is the industry changing, but also each of the major vendors is modernizing its offering to accommodate the digital transformation, and GE Vernova may see some strong competition.

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