

CAPABILITY BRIEF

# Power and Future Grid Systems

IMPROVING PERFORMANCE TO MANAGE THE ELECTRICAL GRID WITH DISTRIBUTED ENERGY RESOURCES (DERs)

## HIGHLIGHTS

Proven, scalable, secure, high-performance connectivity framework for reliable data exchange, regardless of communications network or transport protocols

Integrates and secures legacy equipment and applications/systems

Provides a cost-effective COTS approach to manage the unpredictable demands of DERs

Built on the Data Distribution Service™ (DDS) open standard; no single-vendor lock-in and true interoperability

At the network level, Power Grid management is already undergoing a sizable re-invention. RTI Connex<sup>®</sup> DDS is an architectural software framework that enables fine-grained control of new and legacy equipment, regardless of transport protocols. It helps Utilities to maximize network resources, stay one step ahead of regulations and manage DERs more efficiently.

## A FUTURE-PROOF SOLUTION FOR THE EVOLVING POWER GRID

Today, the modern power grid is at a crossroads. For utility providers, operational challenges and restrictions are mounting from every angle. Compliance with evolving regulations is one such hard-to-quantify element. And though not yet mandatory, new standards are adding further question marks around the future of efficient grid operations. For utility providers, it is no longer an issue of “if” it’s going to complicate operations — it’s merely a matter of “when” and “how.”

An even more immediate concern is the runaway increase in Distributed Energy Resources (DERs), such as Utility-scale solar/storage projects, and even residential behind-the-meter (BTM) devices. The rise of DERs means that some regional utility providers will be faced with a choice: Take on the added responsibility of monitoring/controlling/optimizing existing utility equipment and BTM devices, or face a future of being irrelevant.

Modern power grid operators are now essentially thrust into the position of monitoring and controlling things they have

never “owned” before. What is the right response to this trend? One popular move is buying new equipment, which can be a great short-term solution. But maintaining a mix of new and legacy equipment can sometimes raise more issues than it solves, because these devices typically don’t interoperate efficiently. Couple this with the sea of standards that exist in the utility world, and the choices are overwhelming.

For example, legacy devices tend to communicate in intervals of seconds or even minutes. Newly installed equipment can communicate multiple or even thousands of times per second. At the network level, any operation involving both devices will either slow communication back down to single digits, or even deliver errors due to incompatibility of transport protocols. By cleverly tackling this challenge at the software level, Connex<sup>®</sup> DDS can solve this mismatch of intervals by addressing the individual data, not the timing of it.

## A SOLUTION THAT EVOLVES WITH YOU

Existing utility systems all have something important in common: They are today’s modern workhorses, and they

work well. They have evolved from smaller, manageable projects to complex, secured and heavily relied-upon assets. These systems have taken years to evolve. So, unlike the approach to technology adoption in many other industries, a rip-and-replace scenario simply does not make sense. A more sophisticated approach is needed, wherein technology is added rather than subtracted, in order to handle future power grid requirements as they evolve.

Connex DDS is one of the few available technologies that not only acknowledges these facts, but keeps a tight focus on integration to maximize the performance and throughput of legacy equipment. Connex DDS is additive, which means that Connex DDS interoperates seamlessly with an existing network, integrates with all existing security measures and speaks all the existing languages (protocols, data models, etc.). There is no need to “rip and replace” applications or equipment. In fact, existing systems are strengthened and made to perform better, often in ways that were previously impossible.

### ENSURING SECURITY IN ENERGY SYSTEMS

The ability to fine tune data and data permissions provides the necessary security needed for today’s power grids. DDS security features are not only highly effective at locking out external threats, but are also ideal for solving system vulnerabilities that could potentially compromise security as regulatory and compliance efforts progress.

Connex DDS is built on the new Object Management Group® (OMG®) open standard DDS Security specification. It provides security plugins for user and data authentication, access control, encryption, data tagging and event logging without modifying the existing DDS network infrastructure. This gives the system the necessary data confidentiality and integrity, while protecting information from multiple security domains from unauthorized access and tampering.

### EFFICIENCY THROUGH PERVASIVE INTEROPERABILITY

By establishing rules-based connectivity and keeping data in motion, RTI Connex DDS makes it possible for network devices to work together as one optimized system, which boosts both performance and overall efficiency.

Think of it this way: In today’s utility monitoring and control systems, everything is “made possible” once data is residing in a database – usually back at the server room. In the data-centric world of Connex DDS, data is empowered at the device and published and subscribed to there. Because data is always in motion, it is like having the data available in shared memory, at an instant, at each of the connected devices. It is a far cry from the laborious packaging, shipping, unpacking, processing and storing of siloed data that goes on today.

Crucially, a DDS-based system enables greater availability and insight into data coming from new, unowned utility equipment. It gives utility providers the ability to control data from newly added equipment that lives on the front line and supports private residential consumers, as well as equipment that lives at large facilities and even electric vehicle (EV) charging stations. Using Connex DDS, utility providers can do more with data from DERs, even up to autonomously monitoring, controlling and eliminating demand spikes, instead of merely reacting to them.

Connex DDS offers a rich set of tools that include extremely powerful debugging, integration and visualization capabilities to gain insight into the system in order to fine-tune performance. Tools like Data Routing Service and configurable Quality of Service (QoS) make it possible to specifically control the parameters, speed and types of data being sent, ensuring that data only goes where it is needed.

Connex DDS is proven in more than 1,500 unique designs and is used in mission-critical systems throughout the world, including Siemens Wind.

## ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework company for autonomous systems. RTI Connex® is the world’s leading architecture for developing intelligent distributed systems. Uniquely, Connex shares data directly, connecting AI algorithms to real-time networks of devices to build autonomous systems.

RTI is the best in the world at ensuring our customers’ success in deploying production systems. With over 1,500 designs, RTI software runs over 250 autonomous vehicle programs, controls the largest power plants in North America, coordinates combat management on U.S. Navy ships, drives a new generation of medical robotics, enables flying cars, and provides 24/7 intelligence for hospital and emergency medicine. RTI runs a smarter world.

RTI is the leading vendor of products compliant with the Object Management Group® (OMG®) Data Distribution Service™ (DDS) standard. RTI is privately held and headquartered in Sunnyvale, California with regional offices in Colorado, Spain and Singapore.

Download a free 30-day trial of the latest, fully-functional Connex DDS software today: <https://www.rti.com/downloads>.

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