



Ingenuity is the “X Factor” in Evergy’s ADMS vision

Evergy puts a premium on adaptability, flexibility, and innovation to drive reliability and enterprise-wide value

Every utility must contend with the “do more with less” imperative, but a much smaller number succeed at delivering game-changing results at a fraction of the cost of conventional approaches. Thanks to its sophisticated technology strategy, the technical ingenuity of its people and the long-term support of its leadership, Evergy is one such example.

Seven years ago, Evergy overhauled its distribution management system for its Evergy Missouri (formerly known as Kansas City Power & Light) service territory to drive operational performance, safety and reliability. Into its upgraded [Oracle Utilities Network Management System \(NMS\)](#), Evergy integrated a new web-based distribution automation system to provide operators with near real-time visibility and control into their distribution network through a single user interface. Since the upgrade, [situational awareness, system reliability and outage restoration times have improved considerably](#) – all without having to implement a traditional distribution SCADA (D-SCADA) system.

Evergy is now looking to the next leg of its distribution management and automation journey as it unifies its Missouri and central Kansas service territories under a common platform architecture that it calls “ADMx.” The “x” denotes the fact that Evergy’s technology strategy is based on an architecture, rather than a single system, with real-time OT integration middleware as the unifying technology across distribution management, automation and integration systems. “The overarching goal of ADMx,” says Matt Bult, senior manager for operations technology at Evergy, “is to maintain our focus on innovation, flexibility, and adaptability” through an operational technology (OT) architecture “that supports best-in-class technology” – an approach that aligns with Gartner’s recommended “[Composable Business](#)” strategy.

At the center of Evergy’s ADMS platform architecture is [Oracle Utilities Live Energy Connect \(LEC\)](#), the real-time OT integration middleware that orchestrates dataflows between field devices, Oracle Utilities NMS and third party applications. Architected as an OT Message Bus (OTMB), LEC middleware makes it possible for Evergy to [scale its distribution automation system to hundreds of thousands of devices at a fraction of the cost of conventional D-SCADA offerings](#).



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Matt Bult

Sr. Manager for Operations Technology, Evergy

Key goals of ADMx

Evergy’s ADMS architecture is driven by a clear design philosophy

- Innovation, flexibility and adaptability
- Robust ADMS platform with unified operator UI and apps
- OT-centric middleware that handles both protocol-based and custom integrations
- Modular, closed-loop automation strategies using both home-grown and third-party tools and UIs for engineers
- “Best of breed” OT applications

“We think of LEC as lots of different things – a ‘data gate,’ a ‘service bus,’ and a ‘SCADA data hub,’” says Bult. “LEC sits at the center of our architecture and passes supervisory control data to field devices through different network and communication protocols, making sure that we’re routing data as it makes the most sense to each of the modular systems.”

As part of an integrated solution, [Oracle Utilities Network Management System \(NMS\)](#) is the user interface that Evergy’s system operators and outage managers use to access to each module of Evergy’s ADMx and to initiate control sequences. Evergy expects its approach will help reduce customer outage minutes during normal weather conditions and deliver even more benefits during heavy storm activity. “[We’ve standardized on NMS as the management system for our operators,](#)” says Bult.

While Evergy uses some distribution management system (DMS) features from Oracle Utilities, it has not shied away from developing homegrown or third-party applications when appropriate, if only to better understand its requirements before making an investment decision. Its phased and modular approach to expanding ADMS functionality allows Evergy “to scale each component as it makes sense for our field deployments and for the way we want to run our business,” says Bult. “That way, we’re not making big bets up front, and then having to wait for field device deployments or business processes to catch up” before big benefits are realized.

The decision to select an ADMS and OT integration platform, however, was straightforward. Early on, Evergy standardized on Oracle Utilities NMS due to its popularity with system operators, who have a strong sense of “the way they like things.” At the same time, Oracle Utilities LEC uniquely met Evergy’s need for the “data gate methodology we wanted,” says Bult.

“SQL queries and APIs are great, but this is ultimately about data points,” says Bult. To drive advanced distribution automation, you need a flexible way to collect data, pass control commands, and integrate across vendor platforms “when you need to ... push the envelope” with advanced solutioning, says Bult, “but for [everything else], it should be just protocol-driven integration.” With LEC, Evergy gets a solution for both types of integrations.

NMS and LEC platform architectures offer key benefits to Evergy. “The openness of the back-end data is really what helps us,” says Bult. “There are some vendors for which the structure of the back-end is essentially locked own, and that’s not something that really works for us in this realm.”

Another major benefit of Evergy’s automation team-led approach is its efficacy in driving acceptance and adoption by system operators of advanced automation strategies that streamline some of the more complex field reconfiguration and voltage management. Thanks to early and ongoing internal engagement, “there’s a level of trust between our operators, engineers, and the people in the automation team,” says Bult. Operators will support automation strategies and tools once they are convinced of their safety and reliability, allowing them to focus on the higher order challenges of outage and system management.

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Evergy recognizes that its utility R&D-led, ADMx approach to unified ADMS and distribution automation may not be for everyone since it relies on a solid base of engineering talent and a track record of innovation. According to Bult, the ADMx approach is “modeled on things that we did [at Evergy] for over a decade, just at a much smaller scale.”

And what about traditional D-SCADA, which Evergy has been able to forego in favor of web-based distribution automation running on Oracle Utilities NMS? “D-SCADA is just another spoke on the architecture hub,” says Bult. “D-SCADA architecture is going to be embedded, diverse and distributed at the nodal level,” predicts Bult, “whether it’s a substation RTU, DNP concentrator or a controller.”

With the winter storm season approaching, Evergy is ramping up its preparations, but even so, Bult is feeling optimistic. “The beautiful thing about automation is that even if your automation scheme fails in a major storm or another event, you still have an intelligent device in the field. You still have a recloser reclosing. It’s embedded in what we do as a business and what we design to.”

The distribution management and automation project that started it all

To appreciate where Evergy is headed with its ADMx vision, it important to understand the technology strategy that positioned the company for a hybrid “buy/build” strategy that meets both grid operations and engineering needs.

In 2015, Evergy Missouri initiated an upgrade to its OMS and distribution system that allowed it to integrate 90,000 data points across 30 device types and remotely control 3,200 automated devices. By leveraging Oracle Utilities LEC and Oracle Utilities NMS, Evergy was able to consolidate multiple distribution automation (DA) systems into a manageable system of systems with Oracle Utilities NMS being the single platform and point of interaction for the operators. In Evergy’s “single pane of glass” vision, the entire DA network could be visualized and managed in real time through a single NMS capable of issuing remote controls and displaying operational data in real time without having to rely on a traditional D-SCADA system.

Evergy determined that reducing the number of screens required to actively monitor and manage Evergy’s distribution grid would improve distribution system operator (DSO) response times during power outage events, and subsequent restoration work. Prior to the upgrade, Evergy operators individually managed six sources of data and alarms. Each source came with its own desktop and set of interoperability requirements.

To turn its unified vision into a reality, Evergy needed a way to simplify creation and management of complex data flows across Operational Technology (OT) systems. Oracle Utilities LEC fulfilled this need by providing the OT-centric middleware integration solution required for interoperability and real-time data flows between its operator network management system (NMS), geographic information system (GIS), and DA devices.

After the project, DSOs monitored and interacted with only two screens: an energy management system (EMS) and Oracle Utilities NMS. By leveraging Oracle Utilities LEC to establish a flexible Operational Technology Message Bus (OTMB) architecture, Evergy was able to quickly develop, integrate, and implement an updated DA architecture capable of displaying all operational data in real time, monitoring the status of field devices, establishing alarm parameters, and controlling all devices.

“Twenty years ago everything was on paper,” says Dan Munkers, senior manager of distribution system operations during a [2019 interview](#) as he reflected on the progress that Evergy had made in its 20 year digitalization journey. With its innovative web-based DA solution running on Oracle technology, Evergy Missouri achieved a major milestone in that journey. “We’re talking about outages that impact thousands of customers restored in a couple of minutes,” says Munkers, “whereas historically it would have been a couple of hours before we even got anybody in to look at it.”

Days after going live, Evergy experienced one of its largest outage events in years. All systems performed as expected and the time needed to restore power to customers was significantly reduced despite the severity of the event.

“Oracle Utilities NMS was responsible for getting crews where they needed to go,” says [Munkers in an interview soon after the storm](#).

The impetus for modernization, but with a looming OT integration challenge

Evergy Missouri’s distribution management and DA system upgrade projects were driven by operational needs and a strong business case. Prior to the upgrade, system operators had to toggle between multiple user interfaces (UIs) and applications to perform routine tasks. DA devices generated data using a diverse set of protocols at varied rates, which meant that data was not uniformly available across all control systems and the real-time statuses of devices were not always visible to operators. At that time, EMS and NMS communications and Volt/VAR functions relied upon a cellular wireless network.

As Evergy mulled over its options, it was well aware of the OT integration challenges that lay ahead. Employing technology from multiple vendors creates real-time data exchange challenges — data quality, data cleaning requirements, and data collection needs are heterogeneous. To make matters worse, technology providers are often unwilling to adopt a unified architecture or change their system codebases just to make it interoperable with another vendor’s technology. Custom programming integrations can be costly and take years to complete with no guarantee that all the data exchange issues will be solved. Large-scale, complex custom integrations rarely meet all internal goals; compromises must be made as technical limitations arise.

To SCADA or not to SCADA

When it came to solution and system integration design, Evergy had to decide whether what role, if any, D-SCADA would play. The traditional approach to real-time control and automation would be to deploy a SCADA system to act as the communications layer between the NMS and field devices.

Evergy decided against a SCADA-based solution for a variety of reasons. First, the integration of 90,000 data points and 3,200 field devices to a SCADA system and NMS would have required multiple person-years and a high level of SCADA development and consulting spend to develop. Second, a SCADA-based solution would have been costly to operate since custom programming to adjust integrations and communication pathways would have been required each time a new DA device or system was brought online.

While cost was an important factor in Evergy’s solution strategy, interoperability and security were also important OT imperatives. No matter which path it took, Evergy distribution operations would continue to rely on several communication networks – some secure, but others not. In contrast, ADMS functionality such as control and fault location, isolation and service restoration (FLISR) required an architecture with secure ADMS communication pathways. Had Evergy pursued a SCADA-based strategy, it would have required yet another system to secure communications between the OMS and critical infrastructure SCADA.

In addition to adding unnecessary complexity and cost, a SCADA-based approach would have required yet another DSO user screen – contrary to a key design imperative of the project. Simplifying and streamlining the user experience can improve operator efficiency and lower the risk of operator error.

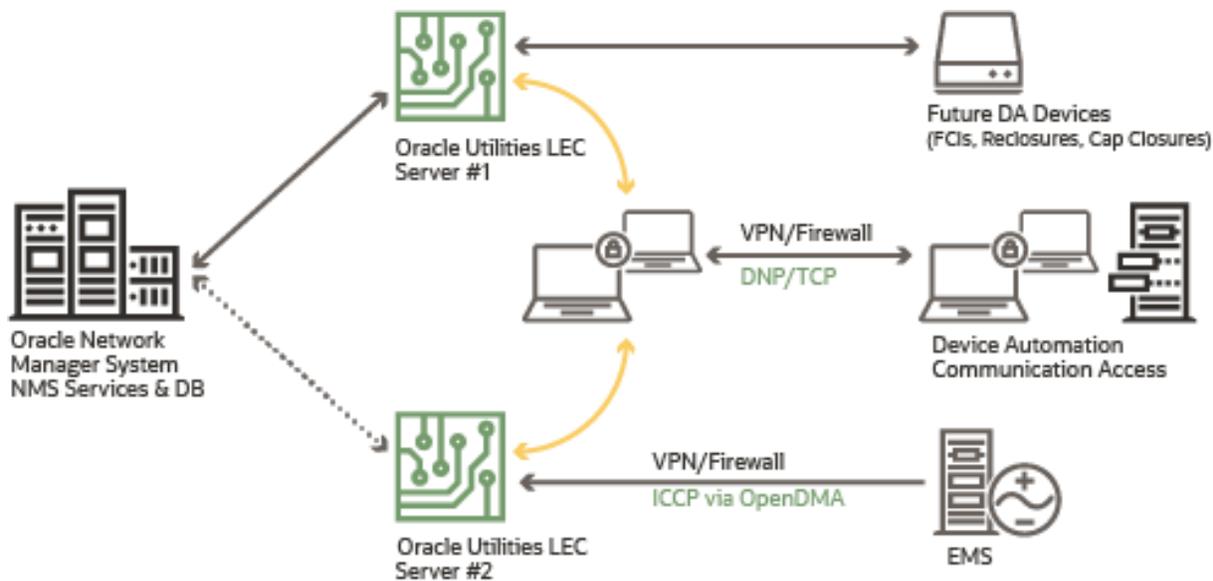
How Oracle Utilities LEC solved the OT integration challenge

To achieve organizational goals associated with the project, Evergy needed an integration platform that was capable of transacting in real time without requiring the manual integration each DA component. Evergy found its solution in [Oracle Utilities LEC](#), a scalable, software-based solution that maintains a small footprint even in large, complex deployments. After careful review, the utility concluded that deploying Oracle Utilities LEC would eliminate complexity, reduce installation time, and lower the long-term cost of maintaining the integration.

Oracle Utilities LEC extracts, transforms, and loads data in real time using high performance in-memory processing — meaning it can process a million transactions per second and can do so while applying operational logic such as

protocol translation, dead-banding, and a full array of additional data manipulation functions. In addition to managing real-time transactions, Oracle Utilities LEC provides data flow configuration and namespace management, keeping devices and systems synchronized and allowing for data flow redefinition as needed. This unified approach to device identification and integration ensures that command/control functions are dispatched to the right DA device at the right time.

Using Oracle Utilities LEC’s OT-centric middleware as the “glue logic” of its architecture, Evergy and its partners were able to refine the way in which applications and devices were integrated back to the distribution grid as well as the way they communicate. The technology allowed for wholesale integration, while at the same time introducing a mechanism for enabling more complex operational capabilities. Using the NMS, the distribution system operator can control OT devices, drive and display the status of all DA devices, and see all operational data in real-time with GIS model overlays. Functions such as dead-banding, data state conversion, transforming by phase state data, graphical configuration of data flows, and Python script-based transformation are implemented in the middleware to ensure a safe, reliable and high-availability integration. Evergy uses redundant high-availability servers in a live/live configuration, ensuring that data is always available to critical OT systems.

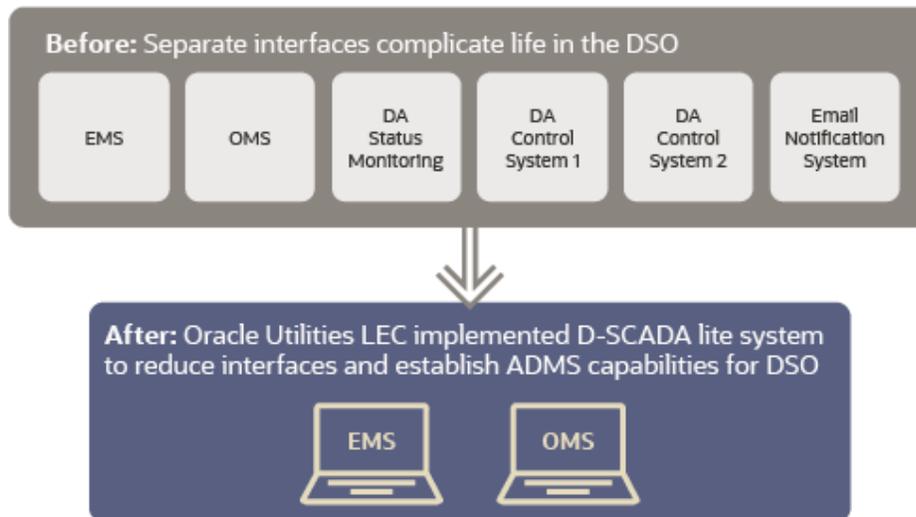


In Evergy’s solution architecture, Oracle Utilities LEC acts as an Operational Technology Message Bus (OTMB), enabling flexible, configurable bi-directional data flows among field devices, OT systems, Oracle NMS, databases, and the control room. Interoperability between systems relies on the ability of the middleware platform to translate protocol languages and transmit data with the correct throughput and latency. Evergy embedded much of its operational and business logic using Python scripting, allowing Oracle Utilities LEC to work in a number of ways: as a protocol translator, data filter, data cleaner, OT message bus, and modular hub for future integrations.

Solution summary and results

Both Oracle Utilities LEC and Oracle Utilities NMS played crucial roles in Evergy Missouri’s eventual distribution management and automation strategy. By facilitating the exchange of data between various secure and unsecure systems, Oracle Utilities LEC solved Evergy Missouri’s complex integration challenge across many systems, communication networks, and devices types. By incorporating Oracle Utilities LEC in its solution design, Evergy was able to integrate its “system of systems” at a fraction of cost and in a fraction of the time normally associated with similarly complex integration projects.

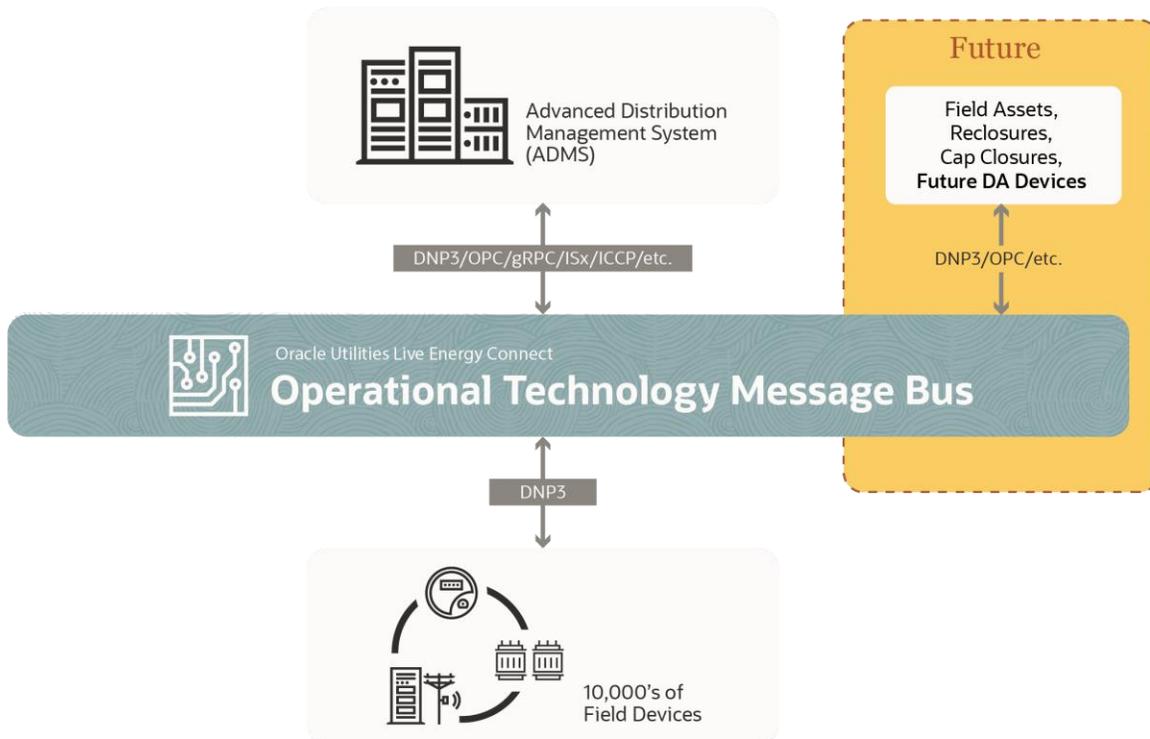
Fully integrated with Oracle Utilities LEC, Oracle Utilities NMS serves as the front-end UI and management system for distribution system operators and outage managers alike. The integrated Oracle Utilities solution allowed Evergy Missouri to consolidate its control room interfaces to two screens from six and to provide its system operators with outage management, distribution management, and real-time control and data acquisition capabilities over 3,200 field devices – all without having to rely on a traditional D-SCADA system.



Shortly after Evergy deployed its upgraded DA system, the utility experienced a widespread outage event. Alarms from throughout the Evergy distribution grid were routed through Oracle NMS. Control room applications alerted field technicians in real time. The status of every device in the field was consistently reported, issued commands were executed and ultimately Evergy's enhanced system of systems based on Oracle Utilities NMS and Oracle Utilities LEC reduced the amount of time between the outage event and power restoration.

What's Next?

Following on the success of this work, Evergy has undertaken two significant projects to increase the scope and scale of this system. Fortunately, its investment in OTMB architecture will be helpful here as well, as it easily allows for flexibility and scalability. The first project is a new application to use Oracle Utilities LEC as an OT data orchestrator to optimize data and ensure systems remain performant. OT data will be published to the OTMB and then various applications (D-SCADA, EMS, DERMS, in-house automation and asset management tools) will consume the data, as appropriate.



The second project is to replicate the entire system for the Evergy Central Kansas service territory. Combined, Oracle Utilities LEC will be scaled to manage millions of data points and streamline the power delivery operations for more than 1.6 million customers in Missouri and Kansas.

By employing Oracle Utilities LEC as an embedded OT middleware layer, Evergy will be able to expand its ability to integrate and adapt to new modular technology and systems without being beholden to a single solution provider or its approach. This enables Evergy to maintain its focus on innovation, flexibility, and adaptability through its operational technology (OT) architecture and support best-in-class technology. With Oracle Utilities LEC and Oracle Utilities NMS functioning as a single integrated solution, Evergy distribution operators and engineers are even better positioned to drive innovation and address the evolving distribution management needs of their customers.

About Oracle Utilities Live Energy Connect

Oracle Utilities LEC is a real-time, OT-centric middleware platform. Oracle Utilities LEC provides a native framework for configuring data flows such as mappings, statistical functions, data filtering, coalescing, protocol translation, and is infinitely enhanced via an embedded in-memory Python engine. Data flow prototypes are set up graphically using templates and are instantiated at runtime from CIM, GIS, or other data sources through table-based CSV files. Oracle Utilities LEC is a network scalable, high-availability solution. Oracle Utilities LEC was developed to provide seamless integration with IT Enterprise Service Buses. Oracle Utilities LEC features native protocol support including ICCP, DNP3, Modbus, OPC, AMQP, MQTT, REST, web services and a host of other industrial protocol languages.

About Oracle Utilities Operational Technology Message Bus Architecture

Oracle Utilities Operational Technology Message Bus (OTMB) is a software-based architectural pattern designed to manage OT integration complexity. OTMB architectures enable bi-directional communication in OT-centric environments—providing seamless integration of devices and applications such as OMS, DCS, SCADA, and a variety of operational and IT systems. OTMB provides operational logic, naming conventions, native protocol translation, and API support. OTMB homogenizes data delivered by diverse platforms, devices, applications, and protocols. Oracle Utilities LEC OTMB is capable of delivering, managing, and transforming data without the need for custom programming between points. OTMB architectures reduce system-of-systems integration times and dramatically reduce the long-term cost of maintaining system of systems integrations. The capabilities of OTMB architecture enable utilities to establish a flexible supportable platform for next-generation smart grids.

About Oracle Utilities Network Management System

Oracle Utilities Network Management System (NMS) empowers you to fully model, monitor, and control in real time the distribution grids and networks of electric, gas, water and wastewater utilities. From distribution to the connected customer, we're giving operators the ability to optimize every corner of your system, including distributed energy resources (DERs) owned by utilities, customers and third parties. Oracle NMS arms you with accurate, actionable intelligence—improving reliability and performance across your territory when it matters most.

About Evergy

Evergy is a regulated electric utility serving more than 1.6 million customers in Missouri and Kansas. Evergy's service area is about 28,000 square miles with 3,700 miles of transmission lines, 22,400 miles of distribution lines and more than 400 substations to deliver power.

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