



Grid Edge Intelligence Portfolio

Beyond the meter, ahead of the curve.

NEW CHALLENGES REQUIRE NEW CAPABILITIES

As a utility, there is pressure to accommodate new demand, integrate renewables, and help decarbonize national and global economies. In addition, aging infrastructure and increasingly volatile weather put safety and reliability of service at risk.

At the same time, the upswell of urgency in the industry has generated a wave of new technologies, business models and cultural changes that you must navigate, including cybersecurity and rising expectations for consumer engagement.

No single strategy will address all these challenges—all of which demand new, agile technologies that deliver greater visibility and management at the grid edge, where so many challenges arise.

WHAT IS THE GRID EDGE?

The grid edge is where the utility and the consumer meet. It's where more EVs charge and where distributed energy resources (DERs) proliferate. It is where hyper-local capacity constraints emerge and where hard-to-monitor infrastructure faces increased risks of failure.

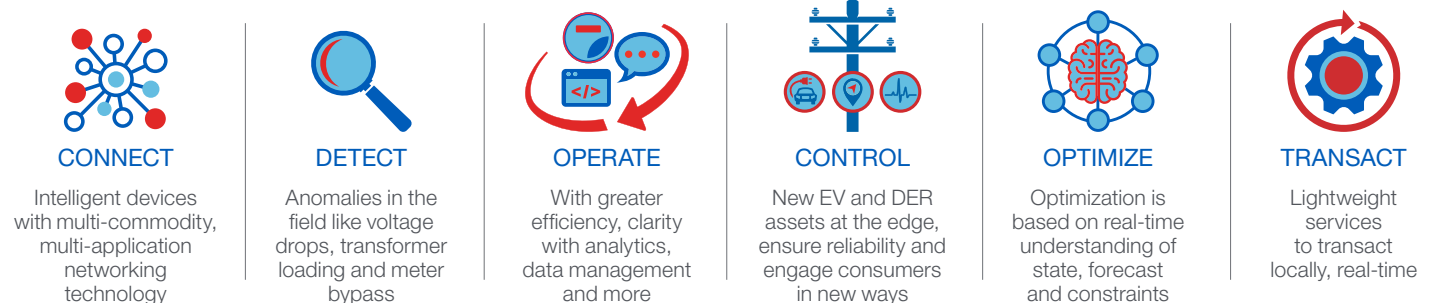
The first generation of advanced metering infrastructure (AMI) revolutionized utility operations for greater efficiency through automation and reduced reliance on boots in the field. The second generation of AMI—[grid edge intelligence](#)—is central to managing the growing complexity of connected devices and two-way power flows. However, historically, there has been a gap at the grid edge—a big blind spot beyond the substation on medium- and low-voltage distribution networks. Engineers modeled and equipped these networks for demand only, produced by legacy equipment such as resistive water heaters and incandescent lighting. But today's variables are more complex, and upgrading distribution assets to meet every potential grid-edge scenario would require untenable levels of infrastructure investment, and time we don't have.

In today's complex environment, you have a decision: commit to costly, new infrastructure to manage loads or invest in a non-wires alternative that manages edge loads more efficiently, delivers real-time and accurate information for grid planning, provides visibility into grid conditions and maximizes capital spending. Investing in Itron's Grid Edge Intelligence portfolio, powered by the most advanced [distributed intelligence applications](#) available, gives you not only visibility, but control as well—autonomous control fueled by real-time visibility that can only come with high-speed data collection and processing at the grid edge.

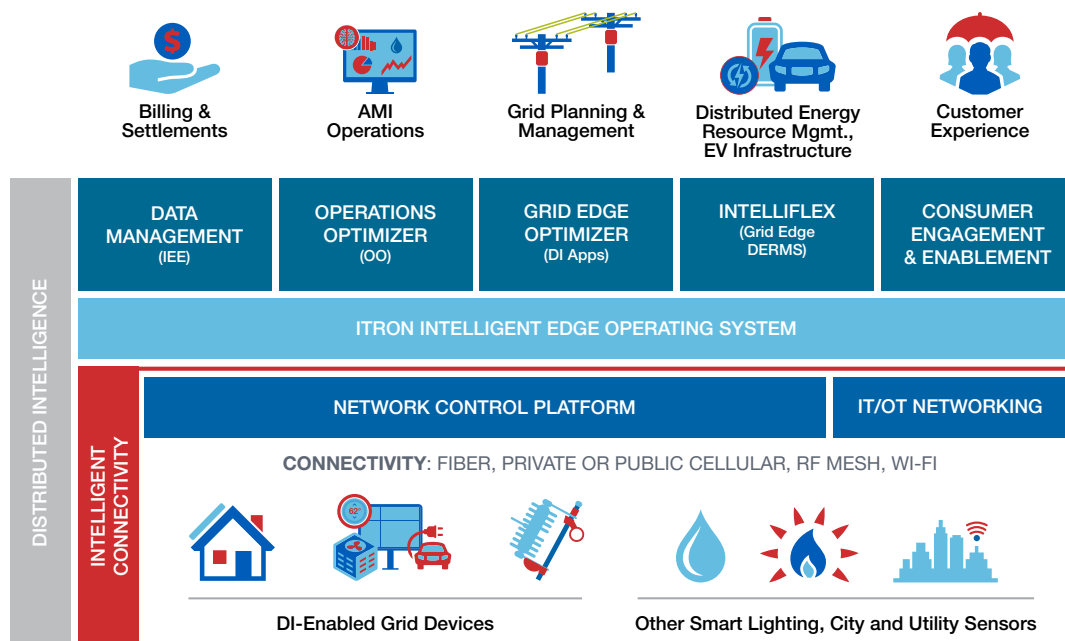
Investing in [Grid Edge Intelligence](#) can close the control gap today with new ways of managing distribution networks and customer relationships. Utilities will gain greater visibility and control at the

Itron Grid Edge Intelligence	AMI 1.0
Data collected every second and analyzed immediately at the edge with an optimized blend of edge & back-office analytics as the use case demands	Data collected every 15 minutes and sent to back office-applications three or four times a day. Monitoring and control only from the back office.
Full system, real-time visibility, awareness & autonomous, local control	Bellwether meters limit voltage modeling and batch-based load visibility
Monitor and analyze vast amounts of high-resolution data produced by sensors using control parameters to respond in real-time to local conditions with low latency	Network latency issues obstruct the management of advanced grid applications by centralized back-office systems
Pre-integrated applications working in concert to address the business challenges of multiple stakeholders across the utility	Requires complex layers of multiple vendor system integration to serve single use cases
Support consumer interconnection and connectivity flexibility to maximize direct DER management capabilities	Requires multiple solutions (i.e. cloud aggregator, and a physical device deployment) to provide connectivity to field devices
Extensible technology allows for rapid innovation and continued development of new applications and integration without impacting core operations. Seamless feature installs, upgrades, vendor management and high availability when hosted via Global Managed Services	Extensive integrations accompany any new application deployment, and the associated back-office and system firmware upgrades require significant effort
Scale to cover large service territories. Extend the capabilities of existing technology infrastructure with enhanced compute capabilities at the edge. Deploy plug-and-play applications for existing and future hardware investments.	Scalability is constrained by limited backhaul bandwidth, coupled with the inability to process at the edge. Additional poles and wires cannot be added fast enough to address today's business challenges, and AMI 1.0 meters do not have the intelligence, memory and compute capabilities to sustain edge processing.
Broad partner ecosystem amplifies value, and enables true interoperability and network visibility to maximize flexibility, embrace standards and provide customer choice	Interoperability limitations create potential for vendor lock-in

GRID EDGE INTELLIGENCE ENABLES PROACTIVE DISTRIBUTION MANAGEMENT



GRID EDGE INTELLIGENCE PORTFOLIO



BENEFITS

- » Renewables Integration
- » Resiliency & Reliability
- » Consumer Access & Engagement
- » Carbon Reduction
- » Reduced Operating Costs
- » Data Access

edge by connecting, detecting, operating and controlling devices, and in doing so you can deliver an efficient, optimized and smarter grid for the communities you serve.

THE VALUE OF GRID EDGE INTELLIGENCE

Grid Edge Intelligence utilizes new, agile technologies to provide real-time visibility and control into the medium- and low-voltage distribution network, where it was previously too expensive to obtain.

With real-time data from the very edge of the grid, you can see the service connections—often for the first time—and how well your medium- and low-voltage networks are performing. With control over these circuits, your systems can optimize performance and gain more capacity through Grid Edge Intelligence applications like distribution automation, transformer load and voltage monitoring, and EV awareness. Plus, with analytical tools, you'll be able to prioritize infrastructure upgrades, proactively [engage consumers](#), and, ultimately, deliver increased levels of reliability. This allows for greater resilience and reliability, consumer engagement and faster progress towards sustainability goals.

With more than 285 million communication devices deployed globally and 8,000 utility customers in more than 100 countries, Itron has been leading the movement at the grid edge for decades. We pioneered distributed intelligence (DI), the underlying technology that enables Grid Edge Intelligence, to deploy solutions at the edge, where situational data is most available, latency is lowest and the opportunity for improvement is tremendous. With more than 14 million DI-enabled meters delivered and more than 15 million DI-enabled applications licensed, utilities are already realizing the benefits of enhanced visibility, faster control and robust data-management.

Our DI platform is foundational to Grid Edge Intelligence—and a key differentiator in the industry—providing multi-transport intelligent connectivity, the option of localized analysis, and visibility and decision-making, while running modular applications configured to solve business challenges. DI-enabled meters and other grid-edge devices have the computing capacity to monitor and analyze the vast amounts of high-resolution data their sensors produce. They

also can be configured with control parameters to respond in real-time to local conditions, unhampered by network latency issues known to obstruct grid management by centralized back-office systems. Plus, with [intelligent connectivity](#), AMI can rapidly confirm local control decisions with surrounding devices in front of the meter, or behind, and flag emerging issues for human intervention, as needed.

THE GRID EDGE INTELLIGENCE PORTFOLIO

The Grid Edge Intelligence portfolio is a collection of software solutions that bring visibility and control to operational and business segments in your organization. The solutions are built on the foundational elements of our AMI and grid-optimization solutions, including an AMI headend, intelligent connectivity and DI-enabled devices.

Our Grid Edge Intelligence portfolio is both cost-effective and scalable. The solutions extend the capabilities of your existing technology infrastructure and can be deployed in concert or as standalone applications:

- » Data Management
- » IntelliFLEX
- » Operations Optimizer
- » Consumer Engagement & Enablement
- » Grid Edge Optimizer

DATA MANAGEMENT

Itron Enterprise Edition™ (IEE) Meter Data Management (MDM) is an industry-leading [data management solution](#) for residential gas, water, electric meters, commercial & industrial (C&I) meters and Internet of Things (IoT) sensors. Our evolving platform provides you with the flexibility, value, and functionality needed regardless of your deployment size.

For larger investor-owned utilities, IEE MDM is a highly scalable enterprise application that centralizes the collection, processing, storage, and complex analysis of smart device data, device events and alarms.

IEE MDM is the most-deployed meter data management system in the world. Our installed base includes more than 100 customers across six continents, with more than 50 million meters in production.

OPERATIONS OPTIMIZER

AMI data has become one of the pillars needed to support business processes. But not every utility has analytics teams dedicated to finding the value in the data generated by millions of endpoints.

[Operations Optimizer](#) (OO) is a set of core analytic applications designed to provide actionable insights on the performance of the AMI system. Applications include AMI Operations, Meter Temperature Monitoring, Network Operations and [Revenue Assurance](#). Through our Operations Optimizer suite of applications, we provide tools, integrated with state-of-the-art data-management applications, to deliver functional capabilities that enhance operational efficiencies while managing these systems at scale.

GRID EDGE OPTIMIZER

Grid Edge Optimizer (GEO) improves the safety and reliability of low- and medium-voltage circuits through an expanding collection of use-case applications. These applications interpret information from your meters and other grid-connected devices and provide actionable information for operational efficiencies such as transformer monitoring, DER awareness, active premise load shedding and much more.

GEO is the link between the high granularity of distribution-level assets, endpoint devices and your advanced distribution management system (ADMS) or distributed energy resources management system (DERMS). It integrates both the incoming data and the outgoing command signals to unify strategic control with a balance of centralized and distributed decision-making depending on the needs of the use case.

Current use cases include:

- » Advanced Temperature Monitoring
- » Advanced Transformer Load Monitoring
- » Advanced Transformer Voltage Monitoring
- » EV Awareness
- » High Impedance Detection
- » Location Awareness (by transformer and phase)
- » Meter Bypass Theft Detection
- » Solar Awareness

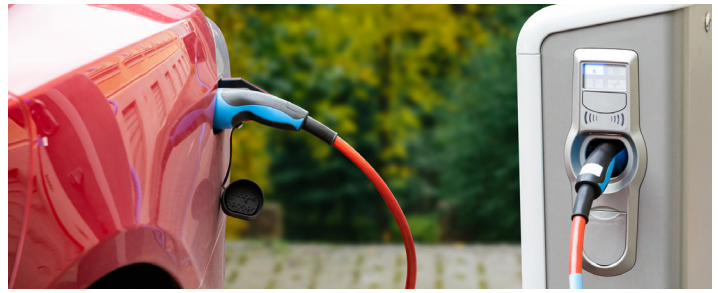
Dozens of other use cases are in development by Itron and third-party developers for capabilities in Advanced Premise Load Shedding, Anomaly Detection, DER Connectivity, Energized Down Conductor detection and more.

Grid Planning

As demands on the grid increase and costly outages continue to create issues for consumers and businesses, it is important to have accurate data about your network's performance. From present-day operations to future-focused planning, our [grid-planning solutions](#) meet your needs for informed decision-making, providing actionable intelligence that simplifies utility planning, engineering and operations.

With advanced analytics, seamless integration and a scalable approach, these tools help you adapt to evolving demands and a changing energy landscape. Our tailored solutions and strong focus on ROI and security set a new standard for utility grid planning that delivers:

- » Next-Generation, Data-Driven Applications
- » System Design & Architecture Highlights



- » Scale & Data Access
- » Comprehensive Integration
- » Advanced Analytics & Prediction

Grid-planning applications include: Model Validator, Grid Forecast & Planner, Power Analyzer and Hosting Capacity Analyzer.

INTELLIFLEX

Harness Demand Flexibility at the Grid Edge—and Turn Behind-the-Meter Devices into Grid Assets

Today's distribution grid faces unprecedented pressures: accelerating electrification, rapid adoption of distributed energy resources (DERs), decarbonization mandates, aging infrastructure and increasingly volatile weather events. Traditional, centralized grid management methods are no longer sufficient to address these complex and evolving challenges, particularly as utilities must integrate a diverse array of DERs—including electric vehicles (EVs), rooftop solar photovoltaics (PV), battery storage and other flexible loads. To navigate this dynamic landscape, utilities require scalable, agile solutions that can seamlessly integrate customer-owned assets, converting them into manageable, grid-supporting resources.

Itron's [IntelliFLEX solution](#) suite, a cornerstone of our Grid Edge Intelligence portfolio, empowers utilities to meet these challenges with real-time visibility, control and optimization at the grid edge. By aggregating a wide range of customer-owned DER assets into responsive grid resources, IntelliFLEX enables utilities to maximize existing infrastructure, manage peak demand effectively and prepare for future growth—achieving greater grid resilience, reliability and customer engagement without requiring extensive infrastructure upgrades.

At the heart of IntelliFLEX's success is its modular architecture and core suite of integrated applications designed specifically to address critical grid-edge needs:

Grid Edge DERMS

The IntelliFLEX DERMS application actively safeguards your valuable grid assets through hyper-localized optimization of load and voltage. By harnessing the advanced capabilities of Itron's Grid Edge Intelligence with distributed intelligence, this application significantly improves visibility into the low-voltage distribution network, providing actionable insights into the impacts of DERs.

With industry-leading forecasting and real-time network analytics, the IntelliFLEX DERMS application empowers grid planners and operators to proactively manage the rapid adoption of DERs such as electric vehicles, battery storage and solar photovoltaics (PV). It aggregates and visualizes DER effects on circuits, enabling informed decision-making, optimized load balancing and targeted deferral of infrastructure upgrades—thus ensuring responsible cost



management while maintaining grid reliability in the face of evolving consumer energy usage and accelerated electrification.

Residential & Fleet Electric Vehicle Applications

IntelliFLEX EV applications deliver real-time monitoring, control and optimization of residential and fleet electric vehicle supply equipment (EVSE), closely working with the DERMS application to support coordinated EV management at the grid edge. By centralizing the management of EV charging events across multiple chargers and vehicles, these solutions help utilities efficiently manage dynamic charging loads, reducing peak demand pressures and facilitating optimal use of existing grid infrastructure.

IntelliFLEX EV applications couple with other Grid Edge Intelligence solutions to unleash the power of EVs to serve as critical grid-flexibility resources by enabling V2X capabilities, grid-responsive managed charging and to accurately shape demand-side flexibility.

Forecasting Service

The IntelliFLEX suite also integrates our industry-leading forecasting software, which provides forecasts to more than 90% of the ISOs in North America and 100% of them in Australia. These predictive insights are necessary for the successful integration of DERs at the grid edge. When combined with the device-level networking capabilities of our DI platform, the evolution of our long-standing forecasting solutions gives you the ideal foundation for coordination and control of behind-the-meter devices.

CONSUMER ENGAGEMENT & ENABLEMENT

Consumer engagement is both more critical and more challenging than ever for two key reasons. First, modern customers interact with their homes and businesses through a large number of third-party platforms and smart devices, which means if utilities want to “meet their customers where they are”, they need to do costly and time-consuming data integrations with those partners. Second, the grid is much more dynamic and constrained, which means consumer programs and program messaging are much more complex and must incorporate information about grid needs in real-time.

As part of our Itron Intelligent Edge Operating System, we provide [DataHub](#), a user-friendly solution for utilities and third parties to authorize the sharing of data. The secure, scalable, cloud-based platform can make a wide variety of grid edge data available through a simple, automated, self-service digital marketplace.

DataHub makes it easy for customers to understand the nature of the data shared, with whom and for how long – as well as what they

will receive in return. A simple authorization and authentication mechanism and standardized API data access eliminates the need to create expensive custom integrations and manual data requests.

DataHub expands beyond existing data-sharing mechanisms, such as Green Button, to include additional data types. These include streaming DI-application data, DER data, load-disaggregation data, low-voltage network data such as transformer loading and more. This enables utilities to seamlessly work with more third-party partners to serve their customers better and ensures those third parties have the information needed to turn customers into (highly satisfied) grid assets.

INTELLIGENT CONNECTIVITY

Utilities are faced with the continuous requirement of providing reliable service to their customers at an affordable price. This is made more difficult today with the rise of natural and man-made challenges including extreme weather, integration of DERs, electrification of transportation, rising demand for compute power at the grid edge, higher data requirements and security. Networks that enable the utility to address these challenges are a foundational component to any solution approach. Itron's Grid Edge Intelligence portfolio allows utilities to manage their distribution systems and connect with devices at the grid edge, enabling multiple use cases with flexible communication technologies.

By continuing to build out and adopt a flexible architecture with multiple communications options, we are delivering Intelligent Connectivity-enabled solutions to our customers, allowing them to create standout, problem-solving services for their customers with reliability and security in mind.

Distribution Automation Communications

Itron's [grid management](#) solution provides a unified connectivity approach that enables you to leverage granular data from devices and multiple applications to optimize real-time grid operations, and improve asset management and planning.

- » Accelerate storm response by combining automation devices with real-time analysis of last-gasp and restoration alerts, fault and current data.
- » Ease renewables integration by leveraging complex power-flow and load data to provide a granular view of the real-time state of the network.
- » Optimize grid operations with high-fidelity data from meters and line sensors to balance load, improve power quality and reduce losses.

ITRON INTELLIGENT EDGE OPERATING SYSTEM

Itron's Grid Edge Intelligence portfolio applications come pre-integrated with the Itron Intelligent Edge Operating System (IEOS). The operating system leverages your existing investments and enables advanced analytics to realize the full ROI of your applications faster while meeting these challenges head on:

- » **Growing Solution Complexity** – As today's energy problems get more complex, intermixing billing, grid management and consumer engagement, the solutions grow in their complexity and blur the lines between stakeholders.
- » **Changing and Increasing Security Standards** – Data security and privacy between devices and software applications continues to grow and shift, making standardization key to solution success.
- » **Increasing Scale and Performance Demand** – As the number of devices and data elements exponentially increases, so does the need for low-latency, high-scale data processing.
- » **Limited Resources** – Even with increasing responsibilities, utilities must be able to leverage existing investments in personnel and infrastructure as much as possible.
- » **Long ROI Realization** – Shorter, less costly integration projects are needed to help realize the ROI of new business applications as quickly as possible.

For these challenges, the Itron Intelligent Edge Operating System delivers:

- » **Advanced Data Analytics:** Harness the power of real-time data analytics to make informed decisions and improve operational efficiency. The Itron IEOS processes vast amounts of data at the edge, enabling actionable insights and predictive analytics from edge applications.
- » **Seamless Integration:** The Itron IEOS seamlessly integrates with existing infrastructure, ensuring a smooth transition and minimal disruption. Its open architecture supports a wide range of devices and communication protocols, including DataHub, which enables data subscriptions to operationalize analytics results from applications.
- » **Enhanced Security:** Protect your critical infrastructure with robust security features. The Itron IEOS includes advanced encryption and continuous monitoring to safeguard against cyber threats.
- » **Scalability:** Whether you're managing a small network or a large-scale deployment, The Itron IEOS scales effortlessly to meet your needs. Its flexible architecture allows for easy expansion and adaptation.

Using a shared platform, the Itron Intelligent Edge Operating System delivers new use cases for complex business problems faster and with less expense. Plus, with all Itron Grid Edge Intelligence applications, utilities benefit from superior IT and OT cloud security and optimization for our [GenX network](#) to help achieve the desired ROI.

GETTING STARTED WITH GRID EDGE INTELLIGENCE

Itron's [Grid Edge Essentials](#) is a pre-integrated solution that addresses the foundational use cases for the digital-transformation journey to the grid edge. It extends your current AMI solution to include support for grid operations, demand flexibility and customer service that leverages distributed intelligence to create next-generation AMI capabilities. Grid Edge Essentials provides everything you need to tackle the most critical, high-value business cases that drive your business.

The Grid Edge Essentials solution includes analytics dedicated to revenue assurance, AMI workflow optimization, Itron's Edge OS and associated distributed intelligence applications, coupled with the solutions needed to increase your customer engagement.

As your business requirements expand and evolve, Itron's Grid Edge Essentials solution delivers expanded capabilities to meet your needs. In addition, it allows you to easily and cost-effectively layer applications in grid management, smart cities, streetlights, EV charging, distribution automation, demand response, consumer engagement and other Grid Edge Intelligence capabilities to maximize the value of your distribution network.

BEYOND THE METER, AHEAD OF THE CURVE

It is now possible to envision a grid edge where meters, transformers and feeders negotiate amongst themselves to achieve localized distribution outcomes. This is a place where assets dynamically adapt and configure sections of the distribution network while allowing consumers to participate in the transactional benefits. Real-time orchestration will help ensure grid reliability, improve sustainability and enhance the consumer experience without over-investing in expensive grid infrastructure.

Grid Edge Intelligence is creating new data, at scale, that have never existed before. Enabling seamless, secure access to data sources unlocks the full value of grid-edge investments. End customers, utilities, government agencies, regulators, researchers and many solution providers can use the data to innovate for everything from better customer engagement to more efficient grid management.

As an experienced utility partner and established industry leader, we offer expertise to solve the complete business challenge from end-to-end. There's a clear and practical migration path and ROI from traditional AMI to Grid Edge Intelligence, and today's AMI customers already own key components of the portfolio. Rather than adding more of the same poles, wires and transformers today, software solutions maximize the operational efficiency and life of power delivery equipment with distributed intelligence embedded into rate base-able assets. These easy-to-access, already-available solutions can help bridge the low- and medium-voltage control gap, providing the capabilities necessary to meet emerging demand for electricity and renewables while also progressing towards sustainability and decarbonization goals.

For more information, contact your [Itron Sales Representative](#) or local Channel Partner.

To learn more visit [itron.com](#)

We create a more resourceful world

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