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Distributed Intelligence

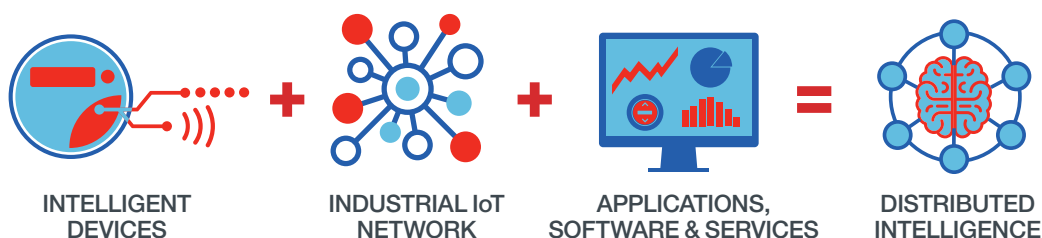
Intelligence that Empowers



The utility industry is undergoing a transformation. The future of our modern grid is dependent on leveraging more distributed intelligence (DI) at the grid edge to help manage growth, stability and safety.

WHAT IS DISTRIBUTED INTELLIGENCE?

Distributed intelligence, the underlying technology that supports Grid Edge Intelligence, delivers the ability to solve value-based use cases at the grid edge through a secure, open enterprise application platform with edge computing capability. Gain unprecedented insights while detecting impedance intolerances, right sizing transformers, discovering theft and enabling power quality in order to address and solve challenges with edge intelligence.



Using smart endpoints (meters, devices and other sensors) with peer-to-peer connectivity, leveraging a secure and resilient industrial IoT (IIoT) network, applications can be downloaded to devices in the field to solve challenges and upgrade functionality. The concept is similar to a consumer-based mobile phone or tablet device that uses an operating environment and runs various applications.

But unlike consumer-owned devices, Itron's DI platform focuses on utility customers and their management of the electric grid, with applications that address **advanced outage awareness,**

consumer engagement, grid reliability, distributed energy resource (DER) management and safety. Additionally, DI leverages an open platform that supports third-party innovation with an API development kit, enabling an ever-increasing ecosystem of partners to create their own value-driven, custom applications. Distributed intelligence effectively moves grid analysis, decision-making and control to the grid's edge, resulting in a significant reduction in latency of action, greatly improved situational awareness, more accurate analysis and advanced event detection.



SITUATIONAL AWARENESS

Gain the information you need before you need it. DI delivers real-time, edge intelligence to help you anticipate potential breakdowns across the grid.



A NEW APPROACH

Leverage new insights to operate more efficiently, increase ROI through better asset management and maintenance, and improve CAIDI and SAIDI metrics.



UNPRECEDENTED INSIGHT

Proactively plan and deploy critical infrastructure to ensure a highly reliable, resilient distribution grid with sophisticated control capabilities.

THE APPLICATION ADVANTAGE

Itron's distributed intelligence platform leverages applications to address common utility challenges or use cases. Each app has its own value proposition and is purpose-built to solve a specific market problem—such as **improving customer safety, reducing operating expenses, increasing capital asset lifetime and enhancing operational efficiency**. And when combined, they can greatly increase the overall value stack of your DI investment.

DI applications can be downloaded by utilities from our Enterprise Application Center to devices in the field to enable new functionality and new value.

GRID MANAGEMENT DI APPS



Advanced Outage Awareness

Advanced Outage Awareness combines multiple outage indicators from existing Itron products to provide more accurate power outage indication and scope, as well as associated accuracy estimates, when power outages occur on the utility distribution grid.



Advanced Temperature Monitoring

Advanced Temperature Monitoring finds potential meter jaw problems before they create a safety hazard or cause an unplanned outage. By using temperature readings from the meter correlated with load, weather, meter location, meter orientation and radio usage (all of which generate heat), Advanced Temperature Monitoring can accurately predict meter jaw problems, micro-arcing and other potential safety issues with customers' meter sockets.



Advanced Transformer Load Management

Advanced Transformer Load Management provides protection and extended life for distribution transformers by continuously monitoring total load on the distribution transformer in both directions and actively controlling consumer loads and distributed generation to maintain loads within safe operating limits. Total transformer load is computed through continual data sharing among all meters on the transformer. The data can be integrated into an ADMS via streaming API or a DNP3 native format. This enables the ADMS to have visibility of events and activities on the low voltage network behind the "spokesmeter".



Advanced Transformer Load Monitoring

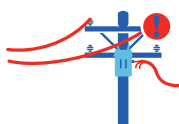
Advanced Transformer Load Monitoring provides information and insight that can extend the service life of distribution transformers by continuously monitoring their bi-directional loads. Using information provided by Advanced Transformer Load Monitoring, you can activate load control programs to keep your distribution transformer loads within the rated operating limits. Total transformer load is computed through continual data sharing among all meters on the transformer.

GRID MANAGEMENT DI APPS (CONTINUED)



Advanced Transformer Voltage Monitoring

Advanced Transformer Voltage Monitoring provides voltage monitoring across the service drops under the transformer. It provides events and alarms based on actual measured voltage as well as self-determination of applicability as a transformer voltage spokesmeter, based on historical voltage trends, feeder reliability and communication network connectivity. The data can be integrated into an ADMS via streaming API or a DNP3 native format. This enables the ADMS to have visibility of events and activities on the low voltage network behind the “spokesmeter”.



High Impedance Detection

High Impedance Detection provides detection of high-impedance connections (poor electrical connections) in your low voltage (LV) secondary distribution. High-impedance connections cause customer voltage flickers, interruptions and potential fire risks. Early detection allows maintenance work to be scheduled rather than corrected through one-off trouble calls and for the condition often to be resolved before impacting your customers.



Location Awareness

Location Awareness provides the electrical location of every meter on the distribution grid, including transformer, phase and feeder. This information is used by multiple DI apps and is also delivered to the back office for update and validation of GIS connectivity, improved outage response, feeder phase balancing and multiple other grid applications.



Meter Bypass Detection

Meter Bypass Detection provides detection of bypass tampering at the electricity revenue meter where jumpers are placed around the meter to bypass collection of some consumption so that the consumer's bill is reduced.



Waveform Anomaly Detection

The Waveform Anomaly Detection application harnesses smart meters as edge computing devices to continuously analyze voltage waveforms at 32 kHz sampling rates, identifying anomalous waveform shapes that indicate power quality issues or grid disturbances. When anomalies are detected, the system captures waveform data from before, during, and after the event and transmits this information for further analysis.

Utilities benefit from proactive maintenance capabilities, reducing outage frequency by identifying failing equipment before catastrophic failure occurs. The system also provides valuable insights during extreme weather events, helps diagnose issues from arcing and vegetation contact to mitigate wildfire.

CONSUMER ENGAGEMENT & DISTRIBUTED ENERGY RESOURCES DI APPS



EV Awareness

EV Awareness provides detection of electrical vehicle charging at a premise and calculation of time-series usage profiles. This can be used for multiple consumer marketing programs aimed at providing the best possible experience for electric vehicle owners.



Solar Awareness

Solar Awareness provides real-time disaggregation and detection of solar generation at a premise and calculation of time-series profile of solar generation behind the revenue meter. This can be used for detecting illegally connected generation, offering of marketing programs associated with generation, estimating generation standby requirements for cloud cover, etc. and multiple other programs.

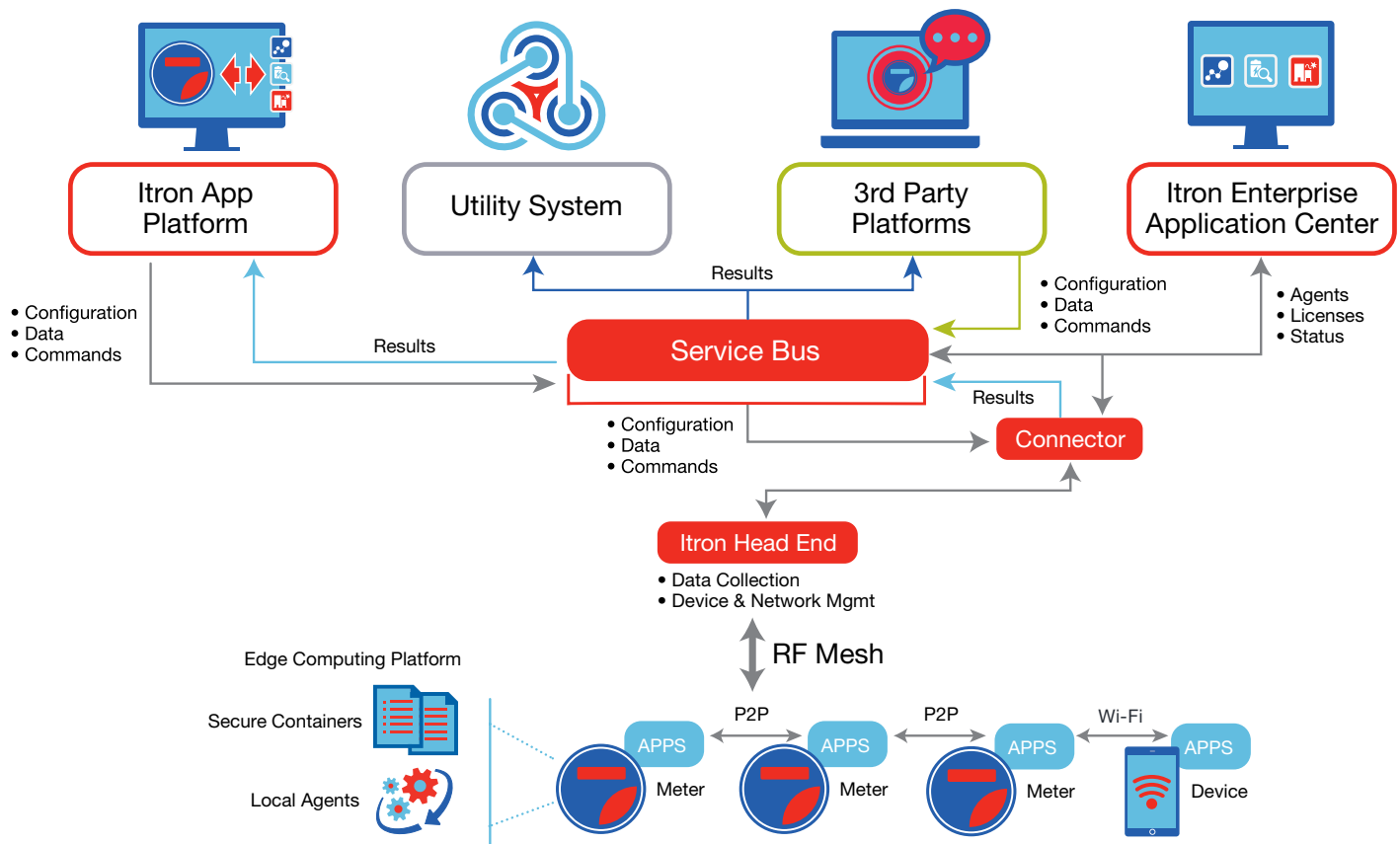
The Right Technology for Tomorrow—Ready Today

Learn what it takes to deploy distributed intelligence in the field, today.

Deploying Itron's Distributed intelligence platform requires components that are a part of every next-generation grid edge intelligence upgrade.

Using an Itron Riva DI-enabled or third-party meter with a Riva network interface card (NIC), connected to a Gen5 router, provides local area connectivity, while the Gen5 router creates a backhaul to the utility back office.

The Itron DI platform, coupled with the Itron Enterprise Application Center, allows you to access numerous applications and benefit from new insights, increase operational efficiency and ensure reliability of your electric grid.





Unlock Innovation through an Ecosystem of Partners

With IIoT expertise and an open DI platform, innovators around the world are joining the Itron Partner Ecosystem to deliver best-in-class solutions to today's challenges. You can realize proven value today with grid edge intelligence applications that allow innovators to build open, interoperable, value-driven outcomes—including smart home and distributed energy resource management (DERMS) offerings—that evolve with market and consumer demands.

DI DEVELOPER PROGRAM MEMBERS



To learn more visit itron.com

We create a more resourceful world

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2111 North Molter Road
Liberty Lake, WA 99019 USA