Itron Distributed Intelligence Applications
Itron’s distributed intelligence (DI) applications, delivered in conjunction with our industrial IoT network, enable new and innovative approaches to solving critical challenges facing the world’s power grids and transforming utility consumer engagement. Distributed intelligence applications provide significant improvements to outage detection and analysis, distribution connectivity modeling, fault detection, theft detection, transformer load management, renewables integration, EV integration and multiple innovative consumer services.

Our distributed intelligence applications are delivered in conjunction with our industry leading IoT-based network and rich ecosystem of multi-service use cases.

By utilizing distributed intelligence applications, you will improve grid efficiency, reliability and safety, transform customer service and more effectively integrate distributed energy resources and electric vehicles onto the grid.

The following describes our distributed intelligence applications. The apps are divided into three categories: Grid Optimization, Consumer Transformation and DER Integration.

**GRID OPTIMIZATION**

**Active Transformer Load Management**
The Active Transformer Load Management DI app provides protection and extended life of 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.

**Cold Load Pickup**
The Cold Load Pickup DI app provides more reliable power restoration by pacing the restoration of individual meters across a distribution transformer to avoid transformer fuse failures due to cold load pickup. Pacing of restoration on each transformer also provides pacing of restoration across the feeder section to avoid protection tripping due to cold load pickup.

**Diversion Theft Detection**
The Diversion Theft Detection DI app provides detection of diversion theft where illegal connections are made ahead of the meter or directly on the LV secondary to steal electricity.

**Feeder Phase Balancing**
The Feeder Phase Balancing DI app provides optimal distribution of meters/transformers across the phases of a feeder for the best possible phase load balancing by utilizing Location Awareness and time-series loads from each meter. Balanced phases reduce losses and voltage imbalance across a distribution feeder.

**High Impedance Detection**
The High Impedance Detection DI app provides detection of high-impedance connections (poor electrical connections) in your low voltage (LV) secondary distribution. High-impedance connections cause customer voltage flicker, interruption and potential fire risk. 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.

**Intelligent Voltage Monitoring**
The Intelligent Voltage Monitoring DI app provides highly configurable, threshold-based voltage monitoring, events and alarming based on actual measured voltage and locally computed primary (MV) voltage, as well as self-determination of applicability as a voltage bellwether, based on historical voltage trends and communication network connectivity.

**Location Awareness**
The Location Awareness DI app 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.

**Outage Detection**
The Outage Detection DI app provides more rapid and accurate identification and location of major outages by optimizing the use of the communication network for outage messages during storm conditions. Communication network statistics and Location Awareness are used on each meter to select optimal bellwether meters for outage notification and detection. During storm mode, only bellwether meters will report outages, maximizing the likelihood that highest priority outage messages will be received.

**Residential Neutral Fault Detection**
The Residential Neutral Fault Detection DI app provides detection of loss of neutral connectivity at a standard residential three-wire, form two-meter service. A broken neutral condition can cause consumer equipment damage and unsafe conditions.

**Theft Detection**
The Theft Detection DI app provides detection of bypass tampering at the electricity revenue meter where jumpers are placed around the meter to steal electricity.
Activity in the Home
The Activity in the Home DI app provides consumer benefits by identifying the presence of someone in the home through identification of noncyclical load usage. This information can be used to offer programs that allow parents to identify when children are home from school, children to identity that elderly parents are active and other consumer services.

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

Excess Usage Identification
The Excess Usage Identification DI app provides consumer benefits by identifying appliances with excess usage or usage that is increasing over time. This information can be used to identify appliance replacement marketing program candidates as well as to identify appliances that require maintenance.

Load Disaggregation
The Load Disaggregation DI app provides disaggregation of the whole premise electric load into the individual electric appliances and loads within the premise, in the form of time series load profiles for the individual loads. This information can be used for numerous customer and utility operations applications and programs.

TOU/Peak Alerts
The TOU/Peak Alerts DI app provides consumer benefits by identifying when high-usage appliances are active during peak price periods and the approximate savings that could be achieved if use of the appliance were curtailed during the peak price period.

Active Demand Response
The Active Demand Response DI app provides high predictability and reliability of demand response results by actively controlling loads and generation within premises to ensure that demand response reduction targets are met. Groups of meters are assigned target demand reductions and work amongst themselves using peer-to-peer communications to ensure that the group target is met and maintained.

Distributed Generation Detection
The Distributed Generation Detection DI app provides detection of generation behind the meter. This information can be used to detect unregistered and incorrectly installed customer generation.

Real-time Local Markets
The Real-time Local Markets DI app provides local power pool capabilities by allowing meters at consumer locations with distributed generation to negotiate real-time purchase with meters at consumer locations with controllable loads, in conjunction with control of the distributed generation and loads to affect the purchase. All purchases are recorded on both meters for settlement and billing.

Solar Disaggregation
The Solar Disaggregation DI app provides 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.