Glossary

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July 10, 2024

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Numbers and Symbols

24-hour time notation

A convention in which the time of day is written in 24-hour notation using the format hh:mm or hh:mm:ss, and there is no usage of AM and PM. Days run from midnight to midnight and are divided into 24 hours; for example, 00:00 indicates midnight, 12:00 indicates noon, and 23:59:59 indicates one second before midnight. A 24-hour time notation is the international standard for time of day notation as outlined by the International Organization for Standardization (ISO).

2c

A two-core cable. This term is typically used in Australia.

3DES

See Triple Data Encryption Algorithm (TDEA) Block Cipher on page 226.

3GPP

See Third Generation Partnership Project (3GPP) on page 222.

3GPP2

See Third Generation Partnership Project 2 (3GPP2) on page 222.

4c

A four-core cable. This term is typically used in Australia.

429W Water Endpoint

A data collection device for Itron's radio-based walk-by on page 236 AMR system, making it an effective solution for meter data collection on page 143 for water utilities.

500M Module

A sub-GHz wireless communications module optimized for battery-powered devices. It enables connectivity to a broad range of IoT sensors and devices for critical infrastructure applications and is equipped with a pre-certified and integrated daughter card.

500W ERT Module

A radio-frequency water endpoint designed to be read under Itron's multipurpose OpenWay Riva network mode or by legacy ChoiceConnect handheld, mobile and Fixed Network readers. The 500W ERT Module attaches to a water meter register from which it collects consumption usage and tamper data that it transmits to a data collection device.

6LoWPAN

Internet Protocol Version 6 (IPv6) on page 119 over low power wide area network (LPWAN) on page 136.

A

AAA

See authentication, authorization, and accounting (AAA) on page 23.

AAAC

See all aluminum alloy conductor (AAAC) on page 14.

AAA server

See Authentication Authorization Accounting (AAA) server on page 23.

AAD

See Azure Active Directory (AAD) on page 25.

AAE file

See advanced AMR export (AAE) file on page 12.

ABC analysis

An inventory categorization method that groups inventory items into three categories (A, B, and C). Categories are based on item value and estimated importance within an organization, with A items identified as the most valuable and important, and C items identified as least valuable and important.

ABE

See AMI Billing Export (ABE) on page 15.

abnormal peak day (APD)

A statistical planning standard defined as the coldest temperature that will be exceeded every 90 years, on average.

Abstract Syntax Notation One (ASN.1)

An international standard for classifying data structures. It specifies 27 data types with tag values starting with 1; for example, Boolean (1), integer (2), and bit string (3). ASN.1 uses additional rules to designate physical data. The primary set is the Basic Encoding Rules (BER), which are often considered synonymous with ASN.1. ASN.1 is widely used in ground and cellular telecommunications as well as in aviation.

AC

See alternating current (AC) on page 14.

accelerometer

A microelectromechanical system (MEMS) used to detect and measure acceleration. Smart meters may contain accelerometers to facilitate tamper and theft detection.

access charge

A charge to an energy service provider (or its customer) for access to a utility's transmission or distribution system. Access charges are imposed on utilities by the entities who own the transmission or distribution wires between the utility and the customer.

access control

Maps the identity of a user to a set of access rules to enforce the appropriate access rights. Itron prefers the RBAC access control mechanism (role-based access control) because it tends to reduce the complexity and cost of security administration in large network applications.

access control list (ACL)

A table that describes the access each user or group of users has to each system object. The list includes data associated with a file, directory, or other network resource and defines the permissions that users, groups, processes, or devices have for accessing it.

access control server (ACS)

A Cisco® high-performance server that operates as a centralized Terminal Access Controller Access-Control System Plus (TACACS+) or Remote Authentication Dial-In User Service (RADIUS) server. It extends access security by combining authentication, user access, and administrator access with policy control within a centralized identity networking solution.

Access Point (AP)

A gateway device that performs the function of communicating over both a wide area network (WAN) on page 238 and the neighborhood area network (NAN) on page 155 and that provides advanced utility networking services, including addressing, routing/switching, health information, network time, security, and encryption.

See also alternate Access Point (AP) on page 14, primary Access Point (AP) on page 181, and secondary Access Point (AP) on page 201.

access point name (APN)

A virtual routing instance that connects a general packet radio service (GPRS) mobile network and another computer network.

access token

A unique security string needed to access a system resource. Possession of a token is accepted by a system as proof that the holder has been authorized to access the resource indicated by the token. The token may denote an identifier used to retrieve the authorization information (reference token) or may self-contain the authorization information in a verifiable manner. See also Tenant Management on page 221.

account

A contractual relationship between a residential or commercial customer and the utility company where the customer agrees to purchase metered resources from the utility.

ACE300 Range

A meter series that has a dual-disc design ensuring high measurement accuracy and excellent long-term stability. ACE300 meters are particularly suitable for residential applications with asymmetric (DIN) or symmetric (UTE) connection standards using a single- or double-rate structure.

ACE6000

A four-quadrant load profiling meter ideally suited to the commercial & industrial (C&I) on page 46 market.

ACE6000 DC4

A multifunction polyphase electronic meter that provides integrated energy measurement in up to four quadrants for commercial & industrial (C&I) on page 46 applications.

ACE8000 FAS

A filter designed to permit an independent power producer to connect to the multi vendor (MV) on page 152 distribution network by efficiently filtering ripple control signals.

ACE8000 Receiver

A universal ripple control receiver that can be configured for any application and is compatible with any existing system.

ACE8000 Ripple Control

A communication system using the electrical network for demand side management purposes, such as tariff switching, direct and dynamic load control or street lighting control.

ACE8000 Transmitter

A transmitter composed of a series or parallel coupling circuit for insulation towards the network and adaptation of the injection rate, a generator producing the ripple control frequency with the necessary power, and a control console issuing the control commands.

ACE9000 IBS

A footprint keypad meter targeted at utilities that want to effortlessly upgrade their conventional electromechanical meters to keypad prepayment.

ACE9000 ISP

An integrated single-phase prepayment meter in the ACE9000 product range.

ACE9000 ITP

An integrated three phase, repayment meter to the ACE9000 product range of prepayment electricity meters from Itron.

ACE9000 SSP DIN-R PLC

A split single-phase DIN rail power line communications (SSP DIN-R PLC) meter is a compact DIN rail mounted 100A, class 1 accuracy prepayment meter using PLC technology for communication between the meter control unit (MCU) and customer interface unit (CIU).

ACE AIMS-PRO

A configuration software that allows the meter's functions to be made available for meeting the customer's operational needs. The companion to Actaris' C&I and T&D meter ranges (ACE SL7000 on page 9, ACE6000 on page 8, ACE8000).

ACE Eclipse Revenue Collector

A system for online vending, customer, meter, and location management system. The full-service architecture provides a graphical user interface through a standard web browser, over a host of communication channels.

Ace Pilot

A product name. ACE Pilot is the European equivalent of OpenWay Tools. This tool is used to create configurations for Galvani meters. These configurations are then embedded as XML within the configuration of the FSM device.

ACE SL7000

A meter ideally suited to commercial, industrial, and substation applications with a large installed base around the world.

ACE SL7000 DTM

The Distribution Transformer Monitor (DTM) on page 72 meter provides accuracy over the entire current range of the transformer. Using Rogowski coils, the range of current measurement of the DTM on page 75 is from 30A to 3000A per phase.

ACE Sparklet

A compact modem that is dedicated to large-scale commercial & industrial (C&I) on page 46 applications.

ACE Sparkline

An intelligent modem based on a communication module and an internal micro-controller that handles all parameters required for transparent data transfer.

ACE Sphere

A software tool designed to facilitate programming of the ACE1000, ACE2000, ACE3000 and ACE5000 range of electronic residential meters from Itron. The software is also able to read and store meter instantaneous billing and historical data.

ACE Vision

An automatic meter reading (AMR) on page 24 system that has evolved to enable industrial and network management applications.

ACK

See acknowledgment (ACK) on page 10.

acknowledgment (ACK)

A message sent between communicating processes or computers to indicate that a block of data arrived at its destination without error.

ACL

See access control list (ACL) on page 8.

ACSE

See Association Control Service Element (ACSE) on page 22.

ACT

See Adaptive Communications Technology on page 11.

Actaris Metering Systems

Actaris Metering Systems was a world leader in the design and manufacture of meters and associated systems for the electricity, gas, water, and heat markets. Itron acquired Actaris in 2007.

ACT coupler unit (ACU)

Mounts outside the connected grid router (CGR) and couples the CGR ACT Module (CAM) to the power lines.

Action Manager (AM)

A software application which enables customers to manage the resolution of all types of AMI incidents at scale. Examples of management features include the ability to receive externally-detected exceptions and, according to a set of priority rules, progress those faults through a workflow to ensure the problems are resolved.

activation

The process of enabling a cellular modem or SIM card so that the associated device may transmit and receive data over a cellular network.

Active Directory (AD)

A Microsoft® directory service that manages network administration and security in a Windows domain network.

Active Directory Application Mode (ADAM)

A lightweight directory access protocol (LDAP) -compliant directory service used for building directory-enabled applications. See also Active Directory (AD) on page 10.

active key

The variable value in a key pair that a system actively uses for communication. The active key cannot normally be changed or rolled over. Only one key from a pair can be active. The other key from the pair is in standby state and held in inactive until needed. Then, it must be set to the active state to be used by the system. See also standby key on page 214.

active key status

Of the key types that are provided in pairs, the status of the key that is actively in use by the system for communications while the second key of the pair is held in standby until needed. Key statuses can be toggled between active and standby by the system administrator.

In OpenWay, the key status (active or standby) has meaning only to the decryption and key update server (DKUS). Key status means nothing to the OpenWay Collection Engine or devices (cell relays, meters, and others).

Active Monitor

An application used to test features of other components to ensure they are up and working. It is bundled with Advanced Metering Manager (AMM) application on page 13.

Active Premise Load Shedding (APLS)

A solution that allows utilities to quickly shed load on targeted meters that meet their scale, security, and equity requirements.

Active Server Pages (ASP)

A Microsoft server-based script engine that dynamically generates webpages. Also called Classic ASP or ASP Classic. ASP.NET supersedes ASP.

ACT PLC Coupler

See Adaptive Communications Technology Power Line Carrier Coupler on page 11.

actual peak load reductions

The actual reduction in annual peak load (in kilowatts) achieved by consumers in a utility demand-side management (DSM) on page 65 program such as HAN Communications Manager (HCM) on page 106.

ACU

See ACT coupler unit (ACU) on page 10.

AD

See Active Directory (AD) on page 10.

ADAM

See Active Directory Application Mode (ADAM) on page 10.

Adapta-Link

Itron's work order configuration tool for use with Service Link. This software enables a utility company to rapidly create and modify work orders for different types of service.

Adaptive Communications Technology

A technology that incorporates both radio frequency (RF) and power-line carrier (PLC) on page 178 onto one chip set. Adaptive Communications Technology (ACT) allows an endpoint to dynamically change its communication media and modulation to the fastest and most reliable available, based on its location, network operating conditions, and the criticality of the application data.

See also Adaptive Communications Technology Power Line Carrier Coupler on page 11.

Adaptive Communications Technology Power Line Carrier Coupler

An external unit that couples the Power Line Carrier (PLC) communication links between the 3-phase mains and the OpenWay Riva Adaptive Communications Module installed in the Connected Grid Router (CGR). Also known as ACT PLC Coupler.

Adaptive Security Appliance (ASA)

A Cisco® appliance that provides user and application policy enforcement, multi-vector attack protection, and secure connection services. The appliance also provides integrated security and network services for advanced application-aware firewall services, voice-over-Internet protocol (VoIP), and multimedia applications.

ADC

See analog-to-digital converter on page 16.

add-in

A third-party software component that can be installed with a host application to enable customizations and extended functionality.

ADE

See AMI Data Export (ADE) on page 15.

ADSL

See asymmetric digital subscriber line (ASDL) on page 22.

advanced AMR export (AAE) file

A file containing completed route information that the Itron Host Processor (IHP) sends to the customer information system (CIS) or to the Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 system.

Advanced Encryption Standard (AES)

A National Institute of Standards and Technology (NIST)-standard cryptographic cipher that uses a block length of 128 bits and key lengths of 128, 192, or 256 bits.

advanced meter

An electric meter that is capable of measuring and recording usage data in time differentiated registers. The meter allows electric consumers, suppliers, and service providers to participate in price-based demand response (DR) on page 64 programs and provides data and functionality to address power quality issues. Also known as a smart meter.

advanced metering

See advanced meter on page 12.

advanced metering infrastructure (AMI)

A utility metering and communications system that leverages two-way communication between a utility company and smart energy management devices, including smart meters, thermostats, and other energy management devices. AMI provides utility companies real-time consumption data, and provides customers detailed usage data. AMI systems support capabilities such as load control, time-of-use and critical-peak pricing, and outage and restoration reporting.

An AMI system consists of the following components:

- Smart meters that collect and store interval consumption data, interface with, and collect and store data from other devices, such as other meters. Smart meters can also initiate and respond to two-way communications with the utility.
- Home gateway devices that communicate with and control energy-using appliances throughout the home, and can communicate with the utility.
- A network over which smart meters, home gateway devices, and other AMI components execute two-way communications to transmit data and commands between the utility and the home.
- A meter data management (MDM) on page 143 system to which the collected data is delivered. MDM systems can interface

with other utility systems, such as customer information systems (CISs), outage management systems (OMSs), and workforce management systems (WMSs).

Advanced Metering Manager (AMM) application

An advanced metering infrastructure (AMI) on page 12 application that provides meter device lifecycle management, which enables the collection of advanced metering information. AMM is comprised of the following components: database (DB) on page 60, Global Meter Reader (GMR) on page 103, and Middle Tier (MT) on page 146. AMM's web-based interface allows utility operators to configure groups, schedules, and exports across a variety of electricity and gas devices, which enables the collection, management, and analysis of consumption, time of use, interval data, power quality measures, and status logs.

AMM is one of several components that make up UtilityIQ software on page 231. See also MPC on page 149 and Firmware Upgrader (FWU) on page 94.

Advanced Pressure Management

See Advanced Water Management on page 13.

Advanced Water Management

A solution which enables users to automatically and continuously optimize pressure across the network, based on the current demand patterns and operating characteristics of that area of the network. The architecture of Itron Smart Pressure Management solutions is built around enterprise class software-based services, combined with highly intelligent loggers and controllers in the network to monitor network performance and control assets such as PRVs (Pressure Reducing Valves) and pumps. Also known as Advanced Pressure Management and Smart Pressure Management.

advance shipping notice (ASN)

A notification of pending deliveries (similar to a packing list) that is transmitted in electronic format.

AEMO

See Australian Energy Market Operator (AEMO) on page 23.

AEP meter barcode

See American Electric Power (AEP) meter barcode on page 15.

AES

See Advanced Encryption Standard (AES) on page 12.

affiliate

A company that is controlled by or has the same owner as another company, such as a utility and a non- regulated energy services company owned by the same holding company.

aggregation

The combining together of multiple load profiles into a single load profile. The single load profile represents the total fluid use, in each of the time intervals, in the load profiles included in the aggregation.

aggregation coefficient

A multiplication factor applied to load profile values before the values are combined with other load profiles in an aggregation.

Aggregation Services Router (ASR)

A Cisco® edge router running the IOS® XE operating system. This operating system incorporates software virtualization that provides high availability for multiple services, such as a firewall, Internet Protocol Security (IPsec) on page 119, and virtual private network (VPN) on page 233.

aggregator

An entity in the energy marketplace that organizes residential or business customers into a buying group for purchasing energy. Depending upon the status of deregulation in a given state, an investor-owned utility, public power company, or rural electric cooperative may perform this function in today's energy market.

Other entities such as buyer cooperatives or brokers may perform this function in a restructured energy market.

aggressive discovery

The method by which nodes first discover neighboring nodes. After selecting a time slot and channel, each node goes into aggressive discovery by sending a neighbor discovery packet as it cycles through its epoch on page 85. See also neighbor table on page 155.

AH

See authentication header (AH) on page 23.

AIB

See application information broker (AIB) on page 19.

AJAX

See Asynchronous JavaScript and XML (AJAX) on page 22.

alarm

A message sent using an automatic data collection system, indicating such conditions as abnormal usage, meter tampering, and power outages.

algorithm

A step-by-step procedure for solving a problem. Algorithms are commonly associated with computer operations.

all aluminum alloy conductor (AAAC)

A type of high-capacity, high-strength stranded conductor, made from one or more strands of aluminum alloy.

Allmess

A German water meter.

ALOHA

A type of time division multiple access (TDMA) transmission system developed by the University of Hawaii, used for satellite and terrestrial radio links. In the traditional ALOHA system, packets are transmitted as required, and like Ethernet's CSMA / CD method, collisions can occur. A slotted ALOHA system triggers transmission starts by a clock and reduces the number of collisions.

ALRS

See automatic loop restoration scheme (ALRS) on page 24.

ALS

See automatic loop scheme (ALS) on page 24.

alternate Access Point (AP)

Another reliable Access Point (AP) on page 8 that can be used by the endpoint device.

alternating current (AC)

A type of electrical current in which the electrical charge alternates between positive and negative. The rate of change between polarities is measured in Hertz (Hz), or cycles per second. Devices powered by alternating current include three electrical wires

of different polarities: negative, positive, and neutral (or ground).

Conversely, direct current (DC) implements a two-wire circuit where the electrical charge travels in one direction. One wire is always negative and the other is positive.

AM

See Action Manager (AM) on page 10.

Amazon Web Service® (AWS®) IoT Cloud

Provides on-demand cloud computing platforms and APIs. These cloud computing web services provide distributed computing processing capacity and software tools via AWS server farms.

ambient temperature

The atmospheric temperature surrounding a device or component.

AMCL

See appliance message client library (AMCL) on page 19.

American Electric Power (AEP) meter barcode

A 17-character meter label format that is a unique identifier for every electric meter in the United States. Developed by American Electric Power (AEP), the AEP barcode follows ANSI C12.10 requirements.

American National Standards Institute (ANSI)

A standards organization that administers the standardization and conformity assessment system used in the U.S. and around the world. When ANSI adopts a standard, it disseminates a code to identify the standard.

See also ANSI C12.18 on page 17, ANSI C12.19 on page 17, and ANSI C12.22 on page 17.

American Wire Gauge (AWG)

The standardized wire gauge system for the diameters of round, solid, nonferrous electrical wire.

AMI

See advanced metering infrastructure (AMI) on page 12.

AMI Billing Export (ABE)

An Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124 subsystem. ABE is IEE's high-volume billing export subsystem.

AMI Data Export (ADE)

An Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124 high-volume export process subsystem. ADE exports large volumes of data in a fast, proficient manner. ADE hosts a separate Export Dispatcher application service, task templates that can be used to run the export, a graphical user interface (GUI) for monitoring and working with exports, and an ADE Trend Report user interface to view summary information about the export.

AMI Endpoint

A wall-mount booster that can be connected through three-wire cabling to Interpreter Register on page 120-enabled water meters, specifically those located in challenging environments.

AMI Essentials (Electric, Combo) NAM

A solution that enables smart grid transformation in the public power sector and provides all the necessary components to realize operational value now and form the foundation for future services and use cases.

AMI Essentials (Water) APAC

A solution that helps customers address the design, deployment, and operational challenges of water management.

AMI Essentials (Water, Gas) NAM

A solution powered by Temetra on page 221, Itron's bundled cellular advanced metering infrastructure (AMI) on page 12 solution for small- and medium-sized water and gas utilities that are less than 100,000 Itron cellular 500G/500W endpoints.

AMI Operations Management

A solution that provides the tools, integrated with state-of-the-art data management applications, to deliver accurate functional capabilities that enhance advanced metering infrastructure (AMI) on page 12 operational efficiencies while managing and operating these systems at scale.

AMI Readings Import (ARI)

An Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124 high-volume meter reading import subsystem. ARI processes collect meter readings for the previous calendar day, then validates, estimates, and imports those readings into IEE.

AMM

See Advanced Metering Manager (AMM) application on page 13.

AMMWSRoute

An Itron component that allows Advanced Metering Manager (AMM) application on page 13 users to route web service calls for AMM. It provides the public API and serves the WSDL and XSD files needed by integration tooling and routes public and legacy API calls. It is required by AMM.

ampacity

The current-carrying capacity of a conductor (expressed in amperes) under stated thermal conditions. Different materials have different limits of ampacity, depending upon the temperature at which they are run, and those limits are set by the National Electrical Code (NEC).

ampere (A)

The practical unit of electric current. One ampere is the current caused to flow through a resistance of one ohm when one volt is impressed across the resistor.

ampere-hour (Ah)

A current of one ampere flowing for one hour.

AMR

See automated meter reading (AMR) on page 24.

AMT

See Assumed Meter Time (AMT) on page 22.

analog-to-digital converter

A device that performs the conversion from an analog signal to a digital signal. Typically referring to voltage, an ADC performs a process to change the continuous analog signal to a digital signal, or digital number, that represents the signal's amplitude.

annunciator

A label or symbol on the meter display that identifies particular quantities displayed for a register. The OpenWay CENTRON Meter, for example, uses LCD annunciators to indicate phase-voltage for each phase (VA, VB, VC), nominal voltage (120 and 240), and load/direction.

anode

An anode is an electrode through which conventional current flows into a polarized electrical device. In a battery or galvanic cell, the anode is the negative electrode from which electrons flow out towards the external part of the circuit.

In electrochemistry, the anode is where oxidation occurs and is the positive polarity contact in an electrolytic cell. At the anode, anions, which are negative ions, are forced by the electrical potential to react chemically and give off electrons (oxidation) which then flow up and into the driving circuit.

ANSI

See American National Standards Institute (ANSI) on page 15.

ANSI C12.11

The ANSI protocol for instrument transformers for revenue metering—10 kV BIL (impulse insulation level) through 350 kV BIL. This standard covers general requirements for metering accuracy, thermal ratings, and transformer and inductively coupled transformer dimensions for revenue metering, 10 kV basic lightning BIL through 350 kV BIL for 0.6 kV nominal system voltage through 69 kV NSV.

ANSI C12.18

The American National Standards Institute (ANSI) on page 15 protocol used to transport data through the optical ports used on most North American electricity meters.

ANSI C12.19

The American National Standards Institute (ANSI) on page 15 protocol that defines the table structure for utility application data to be passed between an end device and a computer.

ANSI C12.22

A subclass of the American National Standards Institute (ANSI) on page 15 C12 family of meter communication and data standards. The C12.22 application layer protocol enables the transport of C12.19 data tables over any network medium.

Itron OpenWay systems use the C12.22 protocol for meter-level communications at all levels below the IP cell relay.

ANSI class

A rating assigned to electric meters by the American National Standards Institute (ANSI) to indicate a meter's ability to safely conduct electrical current. For example, an ANSI rating of 200 (written as CL 200) represents the meter's capability of channeling 200 amperes of continuous electrical current without sustaining damage.

antenna

Antennas improve the capacity of the mesh network. Itron has antenna models optimized to work in a variety of indoor or outdoor installations. Examples include rubber duck antenna on page 197, , and low-profile disc antenna (hockey puck) on page 136

AnyQuest

A mobile data collection solution comprised of multiple components working together to create and collect enhanced data. It includes high performance radio modules, rugged handheld terminals, user-friendly mobile reading, and PC software to transfer data from and to the central systems.

AnyQuest Cyble Enhanced

A high-performance radio module that opens the way to a new generation of modules offering benefits of unprecedented functionality within a mobile data collection system.

AnyQuest EverBlu Pulse Enhanced

A module designed to fulfill the requirement to easily connect any meter with pulse output to the Itron automated meter reading (AMR) on page 24 and advanced metering infrastructure (AMI) on page 12 systems.

AP

See Access Point (AP) on page 8.

APA

See application protocol adapter (APA) on page 19.

Apache HTTP Server

Free public-domain web server software. The original version of Apache was written for UNIX, but there are now versions that run under OS/2 and Windows.

APD

See abnormal peak day (APD) on page 7.

APDU

See application protocol data unit (APDU) on page 19.

API

See Application Programming Interface (API) Manager on page 19.

API resource

An entity provisioned as an application within the Itron Identity Service. An API resource can be used as a scope to request privileges within access tokens for protected API resources. See also Tenant Management on page 221

APLS

See Active Premise Load Shedding (APLS) on page 11.

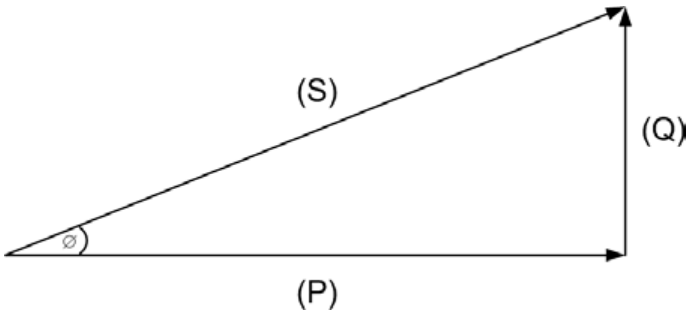
APN

See access point name (APN) on page 8.

apparent power

Total power in an alternating current (AC) circuit, both dissipated and absorbed/returned. Apparent power is symbolized by the letter S and is measured in volt amps (VA). Apparent power is the vector summation of both true power and reactive power.

The following figure is called the Power Triangle. The Power Triangle relates true (P), reactive (Q), and apparent power (S) in trigonometric form.



appliance

A security hardware device. Appliance is often used in the phrase Certicom appliance or security appliance. Appliance can have multiple meanings. When the term appliance appears as Certicom appliance or security appliance, the term does not refer to a common household appliance such as an oven or refrigerator.

appliance message client library (AMCL)

A Certicom AMI solution software component that provides simple application program interfaces (APIs) to encode and decode messages. The OpenWay Collection Engine (CE) uses AMCL to format and deliver messages to the OpenWay signing and encryption server (SES) and to the decryption and key update server (DKUS).

application

In the context of Tenant Management on page 221, an independent entity within Identity Server that acts as a parent container for one or more clients, claims, claimsets, or API resources.

application client

An identity created for a computer or a program that requests data, files, or services or accesses shared network resources. See also Tenant Management on page 221.

application group

A user-defined meter category that enables synchronized operations to be performed on all meters in the group, rather than consecutive operations on each meter. Meters can be included in up to six application groups, but are not required to be included in a group.

application information broker (AIB)

An Itron software product with a set of programming interfaces that allows multiple entities or departments to access and subscribe to collected data.

application layer security

The protection of the application layer by means of a secure association between the applications and field devices, allowing the applications to access data or execute a command against the device. Sometimes called V2 security at Itron after the first version of firmware that incorporated keykeep on page 128 files for application layer security.

application programming interface (API)

A source code-based specification used as an interface by software components to communicate with each other, similar to the way a user interface facilitates interaction between humans and computers. An API may include specifications for routines, data structures, object classes, protocols, and variables. Itron software products implement APIs to allow interaction with other software, which use the APIs to request services from or exercise features of the Itron software.

Application Programming Interface (API) Manager

The OpenWay Collection Engine application that supports service requests from system programs.

application protocol adapter (APA)

A package of compiled .NET assemblies that are used to construct commands to be sent to Itron Security Manager (ISM) before signing.

application protocol data unit (APDU)

A message protocol used to transfer application information between two entities. Also called application layer protocol data unit.

application protocol module (APM) daemon

A Certicom application programming interface (API) component in the OpenWay signing and encryption server (SES) that provides secure communication between the SES and the OpenWay Collection Engine (CE).

application role

In the context of Tenant Management on page 221, a set of privileges assigned to an application user within the Itron Identity Service.

application title (ApTitle)

The C12.22 network address for a cell relay, used to identify the relay as the source or destination of C12.22 messages.

ApplicationServices (AppServ)

A code package that operates alongside the meter firmware on DI-capable meters. AppServ provides the means of communication with DI agents using subscriptions and permissions.

approved supplier list (ASL)

A list that many organizations maintain, used to identify qualified suppliers of materials or services. Organizations often evaluate aspects of potential suppliers' business, such as financial and quality assurance practices, to determine eligibility. After a supplier is added to an organization's ASL, the organization may often reevaluate the supplier's eligibility, as a part of supplier performance management.

Also called approved vendor list (AVL) on page 20.

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Also called approved supplier list (ASL) on page 20.

AppServ

See ApplicationServices (AppServ) on page 20.

ApTitle

See application title (ApTitle) on page 20.

Aquadis+

A diffused volumetric-type water meter with a compact design that provides outstanding accuracy performance. It achieves typical starting flow of 1 L/h and an extended dynamic range up to R800.

Aquadis+ Composite

A piston-type volumetric cold-water meter approved in accordance with Measurement Instrument Directive (MID) and designed for the best metering in residential applications.

Aquadis+ DN15

A volumetric piston meter for residential cold-water metering.

Aquadis+ DN20

A volumetric water meter designed for residential large consumers applications.

Aquadis+ Hot Water

A residential volumetric piston meter dedicated to hot water up to 90°C metering.

Aquadis+ PE

A water meter especially designed to provide reliable and accurate measurement in cold and hot water.

Aquadis+ / TD8

A piston-type water meter suitable for clean water conditions in residential and commercial environments.

Arduino board

An open hardware development board that can be used to design and build devices. See also Arduino sketch on page 21.

Arduino libraries

Arduino allows code to be placed in libraries. A library is a set of C++ files located in a folder with the name of the library. The location of the library folder is usually called libraries and is located in the Arduino folder.

Arduino sketch

A program written using Arduino software and uploaded to and run on an Arduino board. See also Arduino board on page 21.

argument

The actual input supplied to a function call.

Also known as parameter.

ARI

See AMI Readings Import (ARI) on page 16.

arrestor

A protective device that limits power surges to electrical equipment by discharging or diverting them. Arrestors can be designed to limit power surges from various sources. For example, spark, flame, and lightning arrestors can be used to protect the power lines between the utility and the customer.

ASA

See Adaptive Security Appliance (ASA) on page 12.

ASL

See approved supplier list (ASL) on page 20.

ASN

See advance shipping notice (ASN) on page 13.

ASN.1

See Abstract Syntax Notation One (ASN.1) on page 7.

ASP

See Active Server Pages (ASP) on page 11.

See Average Selling Price (ASP) on page 24.

ASP.NET®

A Microsoft® framework for building dynamic websites, web applications, and web services.

ASR

See Aggregation Services Router (ASR) on page 13.

assignment

A collection of work orders or meter data collection tasks given to a specific user, field service representative (FSR), or other technician.

associate

In , a verb meaning to link a device with an Energy Services Interface (ESI) on page 84 but without joining it. A device can become associated also if it is unjoined from an ESI or if a permit join has failed for the device. See also join on page 127.

Association Control Service Element (ACSE)

The Open Systems Interconnection (OSI) method for establishing a call between two application programs. ACSE checks the identities and contexts of the application entities, and can apply an authentication security check.

ACSE is the message format (frame) used for Extended Protocol Specification for Electric Metering (ESPEM) protocol messages that are carried on OpenWay radio-frequency local area networks (RFLANs).

Assumed Meter Time (AMT)

A feature that allows the OpenWay CENTRON Meter to continue operating despite a depleted battery. Meters go into AMT mode when they power up after an outage. Meters exit AMT mode and return to normal operation when they synchronize with the network and attain network time.

asymmetric digital subscriber line (ASDL)

A technology for transmitting digital information at a high bandwidth on existing phone lines to homes and businesses. ADSL provides a continuously available connection. ADSL is asymmetric in that it uses the majority\ of the channel to transmit downstream to the user and only a small part of the channel to receive information from the user. ADSL simultaneously accommodates analog and digital information on the same line. ADSL is generally offered at downstream data rates from 512 Kbps to about 6 Mbps. A form of ADSL, known as universal ADSL or G.lite, has been approved as a standard by the ITU-TS.

asymmetric key encryption

A cryptographic system that uses a key pair—a public key and a mathematically related private key. The public key can be shared and is used to encrypt the data. The private key is known only to the recipient of the encrypted message and is used to decrypt it. This system enables users of unsecured networks to securely exchange data.

Also called public key encryption.

asynchronous

Of or related to a process that operates independently of other processes. In asynchronous communication between computers, the computers do not use timing to determine where transmissions begin and end.

Asynchronous JavaScript and XML (AJAX)

A group of client-side web development techniques for creating asynchronous web applications. AJAX techniques enable the exchange of data between a webpage and a server in the background without interfering with the display or the behavior of the page. This allows user interaction without the need to reload the entire page.

asynchronous signal

A signal that occurs without a corresponding request for that signal. A last gasp (LG) on page 131 from an electricity meter is an example of an asynchronous signal.

ATE

See automatic test equipment (ATE) on page 24.

atmospheric pressure

Measure of the weight of the air above the earth at a given place on the earth's surface. At sea level, atmospheric pressure is approximately 101.325 pascals.

ATP

See available-to-promise (ATP) on page 24.

attenuation

The decrease in amplitude of a signal during its transmission from one point to another.

attribute

A markup construct that consists of a name/value pair that exists within a start tag or an empty-element tag. An attribute is often referred to as metadata that describes or defines a property of an element.

For example, the following XML shows an element called meter that has an attribute called type and another attribute called active.

<meter type=”electric” active=”true”>

The type attribute value describes the type of meter that is represented in the database by the meter element. The active attribute value defines whether the meter is active or inactive within the meter network.

audit engine

An Itron Field Deployment Manager (FDM) on page 93 software component that automates selection of work orders to be audited and generates the corresponding audit work orders.

Australian Energy Market Operator (AEMO)

An independent, member-based organization, which operates the National Electricity Market (NEM), retail, and wholesale gas markets in southeastern Australia.

authentication

The process of verifying the identity of a user, process, or device before releasing resources within an information system. Implementation may require basic credentials (such as a username and password), smart cards, authentication servers, or a public key infrastructure.

Authentication Authorization Accounting (AAA) server

The network server used for access control in a Cisco® RF Mesh-based system. The AAA server identifies users (authentication), implements policies that determine which resources and services a valid user can access (authorization), and keeps track of time and data resources used for billing and analysis (accounting).

authentication, authorization, and accounting (AAA)

A set of protocols that mediate network access. For example, an AAA server identifies users using a process which entails verifying evidence of a digital identity, such as a digital certificate (authentication), and implements policies that determine which resources and services a valid user can access (authorization). Determined authorization is typically inherited during the authentication process, and refers to deciding if an entity has access restrictions, such as encryption. Accounting usually refers to keeping track of time and data resources used for billing and analysis (accounting).

authentication header (AH)

A member of the Internet Protocol Security (IPsec) protocol suite that guarantees IP packet connectionless integrity and data origin authentication. AH can utilize sliding window techniques to protect against replay attacks and to discard old packets.

authority

In the context of Tenant Management on page 221 the service within the Itron Identity Service responsible for issuing, storing, and verifying truths about its subjects (such as the Identity Server).

authorization

The process of enabling the rights and abilities of an authenticated user.

auto associate

The act in which a Field Service Unit (FSU) on page 93 automatically initiates a secure association (SA) on page 201 with the meters that it discovers.

automated meter reading (AMR)

The collection of utility meter data through the use of Encoder/Receiver/Transmitter (ERT) module on page 81s that are connected to the meters, eliminating the need for field service representatives to physically inspect and read the meters. Additionally, ERT modules monitor and record related information such as meter tampering data.

Also called remote meter reading.

automatic loop restoration scheme (ALRS)

A special feeder automation scheme that is used by utilities to improve distribution system reliability. Also called automatic loop scheme (ALS) on page 24.

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Also called remote meter reading.

automatic remote interrogation

Retrieval of data from meters at scheduled times over a communication link.

automatic test equipment (ATE)

One or more pieces of equipment that perform tests on a device, using automation to quickly perform measurements and evaluate the test results.

auto-refresh

The process by which a user interface automatically updates itself at preset intervals.

auto teardown

To have the Field Service Unit (FSU) on page 93 automatically terminate the secure associations after a meter finishes testing. To improve network performance between the Secure FSU and tested meters, Itron recommends automatically tearing down the secure association (SA) on page 201 with each device after testing is completed.

auxiliary work order

Audit and service work orders that specify additional work to be performed in connection with a primary work order.

available-to-promise (ATP)

A business process used in supply-chain management. ATP can be used to calculate product quantities, to provide responses to customer inquiries, and to coordinate the aspects of demand and order promising and fulfillment, such as quantity and delivery due date.

average revenue per kilowatt hour

Calculated as the total monthly revenue divided by the total monthly sales for each sector (residential, commercial, or industrial) and geographic area (state, census division, or national).

Average Selling Price (ASP)

The average price at which a particular product or commodity is sold across channels or markets.

AVL

See approved vendor list (AVL) on page 20.

AWG

See American Wire Gauge (AWG) on page 15.

AWS

See Amazon Web Service® (AWS®) IoT Cloud on page 15.

Axonic

A static ultrasonic flow meter adapted to the needs of district heating and cooling applications.

Azure Active Directory (AAD)

A Microsoft multi-tenant cloud directory service capable of authenticating security principals or working with other identity providers, such as Microsoft's Active Directory.

B

B2B

See board-to-board connector (B2B) on page 30.

backbone device

A device that is required to communicate with parts of the network. These are typically Access Point (AP) on page 8 and Relay on page 192, but could be electricity meters in special circumstances.

back end

The part of a computer system or application that is not directly accessed by the user, usually responsible for storing and manipulating data.

backhaul

The portion of a hierarchical telecommunications network that is made up of intermediate links between the core or backbone of the network and the small subnetworks at its edge. For example, the local subnetwork connects a cell phone with a cell tower and the backhaul includes all the connections between the cell tower and the cellular provider. Backhaul carries traffic back and forth.

The backhaul link provides the connection between the Access Point (AP) on page 8 and Itron applications and is typically the highest capacity data link in a network. In Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124 curtailment programs, backhaul refers to the process of transmitting data beyond its normal destination point and then back again to better utilize personnel or network equipment not located at the destination location. It can also refer to transmitting from a remote site or network to a central or main site.

back office

The internal business operations of a company that are not accessible or visible to the general public.

back office certificate authority (BOCA)

A certificate issued by the back office of a utility, which chains back to the root certificate in an X.509 on page 241 digital certificate hierarchy. Also known as EBOCA.

Multiple BOCAs are used within the Itron system, including: Network Management Entity CA, which signs the network management entity certificates. There may be multiple CAs with different privileges depending on operator requirements. See Certificate Authority (CA) on page 39.

back-office system (BOS)

Platforms and applications that don't interface with customers but help employees manage core functions. Back-office systems can be manual or automated.

backup

A copy of computer data, typically consisting of database content, log files, system files, and programs, to facilitate recovery of data if necessary. Data is transferred from one location to another, such as to an external storage medium for archival and retrieval purposes.

backup key

A key pair removed from the signing and encryption server (SES) and safely stored for later use. This key pair is enabled when a security appliance or its private keys are compromised. Also called a reserve key. See also asymmetric key encryption.

BACT

See Battery-Powered Adaptive Communications Technology (BACT) on page 28.

ballast

A device used to control current in a streetlight. The two types are magnetic and electronic. Magnetic ballast technology predates electronic, and the electronic type provides more functional options over the magnetic type.

ball grid array (BGA)

A type of surface-mount packaging used to permanently mount integrated circuits.

bandwidth

The amount of data transmitted in a given amount of time, usually measured in bits per second, kilobits per second, or megabits per second.

barcode

An identification code that can be read by an optical scanner. A barcode contains binary information about the object to which it is affixed. There are two types of barcodes, linear (1D), and matrix (2D). Linear barcodes consist of a series of vertical bars and spaces of differing widths. Linear barcodes provide a maximum data capacity of 20 characters. Matrix barcodes consist of geometric patterns of vertical and horizontal shapes and spaces. Matrix barcodes provide a maximum data capacity of 7,089 characters.

Itron affixes barcodes to many of its manufactured devices, such as meters and endpoints. Many Itron software products support the use of barcodes for tasks, including inventory management.

baseline, curtailment

A calculated value used to represent a customer's electricity load or usage pattern over a period of time, in the absence of their participation in a curtailment program. Baseline values are calculated using one of many available baseline algorithms.

baseload

The average amount of electricity a homeowner uses just to “run” the home. The usage comes from appliances that are always on, like refrigerators or electric clocks, and items that are not turned on but are plugged in, like a computer or television. See also demand on page 63.

base load capacity

The generating equipment normally operated to serve loads on an around-the-clock basis.

base load plant

A plant, usually housing high-efficiency steam-electric units, which is normally operated to take all or part of the minimum load of a system, and which consequently produces electricity at a constant rate as it runs continuously. These units are operated to maximize system mechanical and thermal efficiency and minimize system-operating costs.

base station

A land station in the land mobile service. For example, in cellular and personal communications uses, each cell has its own base station. Each base station is interconnected with other base stations and with the public switched network.

Basic Encoding Rules (BER)

A set of encoding rules for Abstract Syntax Notation One (ASN.1) notation, which is a method for defining data structures.

basic security

The level of security employed by Itron’s ChoiceConnect network on page 41 endpoint types before the introduction of enhanced security in its 100 series endpoints and CENTRON Bridge meters. Basic security consists of such features as tamper codes, Itron’s proprietary frequency-hopping spread-spectrum (FHSS) protocol for radio frequency communication, and Transport Layer Security/Secure Sockets Layer (TLS/SSL) protocol for Fixed Network communications.

basic unit

A unit used to measure a commodity type. For example, in Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 you can use kWh (the base unit) to measure electricity (the commodity type).

battery backed device (BBD)

A device that provides backup power when your regular power source fails, or voltage drops to an unacceptable level. See also battery-powered device (BPD) on page 28.

battery backup

An option that allows Access Point (AP) on page 8 and Relay on page 192 to operate during outages. See also Infrastructure Battery Pack (IBP) on page 115.

battery electric vehicle (BEV)

A vehicle that runs exclusively from on-board batteries.

Battery Energy Storage System (BESS)

A system that allows the storage of energy for later use.

Battery-Powered Adaptive Communications Technology (BACT)

Obsolete name for battery-powered device (BPD) on page 28.

battery-powered device (BPD)

A device on the mesh network that is powered by a battery and that communicates across the network through a neighboring continuously powered device (CPD) on page 52. Examples are:

- Gas Interface Management Unit (IMU) on page 99
- Milli on page 146
- OpenWay Riva 500G ERT Module on page 164
- OpenWay Riva 500W ERT Module on page 165

To conserve power, BPD transmitters are usually in "sleep" mode. When a BPD first joins the network, it finds the best neighboring CPD as its proxy. Under normal operations, following a negotiated "listening schedule", the BPD wakes up and exchanges data, messages, and firmware updates with the CPD. Commands issued to the BPD are sent to the CPD, which returns answers after the BPD's next successful "wake" cycle. See also battery backed device (BBD) on page 28.

baud

A unit of measurement in digital or telecommunications. Baud equals the number of pulses or bits per second. Also see baud rate.

baud rate

In digital communications, the data transmission rate in symbols per second. When measuring the line code transmission speed, the baud rate is measured in pulses per second.

BBD

See battery backed device (BBD) on page 28.

beacon

Packets of data typically sent by an access point to synchronize a wireless network. An Itron telemetry module beacon provides packets of module status information.

BER

See Basic Encoding Rules (BER) on page 27.

BESS

See Battery Energy Storage System (BESS) on page 28.

Beta

A version of a product released for evaluation and validation from a system functional and user perspective. Typically, the evaluation and validation is performed in a customer environment. The goal of the beta release is to have users exercise the product in a real operational environment, to validate that the release meets requirements, and to uncover any issues not detected during internal product testing.

BEV

See battery electric vehicle (BEV) on page 28.

BGA

See ball grid array (BGA) on page 27.

BGP

See Border Gateway Protocol (BGP) on page 31.

bi-directional metering

A metering functionality that supports the storage of both received and delivered data metrics. Utilities can collect this data to support green credit electricity programs for consumers who own renewable energy facilities or participate in vehicle-to-grid systems.

BIG-IP®

F5® Networks' system of integrated application delivery services. BIG-IP performs load balancing, access control, and application security.

billing cycle

Determines how often bills are sent to utility customers. In BMR on page 30, a billing cycle is a convenient way to verify that meters are being read with enough lead time to generate bills.

billing determinant

A calculation used to create rate charges based on interval data used within a time-of-use (TOU) period. For example, you can create a summer peak billing determinant that multiplies the per-kWh charge by the total kWh of the summer peak TOU. The billing determinant calculation can also include adjustments, such as a power factor (PF) adjustment.

billing read window

Determines the period when a meter can be successfully read for billing purposes. This is the period in hours before and after midnight of the bill generation date.

billing success rate (BSR)

The percentage of meters for which a successful read occurred between midnight and midnight. BSR is a metric for how well the data necessary to generate bills can be gathered during off hours. Unlike RSR, BSR records the percentage of meters read during a given period, whereas RSR records the percentage of successful meter reads per schedule run. See also message success rate (MSR) on page 142 and read success rate (RSR) on page 189.

bill of materials (BOM)

A document that contains lists of all the materials required to manufacture a shippable product, and information on how the parts that are required work together.

binary large object (blob)

A large file that will execute upon successful load to a device. It is often used to send a set of configuration commands to a device.

birth certificate

A digital identification, conforming to the X.509 on page 241 security standard, given to an Itron NIC at the time of its manufacture. See also driver's license on page 74.

blackout period

A period of time during a utility's billing cycle when field service representatives (FSRs) are not to be assigned work orders, such as during holidays or meter reading periods.

blade server

A rack-mounted server that consists of multiple thin, modular electronic circuit boards, called server blades. Each server blade is essentially a server on a card, with its own CPU, memory, input/output (IO) ports, and so on. The blades share a common power supply, operating system, and management mechanism.

blink phase

A phase registered by a meter. A blink phase is registered when a voltage drop is sensed that would cause the meter module to shut down.

blob

See binary large object (blob) on page 30.

block

A consumption tier that includes a price and optionally a threshold. Customers are charged a per unit price for energy consumed within the block. When total consumption exceeds the defined threshold, a new block is entered and a price change occurs.

block interval demand

Demand based on intervals from 1 to 60 minutes. All calculations of demand are based on rolling demand. To calculate block interval demand, you must program the meter register to have one subinterval of the same length as the demand interval.

block rate

Billing rate See also declining block rate on page 63 and inclining block rate on page 114.

Bluetooth RF Master

A radio Bluetooth master unit designed by Itron that can read meters equipped with radio interface units, using any kind of reading terminals equipped with Bluetooth interface.

blurt

A short, one-way message from metrology to register through the board-to-board (B2B) connector.

BMR

See business management review (BMR) on page 33.

board-to-board connector (B2B)

Board-to-board connector that uses the ANSI C12.22 application protocol.

BOCA

See back office certificate authority (BOCA) on page 26.

BOM

See bill of materials (BOM) on page 30.

Border Gateway Protocol (BGP)

The protocol backing the core routing decisions on the Internet. BGP maintains a table of IP networks or “prefixes” that designate network reachability among autonomous systems. It does not use traditional Interior Gateway Protocol (IGP) metrics, but makes routing decisions based on path, network policies, and/or rule sets.

BOS

See back-office system (BOS) on page 26.

bounce diagrams

Diagrams created by transmission line engineers to illustrate the transient waves bouncing back and forth on the transmission line.

box utilization

A feature of Itron’s Field Deployment Manager (FDM) software that enables users to track boxes of inventory items and their contents. It facilitates management of inventory on a first-in, first-out basis and helps inventory managers trace list or misplaced items.

BPD

See battery-powered device (BPD) on page 28.

BPL

See broadband over powerlines (BPL) on page 32.

BPLC

See broadband power line communications (BPLC) on page 32.

Bridge

A communications device that provides high-performance, reliable, and secure DNP3 transport between remote terminal unit (RTU) on page 193 and data centers, Bridges are manufactured to perform one of two roles: Master or Remote. A Master Bridge provides the connection or take-out point for the Remote Bridges to the SCADA system. The Remote Bridges connect to the RTUs to provide connectivity back to the Master.

The Bridge is so named because it connects (bridges) two networks. For example, Bridges deployed in a Distribution Automation solution bridge the Itron RF network and the utility DPN3 network.

There are Bridges for both the Itron Gen4 network and Gen5 network. Both provide Ethernet and serial connectivity for simultaneous support of DNP3 and management traffic. Bridge 5 also provides APIs for maximum flexibility.

See also eBridge on page 77, and sBridge on page 200.

Bridge Configurator

An Itron software tool that, in conjunction with a Field Service Unit (FSU) on page 93, is used for creating networks of Bridge on page 31s, remote terminal unit (RTU) on page 193, and intelligent electronic device (IED) on page 117. A number of DA deployment scenarios and network configurations are supported by this tool.

bring your own identity (BYOI)

In the context of Tenant Management on page 221, an option for a tenant to use an existing active directory within the Identity Service.

British thermal unit (BTU)

A standard unit for measuring the quantity of heat energy equal to the quantity of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit.

broadband over powerlines (BPL)

A type of data transmission in which a single wire can carry high-speed packet (internet) data. Cable TV, for example, uses broadband transmission. Electricity providers can use BPL technology to transmit data over the power lines that they already have in place by using a system of signal injectors, repeaters, and extractors that bypass the distribution transformer. The frequency of BPL signals is much higher than that of traditional power-line carrier (PLC) on page 178 systems.

broadband power line communications (BPLC)

The transmission of data over power lines using a system of signal injectors, repeaters, and extractors that avoid interference at the distribution transformer. The frequency of the data signals is much higher than that of traditional power line carrier systems, so the signals are unaffected by the power carried across the line. Also called power line communications (see power-line carrier (PLC) on page 178).

broadcast

The mode of sending packets over a network so that all devices receive them. Each device's NIC then evaluates the event and decides if it can run it. See also unicast on page 228.

broadcast message

A message destined for all nodes in a network.

broker

A firm that acts as an agent in the sale and purchases of electricity, but never owns the electricity and typically does not own generating facilities.

brownout

A controlled power reduction performed by the utility. The utility decreases voltage on the power lines so customers receive weaker electric current. Typically used to reduce load when the total power demand exceeds the maximum available supply.

BSR

See billing success rate (BSR) on page 29.

BSR/D

See business solution requirements/design (BSR/D) on page 33.

BTO

See build to order (BTO) on page 33.

BTU

See British thermal unit (BTU) on page 32.

BU

See business unit (BU) on page 33.

Bubble Up

A process using MQTT Broker on page 149 to let applications collect readings from meters or sensors without sending explicit read commands; in other words, the data "bubbles up" from the device. This is done by sending asynchronous messages to Trap Messaging Bridge (TMB) on page 225, which will then send these messages to Gateway on page 99, which pushes them to an MQTT broker. The MQTT broker enables applications to publish messages on various topics or to subscribe to messages on particular topics. BMR on page 30 or any other application can subscribe to topics to receive the traps.

bubble-up mode

One of two transmission modes (the other being wake-up mode) by which most Encoder/Receiver/Transmitter (ERT) module on page 81s can be programmed to transmit meter reading and tamper data to data collection devices. In bubble-up mode, an ERT module periodically broadcasts its meter reading and tamper data at programmed intervals in a standard consumption message (SCM), whether or not a data collection device is present. A data collection device must be within receiving range of the ERT signal to read and record the SCM. In contrast, an ERT module programmed to use wake-up mode waits until it receives a wake-up tone from a data collection device before transmitting its SCM.

build to order (BTO)

A manufacturing term for a production approach where products are built only when a confirmed order for the product is received. This is a common form of production for highly customized, high-value, or low-volume products.

Also called make to order.

bulk power market

An energy market restricted to wholesale power suppliers and resellers who acquire energy for resale elsewhere.

business management review (BMR)

A format used to designate line items for invoicing and revenue recognition purposes.

business solution requirements/design (BSR/D)

A document that outlines all solution requirements that will be met by the solution design and identifies any requirements gaps.

business unit (BU)

An organizational unit of a utility, typically based on function (gas, electric, water, cable) or geographic location.

BYOI

See bring your own identity (BYOI) on page 32.

C

C12.11

See ANSI C12.11 on page 17.

C12.19

See ANSI C12.19 on page 17.

C12.22

See ANSI C12.22 on page 17.

C&I

See commercial & industrial (C&I) on page 46.

CA

See Certificate Authority (CA) on page 39.

CAAS

See Central Authentication and Authorization Service (CAAS) on page 38.

Cabinet Node (Cabinet Node MicroAP5)

A product designed to be deployed in city streetlight cabinets containing a maximum of two external third-party meter on page 222s and one or more third-party sensors. The Cabinet Node passes meter and sensor data to Streetlight.Vision (SLV) software on page 215 and Advanced Metering Manager (AMM) application on page 13.

cable armor

A stainless-steel coil that wraps around the endpoint cable to protect the cable jacket.

CAGR

See compounded annual growth rate (CAGR) on page 49.

CAIDI

See Customer Average Interruption Duration Index (CAIDI) on page 57.

CAIFI

See Customer Average Interruption Frequency Index (CAIFI) on page 57.

calculation delay

With demand limiting, the time after a connect that a meter waits to begin calculating demand. See also calculation period on page 34 and demand limiting period on page 64.

calculation period

With demand limiting, the interval between demand measurements during the demand limiting period on page 64.

calendar schedule

A schedule that determines items such as seasonal changes, holidays, or daily patterns.

California Metering Exchange Protocol (CMEP) Exporter

A transformation adapter that processes Advanced Metering Manager (AMM) application on page 13-produced meter read data and generates CSV files which then conform to the CMEP format.

call frequency

The period of time between scheduled automated meter reading (AMR) calls. In the Itron Telephone AMR software system, this is the amount of time to wait between AMR calls to the master station host processor by the Siris or Metscan telephone AMR meter modules.

Call Home Server

A component used with GridScape that enables new Access Point (AP) on page 8 or MicroAP (uAP) Module on page 146 to obtain their configurations over the air. When new APs or MicroAP s connect with the Call Home Server, GridScape receives an “Unknown AP” alert to inform that an unknown AP or MicroAP is attempting to obtain configuration.

calorific value (CV)

A measure of the heating power of a substance, which depends on the composition of the substance that is being burned. The quantity is usually expressed in joules per kilogram.

According to National Grid, for gas, the CV is dependent on the composition of the gas and refers to the amount of energy released when a known volume of gas is completely combusted under specified conditions. The CV of gas, which is dry, gross and measured at standard conditions of temperature (15oC) and pressure (1013.25 millibars), is usually quoted in Megajoules per cubic metre (MJ/m3).

CAM

See Connected Grid Router (CGR) Adaptive Communications Technology (ACT) Module on page 50.

CAM1

See OpenWay Riva CGR ACT Module 1 on page 165.

CAM3S

See OpenWay Riva CGR ACT Module 3S on page 165.

Canadian Standards Association (CSA)

A standards-defining organization for industries that include electronics, communications, and information technology.

canary polling

See exception polling on page 88.

capability

The maximum load that a generating unit, generating station, or other electrical apparatus can carry under specified conditions for a given period without exceeding approved limits of temperature and stress.

capacitor

A device in an electric utility distribution system that reduces energy losses in the system and therefore improves the efficiency of the flow of electricity through distribution lines. Capacitors are installed in substations and on power poles.

Capacitor Voltage

A value that represents a Remote Disconnect switch capacitor's voltage.

capacity

The amount of electric power delivered or required for which a generator, turbine, transformer, transmission circuit, station, or system is rated by the manufacturer.

capacity charge

An element in a two-part pricing method used in capacity transactions (energy charge on page 84 is the other element). The capacity charge, sometimes called demand charge, is assessed on the amount of capacity being purchased and expressed in

$/kWmonth or $/MW-day.

carrier frequency, radio

The radio frequency used by a data collection device to transmit a wake-up tone to an Encoder/Receiver/Transmitter (ERT) module on page 81. ERT modules that use wake-up tones wait until they receive a wake-up tone before transmitting their meter reading and tamper data in a standard consumption message (SCM). To wake up an ERT module, a data collection device emits a utility-specific wake-up tone using a radio frequency of 952 MHz or 956 MHz. Each ERT module can receive a range of carrier frequencies but only responds to the wake-up tone it is programmed to recognize. A utility must receive a license from the Federal Communications Commission (FCC) or Industry Canada (IC) for a specific carrier radio frequency to legally operate a data collection device at that frequency.

CAS

See code access security (CAS) on page 45.

CAT

See CryptoServer Administration Tool (CAT) on page 55.

category node

An item in the navigation pane tree that provides access to a category of Field Deployment Manager (FDM) database records, settings, properties, events, objects, or processes. The permissions granted to your user account determine which nodes you have access to and which of their features you can use.

cathodic protection (CP)

A technique used to control corrosion of a metal structure or surface by introducing an anode to create an electrochemical cell in which the metal structure or surface to be protected is rendered the cathode. There are two types of systems for cathodic protection: sacrificial anode systems and impressed current systems. In each system, the anode possesses a lower electrochemical potential than the cathode (and is thus more corrodible), prompting the corrosion-causing current to flow away from the anode, rather than the cathode. For example, cathodic protection is used to control corrosion of boat hulls, underground storage tanks, home water heaters, and steel water and fuel pipelines. In some industries, governments require regular testing and inspection of cathodic protection systems to ensure proper operation.

CA Tools

See Certificate Authority Tools (CA Tools) on page 39.

CATT

Internal name no longer associated with Communications Tester on page 48.

CATT (Communications Tester)

Internal nickname for Communications Tester on page 48.

CBC

See cipher block chaining (CBC) on page 42.

CBC-MAC

See cipher block chaining message authentication code (CBC-MAC) on page 42.

CBKE

See certificate-based key establishment (CBKE) on page 39.

CBWFQ

See class-based weighted fair queuing (CBWFQ) on page 43.

CCA

See Collector Configuration Application on page 46.

CCF

See centum cubic feet (CCF) on page 39.

CCU

See Cell Control Unit 100 (CCU 100) on page 37.

CCUM

See Continuous Cumulative Demand Value (CCUM) on page 51.

CCX

See Cisco® Compatible Extensions (CCX) program on page 42.

CDC

See change data capture (CDC) on page 41.

CDD

See cooling degree day (CDD) on page 52.

CDMA

See code-division multiple access (CDMA) on page 45.

CDP

See certificate distribution point (CDP) on page 40.

CE

- See conditioning equipment (CE) on page 49
- See OpenWay Collection Engine on page 164

CEC

See Clean Energy Council (CEC) on page 43.

CEF

See Common Events Format (CEF) on page 47.

Cell Control Unit 100 (CCU 100)

A neighborhood pole-mounted data collection device that gathers meter readings and related data from encoder/receiver/transmitter endpoint (ERT) modules in Itron radio-based Fixed Network systems, including ChoiceConnect, Fixed Network, and Water SaveSource systems. The cell control unit (CCU) transfers the data to a host processor using public, Internet Protocol (IP)-based, or private computer networks.

cell ID

The identification number assigned to a radio-frequency local area network (RFLAN) cell. Each cell consists of a group of meters (up to 1,000) and the cell relay through which they communicate with the OpenWay Collection Engine (CE).

cell master

A level-one device in a cell that manages the meters (up to 1,000) within that cell.

CellNIC

See MicroAP (uAP) Module on page 146.

cell relay

An OpenWay communication device that routes messages between the smart meters that make up its cell and the OpenWay Collection Engine (CE).

cell relay under glass (CRUG)

A socket-based cell relay installed inside the base of an OpenWay CENTRON Meter.

cell, RFLAN

A group of OpenWay CENTRON meters (up to 1,000) and the cell relay through which they communicate over a radio-frequency local area network (RFLAN) with the OpenWay Collection Engine (CE).

Cellular

An end-to-end smart metering solution which offers remote meter data collection and meter management, field deployment and commissioning, AMI performance monitoring with a daily direct access to the delivery points over an existing GPRS network. This solution enables utilities to protect their revenue with remote fraud protection while simultaneously empowering consumers to conserve energy.

cellular module

A device integrated under the cover of a meter designed for data collection and network communications using existing cellular data networks. The cellular module works in conjunction with an electric meter to become an intelligent client to a head end system. The module supports all standard metering functions and acts as the database for the integrated device by storing metering data in American National Standards Institute (ANSI) tables, executing scheduled tasks, and monitoring for power outages and other alarm conditions.

Central Authentication and Authorization Service (CAAS)

A software component that supports single sign-on and authentication for applications in the Itron back office. When users log into an application such as Advanced Metering Manager (AMM) application on page 13 or any other GUI-based application, they initially log into a CAAS screen. CAAS authenticates login credentials against user role information stored in the CAAS local database for the application in question. If the credentials match a username with access, CAAS reviews the user privileges for specific application pages, then forwards that information to the application. The application then enforces the user privileges to access particular webpages or to see certain UI objects.

Central Management Software (CMS)

Software used for management, control, and monitoring of systems and devices (such as streetlights, traffic signals, parking meters, and so on) by municipalities and utilities. See also Streetlight.Vision (SLV) software on page 215.

Central Network Operation Department Services (CNODS)

A Network Operations Center (NOC) Itron team that supports the Global Managed Services for customers who are using Itron classic products.

CENTRON II Meter

A solid-state, single-phase residential electricity meter. Personality modules in the CENTRON II Meter provide an array of communications and measurement options, and an optional service switch allows for remote disconnect and reconnect activities.

CENTRON Bridge Meter

A meter which connects smart grid functionality and Itron communication architectures that enable AMI. The meter's adaptability allows it to be incorporated alongside existing Itron electric meters with a mobile collection system, delivering advanced metering benefits associated with interval data, remote service switch and demand reset. The meter can be migrated to a full smart grid solution and supports demand response and distribution automation.

CENTRON Polyphase III Advanced (CP3SLV) Meter

An electricity meter built upon Itron's existing CENTRON III Polyphase Meter. It is supported by programming package PC-PRO+ Advanced on page 171 and Field-Pro software.

As a standalone meter, there is no network to pull readings. Utility employees must walk up to the meter and look at the display, or log into the meter with Field-Pro using an optical probe.

Although this meter has "Polyphase" in its name, this is an autoranging meter. It can operate from 120 to 480 volts, and it performs as whatever meter service it is plugged into. For example, if it's plugged into a 2S residential socket, it performs like a 2S Singlephase meter.

CP3SLV stands for **C**ENTRON **P**olyphase **3**rd generation **S**ocket **L**oad profile **A**dvanced.

CENTRON Polyphase Meter

A solid-state, polyphase electricity meter for the commercial and industrial (C&I) market. The CENTRON Polyphase Meter can be integrated by low- and mid-tier C&I customers into large-scale automated meter reading (AMR) systems.

CENTRON Polyphase R400 Meter

A solid-state, polyphase electricity meter for the commercial and industrial (C&I) market. The CENTRON Polyphase Meter can be integrated by low- and mid-tier C&I customers into large-scale automated meter reading (AMR) systems.

CENTRON R400 Meter

A solid-state, single-phase residential electricity meter.

centum cubic feet (CCF)

One hundred cubic feet. Used in the utility industry to express quantities of natural gas.

CER

See Customer Energy Resources (CER) on page 57.

Certicom™ AMI

A third-party solution that uses a security platform to provide data encryption and integrity to meter data communication and commands taking place between utility meters and utility companies' meter data management (MDM) systems.

certificate

See digital certificate on page 68.

Certificate Authority (CA)

A trusted third-party entity within a network that issues digital certificates and public-private key pairs used for message encryption. The CA verifies the identity of the certificate's owner. The relying party can then trust that the private key is a certificate related to the corresponding public key for that same certificate.

Each certificate authority (CA) has essentially the same security requirements for its protection, but each is capable of issuing certificates for a different purpose, and is operated according to its own separate security (issuance) policy. See also certificate roles on page 40.

Certificate Authority Tools (CA Tools)

A suite of tools that allow operations personnel to perform the following network operator tasks within the public key infrastructure (PKI) hierarchy.

certificate-based key establishment (CBKE)

A key-establishment method based on public keys transported in signed certificates. The digital certificate binds the device identity with a public key and is signed by a certificate authority (CA). A CA public key is required to validate the device certificate.

certificate distribution point (CDP)

The path or protocol in a public key infrastructure (PKI) security certificate indicating where the certificate revocation list (CRL) is located.

certificate revocation list (CRL)

A list of subscribers and their digital certificate status, used to determine whether a server allows or denies access based on the status. The CRL Distribution Tool allows revocation of the private key and certificate of any device that suspected or known to have been compromised through theft or loss. Requires a Certificate Revocation List generated by the KeySafe administrator using CertWeb on page 40.

certificate roles

Roles assigned to individuals dealing with the life cycle or use of a certificate, and which are dictated by a certificate policy.

CertWeb

Used in connection with KeySafe for monitoring certificate expiration dates and creation of a certificate revocation list (CRL) on page 40.

cf

See cubic foot on page 56.

CFD

See computational fluid dynamics (CFD) on page 49.

CF Echo II

An ultrasonic compact heat and cooling meter equipped with an ultrasonic fluff counter.

CFL

See compact fluorescent light (CFL) on page 48.

CFMEA

See Concept Failure Modes Effects and Analysis (CFMEA) on page 49.

CF UltraMaXX MK

An ultrasonic compact thermal energy meter that combines ultrasonic technology with a cartridge system.

CF UltraMaXX V

An ultrasonic compact thermal energy meter used for the measurement of all relevant billing data in heating and cooling systems.

CG

See Connected Grid (CG) on page 50.

CGDM

See Connected Grid Device Manager (CGDM) on page 50.

CGE

See Cisco® Connected Grid Endpoint on page 43.

CG-NMS

See Cisco® Connected Grid Network Management System (CG-NMS) on page 43.

CGR

See Connected Grid Router (CGR) on page 50.

CGR ACT Module

See Connected Grid Router (CGR) Adaptive Communications Technology (ACT) Module on page 50.

CGS

See Cisco® Connected Grid Switch (CGS) on page 43.

Challenge Handshake Authentication Protocol (CHAP)

A protocol that enables secure, encrypted authentication between local and remote workstations.

change data capture (CDC)

A set of software design patterns used to determine and track data that has changed in a database or data repository system, so that a second system can take action based on the changed data. CDC mechanisms most often are used in data warehouse environments.

channel

Any of 120 radio communication frequencies over which an endpoint transmits information to a Fixed Network or mobile data collection device. On electricity meters, each channel is associated with a specific measurement. For example, Channel 1 may measure kWh and Channel 2 may measure voltage. This should not be confused with radio frequency channels.

CHAP

See Challenge Handshake Authentication Protocol (CHAP) on page 41.

child

In an Itron network, a device that is subordinate to another device. A meter that is associated with a Relay is a child of that Relay. Similarly, a Relay is a child of the Access Point to which it is associated. A meter can also be a child of another meter when the parent meter is acting as a Relay on page 192.

child (RFLAN)

In a radio-frequency local area network (RFLAN) cell, a meter that communicates with the OpenWay Collection Engine through a cell relay or another meter in the cell. A meter that communicates with the Collection Engine through a cell relay is the cell relay's child, and the cell relay is the meter's parent. A meter that communicates through another meter in the cell is a child of the meter it communicates through, which is the child meter's parent.

ChoiceConnect Fixed Network

A utility meter data collection and management network consisting of:

- Endpoint-equipped electric, gas, or water meters that measure and record consumption by utility customers.
- Collection and transmission devices called cell control units (CCUs) and repeaters that retrieve meter data and upload it over the Internet to a host system.
- The host system, which receives the data and stores it in a database for billing and analysis purposes.

ChoiceConnect network

Itron's comprehensive suite of Encoder/Receiver/Transmitter (ERT) module on page 81-based automated meter reading (AMR) systems. ChoiceConnect includes walk-by, drive-by, and Fixed Network meter data collection solutions, all using Itron's 900-MHz endpoint technology.

CHS

See Call Home Server on page 35.

churn

Refers to endpoint devices recalculating the egress route to their preferred Access Point on a frequent basis. This is a sign of network instability because an endpoint on page 82's IP address may become stale, resulting in missed reads.

CI

See configuration item (CI) on page 49.

CIA triad

A model for information security policy development. Confidentiality, integrity, and availability are the triad of basic principles that are used to identify problem areas and solutions to secure information.

CIM

See Common Information Model (CIM) on page 47.

CIP

See critical infrastructure protection (CIP) on page 54.

cipher

An algorithm that converts plaintext to ciphertext using a cipher key.

cipher block chaining (CBC)

A cryptography operation that combines the ciphertext of one block with the plaintext of the next block.

cipher block chaining message authentication code (CBC-MAC)

A technique for constructing a message authentication code from a block cipher. The message is encrypted with some block cipher algorithm in CBC mode to create a chain of blocks such that each block depends on the proper encryption of the previous block. This interdependence ensures that a change to any of the plaintext bits will cause the final encrypted block to change in a way that cannot be predicted or counteracted without knowing the key to the block cipher.

ciphertext

Data that is encrypted (encoded) for security purposes. Ciphertext contains all the information of the plaintext message from which it was encrypted but is unreadable without the proper mechanism to decrypt it.

CIQ

See CustomerIQ Software on page 58.

circuit

A conductor or a system of conductors through which electric current flows. Also, a two-way communications path for the transmission of signals.

CIS

See customer information system (CIS) on page 57.

Cisco® Catalyst IR8140 Heavy Duty Router

The networking platform for Cisco CG-MESH/Resilient Mesh and OpenWay Riva network on page 165.

Cisco® Compatible Extensions (CCX) program

A Cisco program that defines specifications for manufacturers of 802.11 wireless local area network (LAN) chips to ensure compliance with Cisco's proprietary wireless LAN protocols. For example, Cisco's Lightweight Extensible Authentication Protocol (LEAP) and Extensible Authentication Protocol-Flexible Authentication using Secure Tunneling (EAP-FAST) are components of CCX.

Cisco® Connected Grid Device Manager (CGDM)

A tool in the Cisco® suite of smart grid communications solutions for utilities used by field technicians to troubleshoot Field Area Routers (FARs). The device manager stores the FAR configuration information.

In OpenWay the CGDM provides field staff access Connected Grid Routers (CGRs) through Wi-Fi or Ethernet.

Cisco® Connected Grid Endpoint

Enable devices to communicate on an IPv6 network.

Cisco® Connected Grid Network Management System (CG-NMS)

A software application that provides centralized management of Cisco® Connected Grid Routers (CGRs), which in turn serve as data collection points for OpenWay 900MHz radio-frequency local area networks (RFLANs).

Cisco® Connected Grid Router (CGR)

A network router developed to serve as a data collection point for the OpenWay field area network.

Cisco® Connected Grid Switch (CGS)

A Cisco® switch designed for use in energy infrastructures.

Cisco® IoT Device Manager

An application used to troubleshoot a Cisco® Connected Grid Router (CGR) on page 43 as well as test devices connected to the CGR. The IoT Device Manager reads CGR configuration information, displays data and manages individual FARs. You can connect to the IoT Device Manager using a secured Ethernet or Wi-Fi link for first-time deployment or troubleshooting.

Cisco® IoT Field Network Directory

A software platform that manages a multi-service network and security infrastructure for Internet of Things (IoT) applications, such as smart grid applications, including Advanced Metering Infrastructure (AMI), Distribution Automation (DA), distributed intelligence, and substation automation. For additional information about Cisco products, see cisco.com.

Cisco® Secure Development Lifecycle (CSDL)

A Cisco development standard designed to ensure code security and resilience. It does this by identifying and implementing specific processes or tools to enable engineers to detect, fix, mitigate, and prevent design and code weaknesses that could become exploitable.

claim

A pre-defined identity context, such as a role claim or persona claim, issued within an access token for a particular user, tenant, or application within the Itron Identity Service. See also Tenant Management on page 221.

class-based weighted fair queuing (CBWFQ)

A network router queuing method that allows traffic to share bandwidth equally after being grouped by classes. The classes can be based upon a variety of parameters, such as priority, interface, or originating program.

Clean Energy Council (CEC)

Australia's renewable energy association.

clear text port

See legacy port on page 132.

CLI

See command line interface (CLI) on page 46.

ClickOnce

A Microsoft deployment technology that is used to create self-updating Windows-based applications. A ClickOnce application is used to install, run, and update applications with little or no user interaction. For more information and product specifications, see https://msdn.microsoft.com.

client

A computer or program that requests data, files, or services or accesses shared network resources from a server computer or program. A client can be further classified as a rich client, hybrid client, or thin client, based its level of reliance upon the server to perform data processing operations.

client-server

A type of computer network that consists of multiple client computers connecting to a single, central server computer. The server is a host running one or more server programs that share their resources with the clients. In contrast, peer-to-peer networks consist of two or more computers that pool their individual resources such as disk drives, CD-ROMs, and printers. These shared resources are available to every computer in the network, while each two of them communicate in a session.

CLO

See constant light output (CLO) on page 50.

cloud client

Computer hardware or computer software that relies on cloud computing for application delivery.

CLPU

See cold load pickup (CLPU) on page 45.

clutter

Surface features, such as structures and foliage, that impact on radio wave propagation.

CM

- See cell master on page 37.
- See contract manufacturer (CM) on page 52.
- See OpenWay Collection Manager (OWCM) on page 164.

CME

See Customer and Market Experience (CME) on page 57.

CMEP Exporter

See California Metering Exchange Protocol (CMEP) Exporter on page 34.

CMS

See Central Management Software (CMS) on page 38.

CMU

See Communications Module Utility (CMU) on page 48.

CNODS

See Central Network Operation Department Services (CNODS) on page 38.

CoAP

See Constrained Application Protocol (CoAP) on page 51.

CoAP Client

Application code that implements the CoAP client framework (which handles CoAP protocol) and solution specific code. CoAP clients are typically built using CoAP core functionality (usually as a library) along with problem domain application code.

CoAp Simple Management Protocol (CSMP)

A remote network management protocol intended for embedded networking devices running within large- scale bandwidth-constrained networks. Connected Grid Endpoints (CGEs) implement CSMP for remote configuration, monitoring, and event generation over the Internet Protocol version 6 (IPv6) network.

code access security (CAS)

A software mechanism in Microsoft .NET Framework that prevents untrusted code from performing privileged actions.

code-division multiple access (CDMA)

A digital cellular technology that uses a spread spectrum method allowing multiple devices to share bandwidth while communicating over a single transmission channel. It is generally referred to as CDMA. In North America, CDMA is the cellular technology used by Verizon, Sprint, and Bell Canada.

code float

The process during which all non-seed NICs acquire a UtilOS firmware on page 231 firmware image from the NIC (seed NIC on page 204 or non-seed) of a close network neighbor that has it. “Close” is defined as reachable without going through any intervening hops. See also code push on page 45.

code push

The act of sending code to a limited number of seed NICs. Pushing the image to a few seed NIC on page 204 (about 3%) and instructing the non-seeds to acquire the image from their direct neighbors is much more resource-efficient than pushing the image to all NICs. This way, network traffic associated with a firmware upgrade takes place between direct neighbors and not along mission-critical routes between the data center and endpoints. Disruption of normal network traffic, such as metering schedules and events, is reduced as much as possible.

cogeneration

The process of capturing heat that is lost during electricity production and converting it into useful thermal energy, usually in the form of hot water or steam.

cogenerator

A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, or cooling purposes.

coincidental demand

Two or more demands that occur at the same time or coincidentally.

coincidental peak load

The sum of two or more peak loads that occur in the same time interval.

cold load pickup (CLPU)

The increased currents that occur during the re-energization of a circuit or substation after an extended power outage during which there was a loss of load diversity. CLPU can also refer to the delay between the end of a power outage (cold load) and the moment when a meter’s register resumes (picks-up) calculation of demand.

Collection Engine

See OpenWay Collection Engine on page 164.

Collection Manager (CM)

See OpenWay Collection Manager (OWCM) on page 164.

collector

A neighborhood pole-mounted data collection device that gathers meter readings and related data from encoder/receiver/transmitter endpoint (ERT) modules in Itron radio-based Fixed Network systems, including ChoiceConnect, Fixed Network, and Water SaveSource systems. It then transfers the data to a host processor using public, Internet Protocol (IP)-based, or private computer networks.

Collector Configuration Application

An Itron Fixed Network application used to configure and manage cell control units (CCUs) individually and in groups.

combined meter

A type of electric meter in which the meter and interval data recorder (IDR) are combined in one device. The recorder identifier (ID), manufacturer, and model are the same as the meter's.

Also called recorder-under-glass (RUG) on page 191.

command key

A system-wide elliptic curve cryptography (ECC) asymmetric key pair used to sign command messages sent from the OpenWay Collection Engine (CE) to the electric meters. Command keys ensure that meter commands originate with the CE. Each meter includes four command keys: two primary keys (active and standby) and two backup keys.

command line interface (CLI)

A user interface to a computer's operating system that provides a means of interacting with a computer program. The user issues commands to the program in lines of text.

command-secured endpoint

An Itron endpoint operating in ChoiceConnect Fixed Network on page 41 mode that has been set to the command security state. In this state, an endpoint’s settings can be changed only in response to secure commands generated by the Itron Security Manager (ISM) server, but secure commands are not required for reading its data.

command security

A security level employed by ChoiceConnect network on page 41 endpoints that support enhanced security, such as Itron’s 100 series endpoints. In command security mode an endpoint’s settings can be changed only through the use of secure commands generated by the Itron Security Manager (ISM) server, but secure commands are not required for reading the endpoint’s data.

comma-separated values (CSV)

A plain-text representation of tabular data in which the cell values of a row are separated by commas and each row is on its own line.

comment code

A coded comment about a meter added by a field employee to a work order or meter reading.

commercial & industrial (C&I)

Refers to commercial and industrial energy and water customers. C&I customers typically have over 500 employees, demand of over 75-kW, are demand metered, and most likely use building management systems.

Examples of commercial customers are schools, hospitals, hotels, and strip malls.

Examples of industrial customers are manufacturing plants, mills, and heavy industry.

commercial and industrial (C&I) meter

Electricity watt-hour meters that are used to measure energy flow in polyphase currents. Polyphase meters are typically used for commercial and industrial (C&I) service locations, which have higher demand for power than the conventional home. Also called a polyphase meter.

committed reduction

An agreement between a utility company and their customer, in which the customer commits to reducing energy usage by a specified amount during utility-defined events.

commodities

- ELE. Electricity
- WAH. Water
- GAS. Gas
- ALL. All
- EAW. Electric and Water
- EAG. Electric and Gas
- GAW. Gas and Water

commodity type

The goods and related services that a utility company might supply to its customers. Market types can include (but are not limited to), water, natural gas, and electricity. See also commodities on page 47.

Commodity type is also called market type.

Common Events Format (CEF)

An Itron-developed API that provides a common format for transferring event data between systems.

Common Information Model (CIM)

A standard that allows application software to exchange information about an electrical network. The Common Information Model (CIM) is a standard based on the Unified Modeling Language (UML). CIM defines common language for the electric power industry that allows application software to exchange information about the configuration and status of an electrical network.

Common Reading Format (CRF)

An XML file format developed by Itron to enable software applications with different native file formats to exchange meter route and energy use data. Originally developed for the Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 software, CRF is used by Itron's Field Deployment Manager (FDM) on page 93, Field Collection System (FCS) on page 93, MV-RS, and Premierplus4 mobile meter reading systems and by its ChoiceConnect Fixed Network on page 41100 and OpenWay network on page 164 meter reading systems.

common readings file (CRF) format

An extensible markup language (XML) file format developed by Itron to enable software applications with different native file formats to exchange meter route and energy use data. Originally developed for the Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 software, CRF is used by Itron's Field Deployment Manager (FDM) on page 93, Field Collection System (FCS) on page 93, MV-RS, and Premierplus4 mobile meter reading systems and by its ChoiceConnect network on page 41 100 and OpenWay network on page 164 meter reading systems.

Common Smart Inverter Profile (CSIP)

A standard that describes smart inverter configuration requirements for an IEEE 2030.5 interface.

Communications Configurator

An Itron software application that remotely configures devices by automatically downloading configuration parameters when the device is powered up.

communication server

A server that manages communications between the OpenWay Collection Engine on page 164 and a group of cell relays. An OpenWay on page 163 solution can include multiple communication servers, and each server can communicate with up to 200 cell relays.

Communications Module

Obsolete term given to an Itron network interface card (NIC) on page 157 when it was installed in a partner product.

Communications Module Utility (CMU)

An Itron software tool that, in conjunction with a Field Service Unit (FSU) on page 93, reads meter data from Itron enabled meters and uploads the meter read data to Advanced Metering Manager (AMM) application on page 13. The application can be used to read meters loaded into AMM but never registered on the network or meters that are unreachable on the Itron network. Additionally, CMU can be used for swapping Itron NICs in meters and performing Demand Resets.

Communications Tester

An Itron software tool that, in conjunction with a Field Service Unit (FSU) on page 93, is used for field and lab testing of devices equipped with Itron NICs that communicate across the mesh network. Communications Tester enables engineers and technicians to transmit and receive messages to and from these devices, log the data, and analyze the results. For example, operators can perform register reads, firmware upgrades, and they can read meter tables, check configuration options, collect radio frequency statistics data, and exercise other troubleshooting features.

Communications Tester also supports user-created compound commands, session logging, and results export.

community technology preview (CTP)

A Microsoft®-coined term for a major public beta-test software release.

compact fluorescent light (CFL)

A fluorescent light bulb that uses less power than a traditional light bulb and has a longer rated life.

Companion Specification for Energy Metering (COSEM)

A data model that provides an interface to model the functionality of an electricity meter. Used with the messaging and transport capabilities of Device Language Message Specification (DLMS) on page 67 as the standard for utility meter data exchange for DLMS/COSEM meters.

compensated cuFt

Unit of measure for measuring gas consumption in multichannel IMUs where a Mercury rotary corrector is installed. See also Gas Interface Management Unit (IMU) on page 99.

competitive transaction charge (CTC)

A financial fee placed on distribution or transmission services. This fee helps the electric utility to recover the costs incurred as a result of energy industry restructuring. These are costs that are usually associated with generation facilities and services, and not recoverable in other ways.

competitive transition charge

A financial fee placed on distribution or transmission services. This fee helps the electric utility to recover the costs incurred as a result of energy industry restructuring. These are costs that are usually associated with generation facilities and services, and not recoverable in other ways.

component

A part of a system or subsystem treated as a self-contained unit for the purposes of identification and change control. This definition applies to the Global Development Process (GDP).

compounded annual growth rate (CAGR)

A business and investing specific term for the geometric progression ratio that provides a constant rate of return over the time period.

compressibility factor

In gas measurement, volume decreases when there is an increase in pressure. Also known as compressibility factor (Z) is the variance of thermodynamic properties of a real gas deviate from those of an ideal gas.

computational fluid dynamics (CFD)

A branch of fluid mechanics that uses numerical analysis and algorithms to solve and analyze problems that involve fluid flows. Computers analyze gas or fluid flows by simulating the interaction of liquids and gases with surfaces that are defined by boundary conditions.

computer virus

A hostile software program that interferes with normal computer operation. A virus propagates to other computer systems by attaching a copy of itself to other programs.

concentrator

A device used for the collection of meter data, such as a handheld computer, mobile collector, or cell control unit (CCU).

Concentrator is a regional term used in Europe.

Concept Failure Modes Effects and Analysis (CFMEA)

See Failure Modes Effects and Analysis (FMEA) on page 91.

conditioning equipment (CE)

Equipment modifications or adjustments necessary to match transmission levels and impedances, and which equalize transmission and delay to bring circuit losses, levels, and distortion within established standards.

condition statement

A list filter component that compares a field value, setting, property, or other item to a specified comparison value. Most condition statements consist of the item to be compared, a comparison value to compare the item to, and a comparison operator word or phrase that specifies the nature of the comparison to be made. A list filter may consist of one or multiple condition statements.

conductor

A type of material, usually in the form of a wire or cable, capable of carrying an electric current.

configuration group

A logical group of meters to which the OpenWay Collection Engine (CE) assigns identical meter configurations. A configuration group allows the CE to manage multiple meters simultaneously to perform a variety of functions. Each meter in a deployment must belong to one configuration group.

configuration item (CI)

A fundamental structural unit of a configuration management system. A CI can be applied to a product and/or component of a product. A CI satisfies an end use function and has distinct requirements and functionality and/or product relationships. Examples of CI types include hardware/devices, software/applications, system on page 217, database (DB) on page 60, and more.

configuration maintenance

A process for making changes to account information in Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124. The term does not include modification of reading data, interval data, or billing determinants.

configuration tag

An encoded tag identifying the meter's associated OpenWay Collection Engine configuration group. Used to identify, monitor, and maintain the configuration (family and version) that determines how the meter records and functions.

connect

Gas, water, or electricity is flowing and is being delivered to the customer.

Connected Grid (CG)

The Cisco® suite of smart grid communications solutions for utilities.

Connected Grid Device Manager (CGDM)

A tool in the Cisco® suite of smart grid communications solutions for utilities used by field technicians to troubleshoot Field Area Routers (FARs). The device manager stores the FAR configuration information.

In OpenWay the CGDM provides field staff access Connected Grid Routers (CGRs) through Wi-Fi or Ethernet.

Connected Grid Router (CGR)

A Cisco® field area router (FAR) used as a network router in OpenWay systems. The CGR is a network router that serves as a data collection point for meters participating in the Cisco® radio frequency (RF) Mesh.

Connected Grid Router (CGR) Adaptive Communications Technology (ACT) Module

A module that enables meters and grid devices equipped with Adaptive Communications Technology (ACT) to communicate with each other while dynamically switching between radio frequency (RF) and power line communication (PLC).

CONQ

See cost of non-quality (CONQ) on page 53.

conservation

Reducing electric, gas or water usage for the purpose of saving natural or scarce resources. Conservation can reduce the capacity requirements for infrastructure and equipment.

conservation pricing

Pricing that provides an incentive to reduce average or peak use, or both.

Conservation Voltage Reduction (CVR)

A technique for reducing the amount of energy waste or over provisioning on the distribution grid, and which reduces energy consumption resulting from a reduction of feeder voltage. This functionality is provided through SensorIQ Application on page 204.

constant light output (CLO)

In streetlight Central Management Software (CMS) on page 38 applications, the adjustment of light to allow for degradation in brightness due to the age of the lamp.

The adjustment takes place using a lumen deprecation curve, which specifies how much the lamp should be dimmed. This is calculated in hours as a percentage of the dimming level set by configuration or by the schedule based on the lamp age.

The CLO algorithm takes into account the age of the bulb or lighting element. As the element ages, it deteriorates, emitting less light for a given input level. When the element is brand new, the NIC firmware sends a lower value to the control board. As the

light ages, the value sent gradually increases. When the light is fully depreciated, firmware does not reduce the CMS requested value. The amount of reduction is defined by a depreciation curve, which defines the reduction factor at various ages of the bulb.

Constrained Application Protocol (CoAP)

Used to communicate with constrained devices. CoAP is a UDP based network protocol that is similar to HTTP with low protocol overhead. CoAP is loosely based on the REST protocol to provide a familiar programming model for accessing device resources. See also CoAP Client on page 45.

consumable inventory

Inventory items that are installed or used. Consumable items can be serialized (items with serial numbers, such as endpoints, meters, and leak detectors) or non-serialized, (items without serial numbers, such as screws and bolts that are purchased in large quantities).

consumed inventory location

The location to which FDM records an inventory item as having been moved when it is installed through work order completion. The consumed inventory item location is not an actual location but an abstract concept that FDM uses for record-keeping and reporting purposes.

consumption

The amount of electricity, gas, or water used by a customer during a specified period. Consumption is usually expressed in kilowatt-hours (electricity), cubic feet or therms (gas), or cubic feet (water).

consumption (fuel)

The amount of fuel used for gross generation, providing standby service, start-up, and/or flame stabilization.

consumption monitoring

An Application Information Broker (AIB) feature that allows a utility to set high and low thresholds to monitor usage at a device. If the usage falls below or rises above the thresholds, a consumption alarm is generated.

consumption read

A meter functioning in consumption mode records a usage value to a single-register memory space.

Reading this value is referred to as a consumption read. See also interval read on page 121.

contents pane

One of several panes that make up an application's main window in some software user interfaces. The contents pane contains the records or other items to be viewed or modified. It is one of two panes into which the display pane may be subdivided (the other is the details pane). For views that do not include a details pane, the contents pane is synonymous with the display pane.

contingency read

A read that is performed on a meter or group of meters that failed an interrogation read. It can be a secondary means of collecting consumption data for billing. If an interrogation (periodic) read fails to read any of the endpoints in a targeted group, a contingency read can be used to gather the missing data from the missing meters. Contingency read responses are sent to the subscriber of the OpenWay Collection Engine data service, typically an MDM system.

Contingency Reader

Replaced by Communications Module Utility (CMU) on page 48.

Continuous Cumulative Demand Value (CCUM)

The sum of the maximum demand and the cumulative demand on a meter at any point in time. At the end of each demand interval, if a new maximum demand is reached, continuous cumulative demand is adjusted to reflect the new maximum demand

value. A demand reset clears the maximum demand value, but does not affect the continuous cumulative demand. Continuous cumulative demand may be used for block, rolling, and thermal demand types.

continuously cumulative maximum demand

The sum of the cumulative maximum demand on page 56 and the present period's maximum demand (peak demand) on page 140.

continuously powered device (CPD)

A device such as an electricity meter, Access Point (AP) on page 8, Relay on page 192, or Bridge on page 31, all of which are powered up on a continuous basis. Gas Interface Management Unit (IMU) on page 99 and Interpreter Register on page 120 devices, for example, use CPDs to store their data to conserve battery power.

contract manufacturer (CM)

A manufacturer that contracts with a firm for components or products.

control area load

The total amount of electricity being used at a given point in time by all consumers within a utility's service territory.

control / logic block

An ERT module on page 87 component that gathers information received from the module's sensors and transducers and uses the information to direct the operation of the module's functions.

control node

An outdoor lighting controller (OLC) on page 168 device that resides in a streetlight used to control lights across the Itron network. See also Smart Street Lighting on page 209.

control plane policing (CoPP)

A Cisco® NX-OS security feature that allows you to configure the quality of service (QoS) filter to manage and protect the Cisco IOS router and switch control planes against reconnaissance and denial-of-service (DoS) attacks.

conveyance loss

Water that is lost during transit as a result of pipe leakage or evaporation.

cooling degree day (CDD)

A unit of measure used to relate a day's temperature to the energy demands to cool buildings. Calculate cooling degree days by subtracting 65 from a day's average temperature. For example, if the day's high is 90°F and the day's low is 70°F, the day's average is 80°F. Subtract 65 from 80 to get 15 cooling degree days.

cooperative electric utility (co-op)

A company that is legally established to supply a public utility, such as water or electricity, to the people who own it. Utility cooperatives generally adhere to a set of operational principals called the Rochdale Principles.

Coordinated Universal Time (UTC)

The primary international time standard, where time is divided into days, hours, minutes, and seconds. Each time zone around the world is expressed as a positive or negative offset from UTC. Coordinated Universal Time can be obtained from official Internet UTC servers and from satellite signals.

COP

- See Critical Operations Protector for Advanced Metering Infrastructure (COP for AMI) on page 54
- See Critical Operations Protector for Demand Response (COP for DR) on page 55

CoPP

See control plane policing (CoPP) on page 52.

core dump

The processes of copying raw data from a device's RAM to a more permanent storage medium. For smart meters, a dump is valuable for identifying and debugging issues that may have caused a device to suffer a fatal error.

core weight

In a transformer, the weight of the iron that makes up the transformer.

corrected reading

A gas volume that has been measured by a gas meter and has been adjusted by the pressure, temperature, energy, and/or supercompressibility factors that are necessary to calculate a standardized gas volume.

corrosion

A chemical reaction with something in the environment that results in a gradual destruction of metal, stone, or other materials.

COSEM

See Companion Specification for Energy Metering (COSEM) on page 48

cost-based pricing

A method of setting rates so that a utility can recover the costs of providing that particular service.

cost of non-quality (CONQ)

The set of costs related to the conformity of products and services to quality standards. All costs covering control and problem prevention activities are included in these costs.

coverage area

The geographical reach of a radio network or system.

coverage validation

A process used to identify whether or not a cellular-enabled smart meter will successfully attach to and communicate via a cellular network. This process can be used for troubleshooting cellular-enabled meters demonstrating little or no communication with the collection engine.

CP

See cathodic protection (CP) on page 36.

CP3SLV

See CENTRON Polyphase III Advanced (CP3SLV) Meter on page 39.

CPD

See continuously powered device (CPD) on page 52.

CPE

See customer premises equipment (CPE) on page 58

CPP

See critical peak pricing (CPP) on page 55.

CP test station

A cathodic protection monitoring facility that allows access to electrical connections to a buried pipeline or structure and a buried reference electrode. See also cathodic protection (CP) on page 36.

CR

See cell relay on page 38.

cradle

A hardware device that provides storage, communications, and battery charging for a handheld data collector in an office or vehicle.

Also called a dock or docking station.

CRC

See cyclical redundancy check (CRC) on page 59.

credential

Evidence, such as a username and password, that verifies the right or authority to access specific resources.

credits

Used to allow a predefined number of operations by the Field Service Unit (FSU) on page 93 before the unit must be returned to an administrator for reactivation with a new set of credits. Once the credits allocation is exhausted, the FSU must be configured with a new set of credits by the administrator.

creep

A condition occurring in an electronic meter where data is gathered and stored, but no power is being consumed. Creep occurs when the meter disc rotates continuously with applied power. Creep affects the accuracy of the meter. Positive creep is when the meter registers more energy than is actually used. Negative creep is when the meter registers less energy than is actually used.

crew dispatch

The dispatch of the same routes or work orders to multiple field service representatives.

CRF

- See Common Reading Format (CRF) on page 47
- See common readings file (CRF) format on page 47

critical command

A command that can potentially affect energy supply or demand. This might be a load control event in the case of Critical Operations Protector for Demand Response (COP for DR) on page 55, or a remote disconnect command in the case of Critical Operations Protector for Advanced Metering Infrastructure (COP for AMI) on page 54.

critical infrastructure protection (CIP)

Preparation for and response to serious threats to vital systems and assets that could have a debilitating impact on national security, public health, or safety.

Critical Operations Protector for Advanced Metering Infrastructure (COP for AMI)

A hardware-based security platform that ensures the stability of the power grid by limiting the number of critical command on page 54 that users can issue within a given period of time. See also Critical Operations Protector for Demand Response (COP for DR) on page 55.

Critical Operations Protector for Demand Response (COP for DR)

A hardware-based security platform that places hardware-based limits on the maximum load shed allowed in the power grid based on permit issuance and multi-party control of critical command on page 54. See also Critical Operations Protector for Advanced Metering Infrastructure (COP for AMI) on page 54.

Critical Operations Protector Permit CA

A Certificate Authority (CA) on page 39 that generates a permit key pair for KeySafe on page 128 or Critical Operations Protector for Advanced Metering Infrastructure (COP for AMI) on page 54 / Critical Operations Protector for Demand Response (COP for DR) on page 55.

critical peak period

A time period during which the demand for electricity usage is expected by the utility to be very high. In a critical peak pricing (CPP) rate structure, rates for power used during this period are much higher than for power used during non-critical peak periods.

critical peak pricing (CPP)

A hybrid of time-of-use (TOU) rate on page 223 and real-time pricing on page 190. Utilities charge fixed time-of-use rates for preset periods but might charge higher rates during extreme supply conditions. Customers are notified in advance of the price change, allowing them time to curtail demand.

CRL

See certificate revocation list (CRL) on page 40.

CROC

Internal name no longer associated with Communications Module Utility (CMU) on page 48.

CRUG

See cell relay under glass (CRUG) on page 38.

CryptKeeper

A grid management application that enables multiple operator certificates to be used in a single environment. This component is part of Shared Services Components (SSC) on page 206.

cryptographic key

A random selection of characters used with a cryptographic algorithm to perform an operation, such as encryption, decryption, or verification. A public key is one example of a cryptographic key.

CryptoServer Administration Tool (CAT)

Software that runs on the administrative console in a KeySafe and COP environment and is used to configure and manage HSMs.

CS

See communication server on page 48.

CSA

See Canadian Standards Association (CSA) on page 35.

CSDL

See Cisco® Secure Development Lifecycle (CSDL) on page 43.

CSIP

See Common Smart Inverter Profile (CSIP) on page 47.

CSMP

See CoAp Simple Management Protocol (CSMP) on page 45

CSV

See comma-separated values (CSV) on page 46.

CT

See current transformer (CT) on page 56.

Also an Internal term for Communications Tester on page 48. Not used as a product abbreviation.

CTAIDI

See Customer Total Average Interruption Duration Index (CTAIDI) on page 58.

cubic foot

An imperial and US customary unit of volume, used in the United States and the United Kingdom. The volume of a cube with sides of one foot in length. Used in the utility industry to express quantities of natural gas.

CUM

See Cumulative Demand Value (CUM) on page 56.

Cumulative Demand Value (CUM)

The sum of all previous maximum demand values on a meter after a demand reset condition. When a demand reset occurs, the maximum demand values are added to the existing corresponding cumulative demand values, and the sums are saved as the new cumulative demand values. These values do not increase until the next demand reset condition. Cumulative demand may be used for block, rolling, and thermal demand types.

cumulative maximum demand

The sum of the previous billing period's maximum demand on page 63s. At the time of demand reset, the maximum demand (peak demand) on page 140 of the previous billing period is added to the previous accumulated total of all maximum demands. See also continuously cumulative maximum demand on page 52.

current

A flow of electrons in an electrical conductor. The strength or rate of movement of the electricity is measured in amperes.

current, electrical

The flow of electricity, normally measured in amperes (A).

current season

A season schedule, programmed into a meter, that defines the present rate schedule.

current summation delivered

Summation of kWh of electricity that have been delivered and consumed by the ratepayer since meter initialization.

current summation received

Summation of kWh of electricity that have been given back to the grid by the ratepayer's local generation since meter.

current transformer (CT)

A device for measuring electrical currents.

Metering style CTs are designed with smaller cores and VA capacities. This causes metering CTs to saturate at lower secondary voltages saving sensitive connected metering devices from damaging large fault currents in the event of a primary electrical fault.

CT meters are used for service points that require electrical current of more than 100 amps. This type of meter takes a sample of the current to determine consumption. Currents of greater than 100 amps are not generally directed through a meter, due to the risk of current overload.

current transformer (CT) ratio

The ratio of the incoming current to the stepped-down current to the meter. In North America, the CT ratio is generally chosen so that the nominal secondary current is 5 to 10 amps, regardless of the primary current.

See also potential transformer (PT ratio) on page 177.

curtailment

A practice that is enacted during periods of peak demand on page 172. Electricity providers may ask consumers to reduce their energy usage. Some utilities offer incentives for voluntary curtailment of energy usage during periods of peak demand.

curtailment baseline

A calculated value used to represent a customer's electricity load or usage pattern over a period of time, in the absence of their participation in a curtailment program. Baseline values are calculated using one of many available baseline algorithms.

Customer and Market Experience (CME)

The representation of and interaction between Itron and customers, including Direct, Indirect, and Channel partners.

customer average in

A reliability index used by electric power utilities to calculate the average number of minutes per year that customers experience power outages or to calculate the average time required to restore service (power) to customers after a power outage.

Customer Average Interruption Duration Index (CAIDI)

Calculated by: sum of all customer interruption durations / total customer interruptions. See also Customer Total Average Interruption Duration Index (CTAIDI) on page 58 and Customer Average Interruption Frequency Index (CAIFI) on page 57.

Customer Average Interruption Frequency Index (CAIFI)

Calculation in which the number of customer interruptions is divided by the number of customers who have had at least one interruption. See also Customer Average Interruption Duration Index (CAIDI) on page 57 and Customer Total Average Interruption Duration Index (CTAIDI) on page 58.

customer class

The differentiation between users of energy or water. The class is determined by usage patterns, usage levels, type of customer (commercial or residential), or the conditions of service.

Customer Energy Resources (CER)

Small-scale energy units or systems owned by consumers.

customer information system (CIS)

Software used by a utility or other market participant for maintaining customer and billing information. The CIS often includes a history of work performed for each customer.

In Field Deployment Manager (FDM) on page 93 systems, the CIS produces the data for all primary work orders and receives all work order completion data from FDM.

From the perspective of Advanced Metering Manager (AMM) application on page 13, an application system that stores meter and customer data.

CustomerIQ Backroom

The administration interface for CustomerIQ Software on page 58.

CustomerIQ Energy Reports

Printed and mailed reports that extend the value of online tools and encourage smart meter customers to use their web portal and provide ongoing energy insights and tips.

CustomerIQ Gas

A customer engagement application that provides natural gas and multi-service utilities with a suite of customer engagement features for residential, commercial, and industrial customers. The CustomerIQ Gas interactive dashboard delivers near-real-time usage insights along with weekly email reports and messaging to in-home devices to help customers reduce consumption, save money, and minimize their environmental impact.

CustomerIQ Software

An Itron interactive web portal intended for utility company customers to help them monitor and analyze their energy use, receive important rate and system alerts, compare their energy use with similar neighbors, and learn how they might be able to reduce energy use and save money through energy efficiency, more appropriate rate plans, and shifting energy use to low-cost time periods. CustomerIQ is designed for use by residential, small and medium business (SMB) on page 208, and commercial & industrial (C&I) on page 46 customers. CustomerIQ was previously known as EnergyIQ on page 84.

CustomerIQ Solar

A customer engagement application that provides comprehensive tools for residential, commercial, and industrial solar customers to help them understand their solar production, electricity usag,e and estimate their net energy bills.

customer part (custpart) numbers

A custom part number that contains all specific hardware, firmware, and settings making it unique and specific to each customer.

customer portal

A web application used by utility customers to view and manage their energy and water consumption.

customer premises equipment (CPE)

Equipment owned by the customer or stored on the customer's property (for example, cable modem, router, or Access Point (AP) on page 8.

customer record

A record in the utility customer information system (CIS) on page 57 that contains pertinent customer account information such as name, address, billing address, telephone number, meter ID, and so on.

Customer Total Average Interruption Duration Index (CTAIDI)

Calculation consisting of the sum of durations of all customer interruptions divided by customers who had at least one interruption. See also Customer Average Interruption Duration Index (CAIDI) on page 57 and Customer Average Interruption Frequency Index (CAIFI) on page 57.

custom list filter

A list filter created by a user to limit the display of list items to those that meet one or more conditions or criteria. In contrast, a standard filter is one that is always available for use by all users and cannot be modified except by users with the necessary permission. You can create a custom filter from scratch or by modifying an existing standard or custom filter.

custpart

See customer part (custpart) numbers on page 58.

CVR

See Conservation Voltage Reduction (CVR) on page 50.

Cyble

A multiple connectivity radio frequency (RF) module for fast automatic meter reading (AMR) on page 24 and advanced metering infrastructure (AMI) on page 12 reading.

Cyble 5A

A unique solution helping utilities engage in the ongoing digitalization of their water distribution networks. Designed to transform mechanical meters into communication data points, Cyble 5A enables IoT data collection using LoRaWAN or Sigfox networks allowing for improved billing efficiency and customer service.

Cyble G3

A compact radio transmitter designed and manufactured by Itron that can be installed on Itron water meters.

Cyble LRFv2

A module compatible with a full range of cold and hot water meters pre-equipped with the Itron Cyble on page 59 target.

Cyble M-Bus

A module that offers enhanced data that enables the utility to improve productivity and bring extra services to customers.

Cyble Sensor

An electric pulse output emitter that is not sensitive to magnets, considers the direction of the flow, and can create up to four signals.

Cyble Sensor ATEX

A smart pulse transmitter for gas meters designed specifically for gas utilities needing to connect electronic devices with a LF pulse input, such as volume converters to a gas meter.

cycle billing

The process of reading only part of a system's meters each day and then billing that portion of its customers. By the end of the cycle (usually a month) the customer is billed.

cyclical redundancy check (CRC)

A mathematical formula applied to groups of data bits sent over a communications link to determine whether the data is accurately transmitted.

D

.dwg

A file name extension for computer-aided design (CAD) drawings; .dwg files are supported by TDS-Sketch and Draw mode.

DA

See Distribution Automation (DA) on page 71.

See Distribution Automation (DA) Essentials on page 71.

daily freeze time (DFT)

The time each day when a water or electric module reads and records demand, time-of-use (TOU), and consumption interval data from the meter. The DFT meter reading is the reading at the top of the hour equal to or before the DFT.

daily peak

The greatest amount of electricity used during a certain period in a day, such as an hour, half-hour, or quarter hour.

daily read time (DRT)

The time each day when a telemetry module reads and transmits system information. For example, in a cathodic protection system, this is the time when the 100T-CP module reads the DC pipe-to-soil and AC voltages.

DALI

See Digital Addressable Lighting Interface (DALI) on page 68.

dashboard

An interactive graphical user interface that displays a summary of the site's functionality. Clicking items on the dashboard employs filters that narrow the view from all to many or one. Can be the home page.

In some Itron applications, the word dashboard is synonymous with domain or workbench. A group of related views and functions within an application, accessible by clicking the applicable navigation pane button.

DASR

See direct access service request (DASR) on page 69.

database administrator (DBA)

A person responsible for the physical design and management of a database and for the evaluation, selection, and implementation of the database management system. In most organizations, the database administrator and data administrator are the same person; however, when the two responsibilities are managed separately, the database administrator's function is more technical.

database (DB)

- A collection of data, usually in digital form, that is typically organized to model relevant aspects of reality. The data is defined so that it can be reorganized and accessed in a number of different ways. The term database is correctly applied to the data and its supporting data structures, and not to the database management system (DBMS) that is used to create, maintain, and access the database.
- A software component that—along with Global Meter Reader (GMR) on page 103, Middle Tier (MT) on page 146—comprises Advanced Metering Manager (AMM) application on page 13. DB manages communications to the Oracle database.

database management system (DBMS)

A software application for the creation, maintenance, and use of databases. A DBMS controls data access, enforces data integrity, maintains database security, and provides data backup and restoration.

data blob

A packet of telemetry module status information sent in a daily bubble-up message. Status information varies by telemetry module type.

data collection device, meter

A computer used to record meter readings and related data. Data recordings can be done manually by a field worker or through an automated meter reading (AMR) or advanced metering infrastructure (AMI) system.

data collection, meter

The retrieval of meter readings, tamper data, status information, or related information from electric, gas, or water meters.

data collector user

A utility employee who performs work in the field, such as collecting data (meter reads), installing endpoints, performing service work, and so on.

Also called field worker, field employee, and meter reader.

Data Encryption Standard (DES)

A symmetric-key algorithm for the encryption of digital data; a block cipher.

DataHub

DataHub enables utilities and their customers to share utility data with third parties, and vice versa, through a simple, automated authorization and authentication process.

data logger

The component of a time-of-use (TOU) meter that records interval usage data.

data logging (noun), datalogging (adjective)

Collection of gas or water consumption data at frequent time intervals. Data is used to provide feedback on usage for billing dispute resolution, conservation efforts, and leak detection (water only). Itron endpoints that support data logging can collect and store up to 40 days of hourly interval or pulse data. The data collected can be reported as interval data, consumption reads (water only), or index values (electric only).

DataPower® Component

A component of IBM®'s Websphere® Enterprise Service Bus (ESB).

Data Transfer Agent (DTA)

Data Transfer Agent (DTA) provides routing and secure transport capabilities for data exported from Itron applications. DTA can be configured to consume data from JMS, File system or an HTTP/S endpoint. DTA can be configured to route data to intermediate transformation adapters or immediately send exported data to customer endpoints for ingestion into utility systems. This product was formerly bundled with SensorIQ Application on page 204.

daylight saving time (DST)

The practice of temporarily advancing clocks by one hour in the spring so afternoons have more daylight and mornings have less daylight.

day of flow

The day in which electricity deliveries are made, measured as the period beginning at midnight for the hour ending 0100 and ending at exactly the end of the 24-hour day.

dB

See decibel (dB) on page 62.

DB

See database (DB) on page 60.

DBA

See database administrator (DBA) on page 60.

dBi

Decibel isotropic. The forward gain of an antenna compared with the hypothetical isotropic antenna, which uniformly distributes energy in all directions.

dBm/dBmW

A power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW). It is used in radio, microwave, and fiber optic networks as a convenient measure of absolute power because it can express both very large and very small values in a short form. Some examples are: 0 dBm = 1 mW, 10 dBm = 10 mW, 24 dBm = 250 mW, 30 dBm = 1,000 mW (1 Watt).

DBMS

See database management system (DBMS) on page 60.

D-Bus

A message-oriented middleware mechanism that allows communication between multiple processes running concurrently on the same machine.

DC

See direct current (DC) on page 69.

DDK

See Distributed Intelligence Developer Key (DDK) meter on page 71.

dead area

Location from which effective transmission cannot be established because the transmitted signal is blocked by clutter. Also known as shadow.

dead head

A situation that occurs when the pump's discharge is closed either due to a blockage in the line or an inadvertently closed valve. At this point, the pump will go to its maximum shut-off head, the fluid will be recirculated within the pump resulting in overheating and possible damage.

debounce

A device or software that ensures that only one digital signal can be registered within the space of a given time (usually milliseconds).

decibel (dB)

A logarithmic unit of measurement that expresses the magnitude of radio power.

decimal degrees

A numerical way of expressing degrees, minutes, and seconds longitude from Greenwich, England and latitude from the equator: decimal degrees = degrees + (minutes / 60) + (seconds/ 3600)

Positive numbers indicate East longitude or North latitude. Negative numbers indicate West longitude or South latitude. For example, W 122° 28’, 39.3” longitude by N 37° 49’, 11.2 latitude expressed in decimal degrees is: -122.477583 longitude by 37.819778 latitude.

deciwatt (dW)

A unit of power equal to 10000 watts.

deciwatt hours (dWh)

A unit of energy equivalent to one Deciwatt (1 dW) of power expended for one hour.

declining block rate

An electricity billing rate that decreases across tiers with the customer's energy use.

decoding

A process of converting a meter consumption read from an ERT to a dial read. Decoding read data provides the granularity required for various use cases. Different use cases potentially require a slightly different unit of granularity. Decoding enables the responsible system component to accomplish specific use cases.

decrypt

To convert (decode) encrypted data (ciphertext) back into its original form (plaintext).

decryption and key update server (DKUS)

The service and/or dedicated appliance responsible for managing keys and decrypting messages sent from the meters to the OpenWay Collection Engine (CE). The DKUS generates, stores, and provides meter and system keys for meters upon registration and authentication. It manages key states for command, revocation, system, and meter keys, and communicates with the signing and encryption server (SES) using the DKUS daemon on page 72. The DKUS assigns multiple keys of each type to a meter: four meter keys and two of each other type of key. Only one key of each type (known as the active key) is in use at any given time. All other keys are in stand-by until activated.

DEECA

See Department of Energy, Environment and Climate Action (DEECA) on page 65.

default

A data field value, parameter, or setting that is automatically selected by a software program. Typically, the user has the option to change default values.

DEH

See Distribution Equipment Hierarchy (DEH) on page 72.

DEIP

See Distributed Energy Integration Program (DEIP) on page 70.

delivery pressure

The gas pressure provided to the customer, which determines the customer’s piping and equipment sizes.

DEM

See distributed energy management on page 70.

demand

The highest requirement for power; that is, the amount of power required to satisfy the demand. There is no time element involved, and the highest requirement for power can occur in an instant. In practice, most demand meters measure the average peak demand over the 15- or 30-minute period. This definition of demand differs from the definition of energy in that energy is the usage of power over time whereas there is no time element in measuring demand. Demand is measured in kilowatts (kW) and energy is measured in kilowatt-hours (kWh).

For example, a demand for 100 kW continuous for an hour equals 100 kWh. If the demand rose to 400 kW continuously for the next hour, the demand for that hour equals 400 kWh. For the two-hour period, the demand is 400 kW because that is the highest requirement for power. The energy used is 500 kWh because that is the actual usage of power over time.

See also:

- continuously cumulative maximum demand on page 52
- cumulative maximum demand on page 56
- energy on page 83
- maximum demand (peak demand) on page 140
- minimum demand on page 146, previous demand on page 180
- projected demand on page 182

demand charge

See capacity charge on page 35.

demand delay

The configurable amount of time required before demand calculations are restarted after a power outage.

demand interval

The specified time over which demand is calculated.

demand limiting period

A configurable period during which demand for a specified electricity meter is limited to using a configurable amount of electricity. See also calculation delay on page 34 and calculation period on page 34.

demand reset

The process of setting demand electricity meter peak demand registers to 0 (zero). Normally, a button on the meter is used for resetting. Itron customers can also use Advanced Metering Manager (AMM) application on page 13 or Communications Module Utility (CMU) on page 48 with a Field Service Unit (FSU) on page 93 to reset the meters wirelessly.

demand response (DR)

A customer-side reduction in electricity consumption, used to modify the timing and/or quantity of demand on the power grid during peak usage times. Examples of demand response (DR) range from time of use (TOU) on page 223 price rates for residential customers, to on-site power generation for those commercial & industrial (C&I) customers whom have the ability. Some uses of DR include, but are not limited to: avoiding brownouts; balancing a power grid's electricity consumption/production relationship; and lowering electricity prices during peak demand.

Refers to a set of time-dependent activities that reduce electricity use to improve grid reliability, manage costs, and encourage load shedding during times when the electric grid is near capacity or prices are high.

Fully automated demand response is initiated at a home, building, or facility through receipt of an external signal. The receipt of the signal initiates pre-programmed shedding strategies. Facility staff at each site pre-program the control systems to receive the signals.

Demand Response Enrollment (DRE) Portal

A web-based enrollment portal for utilities to enroll their customers in Demand Response programs. The site checks customers' eligibility, schedules installation appointments (when required), and synchronizes with the utility customer information system (CIS) on page 57 application.

demand response event

A specific period when the demand response program administrator (ISO, utility) calls for load curtailment from its program participants.

demand response / load control (DRLC)

Refers to specific load reduction actions that utilities can take to reduce demand during peak periods.

Demand response can also use pricing incentives to accomplish these goals.

demand response management system (DRMS)

A system used by utility companies to manage their demand response (DR) on page 64 programs including communications with smart meters, demand-side smart devices (such as HAN devices on page 106), Direct-to-Grid on page 69 load control switches, and so on.

Demand Response Manager (DRM)

A software application that allows utilities to monitor and manage power consumption with the goal of reducing demand, particularly during peak periods. This application has been replaced by HAN Communications Manager (HCM) on page 106.

demand response notification (DRN)

Used to alert customers (through an in-home display, or electronic notification) about pending or current peak rate periods.

demand shedding

Any means to reduce energy consumption during critical peak periods or to reschedule demand to alternative non-peak times, such as during the night. When demand is moved to non-peak times, this is also known as demand shifting.

demand shifting

See demand shedding on page 65.

demand-side management (DSM)

An industry term that refers to controlling energy usage on the customer/demand side of the meter, particularly to shift customer use away from periods of high electrical demand. Demand side management can include a broad array of systems and programs used by utilities to control a customer's energy consumption, for example, fluorescent lighting, load control and smart thermostats. These fall into the general categories of conservation, load management, and fuel substitution.

Examples of DSM include communications with utility-company customers (such as those recommending that they offset use during upcoming peak-price events to save money) and enabling hardware and software. Itron supports, for example, programmable communicating thermostat (PCT) on page 182,electric vehicle supply equipment (EVSE) on page 79, and load control switch (LCS) on page 135 products that utility company customers can use as part of their DSM solutions.

demand subinterval

The smaller blocks of time that are used in rolling demand calculations.

demand threshold

A configured value that, when exceeded by calculated demand, initiates a contact closure, a log entry, or a phone home on event. Alternatively, the number of kW used as a threshold in demand limiting.

Department of Energy (DOE)

The United States federal agency that announces energy policies and acts as a principal advisor to the President of the United States on energy matters. The DOE manages research and development programs, the commercialization of energy technologies, and the associated environmental, regulatory, and defense programs.

Department of Energy, Environment and Climate Action (DEECA)

A government department in Australia.

depersonalizing

Removing the certificate on page 39 and credits on page 54 from a Field Service Unit (FSU) on page 93 to make it available for another user or purpose.

deprovision

See unjoin on page 229.

DER

See Distributed Energy Resource (DER) on page 70.

deregulation

The elimination of regulation from a previously regulated industry or sector of an industry.

DERMS

See Distributed Energy Resource Management System (DERMS) on page 70.

DER Optimizer

See Distributed Energy Resource Optimizer (DER Optimizer) on page 70.

DES

See Data Encryption Standard (DES) on page 61.

Design Failure Modes Effects and Analysis (DFMEA)

A type of Failure Modes Effects and Analysis (FMEA) on page 91, which looks at failures in the product design process and helps with the implementation of design controls.

desk dock

A hardware device that provides storage, communications, and battery charging for a handheld data collection device in an office environment. Also called a cradle.

desktop user

A utility employee who performs work in the office and works directly with the application software to create routes, work orders, and assignments. Desktop users are responsible for creating daily assignments, assigning work orders and routes, and exporting information to collectors. They may also work with reports. Roles could include those of a supervisory and/or dispatcher capacity.

details pane

One of several panes that make up an application's main window in some software user interfaces. The details pane contains the data fields, settings, or other information contained in the record or other item selected in the contents pane.

device

Hardware containing a network interface card (NIC) on page 157. Meters can be electric, gas, or water.

device class

A configuration parameter that defines the type of meter type, such as OpenWay CENTRON Advanced Polyphase Meter.

device command log

An XML-formatted file used by the FDM mobile application to record all information sent to and received from the endpoint. Recorded data includes the date and time of each endpoint operation, the operation duration, the ID of the FSR who performed the operation and the mobile device that was used.

device ID

A unique identifier that is programmed into a device and used by the device to identify itself to a system. Programming options must be configured to prompt you to enter the device ID when initialized.

Device Information Service (DIS)

A shared software platform service for handling meter configurations, distribution equipment relationships, and information responsible for keeping other software systems configuration data in sync. DIS is responsible for handling scenarios such as consumer move in and move out, meter/device swap, and meter to transformer relationship changes as well as auditing data across other software systems.

Device Language Message Specification (DLMS)

An application layer protocol for a messaging and transportation method that communicates between the meter and Itron applications. Used with the data modeling provided by Companion Specification for Energy Metering (COSEM) on page 48 as a standard for utility meter data exchange for DLMS/COSEM meters.

Device Management Service (DMS)

A software component used for sharing information between applications. A central repository of critical device data, DMS enables deployment of non-metering applications without needing to rely on the Itron application database.

device states

Device status. The states that apply to devices in an Itron network are of two types: administrative states and operational states. Administrative states result from user or system input, including provisioning device data, installing new devices on the network, removing a device, or editing device details in Itron applications. Advanced Metering Manager determines operational states from data gathered from the device and stored in the relational database management system (RDBMS) on page 192.

Device Support Tools

An Itron team responsible for handling software tools and testing.

device type

A unique identifier for the type of device used in the field.

device under test (DUT)

A manufactured item undergoing testing to determine whether it will function adequately. Also called unit under test (UUT).

DFMEA

See Design Failure Modes Effects and Analysis (DFMEA) on page 66.

DFT

See daily freeze time (DFT) on page 60.

D-H

See Diffie-Hellman (D-H) key exchange on page 68.

DHCP

See Dynamic Host Configuration Protocol (DHCP) on page 76.

DI

See distributed intelligence (DI) on page 70.

dialogic card

A part of each Itron Telephone Solutions Master Station. The dialogic card answers the phone when the Siris device calls and takes the DTMF tones that are sent by the device over the phone line and communicates them in a way that the computer software can interpret. The software then uses the dialogic board to send its commands back to the device (in the form of tones).

DICD

See Distributed Intelligence Code Deployer (DICD) on page 71.

Diehl Hydrus

A lead-free brass ultrasonic smart water meter for all residential, commercial, and industrial installations.

Diffie-Hellman (D-H) key exchange

A cryptographic key exchange method that enables two agents at each end of a communication exchange to derive a shared, secret key without sending it to the other. Using a common number, both agents use a different random number as a power to raise the common number. After the results are exchanged, the receiving agent raises the received number to the same random power they used before, and the results are the same for both.

diffraction

The radio path between transmitter and receiver, obstructed by surfaces with sharp irregular edges. Waves bend around the obstacle. See also reflection on page 191.

Digital Addressable Lighting Interface (DALI)

A lighting technology protocol managed under IEC standard 62386. DALI enables intelligent management of lighting equipment and is incorporated into Smart Street Lighting on page 209 technologies.

digital certificate

An electronic document that uses public key infrastructure (PKI) to allow an entity to exchange information securely over the Internet. The certificate is signed by a trusted party, thereby binding the key to the entity. Data contained in a certificate can include (but is not limited to) the certificate's serial number, a signature algorithm, credentials that identify the certificate user, the certificate validation and expiration dates, and the public key.

digital line protection (DLP)

A digital protective relay system that provides distance protection for transmission lines.

digital signature algorithm (DSA)

A United States Federal Government standard for digital signatures. DSA is a patented, royalty-free, two- phase key generation method. In the first phase, algorithm parameters are chosen. In the second phase, public keys and private keys are computed.

digital subscriber line access multiplexer (DLSAM)

A network device, usually located in telephone exchanges, that receives signals from multiple customer digital subscriber line (DSL) connections and puts the signals on a high-speed digital communications channel using multiplexing techniques. Depending on the product, DSLAM multiplexers connect DSL lines with some combination of asynchronous transfer mode (ATM), frame relay, or Internet Protocol networks.

digital subscriber line (DSL)

A communications technology used to provide high-bandwidth Internet access to homes and small businesses over copper telephone lines.

DIMP

See Distributed Intelligence Message Processor (DIMP) on page 71.

DINA

See Distributed Intelligence Network Adapter (DINA) on page 71.

DINAShim

See Distributed Intelligence Network Adapter Shim (DINAShim) on page 71.

DIN rail

A metal rail of a standard type widely used for mounting circuit breakers and industrial control equipment inside equipment racks. The term applies to multiple similar standards and was standardized by the Deutsches Institut für Normung (DIN), the German national standards organization.

direct access

The ability of a retail customer to purchase commodity electricity directly from the wholesale market rather than through a local distribution utility.

direct access service request (DASR)

In deregulated energy markets, a request for a final meter reading before the customer switches energy suppliers. The final reading determines the final consumption and billing from the previous supplier.

direct current (DC)

A type of electrical current in which, of the two wires leading to electrical devices, one side of the circuit is always negative and sending electricity while the other side is always positive or neutral. Conversely, in alternating current (AC), the electrical charge alternates between positive and negative. Devices powered by alternating current include three electrical wires of different polarities: negative, positive, and neutral (or ground).

DirectLink

Itron's F1 protocol for Wi-Fi and cellular communication to IntelliPEAK on page 117 and IntelliTEMP on page 118 devices.

direct load control (DLC)

The ability of a utility to turn off appliances (such as air conditioners) in a HAN Communications Manager (HCM) on page 106 network remotely to reduce load during peak periods.

direct sequence spread spectrum (DSSS)

Direct sequence spread spectrum systems transmit on a single selected frequency but on a very wide band. Only a small portion of that band is used for specially encoded information. Direct sequence spread spectrum offers an increase of processing gain for significant improvements in range. See also frequency-hopping spread spectrum (FHSS) on page 96.

Direct-to-Grid

Method of communications that provides demand response (DR) on page 64 solutions though a Smart Street Lighting on page 209 integrated into devices such as a load control switch (LCS) on page 135 or electric vehicle supply equipment (EVSE) on page 79. This allows these devices to communicate directly through the mesh network without going through an Energy Services Interface (ESI) on page 84.

DIS

See Device Information Service (DIS) on page 67.

disaster recovery (DR)

The process, policies, and procedures related to preparing for recovery or continuation of technology infrastructure critical to an organization after a disaster.

disconnect

Gas, water, or electricity is not flowing nor being delivered to the customer. Also see connect on page 50.

dispatchable work order

A work order that is ready for a field service representative (FSR) to complete. There are no reasons keeping the FSR from going to the meter location to perform the work.

dispatch strategy

A system setting that determines how FDM organizes and manages work order dispatch. You can configure FDM for either of two dispatch strategies: Route supports the organization and dispatch of work orders by route, and District supports the organization and dispatch of work orders by district. Selecting this strategy removes all route-related screens and data from the FDM user interface.

display pane

One of several panes that make up an application's main window in some software user interfaces. When you select a node in the navigation pane, the corresponding view opens in the display pane. In some cases, the display pane may be subdivided into two sub-panes, a contents pane and a details pane.

disqualifying exception

A work order exception that makes the work order ineligible for export to a utility's customer information system (CIS).

Distributed Energy Integration Program (DEIP)

In Australia, a collaboration of entities whose purpose is to maximize the value of customers' distributed energy resources (DERs).

distributed energy management

See Distributed Energy Resource Management System (DERMS) on page 70.

Distributed Energy Resource Management System (DERMS)

A platform on which distribution system operators run distributed energy resources-based grids.

Distributed Energy Resource (DER)

A power-generation system that typically generates between five kilowatts (kW) and ten megawatts (MW) of electrical energy and consists of modular technologies located at or near the point of energy consumption to reduce the need for the inefficient transport of energy from remote locations over power lines. DER technologies can be used to work with load-management and energy-storage systems to improve the reliability of the electricity grid. Types of DER include but are not limited to photovoltaics, cogeneration, and wind turbines.

Distributed Energy Resource Optimizer (DER Optimizer)

A suite of modules designed to enable utilities to strategically grow their managed electric vehicle (EV) on page 78 charging programs in scope and sophistication over time to include EV detection, optimized control, and integration of EV charging and management into grid planning.

distributed generation

A distributed generation system that involves small amounts of generation or pieces of generation equipment applied to a utility's distribution system for the purpose of meeting local peak loads and/or displacing the need to build additional infrastructure. Distributed generation may be in the form of gas or propane generators, fuel cells, or solar.

distributed intelligence (DI)

A system designed to process granular data on edge devices before sending statistics and results of complex analytics (outcomes) across the network to head end systems and applications. The apps provide a user interface where utilities can view, analyze, compare, and forecast their metering conditions based on the outcome data.

See also distributed intelligence (DI) applications on page 71.

distributed intelligence (DI) applications

An outcome available to DI customers that is installed on DI-capable meters as two parts: an agent and license. DI applications are licensed, deployed, and managed in Itron Enterprise Application Center (EAC) on page 124. Outcome data from DI applications is viewed in user interfaces in the DI App Platform.

See also distributed intelligence (DI) on page 70.

distributed intelligence (DI) app platform

A component of the DI platform that supports the import, storage, and presentation of DI outcomes data.

distributed intelligence (DI) cloud services

A set of DI-supporting services that includes DI Subscription Service (DSS), Configuration Management Service (CMS), Endpoint Management Service (EMS), Group Management Service (GMS), and Application Management Service (AMS).

Distributed Intelligence Code Deployer (DICD)

Provides DI-related logic to the existing Firmware Upgrader (FWU) functionality and enables Distributed Intelligence Network Adapter (DINA) on page 71 to request agent package downloads.

Distributed Intelligence Developer Key (DDK) meter

A manufacture option available for distributed intelligence (DI) on page 70-ready GenX technology on page 102 electricity meters. DDK meters are manufactured with a script injected that allows the meter to run third-party DI agents without licensing requirements.

Distributed Intelligence Message Processor (DIMP)

A distributed intelligence (DI) on page 70 platform service for real-time data processing (decode, transform, and operational storage) of messages from Itron-built DI edge applications.

Distributed Intelligence Network Adapter (DINA)

DINA is a software application installed with the UtilityIQ suite that forwards all Itron Enterprise Application Center (EAC) on page 124 requests to relevant endpoints and delivers metering data from applications that run on Itron Gen5 Riva Meter on page 101 electricity meters. The DINA user interface provides the ability to create and manage data-collection jobs for supported Itron Gen5 Riva devices. DINA is made up of three services: DINA, DINAShim, and DI Code Deployer (DICD).

Distributed Intelligence Network Adapter Shim (DINAShim)

An intermediary service between Distributed Intelligence Network Adapter (DINA) on page 71 and the On-Premises Hybrid Service (OHS) on page 163. It performs translation on all upstream messages for the Itron Enterprise Application Center (EAC) on page 124. Likewise, all downstream messages from OHS are translated into the formats required for DINA.

Distributed Network Protocol (DNP or DNP3)

An open, standards-based set of communication protocols that enables interoperability between components in process automation systems. Its main use is in the electric utility industry processes that exist between substations, outstations, and master stations. Widely used in Supervisory Control And Data Acquisition (SCADA) on page 216 networks for communications between a master station and remote terminal unit (RTU) on page 193s or intelligent electronic device (IED) on page 117s.

Distribution Automation (DA)

The automatic monitoring and control of a utility's distribution feeders and equipment such as switches, reclosers, and capacitor bank controllers. See also Supervisory Control And Data Acquisition (SCADA) on page 216.

Distribution Automation (DA) Essentials

A streamlined DA offering for the mid-tier market extending Itron's Distribution Automation capabilities to the cooperative and municipal markets.

Distribution Equipment Hierarchy (DEH)

An Itron-developed API that defines how service points and other system equipment are electrically connected. Generally, DEH indicates which service points connect to which transformers, which transformers are in which feeder sections, which sections make up a feeder, and which feeders are on a substation.

distribution feeder

An electrical supply line in the electric utility distribution system (either overhead or underground) that carries power from the substation, through various paths, to the consumer.

distribution line

A power line or system for distributing power from a transmission system to a customer.

distribution management system (DMS)

Systems that consist of a distribution automation system, and which can include a superior dispatching automation system, production management system, GIS, marketing management system, 95598 customer service system, and so on.

distribution power

A packaged power unit located at the point of demand. While the technology is still evolving, examples include fuel cells and photovoltaic cells.

Distribution Transformer Awareness

A solution that diagnoses transformer conditions, monitors performance, pinpoints anomalies at the transformer asset level, provides information on the quality of supply, enables energy diversion detection, and allows identification of meter-to-transformer and meter-to-phase detection.

Distribution Transformer Monitor (DTM)

A hardware device deployed in electric distribution systems to improve grid management, balance loads, and detect outages, power losses, and theft.

district

An organizational or geographical subdivision of a utility.

Diversion Detection

Itron's Active Smart Grid Analytics (ASA) user interface that leverages SAP Business Intelligence analytics applications to employ a variety of methods for utilities to analyze meter alerts, energy and voltage measurements, energy balancing and historic usage patterns to identify energy diversion and meter tampering on a system-wide scale.

DKUS

See decryption and key update server (DKUS) on page 63.

DKUSD

decryption and key update server daemon

A program that uses a transport layer security (TLS) connection to manage communications between the OpenWay decryption and key update server (DKUS) and the OpenWay Collection Engine (CE).

DKUS daemon

A program that uses a transport layer security (TLS) connection to manage communications between the OpenWaydecryption and key update server (DKUS) on page 63 and the OpenWay Collection Engine (CE).

DLC

See direct load control (DLC) on page 69.

DLCA

See Driver's License Certificate Authority (DLCA) on page 74.

DLL

See dynamic link library (DLL) on page 76.

DLMS

See Device Language Message Specification (DLMS) on page 67.

DLP

See digital line protection (DLP) on page 68.

DMS

See Device Management Service (DMS) on page 67.

See distribution management system (DMS) on page 72.

DNP

See Distributed Network Protocol (DNP or DNP3) on page 71.

DNP3

See Distributed Network Protocol (DNP or DNP3) on page 71.

DNS

See domain name system (DNS) on page 73.

dock

A hardware device that provides storage, communications, and battery charging for a handheld data collector in an office or vehicle.

Also called a cradle.

DOE

See Department of Energy (DOE) on page 65.

See Dynamic Operating Envelopes (DOE) on page 76.

domain

A subject area or area of activity that is addressed by a software application. Each domain provides access to the views, functions, and data necessary to perform the tasks associated with that domain. In FDM the permissions granted to your user account determine which application domains you have access to and which domain features you can use.

Also called a workbench or dashboard.

domain, database

A description of an attribute's allowed values. All possible values for a particular field for all records in the database.

domain, Internet

A group of computers whose Internet Protocol (IP) addresses share the same domain name. The domain name is the last part of the address; for example, .com, .org, .ca, .au.

domain name system (DNS)

An Internet service that translates alphanumeric domain names into numeric IP addresses. For example, the alphanumeric domain translated to its IP address through DNS is 192.124.249.65.

domain, network

A group of computers and devices on a network that share a common communications address, can be accessed and administered with a common set of rules, and are under the control of one security database. Permissions that grant access to network resources are maintained in one or more servers called domain controllers. Users are only required to log on to a domain to gain access to its resources.

downstream/upstream

Refers to the relationship between devices along the route. Downstream refers to moving toward a meter. Upstream means moving toward an Access Point. See also child on page 41 and path on page 171.

DR

See demand response (DR) on page 64.

See disaster recovery (DR) on page 69.

DRE

See Demand Response Enrollment (DRE) Portal on page 64.

drift

A slow change of a metrological characteristic of a measuring instrument.

drive-by

A method of reading an electric, gas, or water meter using a radio that is mounted in a vehicle. The meters are read when the vehicle passes in the vicinity of a meter that is equipped with an ERT module.

drive dog

A clamp securing a piece of work and engaging with a slot in a faceplate.

drive dog, ERT module

A mechanical component of a gas module driven by the meter drive dog which rotates as gas passes through the meter. The meter drive dog turns the Encoder/Receiver/Transmitter (ERT) module on page 81 wriggler and shaft. The wriggler and shaft turns the module's drive dog. The module's microprocessor (counter) interprets the rotating shaft/wriggler/module drive dog as a measure of gas consumption.

drive dog, meter

The rotating, mechanical interface on a gas meter that directly engages an index or Encoder/Receiver/Transmitter (ERT) module on page 81 wriggler. As gas passes through the meter, the drive dog rotates. The drive dog's rotation turns the index dials or the ERT module's wriggler, which increments the index dials or ERT module to record gas consumption.

driver's license

A digital identification given to an Itron NIC that certifies that the node is in a System Trusted state and is allowed to join the network. See also birth certificate on page 30 and Operator certificate on page 167.

Driver's License Certificate Authority (DLCA)

A program located in the back office of a utility that issues a certificate (called a driver's license on page 74), which allows a network node to become a member of that network. DLCA is a requirement for link layer security, and is part of Shared Services Components (SSC) on page 206.

DRLC

See demand response / load control (DRLC) on page 65.

DRM

See Demand Response Manager (DRM) on page 65.

DRMS

See demand response management system (DRMS) on page 65.

DRN

See demand response notification (DRN) on page 65.

DRT

See daily read time (DRT) on page 60.

DSA

See digital signature algorithm (DSA) on page 68.

DSL

See digital subscriber line (DSL) on page 68.

DSLAM

See digital subscriber line access multiplexer (DLSAM) on page 68.

DSM

See demand-side management (DSM) on page 65.

DSSS

See direct sequence spread spectrum (DSSS) on page 69.

DST

See daylight saving time (DST) on page 61.

DTA

See Data Transfer Agent (DTA) on page 61.

DTM

See Distribution Transformer Monitor (DTM) on page 72.

dual-band antenna (oil filter)

A low-profile omnidirectional antenna that can be used as a NAN or WAN antenna. The dual-band antenna is designed for outdoor wireless networks operating in either the cellular band or 2.4 GHz frequency range.

dual-band body mount antenna

An external, wireless antenna that operates in both 900 MHz and 2.4 GHz.

dual-band dipole antenna

A 3 dBi omnidirectional antenna that can be used in ISM bands to maximize the coverage radius.

DUT

See device under test (DUT) on page 67.

duty cycle

The ratio of active time to total time in electrical systems (such as motors, refrigerators, and air conditioners). Modifications to heating, ventilating, and air conditioning (HVAC) system duty cycles can be made through demand response applications such

as HAN Communications Manager (HCM) on page 106 to reduce load at one or more customer premises.

dW

See deciwatt (dW) on page 63.

dWh

See deciwatt hours (dWh) on page 63.

Dynamic Host Configuration Protocol (DHCP)

An automatic configuration protocol used on IP networks.

dynamic link library (DLL)

An executable program module in Microsoft® Windows® operating systems that performs one or more functions when executed by the operating system. A DLL may be called by an executable program or another DLL.

Dynamic Operating Envelopes (DOE)

A mechanism for orchestrating and coordinating bi-directional energy flows into the grid by providing upper and lower bounds on the import or export of power in a given time interval for each distributed asset or customer connection point.

E

EAC

See Itron Enterprise Application Center (EAC) on page 124.

EAI

See Enterprise Application Integration (EAI) on page 84.

eBridge

A device that uses Ethernet on page 87 and serial connectivity to provide robust, two-way RF standards-based communications to support Distribution Automation applications such as asset management, Volt/VAR control, self-healing circuits, FCI communications, and distributed generation. See also Bridge on page 31.

ECBOCA

See back office certificate authority (BOCA) on page 26.

ECC

See elliptic curve cryptography (ECC) on page 80.

ECDSA

See elliptic curve digital signature algorithm (ECDSA) on page 80.

ECIES

See elliptic curve integrated encryption scheme (ECIES) on page 80.

Eclipse Enterprise Edition (3E)

A comprehensive management system that uses web service technology for online prepaid electricity and gas vending systems.

ECMT

See Electricity Communications Module Tester (ECMT) on page 78.

ECN

See engineering change notice (ECN) on page 84.

ECO

See engineering change order (ECO) on page 84.

EDC

See Electric Distribution Company (EDC) on page 78.

EDF

See endpoint definition file (EDF) on page 83.

Edge Explorer

Obsolete name for Web UI on page 238, a web-based user interface for Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 version 10 or later.

Edge Gateway

A highly-secure edge computing platform that features Itron's Gen5 Mesh, LTE and PLTE communications to the BOS, and provides advanced distributed intelligence for a wide range of infrastructure applications, including Industrial IoT, Distribution Automation (DA) on page 71, Distributed Energy Resource Management System (DERMS) on page 70, and Smart Cities.

The Edge Gateway can connect, monitor, and manage clusters of new and existing devices using multiple interfaces including Mesh, Ethernet, Wi-Fi, Bluetooth Low Energy (BLE), Serial and USB.

EDI

See electronic data interchange (EDI) on page 79.

EEPROM

See electrically erasable programmable read-only memory (EEPROM) on page 78.

EFC

See extended FAN connectivity (EFC) on page 89.

effective isotropic radiated power (EIRP)

The output power when a signal is concentrated into a smaller area by the antenna.

EFG

See Energy Forecasting Group (EFG) on page 84.

EIRP

See effective isotropic radiated power (EIRP) on page 78.

EkaNet

A functionality that allows you to obtain multiple readings and perform a reset demand when reading a meter using Itron's Mobile Collector and EkaNet endpoints.

EKSF

See electronic key shipment file (EKSF) on page 79.

ELD

See Extended Life Device (ELD) on page 89.

electrically erasable programmable read-only memory (EEPROM)

Non-volatile computer (or electronic device) memory that retains its data when power is removed.

Electric Distribution Company (EDC)

A public utility that distributes electricity to customers.

Electricity Communications Module Tester (ECMT)

A radio frequency (RF) software tool for testing the operational status of electricity meters equipped with NICs. ECMT runs pre-defined test scripts to test electricity meters. When combined with any method of powering an electricity meter, such as a meter test board, ECMT enables utility company meter shops to conduct quality sample testing of inbound meters and to assess field return meters. Formerly called MANTIS.

Electricity OEM Configurator

The Electricity OEM Configurator (formerly known as MUTT) programs, tests, and stores programmatic information used in device provisioning for Itron NICs, electricity meter original equipment manufacturer (OEM) models specified for a given Itron NIC, and supported Load Control Switch (LCS) devices.

electric vehicle (EV)

A vehicle that uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels, fuel cells or an

electric generator to convert fuel to electricity. EVs include, but are not limited to, road and rail vehicles, surface and underwater vessels, electric aircraft, and electric spacecraft.

electric vehicle charging optimizer (EVCO)

An integrated platform for energy and transportation ecosystem, providing charging infrastructure planning, electric vehicle (EV) on page 78 charging management, grid planning, and grid & Distributed Energy Resource (DER) on page 70 orchestration under the EVCO solution.

Electric Vehicle Smart Charging Station

A 240V charging station with Itron's embedded revenue-grade metrology, Zigbee on page 242 Smart Energy communications, and a full-featured Wi-Fi access point.

electric vehicle supply equipment (EVSE)

Charging devices designed specifically for recharging electric vehicles.

electronic authentication, E-authentication

The process of establishing confidence in user identities that are electronically presented to an information system.

electronic credentials

Digital documents used in authentication that bind an identity or an attribute to a subscriber’s token.

electronic data interchange (EDI)

The concept of businesses electronically communicating information that was traditionally communicated on paper, such as purchase orders and invoices. Technical standards for EDI exist to facilitate parties transacting such instruments without having to make special arrangements.

electronic detent

A programming method, or meter option, that prevents received energy from accumulating in the meter's delivered energy register. When the detent feature is enabled, the received energy is accumulated in a separate register.

electronic key shipment file (EKSF)

A file format intended for the secure transmission of device keys.

electronic meter reading (EMR)

The collection, storage, and transmission of meter reading data using a handheld computer or other electronic meter reading device.

electronic security perimeter (ESP)

The logical border that surrounds an access-controlled network or network group with associated cyber assets that are essential to network operation.

electronic serial number (ESN)

The unique International Organization for Standards (ISO) object identification number assigned to a mobile or other electronic device by the manufacturer. The ESN consists of the number issued to the manufacturer (called the arc), which is the same for all devices from that manufacturer, followed by a unique number for the device itself.

The OpenWay Collection Engine (CE) uses the ESN identifier to identify each electric meter it communicates with. The CE displays the ESN as text with a decimal point separator in all interfaces, messages, and data sent to the utility application.

element

A node that describes and organizes data within an XML file. Database entities can be mapped to XML elements so that data can be transferred between applications, even if those applications use different database schemas. APIs use elements to classify

data in the XML document. Elements are sometimes referred to as tags or XML tags. An API element uses an opening tag and a closing tag to define where the element begins and ends. An element can contain attributes, values, and other elements.

ELF

See endpoint location file (ELF) on page 83.

Elliptic curve cryptography

An approach to public-key cryptography based on the algebraic structure of elliptic curves over infinite fields.

elliptic curve cryptography (ECC)

A highly secure public-key cryptography method based on the algebraic structure of elliptic curves over finite fields. ECC provides fast decryption and digital signature processing.

elliptic curve digital signature algorithm (ECDSA)

A digital signature algorithm (DSA) that uses elliptic curve cryptography. Digital signature that the meters use to verify that the messages came from the collection engine and not a malicious source.

elliptic curve integrated encryption scheme (ECIES)

A type of asymmetric encryption.

EM211 Type 100

An extremely compact sealed-for-life electronic credit meter for single-phase residential applications.

EM211 Type 900

A type 900 compact meter with internal tariff control that offers full compatibility with existing metering panels and is equipped with enhanced features for the modern utility environment including comfort of installation, meter reading, and event detection.

EM212

A static energy single-phase class 1 active meter with mechanical register.

EM214

A EM211 Type 900 on page 80 residential three phase electricity meter with internal tariff control that offers full compatibility with existing metering panels and is equipped with enhanced features for the modern utility environment including comfort of installation, meter reading, and event detection.

EM214 TYPE 700

A residential three-phase electricity meter with external tariff control.

EM214 TYPE 900

A residential three-phase electricity meter with internal tariff control.

EM425-UK (SMETS)

A residential electricity metering with two processors that separate metrology from functionality allowing for a range of features including complex tariffs, prepayment rules, and load management data to be easily updated during post installation.

EM425-UK2 SMETS2 4 Terminal

Itron's SMETS2 solution comprises residential smart meters for electricity and gas measurement, serving the UK government's mandated smart meter rollout program. Drawing from a profound heritage in the region and renowned expertise in gas and electricity industries, the SMETS2 solution blends the latest metrology with digital capabilities, supporting the shift to a cleaner and more flexible energy system in the UK. Other variations include the EM425-UK2 SMETS2 5 Terminal.

EM512 Type 700 JAVA

A two-sensor prepaid household electricity single-phase meter with dual sensors.

EM550-EM650 (SEC)

Itron's EMx series is comprised of both single-phase and poly-phase meter variants intended to operate in a global advanced metering infrastructure (AMI) on page 12.

- The EM500 series consists of static, polyphase, four-quadrant, multi-rate, smart meters. It is intended for advanced residential applications and suitable for low voltage direct connected operated networks (LVDC).
- The EM600 series consists of static, polyphase, four-quadrant, multi-rate, smart meters. It is intended for commercial & industrial (C&I) applications and suitable for low voltage / high voltage current transformer connected operated networks (LVCT, HVCT).

EM620 C&I electricity meter

A commercial & industrial (C&I) on page 46 smart electricity meter designed to unlock smart grid capabilities for large customers. Suitable for business applications from small shops to manufacturing facilities, EM620 meters offer comprehensive connectivity options and integrated power quality monitoring to support many application requirements and building blocks to a smarter energy grid. EM620 meters facilitates the transition to smart energy with flexibility, security, and evolution capacities.

embedded services processor (ESP)

A processor in some Cisco® routers that is responsible for data-plane processing tasks and all network traffic. ESPs are also responsible for some advanced services such as firewall protection, flexible packet matching, and network-based application recognition.

emergency supply capacity control (ESCC)

A function reserved for use during supply emergencies to ration power and avoid or minimize power outages.

EMMSYS Meter Data Management

A core solution for day-to-day operational use by utilities, EMMSYS stores data from various data collection systems. The platform can manage data from water, heat, and cooling applications, and interfaces with utility IT infrastructure including workflows and processes leading to full integration.

EMR

See electronic meter reading (EMR) on page 79.

encapsulating security payload (ESP)

An Internet protocol that provides confidentiality, authentication, and integrity through encryption to protect against IP packet tampering.

encoded register-type ERT module

An Encoder/Receiver/Transmitter (ERT) module on page 81 that gets consumption data from a meter by reading messages sent by a meter index containing the data. In contrast, a pulser-type ERT module calculates consumption by counting a meter register's pulses or switch closures.

Encoder/Receiver/Transmitter (ERT) module

A device that attaches to an electricity, gas, or water meter and collects usage and related data either by radio or cellular frequency. An ERT module encodes the data and transmits it to Itron data collection devices and systems such as handheld computers, (HHCs), mobile automated meter reading (MAMR) devices, and fixed networks.

"Module" is capitalized when it is part of the official product name, for example, 500W ERT Module on page 6. "Module" is not capitalized when used to generically describe an ERT, for example, "Itron sells Itron ERT modules."

encryption

The process of changing plaintext into ciphertext, by use of an algorithm for the purpose of security or privacy.

end device (ED)

A network component or device that is either the source or the destination of a message. For example: a computer, printer, web camera, , or meter.

end gap

A gap in the usage data existing between the last time the meter was read and the time usage data was last collected for the same meter. This is not problematic. See also gap on page 98.

end of billing (EOB)

The closing date of a billing cycle. Energy provides charge customers for energy consumption over a defined period. For example, a billing cycle can start on the fifteenth day of the month and end on the fourteenth day of the next month. In this example, the EOB is the end of day on the fourteenth of the month.

End of Extended Support (EOES)

A date in Itron's product life-cycle which indicates that technical support and other types of support services that have been negotiated past original support services for the product are no longer provided.

See also End of New Sales (EONS) on page 82, End of Support (EOS) on page 82, and End of Life (EOL) on page 82.

end of interval (EOI)

End of a demand interval or subinterval.

End of Life (EOL)

A date in Itron's product life-cycle when a product is no longer offered/sold or supported after the stated EOL date.

See also End of Extended Support (EOES) on page 82, End of New Sales (EONS) on page 82, and End of Support (EOS) on page 82.

End of New Sales (EONS)

A date in Itron's product life-cycle when the product is no longer available for purchase by new customers but is supported for customers who have purchased it prior to the EONS date.

See also End of Extended Support (EOES) on page 82, End of Support (EOS) on page 82, and End of Life (EOL) on page 82.

End of Support (EOS)

A date in Itron's product life-cycle when technical support and other types of support services are no longer provided after the date stated. After a product reaches an EOS date, it may be possible to obtain continued support based on mutual agreement between Itron and customer.

See also End of Extended Support (EOES) on page 82, End of New Sales (EONS) on page 82, and End of Life (EOL) on page 82.

end of transmission (EOT)

A transmission control character used in telecommunications to indicate the conclusion of a transmission.

endpoint

Meters, electric vehicle supply equipment (EVSE) on page 79, FCIs, and HAN devices (such as load control switches, and streetlight controllers), distribution controls, cap bank switches, and other specialized network devices. Many endpoints are assigned to nodes. The term may refer to:

- An Encoder/Receiver/Transmitter (ERT) module on page 81 that is attached to a meter. ERT modules collect usage and related data from meters and transmit it to data collection devices and systems.
- A meter that is equipped with a built-in communication module with which it transmits usage and related data to data collection devices and systems.

Endpoint Actor

The component of network abstraction that manages operations and information for an endpoint on page 82.

endpoint configuration

A set of configuration parameters (such as device class, time zone, security parameters, register operation parameters, communication parameters, load profile parameters, and so on) that are defined in the OpenWay Collection Engine (CE) and assigned to a group of meters.

Also called a meter configuration.

endpoint definition file (EDF)

An XML-formatted file listing the electronic serial numbers (ESNs) and device classes of meters shipped from the Itron manufacturing facility. The OpenWay Collection Engine (CE) imports the information from the file, adding the meters to the OpenWay system and enabling the listed meters to register with cell relays in the field.

endpoint ID

The identification number assigned to each endpoint at the time of manufacture that uniquely distinguishes it from all other endpoints.

endpoint location file (ELF)

A comma-separated values (.CSV) file containing either the latitudinal and longitudinal coordinates, or the complete street address that is associated with a specific endpoint ID. ELFs can contain coordinates/addresses for one or more endpoint IDs.

endpoint serial number (EPSN)

Unique identifier for ERT endpoints that use a combination of ERT ID and market type (gas, electric, or water). Identifying ERTs by ID/market type combination, rather than by ID alone, enables Itron to assign duplicate IDs to ERTs of different ERT/market types.

Endpoint Tools

A collection of standard workflows that is included with Itron's Field Deployment Manager software for reading and programming Itron endpoints and for modifying and configuring features that are specific to particular endpoint types.

endpoint type

A 4-bit numeric value contained in all messages transmitted by Itron endpoints. It indicates the classification of the transmitting device and the kind of message or category of messages transmitted. Endpoint types use values 0 to 15. For example, a 100G endpoint has an endpoint type of 12.

energized

See set on page 206.

energy

The use of power over time, expressed in kilowatt-hours (kWh). See also demand on page 63 and time of use (TOU) on page 223.

energy charge

An element in a two-part pricing method used in capacity transactions (capacity charge on page 35 is the other element). This is the charge for the electricity used by an electric customer during the billing period, measured in kilowatt-hours (kWh).

energy diversion

The theft and/or unauthorized use of an energy service such as gas, water, or electricity.

Energy Forecasting Group (EFG)

A subscription support service offered by Itron's EFG that provides participants with a valuable stream of regional data for end-use saturation and efficiency. The commercial, industrial, and residential sectors each have a dedicated EFG.

energy only meters

Meters that do not have their own programs (including meters running in EO mode) and rely on GMI (a generic meter interface software component of UtilOS firmware on page 231) to provide load profile functionality.

energy service provider (ESP)

A non-utility supplier of electricity to a competitive energy marketplace.

Energy Services Interface (ESI)

The meter Smart Street Lighting on page 209 when the HAN radio is activated. An active ESI enables communication to and from HAN devices in the customer location. The ESI can support Zigbee on page 242, in which case it functions as a portal and communicates with ZigBee HAN devices. The ESI can also support a custom direct load control (DLC) on page 69 protocol; in this case, the ESI is embedded inside a device — such as a load control switch (LCS) on page 135 or electric vehicle supply equipment (EVSE) on page 79— and can control some of its functions.

EnergyIQ

See CustomerIQ Software on page 58.

engineering change notice (ECN)

A document that describes and authorizes engineering changes to a product and its corresponding documentation. Also called engineering change order (ECO).

engineering change order (ECO)

A document that describes and authorizes engineering changes to a product and its corresponding documentation. Also called engineering change notice (ECN).

Enterprise Application Integration (EAI)

A framework consisting of services and technologies the enterprise uses, and which acts as middleware enabling system and application integration across the enterprise.

Enterprise on Demand (EOD)

An AT&T program for customers with large data deployments, such as utility companies. EOD customers can purchase SIM cards and activate them in their devices at a later time.

enterprise resource planning (ERP)

The integrated management of main business processes, often in real time and mediated by software and technology.

enterprise service bus (ESB)

A software architecture model used for integrating applications and allowing them to communicate without excessive dependencies on each other.

entity

A single person, place, or thing about which data can be stored. For example, each node in a database is called an entity. Service points, customers, and meters are all entities. The XML APIs use elements and attributes to define the properties of each database entity.

enum

Short for enumeration. A data type consisting of named values like elements, members, enumeral, or enumerators.

Environmental Protection Agency (EPA)

A United States federal government agency that writes and enforces laws, regulations, and national standards that are designed to protect human health and the environment.

EO

See energy only meters on page 84.

EOB

See end of billing (EOB) on page 82.

EOD

See Enterprise on Demand (EOD) on page 84.

EOES

See End of Extended Support (EOES) on page 82.

EOI

See end of interval (EOI) on page 82

EOL

See End of Life (EOL) on page 82.

EONS

See End of New Sales (EONS) on page 82.

EOS

See End of Support (EOS) on page 82.

EOT

See end of transmission (EOT) on page 82.

EPA

See Environmental Protection Agency (EPA) on page 85.

ephemeral key

A relatively short-lived private key on page 181 generated for each execution of a key establishment process.

epoch

The time it takes a node to traverse all the channel time slots in its hopping sequence. See also .

EPSN

See endpoint serial number (EPSN) on page 83.

EquaScan eHCA

An electronic heat cost allocator from the EquaScan software on page 86 system specifically developed to meet the diverse requirements of the independent billing service companies.

EquaScan FNet

An innovative 2-way wireless system specially developed to reliably capture properties with high device density.

EquaScan h-Koax RF

A compact heat meter based on the coaxial principle, ideal for calibration exchange.

EquaScan hMIU RF

A radio module developed for automated data collection from CF UltraMaXX MK on page 40 and CF UltraMaXX V on page 40 thermal energy meters.

EquaScan Inductive Head

An inductive readout head for the EquaScan software on page 86 product portfolio.

EquaScan iSD RF

A smoke alarm designed to meet the highest safety requirements.

EquaScan Master RF

Part of the EquaScan software on page 86 walk-by system for mobile data reading, this serves as a radio frequency unit for bidirectional communication with EquaScan electronic heat cost allocators and meter modules.

EquaScan pMIU RF

A wireless pulse module developed for the automated data logging of pulse-emitting measuring devices.

EquaScan software

A menu-guided software application for computers or tablets that presents data from the EquaScan system.

EquaScan walk-by

An EquaScan mode where the EquaScan Master RF on page 86 mobile reading device reads module data while walking by and forwards it to the EquaScan software on page 86.

EquaScan wMIU RF

An intelligent water meter radio module developed for automated data collection for apartment water meters equipped with a modular CC4 register.

Equipment Outage API

A JSON file web service that provides a standardized API transport. It also provides image-based tiles for map visualization. Two main services are provided by the API:

- Query services: For generic queries based on time range and other filters.
- Identify services: For specific queries based on map-click locations.

ERP

See enterprise resource planning (ERP) on page 84.

error code

A coded message that corresponds to a fault in the meter's operation. In OpenWay meters, the error codes are categorized in severity as non-fatal or fatal faults.

ERT Install

An Itron software application used at meter manufacturing plants and utility meter shops to program large numbers of ERT module on page 87s before they are installed in the field.

ERT module

See Encoder/Receiver/Transmitter (ERT) module on page 81.

ESB

See enterprise service bus (ESB) on page 84.

ESCC

See emergency supply capacity control (ESCC) on page 81.

ESI

See Energy Services Interface (ESI) on page 84.

ESN

See electronic serial number (ESN) on page 79.

ESP

See encapsulating security payload (ESP) on page 81.

Ethernet

A specification for local communication networks that interconnects different kinds of computers, information processing products, and office equipment.

ETL

See extract, transform, and load (ETL) on page 89.

EV

See electric vehicle (EV) on page 78.

EVCO

See electric vehicle charging optimizer (EVCO) on page 79.

EVDO

See Evolution-Data Optimized (EVDO) on page 88.

event

- An occurrence that happens as a result of an action. In Itron product documentation we refer to meter events, device events, billing events, communication events and more. There are many event types. For example, alarms, clock error, low battery warning, diagnostics, calibrations, activation and deactivation.
- In Advanced Metering Manager (AMM) application on page 13 and other Itron applications, an action that occurs on any device in the network, including device configuration changes, schedule deployments, and errors. In meters and Access Points, events can be associated both with the device and with the Itron NIC. All events have a severity level: Informational, Warning, or Error.

event ID

- A number that defines the event.
- The database where events are stored for further analysis.

event log

Log used to record historical events that occur in the meter.

Event Notification Application

An optional MV-90 xi application that sends emails or produces a file when specific meter or MV-90 xi events occur.

EverBlu

A radio network system for central data acquisition. The self-organizing network of EverBlu data collectors enables automatic maintenance of the system and ensures data transmission even with changing radio environmental conditions.

EverBlu Access Point

A solution that is installed in the central location of each district and is the core of the wireless mesh network. The EverBlu Access Point collects meter data daily from all the EverBlu Collector on page 88s on its network.

EverBlu Collector

A device used to collect meter reads from the EverBlu on page 88 MIUs installed at the end points of the network.

EverBlu Cyble Enhanced

An intelligent and compact radio module for Itron water and gas meters, compatible with EverBlu on page 88 fixed network for daily data transmission or on-request meter reads.

Evolution-Data Optimized (EVDO)

A 3G high-speed cellular data service that uses CDMA technology.

EVSE

See electric vehicle supply equipment (EVSE) on page 79.

exception

An error or condition that is not part of the normal processing flow.

exception polling

A proactive outage detection technique where pings are sent to devices to see if they are still alive. Devices that do not respond may signify an outage.

exhaustive

A method by which objects are added to a set or a load profile aggregation through dynamic selection, using logical expressions defined in the Saturne Administration Console. For example, all service points with a particular attribute set and all load profiles with a particular name.

export

Meter read data, for a specific date and time, contained in XML, OUSM (Ontario Utility Smart Metering), IEE (Institution of Electrical Engineers), Loadstar, or HHF (hand held format) files for integration with business systems.

ExpressLink

A direct file transfer method used between Field Collection System (FCS) and Mobile Collection System (MC). Using a network connection and shared folders, import and export route files can be directly transferred between FCS and MC. This eliminates the use of removable media for file transfer purposes.

extended data

Data interrogated on a conditional basis from the OpenWay Collection Engine. The types of interrogated data include current register data, prior extended self-read data, extended load profile data, and instrumentation profile data.

extended endpoint type

An 8-bit numeric value contained in all messages transmitted from Itron endpoints that are capable of transmitting eight bits. The first four bits indicate the endpoint type, and the last four bits further define the type of endpoint. Extended endpoint types use values 0–255.

extended FAN connectivity (EFC)

The communications protocol used by battery powered devices (BPDs) in the 500S R3 network (and older Itron BPD devices). See also field area network (FAN) on page 92.

extended last gasp

An increased period of time in which an asynchronous message from an electricity meter can indicate the meter has lost power. Extended last gasps increase the likelihood of the last gasp reaching the back office, and are currently only available for secure electricity meters. See also last gasp (LG) on page 131 and Extended Life Device (ELD) on page 89.

Extended Life Device (ELD)

Hardware that supports extended last gasp on page 89. Currently, only secure electricity meters support Extended Last Gasp. ELDs differ from other electricity meters in the following ways:

- ELDs wait 300 ms before sending the Last Gasp. This allows non-ELDs time to transmit first.
- ELDs provide up to 16 seconds of power in which the NIC can send a Last Gasp. Non-ELD devices have up to 300 ms.
- ELDs bundle Last Gasps received from other devices exactly like battery backed devices, but only for the 16 seconds of their extended power.
- ELD bundling can be turned off, in which case the ELD sends its own and forwards individual Last Gasps.
- Exception polling is not performed on ELD devices.

eXtended mDNS (xmDNS)

A protocol that extends the mDNS specification to site-local scope to support multi-hop LANs that forward multicast packets, but do not provide unicast DNS service.

Extensible Authentication Protocol (EAP)

An authentication framework frequently used in wireless networks and Point-to-Point connections.

Extensible Markup Language (XML)

A standard, structured file format for exchanging business data over networks. Itron exports interval data to XML files, which can then be imported into back end business systems.

External AAD Tenant ID

In the context of Tenant Management on page 221, the Tenant ID of an Azure Active Directory instance within the Itron Identity Service.

external token

Refers to an external hardware device, such as a smart card.

extract, transform, and load (ETL)

A single process made up of three database functions used to migrate data between databases, form data marts, convert databases from one format to another, and so on. The ETL process involves extracting data from a source database, transforming the data to fit operational needs, and then loading the data into the target, usually another database or a data warehouse.

extranet

A private network that is controlled by a host organization that manages site administration and restricted content for the purpose of supporting business-to-business functions. The host organization allows access to their restricted content through a secure, web-based sign-in for authorized external users. Authorized external users might include vendors, partners, customers, and so on, who require access to the organization’s restricted information.

F

FA

See firmware alpha (FA) on page 94.

Failure Modes Effects and Analysis (FMEA)

A structured approach to discovering potential failures that may exist within the design of a product or process with a goal of applying a structured mitigation of risk.

FAN

See field area network (FAN) on page 92.

FAR

See field area router (FAR) on page 92.

Fast & Flexible Interconnect (FIX)

A program designed to help utilities and grid operations on page 105 address interconnection delays and infrastructure challenges associated with electric vehicle (EV) on page 78 fleet electrification. With FIX, transportation electrification goals are achieved more quickly and at lower costs than traditional methods of distribution load assessments and infrastructure upgrades.

Fast Fourier Transform (FFT)

A representative measure of the spectral energy present in a given radio frequency channel. FFT is a specific family of algorithms that provide a computationally efficient way to calculate Discrete Fourier Transform (DFT).

father

A description of a meter relationship. Similar to a relational database that uses the terms parent and child to describe the hierarchical relationship of the tables. The term father is used in establishing meter relationships.

faulted circuit indicator (FCI)

A device that, if tripped, indicates a failed utility condition such as a power failure.

fault location isolation and service restoration (FLISR)

In intelligent line switching (ILS), a standard and sometimes automated process for detecting faulted feeder segments and restoring service to those utility customers who have lost power.

FC

See feature complete (FC) on page 92.

FC300

See Field Collector 300 on page 93.

FCC

See Federal Communications Commission (FCC) on page 92.

FCI

See faulted circuit indicator (FCI) on page 91.

FCS

See Field Collection System (FCS) on page 93.

FDM

See Field Deployment Manager (FDM) on page 93.

FDM Tools

One of the Field Deployment Manager (FDM) on page 93 suite of products that enables field service employees to install and validate Itron AMR and AMI meters, ERTs and modules. Using Itron radio technologies, wired and wireless network connections, and mobile computing devices such as laptops and tablets, FDM Tools enables users to program, check, validate, and otherwise manage Itron endpoints in the field for use in mobile, Fixed Network, and distributed intelligence (DI) on page 70 environments.

feature complete (FC)

A product milestone that indicates the hardware is feature complete and all identified critical issues have a corrective action plan that does not substantially change production implementation and planned fixtures. Software and firmware are feature complete, and functional testing is complete, but all bug fixes, solution, regression, hardening, and/or field testing are not complete.

Federal Communications Commission (FCC)

The United States federal governing body that issues radio-frequency usage licenses. The FCC also certifies radio and other equipment against standards of operation and performance.

Federal Energy Regulatory Commission (FERC)

The regulatory agency in the United States Department of Energy (DOE) that has jurisdiction over interstate electricity sales and wholesale rates. FERC regulates the price, terms, and conditions of power sold in interstate commerce and all transmission services. FERC is the federal counterpart to state utility regulatory commissions.

Federal Information Processing Standards (FIPS)

Guidelines and specifications issued by the United States National Institute of Standards and Technology (NIST) for federal computer systems used by all non-military government agencies and government contractors. The standards cover data encryption and decryption; user identity authentication via digital signatures, and private key management.

federation, software federation, federated

A group of computing or network providers agreeing upon standards of operation in a collective fashion. The term may be used when describing the inter-operation of two distinct, formally disconnected, networks that may have different internal structures. In networking systems, to be federated means users can send messages from one network to the other. The term federated cloud refers to facilitating the interconnection of two or more geographically separate computing clouds.

FERC

See Federal Energy Regulatory Commission (FERC) on page 92.

FFT

See Fast Fourier Transform (FFT) on page 91.

FHSS

See frequency on page 96.

field area network (FAN)

A Smart Grid communications network infrastructure that combines neighborhood area network (NAN) and wide area network (WAN) components. A FAN can serve as a backhaul network for a variety of electric grid control devices, multi-tenant services (gas and water meters), and data exchanges to home area network (HAN) devices, all connected through a variety of wireless or wired line technologies.

field area router (FAR)

A network router that serves as a data collection point for meters participating in the Cisco RF Mesh. Several thousand meters may communicate to a single FAR. The FAR links the meters to the backhaul.

Field Collection System (FCS)

A data collection engine for handheld and mobile AMR systems. FCS collects data from multiple meter types and provides accurate, reliable meter data to meter data management and customer billing applications.

Field Collector 300

Part of the ChoiceConnect network on page 41 suite of products, the FC300 provides electricity, gas, and water utilities with an ultra-rugged and versatile handheld computer on page 106 for manual and automated meter reading (AMR) on page 24.

Field Deployment Manager (FDM)

An installation management solution for quickly installing and gathering data around new deployments of Itron OpenWay Riva network on page 165 and Gen5 ERTs. FDM enables field service employees to install and validate Itron AMR and AMI meters, ERTs and modules. Using Itron radio technologies and mobile computing devices such as laptops and tablets, FDM allows users to program, check, and validate Itron endpoints in the field for use in mobile or Fixed Network collection environments.

Field Installation and Support Handheld

A software tool that, in conjunction with a Field Service Unit (FSU) on page 93, runs on a portable handheld computer and is used to pair Gas IMUs with gas meters and configure the IMUs for operation over the Itron mesh network.

Field Pairing Service (FPS)

A service that allows customers to install or swap Itron NICs into meters in the field without any field tools. The back office manages the processes required to complete the provisioning with minimal user intervention.

field service representative (FSR)

A utility company technician or contractor who installs, programs, or maintains meters and endpoints on customers' premises. The term is also applied to technicians who audit the quality of other FSRs' work.

Field Service Unit (FSU)

A portable tool used by field technicians to communicate with devices equipped with a Smart Street Lighting on page 209 or NIC for configuration, troubleshooting, and other operations. It can also be used in a laboratory or meter shop to test and preconfigure devices before installation at customer sites. See also FSU Personalization on page 96.

Field Tools

An ERT installation and validation tool built for use on Android and iOS smartphones and tablets. Field Tools is a mobile app built on the Itron Mobile foundation of code to work with North American gas and water ERTs. Using an Itron Mobile Radio (IMR1/IMR2/IMR-FT), a field worker can easily Read, Check and Program 40G, 100G and 100W ERTs, with additional ERT and meter support in the future.

file snapshot

A password-encrypted XML file containing endpoint, meter, and associated settings for use by meter manufacturers in programming endpoints at the factory.

file transfer protocol (FTP)

A client-server protocol that lets a user on one computer transfer files to and from another computer over a Transmission Control Protocol/Internet Protocol (TCP/IP) network. The term may also refer to the client program that the user executes to transfer files.

filter, band-pass

A device that allows frequencies within a certain range and rejects frequencies beyond that range.

filter, list filter

A feature of some lists that enables you to limit the number of list items displayed at any one time to those that meet one or more conditions or criteria. Some filters consist of predefined lists of conditions from which you can select the one to apply. Others

incorporate filter editors that you can use to define your own set of conditions.

final product release (FPR)

A product milestone that indicates the product has successfully passed pilot requirements, reliability (per plan), and specific regulatory testing (per plan) to support general production shipments. See also limited availability (LA) on page 133.

FIPS

See Federal Information Processing Standards (FIPS) on page 92.

firewall

A gateway that limits access between networks in accordance with the local security policy.

firmware

A computer program embedded in a hardware device. See also image on page 113.

firmware alpha (FA)

A product milestone that indicates the feature set aligns with and software alpha (SA) on page 210 releases for early integration testing, if applicable.

firmware multicast group

An application group that is capable of containing meters from different configuration groups and device classes. It differs from conventional application groups in that it uses a single multicast address for each security code rather than different multicast addresses for different configurations and device classes. A firmware multicast group ignores device classes and configuration settings.

Firmware Upgrader (FWU)

An Itron application that manages the delivery, float, and activation of firmware over the Itron network, and provides image management, audits of upgrades, project management, and alerts related to the firmware update process. FWU can also perform audit jobs to make sure devices are running a specified firmware image and can automatically run an upgrade job based on audit results.

FISH

Internal name no longer associated with Field Installation and Support Handheld on page 93.

FIX

See Fast & Flexible Interconnect (FIX) on page 91.

Fixed Network 2.0

A utility meter data collection and management network consisting of:

- Endpoint-equipped electric, gas, or water meters that measure and record consumption by utility customers.
- Collection and transmission devices called cell control units (CCUs) and repeaters that retrieve meter data and upload it over the Internet to a host system.
- The host system, which receives the data and stores it in a database for billing and analysis purposes.

Fixed Network 100

A network system which relies on a combination of wired connection and data management software to collect and manage frequent consumption and usage meter data.

Fixed Network Administration Client (FNAC)

A component of Itron's ChoiceConnect Fixed Network that manages network devices, generates reports, and performs various services.

Fixed Network Application Server (FNAS)

A component of Itron's ChoiceConnect Fixed Network that is used to gather and process meter readings. Also called the head end or collection engine.

flash memory

A nonvolatile data storage technology that supports reprogramming in units of memory called blocks.

flat rate

A fixed billing rate for power consumers that does not vary during the day.

flexible connection

A connection to the power grid that allows a customer to choose to pay to increase the capacity on page 35 of an overloaded grid element or save by reducing generation or capacity.

FLISR

See fault location isolation and service restoration (FLISR) on page 91.

Flodis

A high-end, single jet turbine, extra dry water meter for residential applications, designed mainly for the billing market.

Flodis C&I

A high-end, single jet turbine, extra dry water meter for commercial & industrial (C&I) on page 46 applications, designed mainly for the billing market.

Flostar M

A water meter for commercial & industrial (C&I) on page 46 billing applications with one of the largest measuring ranges, enabled by single jet technology.

Flostar S

A single jet water meter available in DN65 (2.5) to DN150 (6) sizes. Its low flow accuracy combined with significant peak flow capacity ensure complete and efficient measurement across a wide range of flow rates and measurement applications.

flow straightener

A device designed to avoid any effect that flow disturbances generate on metering.

FMEA

See Failure Modes Effects and Analysis (FMEA) on page 91.

FNAC

See Fixed Network Administration Client (FNAC) on page 95.

FNAS

See Fixed Network Application Server (FNAS) on page 95.

forecast

A predicted or anticipated demand for energy. electricity or gas. Forecasting is the basis on which power purchases are made. A forecast may include peak demand, energy, reactive power, or demand profile. A forecast may be made for total system demand, transmission loading, substation/feeder loading, individual customer demand, or appliance demand. Short-term

forecasts (minutes, hours, days) are used for system operation purposes or real time pricing. Long-term forecasting (years) is for power generation and grid planning purposes.

Forecast Manager

A solution that brings together sales forecasting, data management, and reporting into a single integrated application. Forecast Manager automates the input of key data for forecasting and analyzing sales trends linking directly with MetrixND on page 145 forecast and weather impact models.

FPR

See final product release (FPR) on page 94.

FPS

See Field Pairing Service (FPS) on page 93.

FQDN

See fully qualified domain name (FQDN) on page 97.

frequency

Electromagnetic waves used to carry information over radio. For example, the selected radio station in your car is a frequency, which brings in the information you want.

frequency-hopping spread spectrum (FHSS)

Originally developed during the Second World War to avoid jamming, FHSS is a method of sending radio signals over several frequency channels. Unlike direct sequence spread spectrum (DSSS) on page 69, FHSS switches between channels in a pattern known to both sender and receiver, thereby avoiding interference in any one channel.

Fresnel zone

The elliptically shaped area formed by radio frequency waves between a transmitter and a receiver.

from-host file

A file produced by a utility company's customer information system (CIS) containing work order information to be passed to a workforce management system.

fronthaul

Contains utility-specific customer information and billing systems that are integrated into the Itron application. The fronthaul link provides the connection between the utility data center and Itron applications.

FSU

See Field Service Unit (FSU) on page 93.

FSU Certificate Authority (FSU CA)

A certificate authority that signs and issues Field Service Unit (FSU) on page 93 smart card certificates.

FSU Personalization

By personalizing a Field Service Unit (FSU) on page 93, the administrator adds security credentials and initial credits to the FSU that identify it uniquely as part of the utility's Itron system. This authorizes the FSU to connect to the mesh network of the utility. The private key permits the creation of a secure maintenance link that allows the configured credentials to execute commands for a specific duration.

FSU-Secure Access Manager (FSU-SAM)

A software component used in conjunction with an Field Service Unit (FSU) on page 93 that protects an FSU from misuse by allowing an administrator to limit the number of secure maintenance link on page 202s an FSU can issue within a specified

amount of time.

FTP

See file transfer protocol (FTP) on page 93.

full security

A security level employed by ChoiceConnect network on page 41 endpoints or meters that support enhanced security, such as Itron's 100 series endpoints or the CENTRON Bridge Meter. In full security, secure commands and reading keys from the Itron Security Manager (ISM) on page 125 server are required for performing all functions involving the reading of endpoint data or the modification of endpoint or meter settings.

fully qualified domain name (FQDN)

Sometimes referred to as an absolute domain name. A domain name that specifies its exact location in the tree hierarchy of the DNP3. An FQDN is specified with a trailing dot, for example: somehost.example.com.

fully secured endpoint

An Itron ChoiceConnect network on page 41 endpoint or meter that has the Itron Security Manager (ISM) on page 125 level set to full security. An endpoint or meter set to full security requires secure commands and reading keys from the ISM server for performing all functions.

function set

A logical grouping of resources that cooperate to implement 2030.5 features.

FWU

See Firmware Upgrader (FWU) on page 94.

G

G5RM

See Gen5 Riva Meter on page 101.

Gallus sV G

A diaphragm gas meter for Itron's gas smart meter platform. Has a standardized digital communication interface between the main board and the communication board to ensure safe infrastructure investments through future upgradeability.

Ganz

A Hungarian electricity meter.

gap

A hiatus in the usage data collected from a meter.

gap fill interrogation (GFI)

A set of multiple services that work together to identify gaps in reading data that can occur during the reading import process. GFI attempts to fill those gaps that meet size eligibility by requesting the missing readings from the meter through the collection engine web service interface.

gas day

A specific time of day when a gas meter begins its 24-hour day. For many utilities, the gas day is 9:00 AM, but this is not always the case.

gas day take (GDT)

The time each day when a gas ERT module reads and records demand, time-of-use (TOU), and consumption interval data from the gas meter. The GDT meter reading is closest to but not after the GDT.

Gas Distribution Safety

A solution that visualizes and manages new alarms and functionality available from Itron's Intelis Gas Meter on page 116 via the advanced metering infrastructure (AMI) on page 12 network. These alarms include high-flow, high-temperature, high-pressure, low-pressure, air-in-pipe, internal shutoff valve actuation, and pressure tamper.

Gas IMU

A two-way radio with metrology capabilities that can be installed on diaphragm, rotary, and turbine gas meters. The Gas IMU allows remote meter reading, and provides asynchronous alerts for leaks, meter tampering, and other critical events, and it can be remotely configured. There are multiple generations of the Gas IMU, including the Gas IMU 200, 300, and 300A.

Gas IMU 200

See Gas IMU on page 98.

Gas IMU 300

See Gas IMU on page 98.

Gas IMU 300A

See Gas IMU on page 98.

Gas IMU 500T

A communications module that connects electronic volume correctors (EVCs) to a utility network. It provides a solution for collecting temperature and pressure telemetry data, events and alarms, corrected and uncorrected consumption, and interval

data reads from EVCs and then backhauling that data to the head end system. Once the data arrives at the head end, it is made available for presentation in the user interface and for export to other systems, such as an MDMS or analytics package.

Gas IMU Configurator

A software tool that, in conjunction with a Field Service Unit (FSU) on page 93, allows users to configure and test Itron Gas IMUs. Supported tasks allow joining and unjoining Gas IMUs to gas meters, validating meter reading values with a check read, and generating configuration reports for specified Gas IMUs. After executing tasks, the Gas IMU Configurator produces results files which describe in detail what was loaded by the Gas IMU Configurator and the processing results. The primary use case for this tool is provisioning Gas IMUs in a utility's gas meter shop or in a gas meter OEM facility. See also join on page 127 and unjoin on page 229.

Gas Interface Management Unit (IMU)

A two-way radio with an integrated gas meter register that can be installed on diaphragm, rotary, and turbine gas meters. The IMU allows remote meter reading, and provides asynchronous alerts for leaks, meter tampering, and other critical events, and it can be remotely configured.

gateway

A device that handles communications between the utility and the customer's devices such as thermostats, water heaters, and pool pumps. Gateways offer two-way communications, and often provide the customer with the ability to override the utility’s load reduction control signal. Gateways overcome the limitations of one-way load control by sending confirmation signals back to the utility. Web-based software allows customers to see the status and effects of load control actions.

Gateway

A common interface to the Itron mesh network on page 142 and performs the following key functions within the Control Platform architecture:

- Weighted prioritization of multiple classes of traffic destined for the mesh network.
- Adaptive bandwidth management to prevent overutilization of the mesh network infrastructure and to minimize timeout.
- CoAP (Constrained Application Protocol) proxy services to facilitate communications between client applications and Milli 5-based devices on the mesh network.

By metering traffic and queuing traffic based on configurable priorities, Gateway provides essential Quality of Service (QoS) on page 186 for client applications while at the same time regulating traffic to each AP. An Adaptive Rate Limiter and Packets in Flight (PIF) Limiter automatically adjusts the amount of traffic sent to each AP based on traffic indicators such as the round-trip time and the number of successful packets versus failed packets.

Gateway additionally provides insightful network performance statistics on the application's dashboard. The dashboard displays several charts, each of which presents a different set of statistical data. This data provides visibility into network activity and performance such as the number of packets in flight (PIF), the number of packets queued for transmission, device availability, and the number of timeouts.

Gaussian frequency shift keying

A type of frequency shift keying modulation that utilizes a Gaussian filter to smooth positive / negative frequency deviations.

GDP

See global development process (GDP) on page 103.

GDT

See gas day take (GDT) on page 98.

gear shifting

An innovation within the Gen4 technology on page 100 that lets a 300 kbps-capable device not only adjust data rates for backward compatibility but also to dynamically optimize between performance and range. With devices supported by Gen5 technology on page 101, both modulation and speed changes can be made through gear shifting. Earlier Gen 2 devices were limited to 100kbps.

GECKO

Internal name no longer associated with Gas Interface Management Unit (IMU) on page 99.

GEM

See Grid Edge Manager (GEM) on page 105.

Gen4 technology

The networking technology integrated into Itron devices that provides support for new transports, Micromesh Technology on page 146, faster data rates, gear shifting on page 100, and increased memory. For coverage in any type of territory, the modular architecture of Gen4 enables customers to add support for cellular/mobile transport along with RF mesh and support for other transports in the future. The increased data rates support up to 300 kbps performance with lower latency, and the ability to gear-shift to lower data rates supports not only backward compatibility with earlier generations of Itron devices, but also dynamic optimization between performance and range. Increased memory enables Gen4 to support the broadening range of new device types coming onto the smart grid. Gen4 technology provides support for Gen4 versions of the Access Point (AP) on page 8, Bridge on page 31, MicroAP (uAP) Module on page 146, and Relay on page 192s.

Gen5 500G ERT Module

A gas module which provides gas meter reading, high flow alarms, interval data and remote firmware download to improve safety and gas operations. It is designed to be read under I Itron Gen5 industrial IoT networks, or by legacy ChoiceConnect handheld or mobile readers.

Gen5 500W ERT Module

A water module featuring a compact design and industry-leading battery life. It is designed to deliver advanced functionality on Itron's Gen5 industrial IoT network. The module can also be read under legacy meter reading applications, enabling customer flexibility and choice.

Gen5 550G ERT Module

A gas module which provides gas meter reading, high flow alarms, interval data and remote firmware download to improve safety and gas operations. It is designed to be read under I Itron Gen5 industrial IoT networks, or by legacy ChoiceConnect handheld or mobile readers.

Gen5 A-Series Electricity Meters

A smart multi-functional static meter that allows for remote connect and disconnect of electrical services.

Gen5 CENTRON II Meter

A solid-state single-phase residential electricity meter which is compatible with the Itron Gen5 industrial IoT (IIoT) network.

Gen5 CENTRON Polyphase III Meter

A solid-state polyphase electricity meter which is compatible with the Gen5 network.

Gen5 Communications Hub

Allows access to the Gen5 communication solution that provides scalable high performance, reliable, secure DNP3 transport and inter operable head end software and advanced Radio Frequency (RF) Mesh technology. Additionally permits using the UtilityIQ software suite that acts as the centralized hub between the metering system and utility processes via the modem.

Gen5-EGM

See Gen5 Routing Node ERT Gateway Mesh (Gen5-EGM) on page 101.

Gen5 Riva Electricity OEM Configurator

A software suite designed for provisioning communication modules, electric meter models, and Itron Load Control Switch (LCS) devices. Formerly known as Manufacturing Utility Test Tool (MUTT).

Gen5 Riva IEC Singlephase Electricity Meter

An advanced metering infrastructure (AMI) on page 12 meter that combines robust electric smart metering functionality with a more powerful version of the innovative distributed intelligence (DI) on page 70 edge computing capability that can run on Itron's Gen5 IoT (IIoT) network.

Gen5 Riva Meter

An electricity meter that combines robust smart metering functionality with high-performance communications capabilities and a distributed intelligence platform to deliver differentiating capabilities and new approaches to meter-to-grid applications using Gen5 Riva communication solution. Designed to ANSI standards for U.S. markets.

Gen5 Riva Polyphase Electricity Meter

An electricity meter that combines robust smart metering functionality with high-performance communications capabilities and a distributed intelligence platform to deliver differentiating capabilities and new approaches to meter-to-grid applications using Gen5 Riva communication solution. Designed to ANSI standards for U.S. markets.

Gen5 Riva Singlephase Electricity Meter

An electricity meter that combines robust smart metering functionality with high-performance communications capabilities and a distributed intelligence platform to deliver differentiating capabilities and new approaches to meter-to-grid applications using Gen5 Riva communication solution. Designed to ANSI standards for U.S. markets.

Gen5 Routing Node ERT Gateway Mesh (Gen5-EGM)

A device that operates as an additional node to build density or extend the perimeter of an existing mesh within the GenX network. A Gen5 ERT Gateway Mesh improves read rates and connectivity in geographic areas where network coverage is not optimal. The Gen5 ERT Gateway Mesh receives data from devices within the network. The Gen5 ERT Gateway Mesh supports both RF and PLC links within a GenX mesh network. Also known as Gen5-EGM.

Gen5 SL7000

A smart meter that can process, analyze, communicate, and react to grid conditions and business requirements in real-time. The meter, when connected to the optional Gen5 Communications Hub on page 100, is capable of using the Gen5 communications solution, that provides scalable high performance, reliable, secure DNP3 transport and inter operable head end software and advanced Radio Frequency (RF) Mesh technology. This product also permits using the UtilityIQ software on page 231 suite, that acts as the centralized hub between the metering system and utility processes via the modem. Designed to IEC standards for non-U.S. markets.

Gen5 technology

A networking technology that provides the breakthrough capabilities to enable more value to be unlocked from critical infrastructure across new battery-powered devices, new applications powered by distributed intelligence, and enhanced performance supporting mission-critical processes—all while being fully backwards compatible with previous generations. Gen5 technology provides support for Gen5 versions of the Access Point (AP) on page 8, Bridge on page 31, MicroAP (uAP) Module on page 146, Relay on page 192s, Milli on page 146, network interface card (NIC) on page 157, SocketAP 5 on page 210, and more, which, in turn, support the high data capacity of the network with data rates up to 2.4 Mbps.

General Data Protection Regulation (GDPR)

A regulation in EU law on data protection and privacy in the European Union and the European Economic Area. It also addresses the transfer of personal data outside the EU and EEA areas.

general packet radio service (GPRS)

A packet-based wireless communication service that provides continuous connection to the Internet over second generation (2G) and third generation (3G) networks. GPRS transmits data in packets and does not support voice communications. Multiple devices are able to share the same connection channel to transmit data packets upstream and downstream within a network.

generation capacity

The maximum output (MW) that generating equipment can supply to a system load.

Generic Meter Interface (GMI)

A software component of UtilOS firmware on page 231. GMI is the metering interface to electricity meters operating in energy-only mode and IMUs. GMI provides meter reads and data logs and event logs of the meter data stored on the Itron NIC. See also Smart Street Lighting on page 209.

Generic Meter Reader (GMR)

See Global Meter Reader (GMR) on page 103.

GenX NIC

A network interface card (NIC) on page 157 that connects the integrator partner's meter/sensor device to the Itron GenX mesh network. The NIC is responsible for communication tunneling, acting as a Device Language Message Specification (DLMS) on page 67 client, storing DLMS keys, secure communication with network through Network Manager on page 157, and support of RF on page 194 mesh communication.

GenX technology

A networking technology that refers to all generations of the core network technology. The Gen5 network platform specifically refers to the current generation of the network platform technology. For example, customers that have multiple generations of network devices deployed are GenX customers, while a new customer would be referred to as a Gen5 customer.

geocoding

A process of associating geographic coordinates (latitude and longitude) from other geographic data, such as street addresses or postal codes.

geoendpoint

An ERT module on page 87 that communicates with the Fixed Network it belongs to through an intermediary ERT module called its georelay.

geoendpoint candidate

A device with less-than-optimal read quality that has not been programmed for geomode.

geographic information system (GIS)

A system of hardware, software, and data designed to capture, store, manipulate, analyze, manage, and display geographic information in the form of maps, globes, reports, and charts.

geomode

A communication mode in which one Encoder/Receiver/Transmitter (ERT) module on page 81, the georelay, passes messages back and forth between another ERT module, the geoendpoint, and the Fixed Network to which the modules belong. By acting as an intermediary, the georelay enables the geoendpoint to communicate with the network, which environmental conditions would otherwise prevent it from doing.

georelay

An Encoder/Receiver/Transmitter (ERT) module on page 81 that functions as an intermediary for another ERT module (the geoendpoint) that cannot communicate directly with the Fixed Network the two modules belong to. The georelay passes messages back and forth between the geoendpoint and the network.

georelay candidate

A device with good read quality that may serve as an intermediary Encoder/Receiver/Transmitter (ERT) module on page 81 to assist a geoendpoint in communicating with the Fixed Network it belongs to.

GET VPN

See Group Encrypted Transport VPN (GET VPN) on page 105.

GFI

See gap fill interrogation (GFI) on page 98.

GFSK

See Gaussian frequency shift keying on page 99.

GHz

See gigahertz (GHz) on page 103.

gigahertz (GHz)

A measure of frequency, one billion cycles per second, or one billion hertz (Hz). Gigahertz is most commonly used to measure computer processing speed.

gigawatt (GW)

A unit of power equal to 1 billion watts, 1 million kilowatts, or 1,000 megawatts.

gigawatt hours (GWh)

A unit or measure of electricity supply or consumption equal to one billion watt hours (Wh).

GIS

See geographic information system (GIS) on page 102.

global development process (GDP)

Deprecated term. The GDP process was replaced with the new development process (NDP).

globally unique identifier (GUID)

An alphanumeric string of characters, usually 128-bits long, that is used in software applications to provide a unique identifier for files, names, resources, unique primary keys in databases, and so on.

Global Managed Services (GMS)

Itron's Global Managed Services (GMS) team provides expert support and administration where Itron manages and administers software and infrastructure on behalf of its customers. Our GMS team ensures systems are available to customers 24 hours a day via different delivery models based on customer needs.

Global Meter Reader (GMR)

A software component that—along with database (DB) on page 60 and Middle Tier (MT) on page 146—is part of Advanced Metering Manager (AMM) application on page 13 and is responsible for managing network related jobs including meter reading, ping, and meter programs. On startup, the GMR reads meter information from the master database and then manages all of the

meter related jobs through NICNAC commands that interrogate and configure the NICs. See also Generic Meter Reader (GMR) on page 102.

Global Positioning System (GPS)

A satellite-based system that provides positioning and navigation information. By triangulation of signals from three of the satellites, a receiving unit can pinpoint its current location anywhere on earth to within a few meters. Use of at least three satellites is necessary to calculate a two-dimensional position (latitude and longitude) and track movement. Four or more satellites are needed to determine a three-dimensional position (latitude, longitude, and altitude). GPS uses the World Geodetic System (WGS 84) as its reference coordinate system.

Global R&D Metrics (GRDM)

An internal Itron toolset that provides dashboards and reports of various project performance metrics for executives. GRDM is integrated with Project Web App (PWA) and project sites to govern and manage the R&D project development documentation approval process and lifecycle stages.

Global System for Mobile Communications (GSM)

Originally Groupe Spécial Mobile. A standard set developed by the European Telecommunications Standards Institute to describe protocols for second generation digital cellular networks used by mobile phones. Developed in the 1980s, GSM was first deployed in seven European countries in 1992. Operating in the 900 MHz and 1.8 GHz bands in Europe and the 1.9 GHz PCS band in the United States, GSM defines the entire cellular system, not just the air interface.

GMI

See Generic Meter Interface (GMI) on page 102.

GMR

See Generic Meter Reader (GMR) on page 102.

See Global Meter Reader (GMR) on page 103.

GMS

See Global Managed Services (GMS) on page 103.

good interval

An interval that is used to replace missing or bad intervals during the reading validation and estimation (VE) process. Good intervals cannot have an estimated (EST) or power outage (PO) status, cannot have been collected on a utility-defined holiday, and generally represent the same time frame as the bad or missing interval they replace.

GPRS

See general packet radio service (GPRS) on page 102.

GPS

See Global Positioning System (GPS) on page 104.

GRDM

See Global R&D Metrics (GRDM) on page 104.

GRDM Project Names

Naming conventions applied to GRDM projects are categorized by the following systems and business lines.

GreenBe™ Customer Engagement Platform

GreenBe is an Australian technology company that delivers platforms for government and utilities that help authorities nudge, engage, and propel hard to reach customer behaviors. Their customer engagement platform delivers digital transformation and

powerful engagement across the energy, water, and government sectors.

Grid Edge Essentials

A solution that enables smart grid transformation in the public power sector and provides all the necessary components to realize operational value now and form the foundation for future services and use cases.

Grid Edge Intelligence

Enabled by distributed intelligence (DI) on page 70 technology, Itron's Grid Edge Intelligence portfolio empowers utilities with greater visibility and control at the edge by connecting, detecting, operating, and controlling devices to deliver an efficient, optimized, and smarter grid for communities.

Grid Edge Manager (GEM)

A real-time aggregation and display engine for advanced metering infrastructure (AMI) on page 12 data, Distributed Energy Resource (DER) on page 70 data, and forecasts and dynamic operating envelopes aggregated from the edge (meters and DERs) up to transformers, feeders, and substations.

grid operations

Outcomes that support data intelligence through a combination of software and services that help users gain valuable insight into your operations, maximize asset life, enhance efficiency, and improve customer satisfaction.

grid operator

The entity that oversees the delivery of electricity over the grid to the customer, while assuring consistently high levels of reliability and public and worker safety. The grid operator potentially could be independent of the utilities and suppliers.

GridScape Configuration Server

An application used for configuring Access Points (APs) and MicroAPs in Itron networks. Unlike the GridScape application, the GridScape Configuration Server does not collect statistical data.

GridScape Network Manager

A web-based network management application that runs from the utility back-office for remote, secure configuration and management of the Itron Distribution Automation (DA) on page 71 communication networks.

gross generation

The total amount of electric energy produced by the generating units at a generating station or stations, measured at the generator terminals.

Group Encrypted Transport VPN (GET VPN)

A Cisco®-proprietary virtual private network (VPN) that is designed to simplify VPN management and provisioning.

GSM

See Global System for Mobile Communications (GSM) on page 104.

GUID

See globally unique identifier (GUID) on page 103.

GW

See gigawatt (GW) on page 103.

GWh

See gigawatt hours (GWh) on page 103.

H

HA

See hardware alpha (HA) on page 107.

See high availability (HA) on page 108.

Haiku

An Itron service plan that allows delivery of 5000 messages x 16 bytes per month for free to Itron Internet of Things (IoT) customers. The plan is intended for customers with relatively small data requirements.

HAN

See home area network (HAN) on page 109.

HAN Communications Manager (HCM)

An Itron application that enables utility companies to manage home area network (HAN) on page 109 devices (including Zigbee on page 242 and Direct-to-Grid on page 69 devices), utility company rate plans, and to create and manage demand response (DR) on page 64 programs.

HAN devices

Devices that are used in the home or small and medium business (SMB) on page 208 to help customers control and monitor their electricity use and, in some cases, to respond to demand response (DR) on page 64price signals on page 181.

Examples of HAN devices are the programmable communicating thermostat (PCT) on page 182, load control switch (LCS) on page 135 and similar devices, and in-premises display on page 115.

handheld (HH)

See handheld device on page 106.

hand-held file (HHF) format

A file format consisting of multiple 256-byte records that is produced by third-party and Itron software applications running on hand-held data collectors. The format allows data (such as register data, and meter event or history log information) from multiple devices to be stored in the same file.

handheld computer

See handheld device on page 106.

handheld device

A portable data collection device with labeled keys and a display screen used by utility employees (for example, field service representatives) to collect meter readings and related meter data. Itron's handheld computers include the FC200 and FC300 and the older FS/2, FS3, Genesis Portable Computer (GPC), TRx (Japan), and G5. The preferred term when using handheld is handheld device. Handheld is sometimes abbreviated as HH for space purposes.

handheld key

A shared elliptic curve cryptography key that can be used to authenticate commands from handheld computers.

HAN module

A radio-based module that enables home devices (like thermostats, information displays, and smart appliances) to communicate with the OpenWay Collection Engine through a Zigbee on page 242-enhanced meter.

HAN Test Kit

An Itron application that, in conjunction with the Itron Field Service Unit (FSU) on page 93, enables home area network (HAN) device vendors to test their HAN devices with Itron equipment and the Zigbee on page 242 Smart Energy Profile (SEP) implementation to confirm correct interoperation. The tests go beyond what the base ZigBee SEP standards specify, as ZigBee allows room for interpretation in a number of areas.

hardware alpha (HA)

A product milestone that indicates the early sample of a model built to test a design or process is available. May or may not capture the full functionality of the intended design. Testing to support the next build is completed.

hardware security module (HSM)

An appliance that stores sensitive credentials or private keys in hardware-protected memory. An HSM is FIPS-140-2 level 3-compliant, with provisions for tamper evidence and tamper prevention. It also provides hardware-based acceleration for cryptographic operations such as signing, and encryption. It is used with Itron products, such as Critical Operations Protector for Advanced Metering Infrastructure (COP for AMI) on page 54.

harmonic distortion

An effect that causes the true sinewave of alternating voltages and currents to be distorted.

hash-based message authentication code (HMAC)

Calculations to construct a message authentication code (MAC) that involve cryptographic hash functions in combination with a secret key. HMACs can be used to verify the data integrity and authenticity of messages.

hash function

An algorithm that turns a variable-sized amount of text into a fixed-sized output (hash value). Hash functions are used in creating digital signatures, hash tables, and short text condensations for analysis purposes. Also called cryptographic hash function.

hash table

A lookup table that is designed to efficiently store non-contiguous keys. Hash tables are created by using an algorithm to hash the keys into hash buckets. Each bucket is a list of key value pairs. When an item is looked up, its key is hashed to find the appropriate bucket. Then, the bucket is searched for the right key-value pair.

hash value

A block of data represented as a string of bits. See also program seal on page 182.

HCM

See HAN Communications Manager (HCM) on page 106.

HCMWSRoute

An Itron component that allows HAN Communications Manager (HCM) on page 106 users to route web service calls through Mule. It provides the public API and serves the WSDL and XSD files needed by integration tooling and routes public and legacy API calls. It is required by HCM.

HDD

See heating degree day (HDD) on page 108.

HDLC

See High-Level Data Link Control (HDLC) on page 109.

HDL file

See host download file (HDL) on page 110.

head end

The starting point in a communications system.

head end router (HER)

A router that directs communications to and from multiple field area routers (FARs).

The Cisco®Aggregation Services Router (ASR) is the HER model used in OpenWay systems.

head end system (HES)

A software application that receives the stream of meter data brought back to the utility by an AMR/AMI system. Head end systems may perform a limited amount of data validation before either making the data available for other systems to request or before pushing the data out to other systems. Head end systems may also perform a limited set of data management functions for such activities as route management, outage detection, and on-demand reads.

heating degree day (HDD)

A unit of measure used to relate a day's temperature to the energy demands to heat buildings. Calculate heating degree days by subtracting a day's average temperature from 65. For example, if the day's high is 60°F and the day's low is 40°F, the day's average is 50°F. Subtract 50 from 65 to get 15 heating degree days.

HE Bridge

See High Efficiency Bridge on page 109.

HEMS

See Home Energy Management System (HEMS) on page 109.

HER

See head end router (HER) on page 108.

HERMES SoftLab (HSL)

An international company that provides IT solutions and software engineering services to high-tech vendors, telecommunication service providers, financial institutions, and the public sector.

hertz (Hz)

A measure of frequency, one cycle per second. The unit may be applied to any periodic event—for example, a clock might be said to tick at 1 Hz, or a human heart might be said to beat at 1.2 Hz.

HES

See head end system (HES) on page 108.

HH

See handheld device on page 106.

HHF

See hand-held file (HHF) format on page 106.

HID

See high-intensity discharge (HID) on page 109.

high availability (HA)

A system design approach and associated service implementation that ensures that a prearranged level of operational performance will be met during a contractual measurement period.

High Efficiency Bridge

A waterproof DA communication platform that supports connectivity to underground endpoint devices. This device can withstand flood water, oil, and extreme weather environments. It is standard to use the HE Bridge to connect to subterraneous network protectors through both RS-485 or Ethernet interface.

high gain fiberglass (stick antenna)

An omnidirectional stick antenna designed for 800 MHz and 900 MHz ISM bands. It is suited for multipoint, non line of sight (NLOS), and mobile applications where high gain and wide coverage is required.

high-intensity discharge (HID)

A type of lighting technology commonly used for streetlights where light is produced by an electric arc generated between tungsten electrodes that are contained within a fused alumina or quartz tube.

High-Level Data Link Control (HDLC)

A general-purpose protocol that operates at the data link layer of the Open Systems Interconnection (OSI) on page 163 reference model. The protocol uses the services of a physical layer and provides either a best effort or reliable communications path between the transmitter and receiver.

high-pressure sodium (HPS)

A common type of streetlight technology that predates light-emitting diode (LED) on page 133 development for streetlights.

High Speed (Downlink/Uplink) Packet Access (HSPA/HSDPA/HSUPA)

A combination of two mobile telephony protocols, High Speed Downlink Packet Access (HSDPA) and High Speed Uplink Packet Access (HSUPA), which extend and improve the performance of existing Wideband Code Division Multiple Access (WCDMA) protocols. HSPA supports increased peak data rates of up to 14 Mbit/s in the downlink and 5.8 Mbit/s in the uplink. It also reduces latency and provides up to five times more system capacity in the downlink and up to twice as much system capacity in the uplink, reducing the production cost per bit compared to original WCDMA protocols.

high-strength KeySafe

A version of KeySafe on page 128 that enables key-wrapping without degrading client application performance.

HiveMQPlugins

See MQTT Broker on page 149.

HiveMQSSNCfg

See MQTT Broker on page 149.

HMAC

See hash-based message authentication code (HMAC) on page 107.

hockey puck antenna

See low-profile disc antenna (hockey puck) on page 136.

home area network (HAN)

A data communications system contained within the home or small and medium business (SMB) on page 208.

Home Energy Management System (HEMS)

A digital system that monitors and controls energy on page 83 in a household.

Honeywell CN80

A rugged Android™-based handheld device compatible with Temetra on page 221. These devices feature a tactile numerical keyboard to enter visually keyed reads with ease. They also support scanning for ERT Module barcodes.

hop

A point along a network route between the Access Point (AP) on page 8 and the meter. Though not itself a device, a hop is always associated with a device, usually a Relay on page 192 or meter acting as a Relay. When data is transmitted across a network, the packet hops from device to device. See also link on page 133 and route on page 196.

hopping sequence

The selection by a node of a random start channel on page 41 and seed to reduce the amount of interference with other nodes within range.

hop (RFLAN)

The movement of a data packet in communications between two adjacent meters or between a meter and the cell relay in an RFLAN cell.

host download file (HDL)

A proprietary file format (default file name: download.HDL) developed by Itron to download meter reading requests from a utility company's customer information system (CIS) into Itron's MV-RS meter data management system. MV-RS, in turn, sends the information to handheld and/or mobile meter data collection devices. HDL files contain cycle, route, customer, meter, and reading data. Itron's Field Collection System (FCS) employs the HDL file format to import data from utility customer information systems. Itron's Field Deployment Manager (FDM) downloads route information to HDL files for meter read validation by FCS and MV-RS.

hosting location

The physical location of an Access Point or Relay.

host upload file (HUL)

A proprietary file format (default file name: upload.HUL) developed by Itron to upload meter reading data collected by Itron's MV-RS meter data management system to a utility company's customer information system (CIS). Itron's Field Collection System (FCS) also employs the HUL file format to export FCS data to customer information systems.

hotfix

A single, cumulative package of one or more files used to correct specific issues and problems in a previous release of a software product.

HPS

See high-pressure sodium (HPS) on page 109.

HSL

See HERMES SoftLab (HSL) on page 108.

HSM

See hardware security module (HSM) on page 107.

HSPA/HSDPA/HSUPA

See High Speed (Downlink/Uplink) Packet Access (HSPA/HSDPA/HSUPA) on page 109.

HTTP

See Hypertext Transfer Protocol (HTTP) on page 111.

HUL

See host download file (HDL) on page 110.

hybrid client

A computer or program that requests data, files, or services or accesses shared network resources from a server computer or program. Of the client classes, thin client, hybrid, client, and rich client, a hybrid client is a mixture of the thin and rich clients. A hybrid client executes data processing locally, like a rich client, but relies upon the server for data storage, like a thin client.

Hypertext Transfer Protocol (HTTP)

A networking protocol or set of rules for transferring files (text, graphic images, sound, video, and other multimedia files) in distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the web.

Hz

See hertz (Hz) on page 108.

I

I-250

A residential gas meter. This product has been discontinued.

IaaS

See Infrastructure as a Service (IaaS) on page 115.

IBP

See Infrastructure Battery Pack (IBP) on page 115.

IC

See integration complete (IC) on page 116.

ICANN

See Internet Corporation for Assigned Names and Numbers (ICANN) on page 119.

ICC ID

See integrated circuit card identifier (ICC ID) on page 116.

ICR

See inbound communications router (ICR) on page 114.

ICS

See initial collector setup (ICS) on page 115.

ICSP

See Itron Cloud Services Platform (ICSP) on page 123.

IDCM

See Itron Device Configuration Manager (IDCM) on page 124.

IDD

See interface design document (IDD) on page 118.

identification

The process of verifying the identity of a user, process, or device, usually as a prerequisite for granting access to resources in an information technology (IT) system.

IDM

- See interval data message (IDM) on page 120.
- See Import Data Manager (IDM) on page 114.

IDR

See interval data recorder (IDR) on page 121.

IDS

See intrusion detection system (IDS) on page 121.

IEC

See International Electrotechnical Commission (IEC) on page 118.

IED

See intelligent electronic device (IED) on page 117.

IEE

- See Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124.
- See Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124.

IEE common readings XML file (CRF) format

An extensible markup language (XML) file format developed by Itron to enable software applications with different native file formats to exchange meter route and energy use data. Originally developed for Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124, CRF is used by Field Deployment Manager (FDM) on page 93, Field Collection System (FCS) on page 93, and MV-RS on page 153.

IEEE

See Institute of Electrical and Electronic Engineers (IEEE) on page 116.

IETF

See Internet Engineering Task Force (IETF) on page 119.

IFA

See Internal First Article (IFA) on page 118.

IHC

See Itron Hybrid Connector (IHC) on page 124.

IHD

See in-premises display on page 115.

IHP

See Itron Security Manager (ISM) on page 125.

IIS

See Internet Information Services (IIS) on page 119.

IKE

See Internet Key Exchange (IKE) on page 119.

ILID

- Logical Identifier
- A parameter that has been enumerated

IMA

- See interpreter between meter and application (IMA) on page 120.
- See interrogation meter adapter (IMA) manager on page 120.

image

Firmware or software programming code that can be copied to multiple programmable chips in one or more devices, such as Itron NICs or electricity meters. See also code float on page 45.

IMM

See Itron Meter Manager (IMM) on page 125.

impedance

In alternating current (AC) circuits, the measure of the opposition that an electrical circuit presents to the passage of a current when a voltage is applied. Impedance is represented by the letter "Z" and is measured in ohms.

Import Data Manager (IDM)

Import Data Manager (IDM) controls how interval and register data is managed in Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124. All meter data that is sent upstream to IEE MDM is received by IDM and is routed based on the defined configuration of the data routing program.

IMR

See Itron Mobile Radio (IMR) on page 125.

IMS

See Integration Management Service (IMS) on page 116.

IMU

See Gas Interface Management Unit (IMU) on page 99.

IMU Accuracy Tester

Hardware and software solution that, in conjunction with a Field Service Unit (FSU) on page 93 and to log test results. Testing covers counting accuracy, radio frequency links, and event logging.

inactive account

A utility customer account that is no longer in use.

in-band interferers

Transmitters in the same ISM band on page 122 that are not part of Itron's transmitters.

inbound communications router (ICR)

An OpenWay Collection Engine software service that receives information from cell relays or other internet protocol (IP)-connected devices in an OpenWay network. This service pieces message segments together, passes the messages through the security layer to handle inbound traffic decryption, and places the messages onto the Collection Engine's message bus, targeted for the meter communication host (MCH) assigned to the end device that generated the traffic.

inclining block rate

An electricity billing rate that increases across tiers with the customer's energy use.

independent power producer (IPP)

A private entity or entrepreneur who develops, owns, or operates electric power plants fueled by alternative energy sources such as small hydro, wind facilities, cogeneration, or waste-to-energy facilities.

independent system operator (ISO)

In a deregulated marketplace, an independent, federally regulated entity responsible for the reliable operation of the transmission grid, the provision of open transmission access to all market participants on a non- discriminatory basis, and the safety and reliability of the electric system.

info1/info2

Inquiries sent to cell relays within Short Message Service (SMS) messages. The info1 and info2 responses contain information about the cell relay and its operation.

Infosan

A software solution used for water network management. Infosan does an offline analysis of the averaged consumptions, applying a general efficiency loss curve based on meter age, thus estimating the losses for each connection due to aging.

info success rate

The percentage of data packets that succeed when a process sends a poll to a specific node and receives an acknowledgment. Calculated by:

(successes / (successes + failures)) * 100

Infrastructure as a Service (IaaS)

Online services that provide high-level APIs used to dereference various low-level details of underlying network infrastructure like physical computing resources, location, data partitioning, scaling, security, backup, and so on.

Infrastructure Battery Pack (IBP)

A battery pack that uses sealed lead-acid battery technology, which delivers energy over the -40 to +85° C temperature range. Itron operates the Infrastructure Battery Pack on a ''float" (that is, the usage model is defined as long periods of topped-off charge states followed by sporadic deep discharge events (outage events).

in-home display (IHD)

See in-premises display on page 115.

initial collector setup (ICS)

The process for installing a new software version and the utility's specific configuration parameters onto a partition of the cell control unit's (CCU) Secure Digital (SD) card. After ICS completes, the SD card becomes the active root file system.

initialization

The initial set of operations that a system or system component performs after electrical power to the system is switched on or when the system is reset. In the case of an electric meter, initialization includes the operations that are performed during the process of bringing up the meter on the network.

in-network

The status assigned to an endpoint that is meant to be included in project metrics and reports.

in-premises display

A device that shows consumers their electricity usage. Often, the in-premises display and smart thermostat are housed in the same physical unit. Also called in-home display (IHD).

Installer Portal

An Itron software tool used by utilities and third-party installers for installing HAN devices. With the Installer Portal, installers can provision HAN devices in the field, and administrators can set and manage application user permissions.

instantaneous demand

The kilowatt (kW) of power being demanded during a specific period of time.

instantaneous voltage

The voltage between two points at a particular moment in time.

Institute of Electrical and Electronic Engineers (IEEE)

A non-profit professional association dedicated to advancing technological innovation and excellence. IEEE is one of the leading standards-making organizations in the world. IEEE standards affect a wide range of industries including power and energy, biomedical and health care, information technology, telecommunications, transportation, nanotechnology, information assurance, and many more.

integrated circuit card identifier (ICC ID)

The serial number of a subscriber identity module (SIM) card.

integrated meter

The component that gets deployed at the endpoint, which contains the Itron network interface card (NIC) on page 157, the integrator partner's meter/sensor device, and any additional component that is required for the envisioned operation of the integrated meter solution.

integration applications

Software that supports Itron applications providing enhanced capabilities in multiple areas, such as data format translation, moving data across different data transports, and enhanced reporting capabilities.

integration complete (IC)

A product milestone that indicates the hardware, firmware, and software functions and performs to specification within the target systems with only limited code changes going forward for bug fixes. The system operates with stability without workarounds and is ready to support volume testing (farm testing).

Integration Management Service (IMS)

A software component that performs transformation and brokering of data between applications, for both Itron and third-party applications. Its main purpose it to provide a central point of integration from customer systems into the suite of Itron applications to reduce integration costs for utilities. It also allows Itron to support new standard integration formats without needing to add that support to each and every application.

Intelis C&I

An ultrasonic water meter designed to measure water to light commercial and industrial customers.

Intelis Gas Meter

A solid state ultrasonic smart gas meter that includes a safety shutoff valve and integrated RF communications offering:

- Automatic high flow shutoff
- Automatic high temperature shutoff
- Built in temperature compensation with TC and NTC consumption
- Ability to be read under legacy AMR meter reading applications and OpenWay Riva and Gen5 networks

Intelis gFlex

An ultrasonic smart meter offering prepayment capability for residential gas. Integrated into an easy-to-deploy SaaS prepayment solution, the meter helps utilities ensure their revenue and reduce financial exposure.

Intelis gFlow

An accurate, durable, and reliable meter for better management of gas distribution.

Intelis Water Meter

A fully electronic, static water meter designed with a standard encoder protocol. The meter is based on the ultrasonic measurement principle, which means there are no moving parts.

Intelis wSource

A smart water meter dedicated to residential areas. Its embedded communications connect easily to multiple data collection systems and generate extensive data from the water network.

Intelis wSource LoRa

A smart water meter dedicated to residential areas. Its embedded communications connect easily to multiple data collection systems and generate extensive data from the water network.

Intelis wSource NB IoT

A smart water meter with integrated communication intended for use in residential areas. Leveraging ultrasonic technology, Intelis devices are engineered to maintain the highest level of accuracy over their entire lifetime and generate extensive data from the water network.

IntelliCONNECT

A component of IntelliSOURCE Enterprise on page 118 that handles messaging for various classes of devices.

IntelliCOP

A module of IntelliSOURCE Enterprise on page 118 that provides security controls that can observe and limit control events sent to Demand response devices.

intelligent electronic device (IED)

Any of the remote controller units that function as part of the utility network and which can be managed in the smart grid. Capacitor banks, reclosers, and switches are types of IEDs. Transformers are typically not IEDs because they are not intelligent devices.

Itron smart grid infrastructure devices, such as Bridges, communicate with IEDs.

Utility companies also refer to IEDs as devices, Field Device Controller (FDC), programmable communicating thermostat (PCT) on page 182, Supervisory Control And Data Acquisition (SCADA) on page 216 device, or remote terminal unit (RTU) on page 193, which, unlike an IED, is not typically an intelligent device.

IntelliMARKET

A customizable marketing solution that provides consumers with the information and context needed for making informed decisions regarding new and complex energy programs. See also IntelliSOURCE Enterprise on page 118.

IntelliMEASURE

A tool for load control operators that tracks and measures the quantity and quality of any reduction during load control events. See also IntelliSOURCE Enterprise on page 118.

IntelliPEAK

DirectLink on page 69 load control device for Wi-Fi or cellular.

IntelliSCAN

A solution in an iOS software application that interfaces with an IntelliSCAN hardware device, allowing infrared serial communications with 2xx and 3xx load control switches. This solution allows a field technician to read, modify, or set different parameters on the load control switch using a mobile iOS device. See also IntelliSOURCE Enterprise on page 118.

IntelliSOURCE Enterprise

A demand response management system (DRMS) which provides integrated modules to manage energy efficiency programs and distributed energy resources. Every phase of demand response and energy efficiency programs is automated. Utilities are provided a single operational view into all of their residential, small business and commercial and industrial demand energy management initiatives. See also IntelliMARKET on page 117, IntelliMEASURE on page 117, and IntelliSUPPORT on page 118.

IntelliSOURCE Installer application

An iOS software application that interfaces with IntelliSOURCE Enterprise on page 118 and is used to support field technicians in installing devices and managing their Field Service Requests (FSRs) throughout the workday. Previously known as IntelliPHONE.

IntelliSOURCE Scanner application

An iOS software application that interfaces with an IntelliSCAN on page 117 hardware device, allowing a field technician to read, modify, or set different parameters on the load control switch using a mobile iOS device.

IntelliSUPPORT

A program management service that supports the full lifecycle of demand response, energy efficiency, and customer engagement programs. See also IntelliSOURCE Enterprise on page 118.

IntelliTEMP

Itron's Wi-Fi DirectLink on page 69 thermostat.

interactive read

A human-initiated, two-way, instantaneous, and asynchronous communication from the head end system (HES) or meter data management (MDM) system over the network infrastructure to obtain consumption, status, or programming data from gas, water, or electric endpoints. In Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124, an interactive read request is primarily intended to test a specific meter or endpoint's interoperability with the AMI network and to return readings data. The results of an interactive read are generally not permanently stored. Also called an on-demand read (ODR).

Interface Description Kit

Describes hardware interface and interoperability requirements to support consistent technical implementation of smart grid technologies over Internet Protocol (IP)-based networks.

interface design document (IDD)

A document that isolates and identifies business critical integration paths. Each integration point is listed with appropriate summaries outlining interfaces, business functions, examples (where applicable), and illustrated logical process flows.

interferers

See in-band interferers on page 114.

Internal First Article (IFA)

A manufacturing process that is completed before a new product is released to perform a comprehensive study of whether the device meets the engineering, design, and technical specifications.

International Electrotechnical Commission (IEC)

A non-profit, non-governmental international standards organization that prepares and publishes international standards for all electrical, electronic, and related technologies. IEC standards cover a vast range of technologies from power generation, transmission and distribution to home appliances and office equipment, semiconductors, fiber optics, batteries, solar energy, nanotechnology, marine energy, and many others.

International Organization for Standardization (ISO)

An international standard-setting body composed of representatives from various national standards organizations. The ISO promulgates worldwide proprietary, industrial, and commercial standards.

Internet Assigned Numbers Authority (IANA)

The organization that oversees global Internet Protocol (IP) address allocation, autonomous system number allocation, root zone management in the Domain Name System (DNS), media types, and other Internet Protocol-related symbols and numbers. IANA is a department operated by the Internet Corporation for Assigned Names and Numbers (ICANN).

Internet Corporation for Assigned Names and Numbers (ICANN)

A private, nonprofit corporation with authority for administering Internet Protocol (IP) addresses, domain names, and root servers and for other Internet-related matters.

Internet Engineering Task Force (IETF)

An international community of network designers, operators, vendors, and researchers concerned with the evolution of Internet architecture and the smooth operation of the Internet. It is open to any interested individual. Its mission is “to make the Internet work better by producing high-quality, relevant technical documents that influence the way people design, use, and manage the Internet.” It develops and promotes Internet standards, cooperating closely with the Web Consortium (W3C), International Organization for Standardization (ISO), and International Electrotechnical Commission (IEC) standards bodies and dealing in particular with standards of the TCP/IP and Internet Protocol (IP) suite.

Internet Information Services (IIS)

A Microsoft® Windows® web server software application and extension modules.

Internet Key Exchange (IKE)

A protocol used to set up a secure association (SA) on page 201 between the network and the NIC.

Internet of Things (IoT)

Refers to any software, hardware, or firmware that enables communications to and from a variety of end devices across an Internet-connected network.

Devices can be, for example, traffic signals, parking meters, bicycle-rental kiosks, digital signs, video cameras, and motion and environmental sensors. Refers also to the network and services that support this software, hardware, or firmware.

Internet Protocol (IP)

The rules or standards by which data is sent from one computer to another on the Internet.

Internet Protocol Address Resolution Map (IPARM)

Specifies how addresses on Remote Bridge on page 31s are advertised to the Master Bridge for routing purposes.

Internet Protocol Security (IPsec)

A security protocol suite developed and maintained by the Internet Engineering Task Force (IETF) to protect Internet Protocol (IP, see Internet Protocol (IP) on page 119) traffic by encrypting packets and by providing end-to-end authentication. IPsec is most commonly used in so-called tunnel mode with a virtual private network (virtual private network (VPN) on page 233).

GridScape Configuration Server on page 105 and Bridge Configurator on page 31 support IPsec tunnels as a firewall feature.

Internet Protocol Version 6 (IPv6)

An internet communications protocol that routes traffic across the Internet. It is intended to replace IPv4.

Internet service provider (ISP)

A company that provides Internet access and related services, such as website building and virtual hosting.

Internet socket

The method of directing data to the appropriate application in a Transmission Control Protocol/Internet Protocol (TCP/IP) network. The combination of the IP address of the station and a port number compose a socket.

interpreter between meter and application (IMA)

A customized component of the OpenWay Collection Engine that handles device-specific actions in the system for meters, cell relays, or other American National Standards Institute (ANSI) C12.19-compliant devices.

Interpreter Register

Two-way radios integrated with Master Meter water meters that enable communications across the Itron mesh network and that can be used for remote meter reading and remote configuration, and for generating asynchronous alerts for leaks, meter tampering, and other critical events.

interrogation meter adapter (IMA) manager

A component installed on the communication server that manages the interface drivers enabling different meter types and brands to communicate with the OpenWay Collection Engine.

interrogation read

A read performed on a preconfigured set of meters on a configurable schedule. Often referred to as a periodic read, an interrogation read is primarily used to collect consumption data for billing. A utility's meter data management (MDM) application would normally perform an interrogation read on the entire meter population on a repeating cycle (periodically). The OpenWay Collection Engine sends interrogation read responses to an MDM application or other subscriber systems.

interruptible capacity

An interstate pipeline, with backbone transmission or storage capacity, which may be available from time to time, but cannot be assured under all operating conditions.

interruptible load

Refers to program activities that, in accordance with contractual arrangements, can interrupt consumer load at times of seasonal peak load by direct control of the utility system operator or by action of the consumer at the direct request of the system operator. Interruptible load activities usually involve commercial and industrial consumers.

interruptible power

Power that can be interrupted or curtailed by the supplier, usually under the agreed-upon guidelines of the parties involved.

interruptible rate

A special utility rate given to certain industrial customers who have an agreement with their electric provider to have their service reduced or temporarily stopped.

interval data / interval reads

Electricity, gas, or water consumption data that is collected at frequent time intervals. Interval data helps measure usage for billing dispute resolution, conservation efforts, and leak detection (water only). Interval data also helps determine block demand or load profiles. Interval reads measure and store energy usage in regularly measured 15-, 30-, 60-, or 120-minute interval time periods. Interval reads can also be measured in a 1440-minute interval, which represents a 24-hour or daily time period.

interval data message (IDM)

A message sent by some encoder/receiver/transmitter modules (ERT) to an Itron Fixed Network at programmed intervals, in addition to the standard consumption message (SCM). The IDM contains kWh read, tamper, and interval recording data from which the network can calculate such things as demand, time-of-use (TOU), peak energy consumption periods, and load profiling information.

interval data recorder (IDR)

A solid-state electronic device that measures consumption among high-usage commercial and industrial accounts. The data collected is used by a utility to determine peak demand times and adjust its distribution system accordingly.

interval frequency

The time period that lapses between regularly scheduled interval data/interval reads that measure and store energy usage. Typically, interval data/interval reads can be measured in 15, 30, 60, or 120-minute interval time periods. Interval reads can also be measured in a 1440-minute interval, which represents a 24-hour, daily, time period.

Interval frequency is also called interval length.

interval length

The time period that lapses between regularly scheduled interval data/interval reads that measure and store energy usage. Typically, interval data/interval reads can be measured in 15, 30, 60, or 120-minute interval time periods. Interval reads can also be measured in a 1440-minute interval, which represents a 24-hour, daily, time period.

Interval length is also called interval frequency.

interval read

A meter recording usage data on a periodic basis (for example, every 15 or 60 minutes) is known as an interval or load-profile meter. An interval read is the act of reading the interval values stored in the meter. The interval values are stored in channels. See also consumption read on page 51.

intrusion detection system (IDS)

A network and system-monitoring device or software application that evaluates activities, identifies malicious threats and policy violations, and produces reports for a management station.

intrusion prevention system (IPS)

A network-monitoring and system-monitoring device or software application that evaluates activities, identifies malicious threats and policy violations, produces reports to a management station, and actively blocks detected intrusions.

inventory transfer

The movement of inventory items from one warehouse (the from-warehouse) to another (the to-warehouse).

investor-owned utility (IOU)

An electric or gas utility that is owned by a group of investors whose shares of stock are traded on public stock markets.

IoT

See Internet of Things (IoT) on page 119.

IoT Edge Router

A hardware device that enables customers to securely connect a variety of city and utility devices—including those that require legacy-protocol support— across a common RF mesh network infrastructure using proven open standards and interfaces and networking protocol support. Support includes a secure and standards-based architecture for both IPv4 and IPv6 communications with Linux-based network-edge computing capability.

IOU

See investor-owned utility (IOU) on page 121.

IP

See Internet Protocol (IP) on page 119.

IPARM

See Internet Protocol Address Resolution Map (IPARM) on page 119.

IPL

- See Itron Presentation Layer (IPL) on page 125.
- See Itron Private Profile (IPP) on page 125.

IPMP

See Itron Prepayment Management Platform (IPMP) on page 125.

IPP

- See independent power producer (IPP) on page 114.
- See Itron Private Profile (IPP) on page 125.

IPS

See intrusion prevention system (IPS) on page 121.

IPSec

See Internet Protocol Security (IPsec) on page 119.

IPSO Alliance

A non-profit association with members from leading technology, communications, and energy companies. This alliance promotes Smart Objects and provides an avenue for industry adoption of an IPSO Smart Object Registry. The IPSO Alliance works towards and promotes an understanding of identity and privacy. The IPSO Alliance is the primary advocate for Internet Protocol (IP) networked devices for use in energy, consumer, healthcare, and industrial applications.

IPv6

See Internet Protocol Version 6 (IPv6) on page 119.

ISM

See Itron Security Manager (ISM) on page 125.

ISM band

Industrial, Scientific, and Medical band. ISM bands are defined by the ITU-R in 5.138, 5.150, and 5.280 of the Radio Regulations. For the United States, the 902-928 MHz band is an unlicensed frequency band governed by FCC, Part 15. For the European Union, Dubai, and other locations, 865–880 MHz is used, and in Europe and some countries outside of Europe, ETSI is responsible for ISM band regulation.

ISO

- See independent system operator (ISO) on page 114.
- See International Organization for Standardization (ISO) on page 119.

Isobar+

A high-end pressure reducer suitable for collective and domestic housing.

ISP

See Internet service provider (ISP) on page 119.

Itron Access

The former name for Itron Customer Center on page 123.

Itron Analytics

Software that manages, stores, and analyzes data from any of Itron's data collection systems. Itron Analytics' web-based interface allows utility users to view dashboards designed to highlight notable devices or accounts based on metering data, event data, and more. See also distributed intelligence (DI) app platform on page 71.

Itron Analytics Platform

Integration adapters, staging tables, a Master Data Management database, extract, transform, and load (ETL) processes, Analytics DataMarts, and web services that are used to feed information to a set of Analytic Modules.

Itron Appliance

An all-in-one stack of hardware for hosting Itron applications. The Appliance contains all of the computing, storage, and networking infrastructure needed for standard Itron applications deployments.

Itron App Store

The former name for Itron Enterprise Application Center (EAC) on page 124.

Itron Cellular 500G Module

An open-standards IoT gas module designed to operate on Itron's OpenWay Riva network. The module supports both cellular and RF capability.

Itron Cellular 500W Module

An open-standards IoT water module designed to operate on Itron's OpenWay Riva network. The module supports both cellular and RF capability.

Itron Cloud Managed Services

An extension of Itron's classic managed services to encompass private and public cloud platforms.

Itron Cloud Services Platform (ICSP)

A solution including all necessary computer systems which is installed and maintained by Itron on the behalf of the customer.

Itron Customer Center

The online portal (https://customer.itron.com/) where Itron customers can access product-related resources, including software, documentation, service requests, return forms, and so on.

Itron Data Platform

The Itron Data Platform enables an open ecosystem of applications. The platform automatically ingests device data, normalizes and enriches the data, and makes it secure and accessible to utilities and third parties through standard APIs. The Itron Data Platform includes the following:

- Data Archive: An application that enables long-term retention of data. Longer data history supports deeper analysis and new use-cases and analytics.
- Data Visualizations: An application that provides custom data visualizations through native integration with Tableau and support for other business intelligence tools.
- Time Series API: An API that presents time-series data from devices.
- Device Metadata API: An API that presents metadata on devices including device types and locations.
- Advanced Metering Manager (AMM) application on page 13
- SensorIQ Application on page 204

Itron Device Configuration Manager (IDCM)

A centralized configuration management system used to create meter and endpoint configurations for Itron products running on the GenX network.

Itron Energy Manager

A dynamic tool, powered by Temetra on page 221, used to monitor meter data for commercial & industrial (C&I) on page 46 customers.

Itron Engage

Itron's sales channel partner program that extends the reach of Itron's solutions by empowering trusted partners with the right tools, training, and technology to grow their business, deliver valuable results, and help utilities and municipalities better manage energy and water.

Itron Enterprise Application Center (EAC)

A component of the distributed intelligence (DI) platform that provides DI application, application version, and application/version-to-meter management. The EAC's web-based interface allows utility users to view available DI applications and versions, maintain DI application licenses, install licensed DI applications on compatible electric endpoints, track application/version-to-meter relationships, and more.

Itron Enterprise Edition (IEE) Meter Data Management (MDM)

A data management solution for residential gas, water, and electric meters, commercial & industrial (C&I) on page 46 meters, and Internet of Things (IoT) on page 119 sensors. The ever-evolving platform provides users with the flexibility, value, and functionality needed regardless of deployment size. Commonly referred to as IEE.

See also:

- Itron Enterprise Edition (IEE) Meter Data Management (MDM) Settlements on page 124
- Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS) on page 124
- Web UI on page 238

Itron Enterprise Edition (IEE) Meter Data Management (MDM) Settlements

The IEE MDM Settlements module imports, validates, and stores interval readings data collected from metering devices to provide accurate energy market settlements for utilities. IEE MDM Settlements can be a standalone or add-on module to Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124.

Itron Enterprise Edition (IEE) Meter Data Unification and Synchronization (MDUS)

A meter data management system for use with SAP® for Utilities solutions and is an SAP-qualified business solution for MDUS (Meter Data Unification and Synchronization). This software, integrated with SAP solutions, provides utilities with an end-to-end business process and delivers a unified smart grid platform to utility customers.

Itron Host Processor (IHP)

In Premierplus4, the computer that functions as the interface between the utility's mainframe and its handheld data collection devices. The IHP consists of a computer (with keyboard, mouse, monitor, hard disk, and printer), network, and application processes for the Premierplus4 system. It stores and processes meter- reading data and generates system reports.

Itron Hybrid Connector (IHC)

Itron's hybrid cloud and on-premises solution. The IHC consists of two services, a cloud microservice and an on-premises Windows service. These services communicate with each other using either Azure Service Bus or Azure Event Hubs, depending on the scale of data being transmitted.

Itron Managed Services

Itron's Managed Services function as an extension for customer IT departments, dedicated to ensuring the success of their smart metering solution. The services are tailored to customer-specific operational and business requirements and support a variety of advanced capabilities including analytics, customer care, meter data collection, meter data management, web presentment, workforce management, and load-management programs.

Itron Meter Manager (IMM)

A software tool used jointly with ACEVision and the ACEPilot software tool to handle security passwords and keys for data communication with Electricity C&I meters

Itron Mobile

A tool kit for collecting data and performing other field activities. The Itron Mobile app runs on smart phones, tablets, and laptops. It is available for Android, Apple iOS, and Windows 10. Itron Mobile combines walk-by and drive-by features in a single app and leverages mobile technology to deliver valuable new outcomes. Itron Mobile includes a new handheld radio called the Itron Mobile Radio that can be used with any mobile device equipped with Bluetooth Low Energy. The MC3 radio can be used with the Itron Mobile app running on a Windows 10 laptop or tablet.

Itron Mobile Radio (IMR)

An all-purpose, walk-by reader and programmer for use with Itron's Smart meters and endpoints. This lightweight, portable device utilizes Itron's proven SRead technology in a two-way 900 MHz radio for communicating with electric, gas, water and telemetry endpoints using Itron's Mobile application or Field Deployment Manager. The Itron Mobile Radio has been designed to handle environmental elements and each unit is tested to ensure integrity as it relates to dust, rain and drop conditions.

Itron Partner Center

The online portal (https://partner.itron.com/) where Itron partners can access product-related resources, including software, documentation, service requests, return forms, and so on.

Itron Prepayment Management Platform (IPMP)

A prepayment solution that offers security token service (STS) on page 204, hybrid or STS token over-the-air for advanced metering infrastructure (AMI) on page 12-enabled STS prepay meters and AMI-based thin prepayment, available for residential and large power users of electricity, gas, and water.

Itron Presentation Layer (IPL)

A common development platform for Itron web-based applications.

Itron Private Profile (IPP)

A low-power communication standard developed by Itron for its OpenWay 2.4GZ gas modules. IPP enables wireless communication between utility companies and common household devices. Later versions of the 2.4GZ have been updated to use the Zigbee Smart Energy Profile (SEP), a public standard, instead of IPP.

Itron Security Manager (ISM)

A security software application that enables secure communications and data privacy between endpoints and authorized data collection systems. Based on industry-standard encryption technology, ISM employs cryptography to authenticate and encrypt two-way communications, providing the data confidentiality, integrity, and authenticity critical for system security. ISM acts as the centralized key manager. It manages the security keys, security state and security level for each of the endpoints. It also manages the import and export of security key files. If an endpoint security level is changed, ISM will generate additional keys for meter reading applications to update devices in the field. Finally, ISM allows keys to be updated, as required by the utility's security policies, thus mitigating the risk of data theft and manipulation.

Itron Services

Services Itron provides to customers, including business system integration, customer support, hosting choices, installation support, mesh design, and training.

Itron Smart Pay

Prepayment solutions to help utilities simplify operations, cut costs, reduce delinquent account risks, and improve cash flow. Itron's smart payment solutions support both electricity and gas service, as well as a variety of rate structures, business models, and regulatory frameworks.

J

JEF

See Job Execution Framework (JEF) on page 127.

JM

See job manager (JM) on page 127.

JMS Bridge

A Java application that forwards messages from Itron internal message queues to customer message queues.

job

In Advanced Metering Manager (AMM) application on page 13 and other Itron applications, a job is a running or scheduled process, including but not limited to metering schedules, imports, exports, and reports. In common usage, the term is reserved for jobs that read meters over the network.

Job Execution Framework (JEF)

An Itron component used by Power Monitor on page 178. JEF provides quartz job scheduling, job monitoring, and persistence. Job management and monitoring are accomplished with a set of web service calls between JEF and the Power Monitor or EnergyIQ task framework.

job manager (JM)

An OpenWay Collection Engine software service that sends and receives job-related information (for example, requests for action, status, and others) to and from the Collection Engine's message bus.

jobs interface

The web services application programming interface (API) on page 19 used to run and manage jobs.

join

An Itron NIC and its meter are said to be joined when they have been assembled, configured, tested, and communicating together as designed.

With Gas IMU Configurator on page 99, join means connecting a gas IMU to a gas meter so it wakes up and transmits read results to a proxy device on the network. The proxy device sends the read results on to the back office.

With HAN Communications Manager (HCM) on page 106, join means that a device has been associated with an Energy Services Interface (ESI) on page 84, and an authorization has successfully completed or a joined device deprovision has failed.

Join is also referred to as provision. See also unjoin on page 229.

J-pole antenna

An end-fed omnidirectional, half-wave dipole antenna used with Itron Relays and Access Points.

K

kbps

Kilobyte per second.

Kerberos

A computer network authentication protocol built on symmetric key cryptography. Kerberos is a trusted third party that operates as a key distribution center (KDC) and consists of an authentication server and a ticket- granting server that allows nodes to communicate over a non-secure network. Kerberos provides mutual authentication to each node, with each node verifying the other's identity.

key

A value used to control cryptographic operations, such as decryption, encryption, signature generation, or signature verification.

key exchange

The process in which users exchange cryptographic keys, allowing the use of cryptographic algorithms to establish secure communications. Key exchange can mean either the exchange of the same symmetric key in the case of a symmetric key cipher, or the exchange of each other's public keys in the case of asymmetric key cipher.

key exchange command

A secure command that is issued to modify or update the security state of a device.

key generator client library (KGCL)

A component of the OpenWay key generator server (KGS). The Itron manufacturing plant fetches from the KGCL the asymmetric key pairs that it programs into OpenWay CENTRON meters at the time of manufacture.

key generator server (KGS)

The security appliance that generates meter recovery key pairs, which are programmed into the OpenWay CENTRON Meter during the manufacturing process. Meter recovery key pairs are generated using elliptic curve cryptography (ECC).

key generator server daemon (KGSD)

A Linux daemon that handles key pair generation requests by listening for incoming transport layer security (TLS) connections from the key generator client library (KGCL) in the key generator server (KGS).

keykeep

An Itron software keystore on page 129 that contains certificates and keys for a given application, and is stored on the application server. The keykeep is in the form of a file named keykeep.store. It provides application-layer security for customers who do not use a hardware security module (HSM) on page 107 or KeySafe on page 128.

key label

The name assigned to elliptic curve cryptography (ECC) key pairs when they are generated in the hardware security module (HSM). The decryption and key update server (DKUS) uses key labels to tie particular key slots to particular keys.

key pair

The combination of a public key and a private key used in asymmetric key encryption. One key of the pair is used to encrypt the message and the other used to decrypt it.

KeySafe

An Itron hardware and software solution that protects private keys and certificates. It consists of a firmware module and a collection of command line interface (CLI) tools that reside on a piece of hardware called a hardware security module (HSM) on

page 107. The protected memory of the HSM stores the private keys and certificates needed by various applications to securely perform specific functions in the network.

key slot

An entry in the C12.19 key table that is used consistently across the OpenWay system. The decryption and key update server (DKUS) database stores and reports on key states by key slot ID.

keystore

A repository of security certificates, typically identified as keykeep.store or by the file extension jks (Java keystore). See also keykeep on page 128.

key type

In cryptography, key types specify the particular method used to transform plaintext into ciphertext or ciphertext into plaintext during message encryption and decryption. Key types vary in bit size, mathematical structure, and the way in which the key is randomly generated. Different key types provide varying degrees of security.

OpenWay uses asymmetric key types and symmetric key types to provide message security across its network.

KGCL

See key generator client library (KGCL) on page 128

KGS

See key generator server (KGS) on page 128.

KGSD

See key generator server daemon (KGSD) on page 128.

kHz

See kilohertz (kHz) on page 129.

kilohertz (kHz)

A unit of frequency measurement equaling 1,000 cycles per second.

kilovolt ampere (kVA)

A unit of measurement equating to 1000 volt-amperes (VA) on page 234.

kilovolt ampere hours (kVAh)

The standard power measurement used by electricity service utility companies. kVAh measures apparent power used for engineering design criteria because equipment must be designed according to maximum voltage and current criteria, not according to usable power. kVAh is the total power supplied, made up of real power (kWh) and reactive power (kVARh).

kilovolt-ampere reactive (kVAR)

The amount of power lost due to the reactive properties of the network equipment. Reactive power exists in an AC circuit when the current and voltage do not change at the same time.

kilovolt-ampere reactive hours (kVARh)

A unit used to measure reactive power in an AC electric power system. kVARh is the amount of power lost in the system multiplied by the number of intervals per hour. Reactive power exists in an AC circuit when the current and voltage do not change at the same time.

kilowatt (kW)

The electrical unit of power equal to 1,000 watts, or to the energy consumption at a rate of 1000 joules per second.

kilowatt hour (kWh)

The electricity equal to one kilowatt of power supplied to or taken from an electric circuit for one hour. kWh is a measurement of power and time used by utilities for billing purposes.

kilowatt hours delivered (kWh d)

Energy flow from the power grid to the customer that is measured at the meter.

kilowatt hours received (kWh r)

Energy flow from customer to the power grid that is measured at the meter.

kVA

See kilovolt ampere (kVA) on page 129.

kVAh

See kilovolt-ampere reactive hours (kVARh) on page 129.

kVAR

See kilovolt-ampere reactive (kVAR) on page 129.

kVA Rating

The kiloVoltAmp rating of a transformer.

kVARh

See kilovolt-ampere reactive hours (kVARh) on page 129.

kVAR lag

The inductive reactance, or how much the voltage lags the current, of the circuit. See also reactive power on page 189.

kVAR lead

The capacitive reactance, or how much the voltage leads the current, of the circuit. See also reactive power on page 189.

kW

See kilowatt (kW) on page 129.

kWh

See kilowatt hour (kWh) on page 130.

kWh d

See kilowatt hours delivered (kWh d) on page 130.

kWh r

See kilowatt hours received (kWh r) on page 130.

L

LA

See limited availability (LA) on page 133.

lag

Used in the context of time. Lag is to fall behind. Often used in conjunction with lead. Lead meaning to go first and lag meaning to trail behind. See also kVAR lag on page 130.

LAN

See local area network (LAN) on page 136.

large failover group (LFOG)

A large failover group for Distribution Automation (DA) on page 71.

last gasp (LG)

An asynchronous message from an electricity meter that indicates the meter has lost power. Also known as a power out message. Last gasps can result when the loss-of-power PIN becomes active, when zero crossing on page 242 events are missed, or when a transition from utility power to battery power occurs. There is no guarantee that a last gasp will be received by any other device in the network. Also known as standard last gasp (SLG) on page 213. See also extended last gasp on page 89.

last known good (LKG)

Reference to the firmware image stored on the NIC on page 159 that is designated to be booted if the device reboots.

last read pointer (LRP)

A sequence number that indicates reads that have already been recorded in Itron applications. For interval read on page 121s, reads can start at the LRP so only the data available since the last time the meter was successfully read is included in the read and read report.

last time buy

A notice from a component manufacturer instructing its clients to estimate and purchase the quantity of a soon-to-be obsolete component that is required for the remaining life of the clients' products that use the component.

LB

See load balancer (LB) on page 134.

LC

See load control (LC) on page 135.

LCC

See Load Control Configurator (LCC) on page 135.

LCD

See liquid crystal display (LCD) on page 134.

LCS

See load control switch (LCS) on page 135.

LDAP

See Lightweight Directory Access Protocol (LDAP) on page 133.

LDC

See local distribution company (LDC) on page 136.

lead

Used in the context of time. Lead is to go first. Often used in conjunction with lag. Lead meaning to go first and lag meaning to trail behind. See also kVAR lead on page 130.

leak detection

Technology that includes software and hardware used to identify leaks in a utility's distribution system. This term typically applies to a flag available on Itron endpoints that indicates possible leaks at the point of service.

Leak Sensor

An acoustic water leak sensor that listens for leaks in the distribution system of a water network. With Itron water leak sensors, utilities can locate and repair leaks in their distribution system before they become catastrophic main breaks.

learning management system (LMS)

A software application used to schedule, deliver, and track learning events. Learning events can include, but are not limited to trainings, certifications, and self-assessments.

Least Significant Bit (LSB)

The bit position in a binary integer giving the units value, that is, determining whether the number is even or odd. The LSB is sometimes referred to as the right-most bit due to the convention in positional notation of writing less significant digits further to the right.

leaving and entering

The state of an endpoint when it is leaving one group and entering a new group.

LED

See light-emitting diode (LED) on page 133.

legacy port

A nonsecure port on the NIC. Also called the clear text port because clear text is sent through the port instead of encrypted data. Itron has an internal tool called Legacy Port Off (LPO) that forces any data source, including an FSU, to instead send data through the secure port 648 to reach the Itron NIC in an endpoint.

level one device

The top device in a hierarchical network structure.

level, RFLAN

The number of communication hops between a meter in an RFLAN cell and its cell relay, plus one. A cell relay's level is 1. The meters that communicate with it directly, called its children, have a level of 2. The meters that communicate with it through its children have a level of 3, and so on. A meter that is not currently a member of a cell is assigned a level of 0.

LFDI

See Long Form Device Identifier (LFDI) on page 136.

LFOG

See large failover group (LFOG) on page 131.

LG

See last gasp (LG) on page 131.

license

An agreement that defines the terms, conditions, and expiration dates (if applicable) of the purchased products that can be used by a tenant. Licenses may also determine the functionality available for end users, or may place limitations on the system's quantifiable attributes, such as the maximum number of meters supported, the volume of data that can be handled, or API requests processed per hour. See also Tenant Management on page 221.

licensed customer

Any person or entity who, with express authorization from Itron, purchases, leases, licenses, subscribes to or uses any licensed product only for such person's or entity's own use and not for the purpose of providing the licensed product or any service to a third party.

lid

A removable or hinged cover for the top of a container.

LID

See logical identifier (LID) on page 136.

light-emitting diode (LED)

A type of lighting technology increasingly used for streetlights, in particular to replace existing high-pressure sodium (HPS) on page 109 streetlights.

Lightweight Directory Access Protocol (LDAP)

An application protocol for accessing and maintaining distributed directory information services over an Internet Protocol (IP) network. LDAP support is implemented in web browsers and email programs, which can query an LDAP-compliant directory.

Lightweight Machine to Machine (LwM2M)

A highly efficient, secure communication protocol available to CENTRON II Meter on page 38s and CENTRON Polyphase Meter on page 39s.

limited availability (LA)

A product milestone that indicates all documents are complete unless there is an exception specifically held to the end, such as an upgrade guide or Itron classic release notes with heavy product manager input. LA releases occur when a product and its documentation are sent to select customers ahead of a final product release (FPR) on page 94 for all customers.

line of sight

Communications through free-air with no obstacles.

line sensor

See sensor on page 204.

link

A connection between devices in a network. See also hop on page 110 and route on page 196.

link budget

The total amount of radio frequency power available to establish a link between the transmitter and receiver, expressed mathematically:

PLinkBudget = PTx - PTxLoss + PTxAntenna + PRxAntenna - PRxLoss - PRxSensitivity

link layer

A physical and logical network component that connects devices in a network. Sometimes called the data link layer or L2. See also mesh network on page 142.

link layer security

A security solution that protects RF mesh traffic and reduces the threat of denial-of-service attacks by preventing a device's access to a network unless that device can be authenticated.

link quality

The overall radio frequency quality of a link between a transmitter and receiver. Often expressed in terms of message success rate (MSR) on page 142.

Linky

A smart meter that allows the management of peak demand, integration of renewable energy and electric vehicles, and the ability for end consumers to better know, understand, and manage their energy consumption.

liquid crystal display (LCD)

A flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.

list pane

A contents pane that displays a list of records or other items.

liter

A unit of measure for volume that is the equal to one thousand (1,000) cubic centimeters.

LKG

See last known good (LKG) on page 131.

LMS

See learning management system (LMS) on page 132.

load

The electric power used by devices connected to an electrical generating system. This encompasses the amount of electric power required to meet customers' use in a given period and the amount of electric power delivered or required at any specific point or points on a system. The power requirement originates at the customers' energy-consuming equipment.

load aggregation

An aggregation of energy consumption from facilities that are geographically separate from each other. Used for acquiring and billing utility services.

load balancer (LB)

A smart router that tracks and routes communications between servers and applications to distribute workload, avoid overload, and improve availability.

The OpenWay Collection Engine employs BIG-IP® Local Traffic Manager™ for load balancing.

load balancing

The even distribution of processing or service requests across multiple servers in a computer network to avoid overloading any one server. Because load balancing distributes requests based on the actual load at each server, it ensures availability while defending against denial-of-service attacks. A network's load balancing service is usually provided by dedicated software or hardware, such as a multilayer switch or a domain name system (DNS) on page 73 server.

load control (LC)

Shifting use of electricity from periods of high demand to periods of lower demand, when the cost of electricity usually is lower. Also called load management.

Load Control Configurator (LCC)

A software tool that, in conjunction with a Field Service Unit (FSU) on page 93, is used for verifying Direct-to-Grid load control switch installation, configuration, upgrades, and for field troubleshooting and repair. The tool provides the core functionality for configuring the switch, validates network connectivity to the switch, tests its ability to shed load, and troubleshoots potential issues during or after initial installation.

Direct-to-Grid load control switch (LCS) on page 135 installers can use LCC to: Apply a configuration profile to a switch based on how it was installed and the types of devices connected (for example, conventional AC versus heat pump systems), verify switch operations (for example, ensuing that it can turn load on and off), and record additional information about loads connected to the switch (such as type and size of the HVAC compressor).

load control event

A HAN Communications Manager (HCM) on page 106 event that is generated if the total load is above a certain threshold.

load control switch (LCS)

A switch that utilities or consumers can use remotely to temporarily turn off devices that are connected to the network. Itron supports both Zigbee on page 242 and Direct-to-Grid on page 69 LCS implementations for these devices. See also physical relays on page 174 and virtual relays on page 233.

load factor

The average power divided by the peak power for some period of time.

load forecast

An estimation of electricity or natural gas demand, or energy consumption, at some future time. Forecasts are used to predict energy demand minutes ahead to years into the future.

load management

See load control (LC) on page 135.

load profile

A graphical representation of electricity load over time. A measurement of a customer's electricity usage over a period shows how much and when a customer uses electricity. Load profiles can be used by transmission system operators to forecast electricity supply.

load profile data

Electricity consumption data collected at frequent time intervals to provide feedback for determining load profiles. Interval reads measure and store energy usage in regularly measured 15-minute, 30-minute, 60-minute, or 120-minute interval time periods. Also called interval data.

load-profile meter

A load-profile electricity meter records load (electricity usage) in hourly, 15-minute, or other intervals. See also interval read on page 121.

load shedding

The process of deliberately removing (either manually or automatically) preselected customer demand from a power system. Load shedding is generally engaged in response to an abnormal condition (for example, when power demand exceeds power supply) to maintain the integrity of the system and minimize overall customer outages.

local area network (LAN)

A data communications system in a limited geographic area and that has a specific user group. A LAN is restricted to a relatively small areas, such as a room, building, or small neighborhood. Within a mesh-based AMI system, a LAN connects meters to collection points.

local distribution company (LDC)

The local utility entity that constructs and maintains the distribution wires or pipes that are used to deliver energy or water to the end customer.

locale

Determines the language in which the user interface displays. Typically, the preferred language of the user.

Local Traffic Manager™ (LTM)

BIG-IP®'s application delivery networking system, which the OpenWay Collection Engine (CE) uses for load balancing and traffic management.

location

A service point specified by premises + market (E, G, W) + index. There may be more than one location at a customer's premises.

logical identifier (LID)

A unique name used to identify a data value, such as the current voltage or serial number, that is collected within an electricity meter.

logical unit number (LUN)

In computer storage, a logical unit number or LUN is a number used to identify a logical unit, which is a device addressed by the SCSI (Small Computer System Interface) protocol or similar protocols such as Fibre Channel or iSCSI. LUNs are most often used to refer to a logical disk as created on a storage area network (SAN) on page 214.

Long Form Device Identifier (LFDI)

A 20-byte hash of device's 2030.5 certificate used for device access control.

Long-Term Evolution (LTE)

A standard for wireless broadband communication for mobile devices and data terminals, based on the GSM/EDGE and UMTS/HSPA technologies. It increases the capacity and speed using a different radio interface together with core network improvements.

low power wide area network (LPWAN)

A type of wireless network supporting long-range communications at a low bit rate. LPWAN is intended for wireless battery powered devices.

low-profile disc antenna (hockey puck)

A flat "hockey puck" style antenna for use with pad-mounted transformers and other applications that need a flat antenna.

LPO

See legacy port on page 132.

LPWAN

See low power wide area network (LPWAN) on page 136.

LRP

See last read pointer (LRP) on page 131.

LSB

See Least Significant Bit (LSB) on page 132

LTE

See Long-Term Evolution (LTE) on page 136.

LTM

See Local Traffic Manager™ (LTM) on page 136.

luminaire

Any apparatus that distributes, filters, or transforms light transmitted from one or more lamps and which includes, besides the lamps themselves, all parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply.

LUN

See logical unit number (LUN) on page 136.

LV DERMS

An integrated solution designed for providing visibility and management of Distributed Energy Resources (DERs) on the distribution network. Previously known as NEM2025.

LwM2M

See Lightweight Machine to Machine (LwM2M) on page 133.

M

M2C

See meter to cash (M2C) on page 145.

M2M

See machine to machine (M2M) on page 138.

MAC

- See Mandatory Access Control (MAC) on page 139
- See Media Access Control (MAC) address on page 141
- See message authentication code (MAC) on page 142

MAC address

See Media Access Control (MAC) address on page 141.

machine to machine (M2M)

Direct communication between devices using wired and/or wireless communications channels. Can include devices which enable a sensor or meter to communicate the information it records to application software that can use it. Applies to typical communication paths for Internet of Things (IoT) on page 119 sensors and devices.

magnet swipe

Use of a magnet to activate the programming mode of Itron endpoints, such as the 500G ERT Module or 500W ERT Module on page 6.

MAIFI

See Momentary Average Interruption Frequency Index (MAIFI) on page 148.

maintenance factor

In streetlight Central Management Software (CMS) on page 38 applications, the factor used to take into account how long it has been since the fixture has been cleaned. When the light has just been cleaned, the NIC firmware reduces the value by a maximum amount. The value sent to the control board gradually increases until the maintenance period has passed, at which point there is no reduction by the firmware.

Maintenance of Line (MOL)

The term used for products that are released and no longer in new product introduction (NPI) on page 158.

malicious code

Software or firmware that is intended to perform an unauthorized process to create an adverse impact on the confidentiality, integrity, or availability of an information system. Examples include, but are not limited to, viruses, worms, Trojan horses, and other code-based entities that infect a host.

malware

A program that is inserted into a system, usually covertly, with the intent to compromise the confidentiality, integrity, or availability of the victim’s data, applications, or operating system or to otherwise annoy or disrupt the victim.

MAMR

See mobile on page 147.

MAN

See metropolitan area network (MAN) on page 145.

Managed Appliance

See Itron Appliance on page 123.

management information base (MIB)

A virtual database used for managing entities in a communications network. Most often associated with the Simple Network Management Protocol (SNMP), the term is also used more generically in contexts such as in the Open Systems Interconnection/International Organization for Standardization (OSI/ISO) network management model.

Manage Meter Keys (MMK)

A decryption and key update server (DKUS) application used to manage individual meter keys.

Manage System Keys (MSK)

A decryption and key update server (DKUS) application used to manage system-wide symmetric and asymmetric keys.

Mandatory Access Control (MAC)

An access control mechanism that defines user access rights.

MANTIS

Internal name no longer associated with Electricity Communications Module Tester (ECMT) on page 78.

manufacturing station certificate

One of three credentials embedded in NIC firmware at the time of manufacture. This is the certificate in the chain between the birth certificate and SSN Root.

Market Transaction Suite (MTS)

A software system designed for the Australian electricity market. MTS receives and sends market transactions to various market participants, including the Australian Energy Market Operator (AEMO). MTS interfaces to Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124. MTS is an AEMO-compliant product and supports the Australian rules, validations, files formats, and protocols.

market type

The goods and related services that a utility company might supply to its customers. Market types can include (but are not limited to), water, natural gas, and electricity. Also called commodity type.

married

A term used to describe an Encoder/Receiver/Transmitter (ERT) module on page 81 that is physically connected to and configured for use with a particular meter.

Master Data Import (MDI)

The MDI configuration file defines the device information. Use the configuration file to perform configuration maintenance tasks such as updating account and meter information. This file contains account-specific information from your CIS system. The Configuration file is required for installation locations where the work order has been completed and an endpoint has been installed. It is one file with different attributes for each system. This file must be maintained and updated when any associated account, meter, endpoint, etc. information changes.

master device

A device that controls a remote device on page 193. A master device is typically deployed as a core device and a remote device is typically deployed as an edge network device.

Master Failover Protocol (MFP)

Enables high availability (HA) on page 108 and load-balancing of connections through multiple Master Bridge on page 31s.

master production schedule (MPS)

A company's manufacturing schedule that identifies and quantifies products to be assembled or made, the materials and staffing required to produce them, and the time frame in which they will be produced.

Master Relay (MR)

An OpenWay Collection Engine software service that registers processes within the C12.22 architecture, provides device registration and ApTitles assignments (which function as network addresses similar to Internet addresses), and includes an integral C12.22 authentication host for authorizing participation on the C12.22 network, though it also supports external C12.22 authentication hosts.

material requirements planning (MRP)

A computerized production planning, scheduling, and inventory control system used to forecast and order materials used in a manufacturing process.

material review board (MRB)

A committee in a manufacturing company that determines what to do with unusable or non-conforming materials. This may include reworking it, scrapping it, or returning it to the vendor.

maximum demand (peak demand)

The highest demand on page 63 measured over a selected period of time (typically within a billing period).

See also cumulative maximum demand on page 56.

M-Bus board

A meter interface unit (MIU) on page 144 that easily plugs inside of a meter. The M-Bus board transmits not only the volume consumption information, but also instantaneous parameters (for example, flow rate, instantaneous power, and temperature difference) directly collected from the meter's micro-processor.

MC

See Measurement Canada (MC) on page 141.

MC3

See Mobile Collections System (MC3) on page 147.

MC4

See Mobile Collection Systems (MC4) on page 147.

MC4Core

A Mobile Collection Systems (MC4) on page 147 configuration.

MC4Max

A Mobile Collection Systems (MC4) on page 147 configuration.

MC4Pro

A Mobile Collection Systems (MC4) on page 147 configuration.

Mcf

A unit of measure for volume that is equal to 1,000 cubic feet. Mcf is commonly used in the utility industry to measure volumetric quantities of natural gas.

MCH

See meter communication host (MCH) on page 143.

MD5

See message digest number 5 (MD5) on page 142.

MDAPI

See multi-device application programming interface (MDAPI) on page 150.

MDI

See Master Data Import (MDI) on page 139.

MDM

See meter data management (MDM) on page 143.

MDMA

See meter demand management agent (MDMA) on page 143.

MDMS

See .meter data management system (MDMS) on page 143

mDNS

See multicast DNS (mDNS) on page 150.

measurable outage or measurable duration

An outage that can be measured, that is, one that has a duration of longer than n, where n is configurable in UtilOS firmware on page 231.

Measurement Canada (MC)

An agency of the government of Canada's Innovation, Science, and Economic Development portfolio in the Small Business, Tourism, and Marketplace Services sector. The agency's mandate is to ensure the integrity and accuracy of trade measurement in Canada through enforcement and administration of federal acts and regulations. After Itron releases a new meter/endpoint or makes any modifications to an existing meter/endpoint hardware or firmware, it must go through MC's process before it can be sold in Canada. Depending on what is to be approved, the process can take several months to complete.

media

Physical devices or writing surfaces including, but not limited to, magnetic tapes, optical disks, magnetic disks, LSI memory chips, printouts (but not including display media) onto which information is recorded, stored, or printed within an information system.

Media Access Control (MAC) address

A unique number assigned to a network device by the manufacturer to identify the device's Internet Protocol (IP) network adapter. A MAC address is 48 bits long and is usually represented by a 16-digit hexadecimal number. The first few digits of a MAC address typically identify the manufacturer. The remaining digits uniquely identify the device's specific interface.

The last ten digits are displayed below a barcode on the faceplate of the OpenWay CENTRON Meter.

Megabar+

A pressure reducer dedicated to collective housing and big size networks.

megahertz (MHz)

A measure of frequency equal to one million cycles per second.

megawatt (MW)

A unit of power equal to one million watts.

megawatt-hour (MWh)

One thousand kilowatt-hours (kWh) or one million-watt hours (Wh).

member

A device that is logically bundled as part of a group of related devices. For instance, an endpoint is a member of a group of related endpoints.

mesh device

A device that contains a comm module compatible with the IPv6-based network. Mesh devices include device type ITRD meters (OpenWay CENTRON Singlephase Meter).

mesh network

A local area network (LAN) on page 136 of continuously connected meter end nodes, Access Point (AP) on page 8, and Relay on page 192s that connect to and communicate with adjacent nodes via multiple hops. In a mesh network, devices collaborate to propagate the data in the network.

message authentication code (MAC)

An authentication tag that applies a secret key and an authentication scheme to a message to prove a message's integrity. MACs are both verified and computed using the same secret key. Sometimes called a keyed (cryptographic) hash function.

message digest

A condensed text string distilled from the content of a text message. The message digest value is derived using a one-way hash function. The message digest is used to create a digital signature.

message digest number 5 (MD5)

A cryptographic hash algorithm used to create a 128-bit message digest used in security applications and to check data integrity.

Message Queue Telemetry Transport (MQTT)

An Organization for the Advancement of Structured Information Standards (OASIS) standard messaging protocol for the Internet of Things (IoT) on page 119. It is designed as an extremely lightweight publish/subscribe messaging transport that is ideal for connecting remote devices with a small code footprint and minimal network bandwidth.

message success rate (MSR)

The percentage of packet on page 170s that are transmitted (by the AP) and also acknowledged (by the meter).

The MSR is derived from successful packet transmission during scheduled reads, on-demand read (ODR) on page 163, and segment retries. MSR is a metric for packet transmission and how well the AP communicates with a meter. See also billing success rate (BSR) on page 29, read (meter read) on page 189, and one-time schedule on page 163.

meter

A device used to measure and record one or more quantities at a meter point. Meters can store the measured and recorded quantities either electromechanically (in the form of physical dials and needles) or in an electronic memory, or both. For meters that store recorded and measured quantities electromechanically, the meter's physical characteristics determine the numbers and types of quantities it can store. For meters that store recorded and measured quantities electronically, the meter's programming determines the numbers and types of quantities it can store.

Meter Access Program (MAP)

A feature of Itron’s Field Deployment Manager (FDM) software that enables a project manager to track the number of attempts made to complete a work order in fulfillment of contractual obligations before returning it to the utility. MAP automatically

maintains a running record of all attempts to complete work orders. It can also be configured to automatically export return-to-utility (RTU) work orders for which the contractual requirements have been met.

meter badge

A label on a gas meter that includes the meter ID and meter capacity.

meter base

A receptacle for an electric power meter. It contains a wiring chamber with conduit entrances and exits, matching jaws to accommodate the blades of a detachable watt-hour meter, and a base for proper support and positioning.

Also called a meter socket.

meter capacity

- Electricity meters: The class rating of the meter. A typical residential meter may have a class value of 200, meaning it can pass 200 amps.
- Gas meters: The nominal rating of the meter volume. Meter manufacturers typically size this in terms of cubic feet per hour. For example, a 250 cfh meter has a capacity of 250 cubic ft per hr.
- Water meters: Water meters typically measure and display total usage in cubic feet (ft.3), cubic meters (m3), or US gallons.

meter communication host (MCH)

An OpenWay Collection Engine software service that processes job requests, generates and sends system messages to the meter network, updates job statuses, and publishes read and event information to external consumers.

meter configuration

A set of configuration parameters, such as device class, time zone, security parameters, register operation parameters, communication parameters, load profile parameters, and so on, that are defined in the OpenWay Collection Engine (CE) and assigned to a group of meters.

Also called an endpoint configuration.

meter data collection

The retrieval of meter readings, tamper data, status information, or related information from electric, gas, or water meters.

meter data collection device

A computer used to record meter readings and related data. Data recordings can be done manually by a field worker or through an automated meter reading (AMR) or advanced metering infrastructure (AMI) system.

meter data management (MDM)

The collection, processing, storage, and analysis of utility meter data.

meter data management system (MDMS)

A system that performs long term data storage and management for the large quantity of data delivered by smart metering systems. The MDMS imports the meter data and validates and processes it so it can be used for billing and analysis.

meter demand management agent (MDMA)

In a deregulated energy market, an entity that is certified to collect and distribute metering information on behalf of utilities, energy service providers, or end customers.

meter event

An occurrence, alarm, or exception that is logged in the meter Event/History Log.

meter ID

Unique identifier associated or programmed into an electric, gas, or water meter. See also device ID on page 67.

meter index

The dials or LCD on the front of a meter which indicate the volume of gas that has passed through the meter.

meter interface unit (MIU)

A device installed on, or at a separate location from, the meter and used to read and transfer the water consumption data of the meter.

meter key

A meter-specific advanced encryption standard-based (AES) key used for encrypted data submitted by the OpenWay CENTRON Meter to the Collection Engine (CE).

Meter Patch Antenna Coupler (MPAC)

A passive microstrip antenna and coaxial cable for connecting a meter equipped with an Itron NIC to a remotely mounted antenna. This hardware is intended for meters that are located in hard-to-reach locations, such as meter rooms and metal enclosures. The antenna coupler boosts the RF signal, so the signal can get to the hard-to-reach meters.

Meter Plugins

Software that Itron provides for each meter manufacturer and standard. For example, there is one Plugin for Itron C12.19 on page 34 meters and another for all Itron Device Language Message Specification (DLMS) on page 67 / Companion Specification for Energy Metering (COSEM) on page 48 meters. All metering functionality particular to the meter is contained in its Plugin.

meter program

A program that utilities deploy on the meter that specifies how the meter functions.

Meter Program Configurator (MPC)

An Itron application that remotely programs and configures both energy-only and advanced digital electricity meters on a mass scale. This is one of several components which makes up the UtilityIQ software on page 231 suite.

Meter Reading Acquisition System (MRAS)

Obsolete name for Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124, a data collection system for reading meter consumption data and for billing or energy management purposes.

meter reading export (MRE) file

A file that contains completed meter reading route information that is transmitted from the meter reading host processor back to the utility's customer information system (CIS).

meter reading import (MRI) file

A file containing meter reading route information that is transmitted from a utility's customer information system (CIS) to the meter reading host processor. This file contains work order and meter input records for each account to be processed.

meter record

A record that is associated with a customer record and that contains meter reading and billing data, high / low checks, and survey information.

meter service provider (MSP)

In a deregulated energy market, an entity that is certified to purchase, install, and maintain meters.

meter socket

A receptacle for an electric power meter. It contains a wiring chamber with conduit entrances and exits, matching jaws to accommodate the blades of a detachable watt-hour meter, and a base for proper support and positioning.

Also called a meter base.

meter to cash (M2C)

A day-to-day process for energy and utility companies with core emphasis on optimization of utility's business process.

metrics

Tools designed to facilitate decision-making and improve performance and accountability through collection, analysis, and reporting of relevant performance-related data.

MetrixIDR Retail

A flexible system that generates sub-hourly, hourly, and daily forecasts for lists of delivery points or portfolios of electric and gas retail customers, where the portfolio can be changed daily.

MetrixIDR System Operations

A flexible and accurate short-term load forecasting system that is ideal for forecasting total system loads, transmission zone loads, daily gas send-out, and energy prices.

MetrixLT

A specialized tool for developing hourly and sub-hourly load forecasts to support utility generation, transmission, and distribution planning.

MetrixND

A forecasting engine that allows rapid development of accurate forecasts. Its intuitive Windows®-based interface and drag-and-drop architecture streamline the development of forecasting variables and models.

metrology

A general term used to describe the basic measurement functionalities of utility meters.

metrology board

In a solid-state meter, the electronic board that measures energy consumption. A metrology board interfaces with the power system, converts analog voltage and current (v&I) signals to digital data, calculates energy quantities, and communicates this information to the meter’s register/display as pulses or digital data.

metropolitan area network (MAN)

A data communications system that lies within an intermediate-sized geographic area (usually a city or a large campus) and has a specific user group.

MFP

See Master Failover Protocol (MFP) on page 140.

MHz

See megahertz (MHz) on page 141.

MIB

See management information base (MIB) on page 139.

MicroAP (uAP) Module

An Itron NIC that includes a cellular modem that can be configured to act as a self-contained Access Point (AP) on page 8. This is especially useful to connect isolated or hard-to-hear devices.

Micromesh Technology

The Itron technology used when a WAN-enabled Itron NIC connects to nearby grid devices via an RF mesh and acts as their take-out point for the WAN. This option allows utilities to adapt the number of cellular connections needed based on such factors as topology, coverage, density, bandwidth requirements, and the pace of deployment.

Microsoft Message Queuing (MSMQ)

A Microsoft technology that enables applications running at different times to communicate across heterogeneous networks and systems that may be temporarily offline. Applications send messages to queues and read messages from queues. Message Queuing provides guaranteed message delivery, efficient routing, security, and priority-based messaging.

Middle Tier (MT)

A software component that—along with Global Meter Reader (GMR) on page 103 and database (DB) on page 60—comprises Advanced Metering Manager (AMM) application on page 13. MT provides user interface functionality and web services.

Milli

A low-cost, small-form-factor Itron communications module used in battery-powered devices.

Milli Developer Kit

A collection of hardware components designed to provide IoT developers with the tools necessary to develop continuously powered data capture and control devices.

Milli Manufacturing Tool

A software application designed to integrate with Milli modules and enable customer configuration and troubleshooting.

milliwatt (mW)

A unit of power equal to one thousandth of a watt.

MIMO

See move in / move out (MIMO) on page 149.

Minibar

A pressure reducer designed for collective housing water and energy savings.

miniAP

An alternating current (AC) on page 14 power connector that provides backhaul for Internet of Things (IoT) on page 119, smart city, and other devices. The miniAP provides high performance and deployment flexibility, supporting a combination of 2G or 3G technologies, carriers, and radio frequency (RF) on page 187 mesh communications.

minimum demand

The lowest measured demand on page 63 over a selected period of time.

mirroring

Mirroring meter data allows the NIC to support battery-backed and Zigbee on page 242-enabled gas and water meters that only activate for short periods to conserve energy.

MIU

See meter interface unit (MIU) on page 144.

MIVS

See momentary interruption / voltage sag on page 148.

MLOG

An application which integrates with MLOG sensors and creates a leak index for each one each night.

Mlogonline

A software tool for continuous assessment of pipeline integrity that enables users to:

- Detect emerging and existing leaks
- Track new and historic leaks
- Track noises
- Prioritize and rank potential leaks for field investigation
- Provide a mapping visualization tool of where potential leaks exist within the water system

Using mlogonline and Itron's leak sensors provides a targeted and systematic approach to optimize a utility's field workforce for maximum return on investment.

MMK

See Manage Meter Keys (MMK) on page 139.

MMR3, MICA

A telematics handheld device on page 106 or field installation and configuration comprised of MMR3 RF module and MICA PC software.

mobile

Device or technology that goes where the user goes.

mobile automated meter reading (MAMR)

Automated meter reading (AMR) in which radio transceivers that are installed in vehicles read Encoder/Receiver/Transmitter (ERT) module on page 81-equipped electricity, gas, or water meters using radio frequency technology.

Mobile Collection Systems (MC4)

A device powered by Itron SRead radio which enables drive-by data collection for Itron's ChoiceConnect advanced data collection suite. It comes in 3 configurations: MC4Core, MC4Max, and MC4Pro. This product provides better reading sensitivity than MC3 family and addresses obsolescence of the High Power Wake-Up transmitter needed to read 40G ERT. MC4 replaces MC3/MC3 Lite.

Mobile Collections System (MC3)

A device powered by Itron SRead radio which enables drive-by data collection for Itron's ChoiceConnect advanced data collection suite.

Mobile Collector

One of two data collection devices used in Itron's legacy Mobile Collection systems. The Mobile Collector houses the transmitters, receivers, and other electronics required to communicate with radio-based endpoints. One version is designed for use with the GoBook MAX Mobile Collection laptop, the other is designed for use with the GoBook III Mobile Collection laptop.

Mobile Collector Lite

A portable drive-by & meter data collection solution that uses the Itron FC300 handheld with an external radio to gather consumption and tamper data from electricity, gas and water radio-based endpoints.

mode timeout

The amount of time the meter remains in test mode before automatically returning to normal mode.

modem

The device used to connect data equipment to a communication line. Modems are commonly used to connect computer equipment to telephone lines.

MOL

See Maintenance of Line (MOL) on page 138.

Momentary Average Interruption Frequency Index (MAIFI)

A reliability indicator used by electric power utilities. MAIFI is the average number of momentary interruptions that a customer would experience during a given period, which is typically a year.

momentary interruption / voltage sag

A meter event that occurs when the voltage drops from normal voltage by a user-defined percentage (10 to 50%) for longer than three cycles. This event is declared when a programmable number of MIVS (1 to 10) occurs within a specified time (within 60 minutes).

momentary outage

An outage that cannot be measured, that is, one that has a duration of less than n, where n is configurable in UtilOS firmware on page 231.

monitoring data

Non-revenue register or interval data that is not intended to be stored but rather normalized and sent to a reading XML file for import by an external system.

monitoring data program

A program used to define monitoring data quantities that are not intended to be stored but rather normalized and saved to a reading XML file for import by an external system. Monitoring data programs link temporally to meter instances.

months supply on hand (MSOH)

The amount of a product or commodity available in inventory, expressed as the number of months it can be expected to last based on anticipated usage.

morning of adjustment factor

The ratio of the average load for the first three of four hours before a demand response event to the average load for the same hours from the previous ten similar days.

morphology

The combination of terrain and surface clutter.

Most Significant Bit (MSB)

The bit in a multiple-bit binary number with the largest value. This is usually the bit farthest to the left, or the bit transmitted first in a sequence. The MSB is sometimes referred to as the left-most bit due to the convention in positional notation of writing more significant digits further to the left.

mounting equipment

Hardware equipment for mounting Access Points and Battery Backups to a range of utility assets. Mounting kits are offered in several formats including:

- Utility pole kits(wood/concrete)
- Light-pole/lamp-armkits
- Wallkits
- Pad-mounted enclosurekits

move in / move out (MIMO)

A single consumption (historical) read for a single date and time interval, using local standard time. Called a MIMO because it is often used when a customer is moving in or moving out of a residence.

MPAC

See Meter Patch Antenna Coupler (MPAC) on page 144.

MP-BGP

See Multi-Protocol Border Gateway Protocol (MP-BGP) on page 151.

MPC

See Meter Program Configurator (MPC) on page 144.

MPLS

See multiprotocol label switching (MPLS) on page 151.

MPS

See master production schedule (MPS) on page 140.

MQTT

See Message Queue Telemetry Transport (MQTT) on page 142.

MQTT Broker

In combination with the Gateway, MQTT Broker enables Milli on page 146-based devices to asynchronously publish traps to topics and client applications to subscribe to particular topics. Applications can thereby collect readings from meters or sensors without the need for explicit read commands.

MQTT Topic Remapper (MTR)

A service that supports MQTT multi tenancy by subscribing to all messages published on the /ssni/# topic and republishing the messages on the corresponding tenant-specific topic.

MR

See Master Relay (MR) on page 140.

MRAS

See Meter Reading Acquisition System (MRAS) on page 144.

MRB

See material review board (MRB) on page 140.

MRE file

See meter reading export (MRE) file on page 144.

MRI file

See meter reading import (MRI) file on page 144.

MRP

See material requirements planning (MRP) on page 140.

MSB

See Most Significant Bit (MSB) on page 148.

MSIA

See MultiSpeak® Interoperability Adapter (MSIA) on page 151.

MSK

See Manage System Keys (MSK) on page 139.

MSMQ

See Microsoft Message Queuing (MSMQ) on page 146.

MSOH

See months supply on hand (MSOH) on page 148.

MSP

See meter service provider (MSP) on page 144.

MSR

See message success rate (MSR) on page 142.

MT

See Middle Tier (MT) on page 146.

MTR

See MQTT Topic Remapper (MTR) on page 149.

MTS

See Market Transaction Suite (MTS) on page 139.

multicast

A group communication method where information is addressed to a group of destination computers simultaneously. Multicast supports one-to-many or many-to-many distribution.

multicast address

An address used to target a group of meters. By broadcasting to a multicast address, the Collection Engine can simultaneously send firmware updates, messages, jobs, or configuration data to all meters in the multicast group. The Collection Engine builds multicast addresses dynamically, by appending a group number to a cell relay or Connected Grid Router broadcast port.

multicast DNS (mDNS)

A device that resolves hostnames to IP addresses within small networks that do not include a local name server, a standard method of finding available network services.

multi-device application programming interface (MDAPI)

An application programming interface (API) that enables a software application to communicate with multiple Itron radios and endpoints.

multi-dock

A hardware device that provides storage, communications, and battery charging for up to five (FC300) or six (FC200) handhelds in an office environment.

multi-drop

A meter installation configuration in which more than one meter is connected to a communication device such as a line-sharing device, data switch, or modem splitter in a radial configuration. Communication takes place via RS-232, RS-485, or the optical port connection.

multihomed

For Itron devices, describes IP addresses that are assigned to multiple port interfaces.

Multimag TM II Cyble (C&I)

A multi-jet turbine water meter for commercial & industrial (C&I) on page 46 applications, ready for automatic meter reading (AMR) on page 24.

Multimag TMI II Cyble (Residential)

A multi-jet turbine water meter for residential applications with fully automatic meter reading (AMR) on page 24 capabilities.

Multi-Protocol Border Gateway Protocol (MP-BGP)

An enhanced Border Gateway Protocol (BGP) that carries routing information for multiple network layer protocol address families. All BGP commands and routing policy capabilities can be used with MP-BGP.

multiprotocol label switching (MPLS)

A mechanism in high-performance telecommunications networks that directs data from one network node to the next based on short path labels rather than long network addresses. This saves the time needed for a router to look up the address of the next node to forward the packet to. MPLS is called multiprotocol because it works with the Internet Protocol (IP), Asynchronous Transport Mode (ATM), and frame relay network protocols.

Multipurpose Internet Mail Extensions (MIME)

An extension that defines content type, and is typically referred to as MIME type. The extension classifies file types so that internet programs can transfer duplicate file types in the same way.

multi-role certificate

In UtilOS firmware on page 231 2.0.2 and later, certificates can have multiple roles encoded in them. Each role is mapped to a set of commands that the authorized certificate holder can perform.

MultiSpeak®

A specification that defines standardized interfaces for software applications that support common electric utility processes, including demand response (DR) and home area networks (HAN). MultiSpeak enables vendors and utilities to develop XML-based interfaces between systems without requiring extensive customization.

MultiSpeak® Interoperability Adapter (MSIA)

A software that supports the MultiSpeak web-services-based integration specification. The specification includes transactions for most applications within a utility systems environment. The Itron implementation supports meter provisioning and reading and meter reading notification, Disconnect/Reconnect, integration with an external system for full synchronization of service locations, and Outage Detection and Notification. The MultiSpeak standard provides the basis of the Itron MultiSpeak Interoperability Adapter implementation.

MSIA is made up of two components:

- AMMMultispeak
- MSIAWSRoute

multi vendor (MV)

Denoting technology products or services from more than one supplier.

multi-vendor laptop (MVLT)

A 16-bit application designed to retrieve data from meters or recorders.

municipal, muni

A utility that is owned and operated by a city or county, often having access to low-cost power from federal hydroelectric projects exempt from income and other taxes at the federal and state levels.

MUTT

Internal name no longer associated with Electricity OEM Configurator on page 78.

MV

See multi vendor (MV) on page 152.

MV-90 xi

A solution for interval data collection, management, and analysis. MV-90 xi can be used as a data collection engine that interfaces to existing data management and analysis tools, or as an end-to-end interval data collection and management solution.

MV-90 xi Billing Determinants Export Package

An optional MV-90 xi module that calculates billing determinant values derived from the interval data. If a time-of-use schedule is specified for a customer, the billing determinants are calculated for on-peak, mid- peak, and off-peak periods.

MV-90 xi DST Package

An optional MV-90 xi module that adjusts the times on interval data from load profile meters that are programmed with the pre-2007 daylight saving time (DST) schedule. The adjustment is performed on interval data entering MV-90 xi through remote interrogation and handheld files imports, including HHF imports from non-Itron systems.

MV-90 xi Event Notification Package

An optional MV-90 xi module that enables near real-time notification of meter events or alarms and system events in the MV-90 xi system. The types of events can include failed tasks and rejected validations.

MV-90 xi Monitor

An MV-90 xi program that manages scheduled tasks to be performed by MV-90 xi. Monitor periodically scans the scheduled task list and initiates tasks using Time Due and Priority indicators.

MV-90 xi OpenWay CENTRON TOU Program

A feature of the MV-90 xi application that allows the MV 90 xi user to create Time-Of-Use (TOU) seasons to be uploaded as the “pending TOU season” to OpenWay CENTRON meters. These TOU seasons define the rates and daily patterns for the OpenWay CENTRON meter’s TOU billing registers and are uploaded to the meter prior to the season’s start date. Once the season’s start date arrives, the device moves the pending TOU season to the current TOU season table and a new pending season can be uploaded.

MV-90 xi TCP/IP Package

An optional MV-90 xi module that can be used for network-based meter communications. The TCP/IP package establishes a host-initiated TCP/IP session with a meter that has a network interface. After the TCP/IP session is established, the TIM module

takes over communication with the meter.

MV-COMM

Itron's multi-port front-end processor for the base MV-90 platform that significantly enhances communications speed and efficiency between end-point metering devices and the MV-90 host processor.

MVLT

See multi-vendor laptop (MVLT) on page 152.

MVLT xi

A multi-vendor laptop data collection software for use in conjunction with Itron's MV-90 xi on page 152 or Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 products. It is used to download load profile data from commercial & industrial (C&I) on page 46 meters that do not have a remote communication interface or for which the remote interface is not available. MVLT xi can read meters in the field through an optical or serial RS-232 interface or using telephone and IP communications.

MV-Notify

An MV-90 xi program that runs in the system tray for MV-90 xi client machines that are running the Event Notification package. It provides the notifications and file output processing for the system.

MV-PBS

The MV-PBS Complex Billing System offers energy providers a cost-effective solution for billing and financial settlement. MV-PBS integrates the complex billing function with upstream and downstream systems to meet the specific needs of commercial, industrial, and wholesale energy users under a variety of complex rates, supply contracts, and schedules.

MV-RS

A PC-based meter reading software solution for data collection and route management for Itron handheld computers, mobile collection systems, optical probes, and touch probes.

MV-WEB

An online tool that provides commercial and industrial customers secure and reliable access to their load profile data. MV-WEB also provides access to customer load data for account representatives, load research and generation personnel, engineers, management, and other internal staff who don't have direct access to MV-90 xi.

mW

See milliwatt (mW) on page 146.

MW

See megawatt (MW) on page 142.

MWh

See megawatt-hour (MWh) on page 142.

N

NAA

See Network Administration Application (NAA) on page 156.

NaaS

See Network as a Service (NaaS) on page 156.

NAC

- See network access control (NAC) on page 156.
- See network admission control (NAC) on page 156.

namespace

An XML element used by web services that enables client applications to distinguish between data types that are named the same but defined differently. Unique namespaces allow an XML parser to interpret XML files correctly when multiple applications are using the same web service to communicate with one another.

NAN

See neighborhood area network (NAN) on page 155.

Narrow Band Internet of Things (NB-IoT)

A low power wide area network radio technology standard developed by 3GPP to enable a wide range of cellular devices and services.

Narval+ Combine

A unique solution to cover hot and cold water needs in residential settings. Utilizing the acclaimed and familiar easy-to-install features from previous generations, Narval+ Combiné also serves as a steppingstone to modern water networks by being fully compatible with remote reading systems for walk-by/drive-by data collection or network-based operations.

NASPI

See North American SynchroPhaser Initiative on page 161.

NAT

See network address translation (NAT) on page 156.

National Electrical Manufacturers Association (NEMA)

the largest trade association of electrical equipment manufacturers in the United States. Founded in 1926, it advocates for the industry, and publishes standards for electrical products.

National Electricity Market (NEM)

The Australian wholesale electricity market and the associated synchronous electricity transmission grid, which meets the demand of more than eight million Australian consumers annually. The NEM uses pool arrangements to exchange electricity between energy consumers and energy producers.

National Institute of Standards and Technology (NIST)

The federal technology agency that works with industry to develop and apply technology, measurements, and standards.

navigation pane

One of several panes that make up an application's main window in some software user interfaces. The navigation pane consists of workbench buttons at the bottom of the navigation pane. Each workbench button provides access to a group of related views and functions called a workbench. A navigation tree that consists of a series of nodes—usually arranged in a tree structure—

makes up the selected workbench. Each node opens a view, report, form, commands, procedures, or other items to which the workbench provides access.

NB-IoT

See Narrow Band Internet of Things (NB-IoT) on page 154.

NC

See Network Center on page 156.

NCE

See Network Collection Engine (NCE) on page 156.

NCNR

See non-cancelable non-returnable (NCNR) on page 159.

Near field communication (NFC)

A set of communication protocols that enables communication between two electronic devices.

Near field communication (NFC) Field Tool

An application used for maintenance and installation activity on Intelis wSource products through the NFC communication protocol.

NEC

See Network Event Collector (NEC) on page 157.

neighborhood area network (NAN)

A wireless community that provides wireless device users anonymous and quick access to the Internet. A NAN is built around one or more access points covering a small geographic area (the neighborhood). The coverage can be up to 1 kilometer in radius if the owner of the access point is using an omni-directional antenna. Neighbors participating in the NAN use directional antennas pointing toward the access point.

neighbor table

A memory structure within each Itron NIC to store data about its neighboring NIC-enabled devices.

NEM

- See National Electricity Market (NEM) on page 154.
- See net energy metering (NEM) on page 155.
- See Network Element Manager (NEM) on page 157.

NEMA

See National Electrical Manufacturers Association (NEMA) on page 154.

NERC

See North American Energy Reliability Council (NERC) on page 161.

net energy metering (NEM)

Billing program serving consumers who produce and feed energy into the grid and use energy when needed. For example, a consumer with solar panels on their home may produce more energy than they can use. They feed the excess energy into the grid and use energy from the utility when their solar panels do not produce sufficient energy to meet their demand. The energy produced, less the energy consumed equals net energy.

Net Manager (net_mgr)

A stand-alone, server-based Linux command-line utility that is available to Itron customers on an as needed basis. Using the version of Net Manager specific to your UtilOS firmware on page 231 version, you are able to communicate with devices connected to the Itron mesh network.

Net Manager Secure (net_mgrs)

A wrapper for Net Manager (net_mgr) on page 156 that adds encryption, integrity, and authentication to Net Manager operations through the use of secure associations. The creation and use of secure associations requires a shared secret, which is protected by and uses a keystore, Itron KeySafe, or high-strength KeySafe on page 109. In addition to the creation of secure associations, Net Manager Secure automatically performs other secure association management functions, such as renewing expired associations.

net metering

The final result of applying power generated against power purchased for customers who both generate and purchase power. A net register calculates energy to be billed by subtracting power received from the customer from the power delivered to the customer.

network access control (NAC)

A computer network security approach that enables and enforces role-based network access by forcing user or machine authentication before allowing access to the network. Access is based on an assessment of the user or machine's security status, such as the presence of anti-virus software and personal firewalls. Several major networking vendors provide proprietary NAC products.

network address translation (NAT)

The process of modifying global IP addresses into internal IP packet header addresses, so that multiple hosts with private IP addresses share a single external IP address while remaining protected by firewalls. A NAT converts the address of each LAN node into one IP address. It can also provide security by hiding individual IP addresses from the outside world.

Network Administration Application (NAA)

The primary user interface for Fixed Network that provides features and functionality for monitoring, maintaining, and reporting on network operations and endpoint operations within the system.

network admission control (NAC)

Cisco®-proprietary version of network access control (NAC). A computer network security approach that enables and enforces role-based network access by forcing user or machine authentication before allowing access to the network. Access is based on an assessment of the user or machine's security status, such as the presence of anti-virus software and personal firewalls.

Network as a Service (NaaS)

Services for network transport connectivity. NaaS involves the optimization of resource allocations by considering network and computing resources as a unified whole.

Network Center

A network management application that provides advanced network management capabilities such as fault management and performance management.

Network Center ES

A customized version of Elasticsearch search software used by Network Center on page 156.

Network Collection Engine (NCE)

The non-user interface components of Itron's Fixed Network software.

network discovery

When a new node is first energized, it broadcasts a discovery message. The discovery message is received by all Itron NICs that share the same Bridge on page 31 Master.

Networked Lighting Controller (NLC)

A photocell device that sits on top of a streetlight or is built inside of it. It is designed to control and monitor a particular device. Some devices have a serial port to connect to another device, such as a sensor (a pollution sensor, for example). NLCs communicate with Streetlight.Vision (SLV) software on page 215 through the Itron mesh network using Access Point (AP) on page 8s, Relay on page 192s, or Gateway on page 99.

See also:

- SELC 4-Pin External Networked Lighting Controller (NLC) on page 204
- SELC 5 / 7-Pin External Networked Lighting Controller (NLC) on page 204
- SELC Internal Networked Lighting Controller (NLC) on page 204

Network Element Manager (NEM)

An Itron application that provides fault management through asynchronous notifications to alert operators of potential issues at a remote node without waiting for a polling schedule to request status.

NEM receives notifications, including electricity meter last gasps, forwarded by neighbor nodes acting as proxies for the node emitting the last gasp. When an electricity meter loses power, its NIC can emit a last gasp message. Neighbor nodes forward all last gasps they receive.

Network Event Collector (NEC)

A centralized NIC and application event collection and repository for Itron and third-party applications. NEC reads new events from NICs and load control switch (LCS) on page 135 devices at a scheduled interval or on demand, and sends them to applications through a JMS queue. You can use the JMX console to schedule the job with a cron expression. An application may also schedule on-demand jobs through a web service API.

network ID

A two-byte (16-bit) value that provides logical separation of overlapping networks by limiting neighbor discovery to devices with a matching network ID. Its primary function is to logically separate adjoining customer networks from each other.

network interface card (NIC)

The module installed in meters and Itron devices that communicates across the Itron mesh network.

Network Library

A library of commands for running jobs on the network.

Network Management System (NMS)

The head end of an AMI system that manages the AMI communications network.

Network Manager

See Net Manager (net_mgr) on page 156.

Network Manager Entity (NM Entity) Certificate Authority

Signer of the Network Manager Entity (NM Entity) certificates on page 158. There may be multiple Certificate Authorities with different privileges, depending on operator requirements.

Network Manager Entity (NM Entity) certificates

Certificates used in the certificate chain, based on the Net Manager protocol proprietary to Itron. These certificates are issued to the programs that manage the smart grid.

Network Manager Secure

See Net Manager Secure (net_mgrs) on page 156.

network operations center (NOC)

One or more locations from which control over a computer network or telecommunications network is exercised. NOCs monitor the network for alarms and conditions that require attention to maintain the network's performance, and mitigate those conditions when they occur.

Network Operations Manager (NOM)

A system component responsible for the operation and management of network communications. NOM manages communication of the Point-to-Point (PP3) network interface to gateways (communication devices), and the Point-to-Multipoint (PM1) network interface to remote devices (meters).

Network Performance Application (NPA)

The component of Itron's Fixed Network software that monitors network deployment and operations. NPA includes an interactive dashboard and extensive reporting functionality.

Network Provider

A third-party network, such as Verizon® Internet of Things (IoT) on page 119, Wireless Smart Utility Network (Wi-SUN®), AT&T®, and Vodaphone®.

Network Security

A software that is part of the Shared Services Components (SSC) on page 206. It is responsible for handling the NetManager security.

Network Time Protocol (NTP)

An internet protocol used to synchronize the clock times between computer systems or network devices to within a few milliseconds of Coordinated Universal Time (UTC). NTP typically coordinates the time between network devices communicating through packet switching or a variable-latency data network.

network time protocol (NTP) server

A server in a client-server model, that is attached or synchronized to a high-precision timekeeping device, such as an atomic clock or GPS clock. The NTP server sends time stamps to its NTP clients using networking communications such as, broadcasting, multicasting, or User Data Protocol (UDP). The NTP client synchronizes the time clocks of all participating devices within its network to within a few milliseconds of Coordinated Universal Time (UTC).

Network Web Application (NWA)

An Itron Fixed Network web-based user interface used primarily by customer service representatives (CSRs) to capture daily, hourly, or on-demand endpoint reads.

new product introduction (NPI)

The process that takes an idea from an initial working prototype to a thoroughly refined and reproducible final product.

new service

A new, not previously registered, customer account or meter.

NFC

See Near field communication (NFC) on page 155.

See Near field communication (NFC) Field Tool on page 155.

NIC

See network interface card (NIC) on page 157.

NICNAC

The secure communications library Itron uses to communicate securely with devices.

NIST

See National Institute of Standards and Technology (NIST) on page 154.

NLC

See Networked Lighting Controller (NLC) on page 157.

NMEntity (Network Manager Entity)

See Network Manager Entity (NM Entity) certificates on page 158.

NMS

See Network Management System (NMS) on page 157.

NOC

See network operations center (NOC) on page 158.

node

A network device. Examples include electricity meters, Relays, and IMUs. In SensorIQ Application on page 204, refers to a single instance of the application, and SensorIQ can run in a cluster that distributes load among nodes for increased overall processing power.

node, network

A cell relay, meter, or server.

nodeq

A list of all neighboring nodes which are currently in the active state – meaning that links to each have been established and are currently being maintained. Also known as node queue. See also neighbor table on page 155.

node queue

See nodeq on page 159.

NodeSim

An Itron application for simulating meter endpoints in the network to aid development and test purposes with the UtilityIQ software on page 231 applications. NodeSim is used primarily for large-scale testing (hundreds to millions of Itron smart devices), testing features that cannot easily be reproduced on real meters, such as generating certain event logs or setting status flags, and for development and troubleshooting in a controlled and reproducible environment.

NOM

See Network Operations Manager (NOM) on page 158.

non-cancelable non-returnable (NCNR)

A term applied to a product order indicating that the purchaser cannot cancel the order, reduce in number the products ordered, or return the order except in case of a product defect.

nonce

An arbitrary number used in cryptographic communications that is generated for security purposes. A nonce is generated and used only one time in any security session—during the authentication challenge when a meter registers or when it re-authenticates.

non-consumable inventory

Inventory items that do not get installed or used up. Non-consumable items can be serialized (items with serial numbers, such as data collection devices and cell phones) or non-serialized, such as screwdrivers and other hand tools.

non line of sight (NLOS)

When the path between a transmitter and a receiver is completely or partially obscured by houses, trees, and other objects.

non-repudiation

Assurance that the validity of data being transmitted cannot be denied or rejected. A common application of non-repudiation is signature verification and trust.

non-revenue water (NRW)

The amount of water in a system that cannot be accounted for and therefore cannot be billed. Most common sources for non-revenue water are theft, under-performing water meters, system design flaws, and leaks.

Also called unaccounted-for water.

non-route data

Data that is imported or collected, but is not part of the data collection route. This data includes any new or revised code information, system messages, and parameter information.

non-serialized inventory

Inventory items without serial numbers. Non-serialized items can be consumable—those that get installed or used up, such as door hangers and screws—or non-consumable, such as hand tools used to perform installations or maintenance.

non-technical loss

Power system losses attributed to factors external to power transmission and distribution that are not naturally occurring or expected. Common causes for these losses are deliberate tampering with the system, component malfunctions or misconfigurations, billing errors. Nontechnical losses between 1 and 2% are typical, but these losses can be much higher depending on the region and other factors. See also technical losses on page 220.

non-value-added (NVA)

Contributing nothing to a product or service and generating a zero or negative return on the investment of resources; waste.

non-volatile memory (NVM)

A type of electrically erasable programmable read-only memory (EEPROM) chip used for easy and fast information storage.

normalization

Translation of data from specific data formats received from various meters (DLMS/COSEM, C12.22) to the standard XML data contract OpenWay uses to publish out its meter data. This translation process includes unpacking the meter data from the raw message, converting the values to the base quantity (for example, converting kilowatt hour to watt hour), translating any device-specific events to an internal OpenWay event list, and translating any device specific reading codes (status codes) to an internal OpenWay list.

normal mode

One of the operating modes of the meter that includes all routine meter operations.

North American Energy Reliability Council (NERC)

An organization formed by the electric utility industry in 1968 to promote the reliability and adequacy of bulk power supplies in North American utility systems.

North American SynchroPhaser Initiative

A collaborative effort involving the United States Department of Energy (DOE), the North American Electric Reliability Corporation (NERC), and North American electric utilities, vendors, consultants, and federal and private researchers and academics. NASPI 's mission is to improve power system reliability and visibility through wide area measurement and control. Its activities are funded by DOE and NERC, and by the voluntary efforts of industry members and experts.

not registered

The status of an endpoint when it has either not registered or has deregistered.

not validated (NV)

Common readings file (CRF) validation attribute value meaning that the data is not validated (NV).

not yet registered

The state of a device that has not yet been defined as an authorized member of the network.

NPA

See Network Performance Application (NPA) on page 158.

NPI

See new product introduction (NPI) on page 158.

NRW

See non-revenue water (NRW) on page 160.

n-tier data application

Data applications that have clear separations between the tiers that make up the application. Tiers may communicate through services such as web services. Examples of tiers typically include a presentation tier, a middle tier, and a data tier. Separating the components into tiers provides maintainability and scalability of the application. N-tier applications typically store sensitive information in a middle tier to maintain isolation from the presentation tier. N-tier data applications are sometimes called n-layer applications or distributed applications.

NTP

See Network Time Protocol (NTP) on page 158.

NVA

See non-value-added (NVA) on page 160.

NVM

See non-volatile memory (NVM) on page 160.

NWA

See Network Web Application (NWA) on page 158.

O

O&M

See Operations & Maintenance (O&M) on page 166.

object identification system (OBIS)

A system of coding the Companion Specification for Energy Metering (COSEM) model objects.

obligation to serve

A utility's obligation to provide service to any customer who seeks that service, and is willing to pay the rates for that service.

OCOGS

See operating cost of goods sold on page 166.

ODR

See on-demand read (ODR) on page 163.

ODS

See Outage Detection System (ODS) on page 168.

ODSWSRoute

An Itron component that allows Outage Detection System (ODS) on page 168 users to route web service calls for ODS. It provides the public API and serves the WSDL and XSD files needed by integration tooling and routes public and legacy API calls. It is required by ODS.

OEM

See original equipment manufacturer (OEM) on page 167.

OFDM

See orthogonal frequency division multiplexing (OFDM) on page 167.

off-cycle reads

Meter reads recorded outside of the normal reading schedule, such as reads required when customers move out or reads required for billing investigations.

off-peak

Periods of relatively low demand during which energy may be offered at a reduced rate.

off-site meter reading (OMR)

The use of radio-equipped handheld computers to read Encoder/Receiver/Transmitter (ERT) module on page 81-equipped electric, gas, or water meters. OMR reduces the need to directly access meters.

OHS

See On-Premises Hybrid Service (OHS) on page 163.

OLC

See outdoor lighting controller (OLC) on page 168.

OMR

See off-site meter reading (OMR) on page 162.

OMS (OM)

See outage management system (OMS or OM) on page 168.

on-demand read (ODR)

A human-initiated, two-way, instantaneous, and asynchronous communication from the head end system (HES) or meter data management (MDM) system over the network infrastructure to obtain consumption, status, or programming data from gas, water, or electric endpoints.

In Itron Fixed Network, an on-demand read request is initiated either at the Network Web Application (NWA) or the Network Administration Application. The read request is communicated over the advanced metering infrastructure (AMI) network to an Encoder/Receiver/Transmitter (ERT) module on page 81, cell control unit (CCU), or database to obtain the most recent read that does not exceed staleness factor limitations.

one-time schedule

A schedule with a frequency of a single instance.

on-peak

Related to electricity use during periods of time when prices tend to be highest due to increased demand.

On-Premises Hybrid Service (OHS)

A Windows service installed on the customer network to access an on-premises data source, such as the OpenWay Collection Manager on an OpenWay Riva network or the Advanced Metering Manager (AMM) on a Riva Gen5 network. OHS acts as a bridge between the Itron cloud environments and an on-premises data center.

OO (Operations Optimizer)

Internal nickname for Operations Optimizer software on page 167.

Open Shortest Path First (OSPF)

An adaptive routing protocol for Internet Protocol (IP) networks that lets routers dynamically learn routes from other routers and to advertise routes to other routers. It lets routers select routes based on the current state of the network, rather than on a static picture of how routers are connected. It also includes such advanced features as support for a hierarchical topology and automatic load sharing among routes.

Open Smart City Protocol (OSCP)

A protocol standard defined by a group of independent companies used for connecting smart city devices from any supplier to Control and Monitoring Software.

Open Systems Interconnection (OSI)

A standard model developed by the International Organization for Standardization (ISO) that specifies how messages should be transmitted between points in a telecommunications network. The model organizes the communication process so that similar communication functions grouped into each of seven logical layers.

OpenWay

Itron's network and solution platform that comprises smart meters and grid devices communications network infrastructure and data collection software, with a standards-based, multi-application network based on IPv6 architecture jointly developed by Itron and Cisco.

OpenWay CENTRON ABNT

A smart meter featuring open-standards architecture, modular design for flexibility in communications, and extensive features and functionality.

OpenWay CENTRON Cellular LTE-M

An electricity meter that uses Cellular IoT LTE-M Cat-M1 networks to transmit meter data. It includes both Zigbee and RF ERT wireless components that can be configured to customer needs.

OpenWay CENTRON Meter

A smart meter used to collect, process and transmit energy information to utility systems. Calculations and usage data are calculated within the meter itself.

OpenWay CENTRON Polyphase Meter

A smart grid device for use in most commercial and industrial (C&I) applications. It is compliant with the ANSI C12.19 and C12.22 standards for storage and transport of register data over a network.

OpenWay Collection Engine

An advanced metering infrastructure (AMI) head-end application used to register, communicate with, and manage utility devices. The Collection Engine is a C12.22-compliant software application that collects meter data and manages, upgrades, and in some cases connects and disconnects meters through remote two-way communications. The Collection Engine passes collected meter data to the meter data management (MDM) system for storage and manipulation at the utility. It stores information related to registered meter configurations, such as cell relay data, communication paths, group assignments, and firmware versions.

OpenWay Collection Manager (OWCM)

A software designed to securely manage two-way communications to millions of meters for interval data collection. Collection Manager acts as the centralized AMI hub between the field network and the utility back office systems and manages high-volume, secure communications to the meter population to perform tasks such as remote meter reading, operating the disconnect switch, updating firmware and updating the state and behavior of devices within the distribution network. It manages communications and data collection processes to support meter data management, billing, outage management, distribution automation, and load control.

OpenWay Control

A software product based on the Tropos Control network management software. It provides functionality required to manage the smart grid wireless networks as a system, including Itron OpenWay Cell Relays, OpenWay Cell Routers, and Tropos routers.

OpenWay Direct Connect Solution

A solution designed for special situations within an OpenWay on page 163 AMI on page 15 deployment.

OpenWay Gas Module

A radio-frequency (RF) gas meter module used with the OpenWay advanced metering system. The 2.4GZ is built upon the foundation of the Itron 40-series gas ERT module. The 2.4GZ uses open-architecture wireless networking for the ultimate interoperable solution for combination gas and electric utilities.

OpenWay Integrated Cell Router

A two-way communications device which supports smart meters and smart grid applications.

OpenWay network

See OpenWay on page 163.

OpenWay Operations Center (OWOC)

An obsolete term for a family of products that includes OpenWay Collection Manager (OWCM) on page 164, Action Manager (AM) on page 10, and Performance Manager (PM) on page 172.

OpenWay Range Extender

A device that increases the reliability of the RFLAN mesh in geographically sparse regions.

OpenWay Riva 500G ERT Module

An IPv6 open-standards based gas module that offers a flexible RF reading option. It is designed to be read under Itron's OpenWay Riva multi-purpose Internet of Things (IoT) network, or by legacy ChoiceConnect handheld or mobile readers.

OpenWay Riva 500W ERT Module

An IPv6 open-standards based water module that offers a flexible RF reading option. It is designed to be read under Itron's OpenWay Riva multi-purpose Internet of Things (IoT) network, or by legacy ChoiceConnect handheld, mobile and Fixed Network readers.

OpenWay Riva 550G ERT Module

An IPv6 open-standards based gas module that offers a flexible RF reading option. It is designed to be read under Itron's OpenWay Riva multi-purpose Internet of Things (IoT) network, or by legacy ChoiceConnect handheld or mobile readers.

OpenWay Riva CENTRON Meter

An electricity meter which combines robust smart metering functionality with high-performance communications capabilities and a distributed intelligence platform to deliver differentiating capabilities and new approaches to meter-to-grid applications. Designed to ANSI standards for U.S. markets. Also known as OpenWay Riva CENTRON Singlephase Meter.

OpenWay Riva CENTRON Polyphase Meter

An electricity meter which combines robust smart metering functionality with high-performance communications capabilities and a distributed intelligence platform to deliver differentiating capabilities and new approaches to meter-to-grid applications. Designed to ANSI standards for U.S. markets.

OpenWay Riva CENTRON Singlephase Meter

See OpenWay Riva CENTRON Meter on page 165.

OpenWay Riva CGR ACT Module 1

A module which is installed in the Cisco Connected Grid Router and is designed to provide adaptive communications within the network, seamlessly routing packets of information from meters and other grid devices within the mesh network to the head end. This integrated multi-link module enables assured connectivity at lower cost by dynamically routing traffic over Radio Frequency (RF) or Power Line Carrier (PLC) based on connection strength and use case.

OpenWay Riva CGR ACT Module 3S

A plug-In module for the Cisco CGR CGR ACT Module 3 for Star deployments.

OpenWay Riva Electricity Meter

A smart meter which can process, analyze, communicate, and react to grid conditions and business requirements in real-time. The meter is capable of switching between Radio Frequency (RF) and Power Line Carrier (PLC) to ensure the most reliable path. Designed to IEC standards for non-U.S. markets.

OpenWay Riva Gas Disconnect

A device that gives gas utilities the power to shutoff gas remotely as needed. With the optional flood sensor it can automatically shutoff gas when a flood is detected. It is designed to be read under Itron's OpenWay Riva multi-purpose Internet of Things (IoT) network.

OpenWay Riva Leak Sensor

An acoustic water leak sensor that listens for leaks in the distribution system of a water network. With Itron water leak sensors, utilities can locate and repair leaks in their distribution system before they become catastrophic main breaks.

OpenWay Riva network

The standard in grid communications and edge intelligence for smart meters. It is the latest alternative to OpenWay on page 163, and includes Adaptive Communications Technology (ACT) and intelligence to devices at the edge of the network and beyond.

This is Itron's preferred term for referring to switching from mobile mode to the OpenWay Riva network. Do not use the generic term network mode. For example, 500s devices are capable of operating in mobile mode or on the OpenWay Riva network.

OpenWay Riva Pole Mount Router

A device that provides dual mesh network communications for both RFLAN and OpenWay Riva.

OpenWay Riva Polyphase Electricity Meter (CPC Protocol)

A smart meter which can process, analyze, communicate, and react to grid conditions and business requirements in real-time. The meter is capable of switching between Radio Frequency (RF) and Power Line Carrier (PLC) to ensure the most reliable path. Designed to IEC standards for non-U.S. markets.

OpenWay Riva Routing Node - ERT Gateway Star

A device that reads 100g and 100w devices on an IPv6 Riva network.

OpenWay Riva Routing Node - Mesh Node Base

A device that provides for the addition of a mesh node within an OpenWay mesh deployment to address network connectivity challenges. The Mesh Node Base supports both Radio Frequency (RF) and Power Line Carrier (PLC) links.

OpenWay Riva Smart Network Interface Card

A universal, smart, communications module with integrated Adaptive Communications Technology (ACT) designed to be used with third party meter vendors. Also referred to as Smart NIC.

OpenWay Riva Socket-Based Router

A device that provides dual mesh network communications for both RFLAN and OpenWay Riva to add advanced functionality to the network.

OpenWay Riva technology

An IoT-based technology developed by Itron that enhances the capability of the OpenWay solution. OpenWay Riva technology combines RF wireless and powerline carrier communications on the same chipset in the same device.

OpenWay Tools

An application used to interrogate meter data and to diagnose potential meter issues. It contains all of the intuitive means of setting up meter program files and diagnosing field problems. OpenWay Tools includes a group of applications that are used to program, read, and diagnose Itron OpenWay CENTRON meters.

operating cost of goods sold

The direct costs involved in the production of a company's products and services

operating current

The maximum electrical current a device or conductor can carry without being damaged.

operating current (OC)

The maximum electrical current a device or conductor can carry without being damaged.

operational technology (OT)

A category of computing and communication systems to manage, monitor, and control industrial operations with a focus on the physical devices and processes they use. OT computer systems are typically deployed in critical infrastructure industries such as power, water, and manufacturing, and are used to control the physical aspects of networked devices. For example, controlling valves, and regulating temperature, flow, and pressure. OT systems use technologies for hardware design and communications protocols that are unique from those used in informational technology (IT) environments.

Operations & Maintenance (O&M)

The functions, duties and labor associated with the daily activities and normal repairs, replacement of parts and structural components, and other activities needed to preserve an asset so that it continues to provide acceptable services and achieves its

expected life.

Operations Optimizer software

A customer care and outreach, grid management, and network management application. Operations Optimizer software is composed of individually licensed programs that produce valuable insights based on a variety of utility and third-party data. This analytical output is made available to users through a web interface consisting of list information and geospatial representations.

Operator certificate

A private key issued under the SSN Root on page 213 and unique for each customer. The Operator certificate is used to sign all certificates under it in the PKI hierarchy.

Operator key

See Operator certificate.

OpsGuard

A service provided to Itron licensed customers that allows them to better monitor their system, and also allows Itron to view the system for troubleshooting purposes.

optical port

An infrared port on some types of electricity meters that allows network access for meter reads, meter program changes, and other communication.

optical probe

A type of equipment, such as a wand with an optical interface, that is attached to the handheld data collector. An optical probe can be attached to the serial port of a mobile meter data collection device. This probe enables the device to gather data from electric meters that have a special optical port for this probe.

original equipment manufacturer (OEM)

A company that produces parts and equipment that may be marketed by another manufacturer.

orphaned order

A work order that was dispatched to a mobile device and then manually returned (set to the Returned state) on the Field Deployment Manager (FDM) server. The order remains on the mobile device until the next time the device is synchronized with the server.

orthogonal frequency division multiplexing (OFDM)

a type of digital transmission and a method of encoding digital data on multiple carrier frequencies

OSCP

See Open Smart City Protocol (OSCP) on page 163.

OSI

See Open Systems Interconnection (OSI) on page 163.

OSPF

See Open Shortest Path First (OSPF) on page 163.

OT

See operational technology (OT) on page 166.

OTA

See over-the-air on page 168.

outage

A period of time during which power is lost. An interruption or failure in the supply of power.

outage detection and restoration

A process of learning that power is lost and re-enabling the power. Outages can be detected directly with equipment that notifies the utility that the meter or network collector has lost power.

Outages can also be inferred by software analyzing data. Inferred outage detection is the ability to receive and analyze data returned from meter reading systems to determine that a power outage has occurred.

Outage restoration can be signaled in different ways. The meter can send a specific signal stating that the power has been restored, or the utility head end can infer that the power has returned when the head end receives a signal from the meter.

Outage Detection System (ODS)

An Itron application that manages outage-related messages from electricity meters, including last gasp and power restore messages.

outage management system (OMS or OM)

A centralized system that manages the identification of all outage events and the restoration of service in a utility grid. An OMS system usually is tightly integrated with a work order management system (WOMS) on page 239.

outcome

A utility customer solution that consists of software applications, data-delivery services, and quantity tiers for supported numbers of endpoints.

outdoor lighting controller (OLC)

Any device used to control streetlights. Can be either a control node on page 52, photocell on page 174, or street light controller on page 215. See also Smart Street Lighting on page 209.

out-of-band interferers

Transmissions operating below 902 MHz or above 928 MHz that may interfere with transmissions between 902 and 928 MHz. See also in-band interferers on page 114.

out-of-network

The status assigned to endpoints that are to be excluded for any reason from the contract.

out-of-route read

A meter reading that was collected, but the account for that reading was not part of the read-route.

oversampling

The process of increasing the sampling frequency by generating new digital samples based on the values of known samples. In cases where power is restored after an outage but the Smart Street Lighting on page 209 is temporarily unable to reach an AP to synchronize its clock, UtilOS firmware on page 231 begins oversampling data and storing it in temporary flash memory. Once the Itron NIC is able to synchronize its clock, it allocates the stored data into the appropriate intervals and flags those intervals as CONVERTED_INTERVAL.

over-the-air

Wireless communications between devices. Sometimes used to refer to the programming of devices through wireless communications.

over voltage / under voltage (OV/UV)

Over voltage occurs when the voltage is at least 10% higher than the standard voltage. Under voltage occurs when the voltage is at least 10% less than the standard voltage.

OW

See OpenWay on page 163.

OWCM

See OpenWay Collection Manager (OWCM) on page 164.

OWOC

See OpenWay Operations Center (OWOC) on page 164.

OWR

See OpenWay Riva technology on page 166.

P

P2P

See peer-to-peer (P2P) on page 172.

PaaS

See Platform as a Service (PaaS) on page 175.

pacing

The combination of prioritization and rate limiting of packets to endpoints on a subnetwork on page 215.

packet

A unit of data that consists of a header, which contains data such as destination address, and a payload on page 171, which contains application data such as interval read results. See also ping on page 175.

packets in flight

The number of simultaneous packet on page 170s being transferred between a sender and a receiver. A packet in flight is a packet that the sender has sent but the receiver has not yet acknowledged as received.

pad-mounted transformer mounting kit

A mounting kit for installing APs or Relays with a remotely mounted NAN antenna in a secure, fiberglass or plastic, pedestal-type enclosure.

Panasonic Toughbook and Toughpad

Field computers used for Itron Mobile on page 125 and MC on page 140 drive-by and walk-by reading. When equipped with optional GPS on page 104 and barcode on page 27 reader, they support the Field Deployment Manager (FDM) on page 93 deployment functions and Itron Mobile on page 125.

parameters

System settings that determine the way that features function. By changing parameter settings, you can adjust and optimize the way that the functionality works to adhere to the business requirements of a utility company. For example, the logging parameters enable you to specify the location where and the length of time that log files are retained. The utility can change the logging parameter to comply with their internal data retention policy.

parent

A network device to which other devices are registered.

In a radio-frequency local area network (RFLAN) cell, a cell relay or meter through which a child meter communicates with the OpenWay Collection Engine. A meter that communicates with the Collection Engine through a cell relay is the cell relay's child, and the cell relay is the meter's parent. A meter that communicates through another meter in the cell is a child of the meter it communicates through, which is the child meter's parent.

passphrase

A sequence of characters or text used to control access to data, programs, or computer systems. Passphrases can also be used to control access to cryptographic programs, and some systems use passphrases as encryption keys. Passphrases are similar to password on page 170s in usage but generally longer for added security.

password

A string of characters (letters, numbers, and other symbols) used to authenticate an identity or to verify access authorization.

password-protection

Restricting access to files by requiring users to enter a password.

patch

A software fix developed to resolve a critical issue that would stop business operations in a production environment. A patch can be delivered separately from a scheduled release.

path

Refers to how cells, nodes, and endpoints are connected together. For example, the path from cell A to endpoint Z runs through node B. See also route on page 196.

path cost

a calculation that helps network administrators and systems determine optimal paths for communications across the mesh network. In general, high information success rates, like high hop-count numbers, translate into lower route costs.

path loss

Total amount of power lost in the propagation of the RF signal from the transmitter to the receiver.

payload

The part of a packet that is not the header. Payloads consist of application data such as interval read results. In the case of an on-demand read (ODR) on page 163 ping, the user can set the payload size to increase or decrease the size of the packet. In RF networks, small packet on page 170s can traverse the network more successfully than larger packets. When performing an On Demand ping on page 175, users can configure the payload up to 255 bytes.

PBU

See product business unit (PBU) on page 181.

PCA

See Permit Certificate Authority (PCA) on page 172.

PCBA

See printed circuit board assembly (PCBA) on page 181.

PC Card

See Personal Computer (PC) card on page 173.

PCI

See peripheral component interconnect (PCI) on page 172.

PCMCIA card

See Personal Computer Memory Card International Association (PCMCIA) card on page 173.

PCOMP

See pressure compensation multiplier (PCOMP) on page 180.

PCOMP factor

See pressure compensation (PCOMP) factor on page 180.

PC-PRO+ Advanced

A software suite that enables users to directly communicate with devices via an optical connection. The intended use ranges from the management of user settings, creation of device programs, meter shop testing, and performing local meter operations.

PCT

See programmable communicating thermostat (PCT) on page 182.

peak demand

A period (day, month, year) when electrical power is expected to be provided for a sustained period at a significantly higher than average supply level.

peaking capacity

Capacity of generating equipment normally reserved for operation during the hours of highest daily, weekly, or seasonal loads.

peaking plant

A power plant that normally operates only during peak load periods.

peak shaving

Reduction of load during peak periods or events. Participating utilities want to reduce peaks and fill valleys so that power plants and infrastructure are more efficiently used. Participating customers are typically commercial & industrial (C&I) on page 46 customers that receive rebates for reducing load during peak periods or events.

time of use (TOU) on page 223 rates are used to encourage individual customers to reduce load during peak usage periods for that geographical area. Also known as peak shaving, this decreases the need to run or build extra power plants simply to support these peaks.

peer domain

In the context of Tenant Management on page 221, a trusted external domain that contains existing user identities within the Itron Identity Service.

peering

An agreement among network providers to connect one another's internet traffic without having to pay for third-party services to transfer data packets.

peer-to-peer (P2P)

A type of computer network that consists of two or more computers that pool their individual resources such as disk drives, CD-ROMs, and printers. These shared resources are available to every computer in the network, while each two of them communicate in a session.

In contrast, a client-server network consists of multiple client computers connecting to a single, central server computer. The server is a host running one or more server programs that share their resources with the clients.

Performance Manager (PM)

A software application that enables customers to manage and operate an AMI system at scale. Examples of management features include the ability to report with integrated visualization, SLA tracking, fault detection and exception management.

peripheral component interconnect (PCI)

A local 64-bit bus standard developed by Intel® Corporation. Most personal computers (PCs) and some Macintosh computers include a PCI.

permit

In Itron cryptographic practice, an additional security check within the X.509 digital certificate hierarchy that is used to implement rate limitation on critical command on page 54. A permit must be signed by the private key of the certificate authority with privileges associated with the issued command.

Permit Certificate Authority (PCA)

The authority that signs Itron application permit certificates.

permit signer

The private key on page 181.

persona

In the context of Tenant Management on page 221, a user with a predefined set of roles within the Itron Identity Service. Personas are issued a certain set of security permissions, or grants, needed to achieve their goals as system users.

Personal Computer (PC) card

A plug-in module device used to add functionality (such as wireless network access and additional RAM) to laptop computers and, less commonly, desktop computers. There are three types of PC Cards: type I, II, and III.

PC Card types vary by physical thickness, data path, data rate, and voltage. Type I PC Cards are available as a 16-bit interface, while type II and type III PC Cards are available as a 16-bit or 32-bit interface. The PC Card was superseded by the ExpressCard in 2003. PC Card was previously known as Personal Computer Memory Card International Association (PCMCIA) card on page 173.

Personal Computer Memory Card International Association (PCMCIA)

An industry group organized in 1989 to promote standards for a credit card-size memory or I/O device that would fit into a personal computer, usually a notebook or laptop computer.

Personal Computer Memory Card International Association (PCMCIA) card

An obsolete term for Personal Computer (PC) card on page 173.

personal identification number (PIN)

An alphabetic, numeric, or alphanumeric code or password used to authenticate an identity.

personality module, CENTRON Meter

The component of the CENTRON Meter that contains the meter display, register functionality, and communication capabilities. Each version of the meter is distinguished by the personality module that is mounted on the standard meter metrology base. Available personality modules include:

- Energy only
- Demand
- Time-of-use (TOU) with demand
- Load profile with TOU and demand
- Energy only with radio-frequency automated meter reading (AMR)
- Cellnet Fixed Network
- Energy plus demand with radio-frequency AMR

Personalization

See FSU Personalization on page 96.

PEV

See plug-in electric vehicle (PEV) on page 176.

PF

See power factor (PF) on page 178.

PHEV

See plug-in hybrid electric vehicle (PHEV) on page 176.

PHMSA

See Pipeline and Hazardous Materials Safety Administration (PHMSA) on page 175.

PHMSA 49 CFR 192

A Code of Federal Regulations (CFR) standard for the transportation of natural and other gas by pipeline. The code was created by the Pipeline and Hazardous Materials Safety Administration (PHMSA) on page 175.

photocell

An outdoor lighting controller (OLC) on page 168 device mounted to a streetlight luminaire that detects how much sunlight is available, and switches the light on or off in response. The Itron NIC used for communications across the mesh network can be installed in streetlight photocells. See also Smart Street Lighting on page 209.

photovoltaics (PV)

A semiconductor technology for generating electrical power by converting solar radiation into direct current (DC) electricity. PV power generation requires solar panels composed of solar cells containing photovoltaic materials.

Phy Frame

A data unit that is transported across the physical layer.

physical relays

Used to physically control and connect one or more assets through a Direct-to-Grid on page 69 load control switch (LCS) on page 135. Typical assets are HVACs, water heaters, and pool pumps. Each relay allows control signals to turn the asset behind the switch on or off.

An HVAC, for example, could include multiple components (such as a first stage compressor, second stage compressor, fan, and heat strip), each of which is connected to and controlled by a separate physical relay.

When sending a DRLC event, you might want to control only certain components. For example, the utility might want to turn off the compressors but keep the fan on. The switches accomplish this through virtual relays on page 233, each of which is associated with multiple physical relays.

Pick to Order (PTO)

A stocking strategy implemented in Oracle platforms which does not involve manufacturing. Can indicate either a configuration model or a kit. In both cases, PTO implies that multiple items are picked based on one line item on a sales order. The options for picked items are based on a selection from a variety of finished products from a relatively small number of sub-assemblies and components. Because there is no manufacturing involved, PTO models or PTO kits can be shipped as soon as they are ordered, depending on the availability of the required items. When the pick list is generated for these items, the individual items that were selected (in the case of a PTO model) or that were part of the standard PTO kit are printed in the pick list, which can then be picked and shipped.

A PTO kit consists of:

- Standard bill of material with mandatory included items
- Pick slip used to kit included items

A PTO configuration consists of:

- Pick-to-Order models with optional Assemble-to-Order items
- Pick-to-Order model containing Assemble-to-Order model

PIM-SM

See Protocol Independent Multicast – Sparse Mode (PIM-SM) protocol on page 182.

PIN

See personal identification number (PIN) on page 173.

ping

A program that tests the reachability of devices on a network. The ping program sends a packet on page 170 to the named device and returns data indicating how long, in milliseconds, the packet took to reach the device and return (also known as round trip time). See also reachable on page 189 and traceroute on page 224.

PingFederate® (PingFed)

A product offering of Ping Identity®, PingFed is an enterprise federation server that enables user authentication and standards-based single sign-on (SSO) for employee, partner, and customer identity types.

Pipe Asset Management

A solution that uses artificial intelligence (AI) and machine learning to take the guesswork out of identifying water utility distribution pipes that need to be replaced or repaired. The tool also identifies lead pipe locations so they can be prioritized for removal.

Pipeline and Hazardous Materials Safety Administration (PHMSA)

A U.S. Department of Transportation agency that creates and enforces regulations for the careful, consistent, and environmentally sound operation of the nation's pipeline transportation system. The agency is also responsible for monitoring hazardous material shipments by air, land, and sea. The agency consists of the Office of Pipeline Safety and the Office of Hazardous Materials safety.

pipe-to-soil potential

The voltage potential generated between a metal pipe and a standard reference electrode in the surrounding soil. Most utilities use a copper-copper sulfate electrode as the standard reference cell to predict electrolytic corrosion.

pit set

A water meter that is installed underground in a pit or vault.

PKCS

See public key cryptography standards (PKCS) on page 184.

PKCS #11

A standard set of APIs and shared libraries that isolate an application from the details of the cryptographic device. This enables the application to provide a unified interface for PKCS #11-compliant cryptographic devices.

PKI

See Public Key Infrastructure (PKI) on page 184.

Platform as a Service (PaaS)

A category of cloud computing services that provides a platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining the infrastructure typically associated with developing and launching an app.

PLC

See power-line carrier (PLC) on page 178.

PLG

See power light gradient (PLG) on page 178.

plug-in electric vehicle (PEV)

Any vehicle that can be recharged from an external source of electricity, such as wall sockets, and the electricity stored in the rechargeable battery packs drives or contributes to drive the wheels. PEV is a subset of electric vehicles that includes all-electric, or battery electric vehicles (BEVs), and plug-in hybrid electric vehicle (PHEV) on page 176.

plug-in hybrid electric vehicle (PHEV)

An automobile which combines a gasoline or diesel engine with an electric motor and a large rechargeable battery. Unlike conventional hybrids, PHEVS can be plugged-in and recharged from an outlet, allowing them to drive extended distances using just electricity.

plug sensor

See smart plug on page 209.

PM

See Performance Manager (PM) on page 172.

PMCR

See pole-mounted cell relay (PMCR) on page 176.

PMFEA

See Process Failure Modes Effects and Analysis (PFMEA) on page 181.

PMR

See pole mount router (PMR) on page 176.

PN sequence

See pseudo-noise (PN) sequence on page 183.

PoE

See Power over Ethernet (PoE) on page 178.

Point-to-Point Protocol (PPP)

A protocol used across physical networks (for example, cellular networks, fiber-optic networks, phone-line networks, and broadband Internet networks) that use different network layer protocols to establish direct connection and enable network operation on the same communication link. PPP can also provide connection authentication and message transmission encryption and compression.

OpenWay uses PPP in the interface between the Connected Grid Mesh Communications Module (CG-Mesh) and the Application Module in the OpenWay CENTRON Meter.

pole

A column or post where to mount conductors and equipment in a power system. Also known as a utility pole.

pole mount router (PMR)

A device that communicates between the internet and the devices that are connected to the internet. See also OpenWay Riva Pole Mount Router on page 166.

pole-mounted cell relay (PMCR)

An Itron OpenWay cell relay that is mounted on a utility or light pole. The cell relay contains the cell relay and cell master components within one housing. The PMCR is designed to achieve better radio-frequency local area network (RFLAN) performance by mounting the device at higher elevations on utility poles or other assets. The PMCR has four antennas that

support wide area network (WAN), RFLAN, and Zigbee on page 242 (2) communications. There are two external connectors that are used for power and Ethernet. The external connectors are weather-proof when used with Itron-specified cables.

pole number

The numerical identifier of the utility pole associated with a meter.

Pole Sensor

A device that, when mounted to utility poles, allows customers to monitor pole characteristics such as tilt, orientation, and shock/impact from hazardous weather and other events.

policy

The rules regarding what types of commands are rate-limited, including what privileges certificates possess. See also rate limitation on page 188.

POLR

See provider of last resort (POLR) on page 183.

polyphase

Consisting of more than one phase.

polyphase meter

Electricity watt-hour meters that are used to measure energy flow in polyphase currents. Polyphase meters are typically used for commercial and industrial (C&I) service locations, which have higher demand for power than the conventional home. Also called commercial and industrial (C&I) meter.

PON

See positive outage notification (PON) on page 177.

See power outage notification (PON) on page 178.

port

In networking, a port is used in conjunction with a computer address that specifies a process running on the destination computer.

Portable Operating System Interface (POSIX™)

A family of standards, specified by the Institute of Electrical and Electronics Engineers (IEEE), to maintain compatibility among operating systems. POSIX defines a standard operating system interface and environment, including a command interpreter, or “shell”, and common utility programs to support applications portability at the source code level.

positive outage notification (PON)

A message sent by a device saying it has lost electric power. PON is a component of Itron’s Fixed Network technology that enables utilities to detect and locate outages within two minutes, often ahead of customer calls.

POSIX™

See Portable Operating System Interface (POSIX™) on page 177.

potable water

Water that is of acceptable quality for drinking.

potential transformer (PT ratio)

Potential transformers, also known as voltage transformers (VT), are used to convert high voltages to safe levels before the high voltages or currents reach the transformers or meters. The PT ratio is the voltage ratio between the primary and secondary

windings. The primary winding has a greater number of turns than the secondary winding. In North America, the PT ratio is typically chosen so that the nominal secondary voltage is 120 volts.

power

The energy transfer rate, typically measured in watts.

power factor (PF)

The ratio of real power (kW) actually used in an electrical circuit to apparent power (kVA), that is, the power being drawn from the power source.

power-line carrier (PLC)

A communication system that transmits data between devices over power lines. Also known as power-line communications.

power light gradient (PLG)

A factor used to address the fact that a 50% dimming level on a light does not necessarily correspond to a 50% lamp power output. In Communications Tester, this is expressed as an attribute for the lamp type and calculated as the ratio of change in light level divided by change in power level. The value is likely to vary for each light manufacturer/model. If the value is not known, it is assumed to be 1.

Power Monitor

An Itron application that provides real-time alerts for voltage sags and swells on monitored endpoints. To enable monitored endpoints, you create voltage profiles. A voltage profile establishes high and low thresholds for line voltage that, if violated, sends a trap to Advanced Metering Manager (AMM) application on page 13 which is forwarded through Java Messaging Service (JMS) to external applications, including voltage optimization systems. This product has been improved and released as SensorIQ Application on page 204.

power outage notification (PON)

An alert that is sent over the network when a meter loses power. When a meter loses power, it is no longer able to forward messages from other meters. In the case of a widespread outage in a radio frequency (RF) Mesh system, meters that can be heard by the cell relay (at levels 2, 3 and sometimes 4) will report loss of power upstream. The meter sends three short PON messages, powered by the energy stored in the meter's capacitors.

power out message

See last gasp (LG) on page 131.

Power Over Energy

An energy literacy initiative Itron participates in focused on educating, empowering, and motivating people to make smart decisions about how electricity is used.

Power over Ethernet (PoE)

An IEEE 802.3af standard that allows Ethernet on page 87 cables to supply the power for network devices while they are transmitting data.

power pool

Two or more interconnected utilities that coordinate operations and resources to meet the utilities' combined load in the most economical and efficient way.

PowerPortal

Part of the URL for the customer engagement port module of IntelliSOURCE Enterprise on page 118.

power quality

The metrics associated with powering and grounding electronic equipment in a manner that is appropriate for that equipment and compatible with the service location's wiring system and other connected components.

Many polyphase meters are capable of detecting and measuring power quality issues, such as sags, surges, and harmonics.

Power Quality Monitoring (PQM)

A technique to monitor sags and swells in real-time and take action before they result in power quality violations or equipment overload. This functionality is provided through Power Monitor on page 178 or SensorIQ Application on page 204.

Power Restoration Notification (PRN)

A message sent when power is restored to the meter after an outage, which executes the reboot process that enables metrology, register, and communications functions.

Power Save Mode (PSM)

The Power Save Mode (PSM) in 802.11 deactivates the wireless network interface during periods of inactivity.

power supply block

An Encoder/Receiver/Transmitter (ERT) module on page 81 component that provides electricity to the module’s electronic components.

power supply unit (PSU), computer

A computer component that converts alternating power (AC) electricity to low-voltage regulated direct current (DC) for the computer's electronic parts.

PPP

See Point-to-Point Protocol (PPP) on page 176.

PPV

See purchase price variance (PPV) on page 185.

PQM

See Power Quality Monitoring (PQM) on page 179.

PRN

See Power Restoration Notification (PRN) on page 179.

preferred Access Point

See primary Access Point (AP) on page 181.

Preferred Roaming List (PRL)

A database residing in a code division multiple access (CDMA) device that contains the information the device needs to obtain service outside of the device's home network. Information in the PRL includes but is not limited to, service provider identifiers and the radio frequency bands over which the device scans for alternative service providers. In Itron cell relays, the activation process updates the PRL after the cell relay is installed or relocated.

premise ID

A unique numeric service address identifier, including the apartment or suite.

premises/premise

A physical location, such as a building, complex, or street address where metering equipment is installed. A customer’s premises may have one or more service points. However, the term premises refers to a physical location, whereas service point refers to

the service delivery location. In most billing systems, premises acts as a constant identifier for a physical location, unchanging over time.

The term premise is incorrectly used throughout Itron. The correct term is premises, which is always plural. Suggested alternative terms are, premises, location, or site.

prepaid metering

Utility metering business model that requires advance payment to the utility by the customer before the utility can be used. Requires a prepaid meter (sometimes called a prepayment meter) to be installed at the service location.

prepayment metering

Utility metering business model that requires advance payment to the utility by the customer before the utility can be used. Requires a prepaid meter (sometimes called a prepayment meter) to be installed at the service location.

pre-shared key (PSK)

A key that has previously been shared between two parties over a secure channel.

Pressibar+

A pressure reducer designed to protect an insulated appliance (water heater, boiler, refrigerator, water cooler, and so on).

pressure compensation multiplier (PCOMP)

A static multiplier value applied to the result of (pulse count * count rate) and is delivered in units of 1/10000 of an engineering unit. There are a few different uses of PCOMP in various endpoints. Sometimes PCOMP is a static pressure compensation value applied to families of meters and/or meter locations within a service territory. PCOMP is applied to compensate for a generalized pressure of the commodity within the distribution line. Sometimes PCOMP is an error correction multiplier used to compensate for a known difference between pulse count and actual consumed volume.

This should not be confused with Fixed Factor billing where pressure is recorded or defined for certain customers and is applied to the index consumption reading in the customer information system (CIS). The rate is factored into the multiplier that the end customer would see on an invoice.

pressure compensation (PCOMP) factor

A value programmed into an endpoint to compensate for the effect of atmospheric pressure on recorded consumption.

pressure regulator

A device that maintains a level of pressure in a fluid flow line, regardless of the rate of flow in the line or the change in upstream pressure.

previous demand

The maximum demand (peak demand) on page 140 from the most recently completed interval. See also demand on page 63.

price cap

A level above which regulated prices may not rise.

pricecast

A message used to send price and other information to thermostats, which allows utilities to call special pricing events and have thermostats react in an automated fashion to help save customers money, and reduce peak usage for the utility. Customers are offered lower off peak rates in exchange for installing these connected thermostats. Pricecast runs at least once daily throughout the year, as prices can change even during peak/winter seasons due to block rate on page 30 rate plans are affected, or VPP event, which affects only customers on VPP rate plans. VPP events indicate periods of the day that do not have off-peak pricing set, and they can be Low, Standard, High, or Critical.

price response

The reduction of electrical consumption at the customer level in response to wholesale electricity price signals.

price signals

As managed by Itron through the HAN Communications Manager (HCM) on page 106 application, price signals indicate to customers, typically through HAN devices on page 106, changes in their utility's rates for electricity. This helps customers to know about or respond to rate changes, so they can limit expenses by reducing or shifting their use during high-cost periods.

price transparency

Market prices to generate and transmit service to the public. This allows customers to know how much they will pay for power supply and transportation in a deregulated market.

primary Access Point (AP)

The best performing, most reliable Access Point as determined by the endpoint device. Also known as the preferred Access Point. See also secondary Access Point (AP) on page 201.

printed circuit board assembly (PCBA)

The process of joining the wirings on a printed circuit board with electronic parts.

private key

The unpublished key in a cryptographic system that uses two keys for encryption and decryption. When encryption keys must be negotiated, key agreement takes place by combining one public key on page 184 with a private key from another key pair over a secure association. See also root key on page 196.

PRL

See Preferred Roaming List (PRL) on page 179.

processed

Indicates whether the specific functionality has reached its completion.

Process Failure Modes Effects and Analysis (PFMEA)

A qualitative tool used with the intention of preventing failures. Also called Process Failure Modes Effects and Analysis (FMEA) on page 91, it is an aid to initiatives for process improvement to identify and analyze potential failures in a process.

product business unit (PBU)

Itron's product business units include:

- Devices
- Networks
- Outcomes

Product Security Incident Response Team (PSIRT)

A team dedicated to Cisco® security intelligence operations. PSIRT manages the receipt, investigation, and public reporting of security vulnerability information related to Cisco products and networks.

program

A group of related projects and activities managed in a coordinated way to achieve a single set of system-level requirements. Programs may also include elements of related work outside the scope of the discrete projects in the program.

programmable communicating thermostat (PCT)

A thermostat that can be programmed by the user to respond to user time and temperature preferences and can communicate with the utility. It can also be programmed to respond to control heating, ventilation, and air conditioning (HVAC) components based on utility-determined grid-level system emergencies, demand response programs, and pricing events to modify demand during peak times.

program seal

A hash value on page 107 of the meter program used to uniquely identify meter programs. Any change detected in the seal indicates a legitimate re-programming of the meter, tampering, or damage.

project

A standalone endeavor with a definite beginning and end undertaken to create a complete product, service, or requirement set. Projects within a Program are related through the common outcome or collective capability to fulfil a single set of system-level requirements. A project may or may not be part of a program but a program will always have projects. If the relationship between projects is only that of a shared client, seller, technology, or resource, the effort should be managed as a collection of projects rather than as a program.

projected demand

The estimated maximum demand (peak demand) on page 140 that a meter will accumulate by the end of the current interval. See also demand on page 63.

promiscuous network ID

A network node that uses the promiscuous network ID can join any other network and accept packets from any other node. Similarly, any node can accept packets from a node using the promiscuous network ID.

propagation

The motion of waves through or along a medium.

protective filters

Filters that are robust and compact for easy and durable installation in harsh environments. The “V” shaped design helps District Heating Companies keep their installations safe from undesired particles.

protocol

An agreed upon format for transmitting data between two devices. Protocols have rules that govern the syntax, semantics, and synchronization of communication. Protocols may be implemented by hardware, software, or a combination of both.

Protocol for Access, Configuration and Transfer (PACT)

A specification for transporting data between different electricity meter types and the host tariff (billing) system.

Protocol Independent Multicast – Sparse Mode (PIM-SM) protocol

A protocol for efficiently routing Internet Protocol (IP) packets to multicast groups that may span wide-area and inter-domain Internets. The protocol is called “protocol independent” because it is not dependent on any particular unicast routing protocol for topology discovery, and sparse-mode because it is suitable for groups where a very low percentage of the nodes (and their routers) will subscribe to the multicast session.

Protocol Specification for Electricity Meters (PSEM)

A protocol commonly used with North American meters as the interface between the meter and automatic meter reading (AMR) on page 24 communications add-ons. PSEM is part of the C12.18 ANSI standard for electricity meters. Also known as Protocol Standards for Electricity Meters.

Protocol Specification for Electricity Meters X (PSEMX)

A variation of the PSEM protocol that allows for the logon, security, and read/write services to be encrypted and authenticated to removing the possibility of simple packet tampering and replay. This authentication allows the meter to verify that highly important messages such as service disconnect originate from the back office. See also Protocol Specification for Electricity Meters (PSEM) on page 182.

provider of last resort (POLR)

A utility that is legally designated to provide service to a customer that other suppliers have declined to serve.

provision

See join on page 127.

provisioned [OW]

The state of a device that has been authenticated to communicate with the OpenWay Collection Engine over an OpenWay network.

provisioning

In Field Deployment Manager (FDM), the process of installing, configuring, or updating the mobile software application.

In OpenWay, the process of preparing meters for deployment into an OpenWay radio frequency (RF) Mesh network. Meters that have completed the provisioning process have embedded security keys, certificates, and an assigned service set identifier (SSID).

PSEM

See Protocol Specification for Electricity Meters (PSEM) on page 182.

PSEMX

See Protocol Specification for Electricity Meters X (PSEMX) on page 183.

pseudo-noise (PN) sequence

A preamble or introductory bit sequence transmitted to an endpoint in a wake-up tone, allowing the endpoint to predict when it should turn on its receiver.

PSIRT

See Product Security Incident Response Team (PSIRT) on page 181.

PSK

See pre-shared key (PSK) on page 180.

PSM

See Power Save Mode (PSM) on page 179.

PSU

See power supply unit (PSU), computer on page 179.

PTO

See Pick to Order (PTO) on page 174.

public (asymmetric) key encryption

A cryptographic system that uses a key pair—a public key and a mathematically related private key. The public key can be shared and is used to encrypt the data. The private key is known only to the recipient of the encrypted message and is used to decrypt it. This system enables users of unsecured networks to securely exchange data.

Also called asymmetric key encryption.

public key

A key that is bound into a digital certificate or other digitally signed object. It is often the public part of an asymmetric key pair that is typically used to verify signatures or encrypt data. The public key may be widely distributed. Data encrypted with the public key can only be decrypted with the corresponding private key. Public keys are bound into X.509 digital certificates in a predefined hierarchy. See also .

public key cryptography standards (PKCS)

Standards that are devised and published by RSA Laboratories and which relate to RSA asymmetric key algorithms, to promote and facilitate the use of public key techniques.

public key hash value

A value used in a public key algorithm to encrypt messages by turning a variable-sized amount of text into a fixed-sized output (hash value). Hash functions are used in creating digital signatures, hash tables, and short text condensations for analysis purposes.

One example of a public key hash value is the digital signature that is created through the SHA-256 algorithm (called a hash function) and used to verify the correct six public keys are installed in an OpenWay CENTRON Meter.

Public Key Infrastructure (PKI)

A framework for creating a secure method for exchanging information based on public key cryptography. The foundation of PKI is the Certificate Authority (CA) on page 39, which issues digital certificates that authenticate the identity of organizations and individuals over a public system. The certificates are also used to sign messages, which ensures that messages have not been tampered with.

Public Utilities Commission (PUC)

A state regulatory agency that establishes and oversees policy guidelines and provides direction to public utilities.

publishing

The method that HAN Communications Manager (HCM) on page 106 uses to push new energy rates to an Energy Services Interface (ESI) on page 84.

PUC

See Public Utilities Commission (PUC) on page 184.

Pulsadis

A ripple control system for street lights.

pulse

The raw units electricity meters record. Pulses are converted into watthours.

pulse multiplication factor

See Secure Copy (SCP) on page 201.

pulser-type ERT module

An Encoder/Receiver/Transmitter (ERT) module on page 81 that calculates consumption by counting a meter register's pulses or switch closures. In contrast, an encoded register-type ERT module gets consumption data from a meter by reading messages sent by a meter index containing the data.

pulse weight

The number of cubic feet of gas per rotation of the gas meter wriggler, or per signal from the pulser.

purchase price variance (PPV)

The difference between the standard or budgeted price per unit of an item or service and the amount actually paid multiplied by the number of units bought.

PuTTY

A free and open-source terminal emulation software program and network file transfer application. Microsoft Windows users use PuTTY to securely connect to remote computers over the Internet, using Telnet and Secure Shell (SSH) network protocols. In Itron OpenWay solutions, PuTTY is used to open a command-line interface to communicate with cell relays. In Itron radio-based Fixed Network solutions, PuTTY is used to open a command-line interface to communicate with cell control units (CCUs).

PV

See photovoltaics (PV) on page 174.

PV inverter

An electrical power converter that transforms the variable direct current (DC) output of a photovoltaic (PV) solar panel into an alternating current (AC) that can be used in an off-grid system or fed into an electrical grid.

Python™

A high-level, interpreted, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation.

Q

QA

See quality assurance (QA) on page 186.

QC

See quality control (QC) on page 186.

QoS

See Quality of Service (QoS) on page 186.

quality assurance (QA)

The maintenance of a desired level of quality in a service or product, especially by means of attention to every stage of the process of delivery or production.

quality control (QC)

A system of maintaining standards in manufactured products by testing a sample of the output against the specification.

Quality of Service (QoS)

- The description or measurement of the overall performance of a service, such as a computer network or a cloud computing service, particularly the performance seen by the users of the network.
- A method of prioritizing network traffic. The Cisco radio frequency (RF) Mesh network uses standard Internet Protocol (IP)-based QoS to support multiple types of data traffic flows. Data packets are marked and prioritized enabling mission critical applications to be prioritized over data collection or firmware downloads. In the OpenWay SR 5.0 solution, an administrator uses QoS to set traffic priority during installation of the OpenWay Collection Engine.

queue

A list. In Advanced Metering Manager (AMM) application on page 13, a list of meters associated with a schedule is referred to as a queue. In general computing, a queue can be a list of commands to execute one by one.

R

RabbitMQ™ Software

A lightweight open-source message broker software that implements the Advanced Message Queuing Protocol (AMQP) and other protocols.

RAC

See real application clustering (RAC) on page 190.

radio access network (RAN)

The part of a mobile telecommunication system that connects a device such as a mobile phone, computer, or any remotely controlled machine to a core network via a radio connection.

In Itron's Fixed Network, the communication network connecting cell control units (CCUs) to endpoints is a RAN.

radio carrier frequency

The radio frequency used by a data collection device to transmit a wake-up tone to an Encoder/Receiver/Transmitter (ERT) module on page 81. ERT modules that use wake-up tones wait until they receive a wake-up tone before transmitting their meter reading and tamper data in a standard consumption message (SCM). To wake up an ERT module, a data collection device emits a utility-specific wake-up tone using a radio frequency of 952 MHz or 956 MHz. Each ERT module can receive a range of carrier frequencies but only responds to the wake-up tone it is programmed to recognize. A utility must receive a license from the Federal Communications Commission (FCC) or Industry Canada (IC) for a specific carrier radio frequency to legally operate a data collection device at that frequency.

radio frequency (RF)

The rate of oscillation of transmitting waves of a given radio message or broadcast. RF is the electromagnetic field generated by AC current that is suitable for wireless communications.

radio-frequency communications block

An Encoder/Receiver/Transmitter (ERT) module on page 81 component that receives a wake-up signal from and transmits data to a data collection device.

Radio-Frequency Configuration Tool (RFCT)

The configuration tool used by Itron international RF devices to configure them. It is used to read, configure, and check radio devices like: AnyQuest Cyble, EverBlu Cyble, Cyble 5, RF Option Board, and Intelis Water Meter.

radio-frequency local area network (RFLAN)

An Itron-proprietary local area network (LAN) consisting of an OpenWay cell relay and the CENTRON meters that communicate with it through radio frequency connections. Each cell relay can support up to 2000 meters. Connectivity between a meter and a cell relay can be direct, through another smart meter, or through multiple layers of smart meters. The RFLAN network is dynamic and self-healing. If the connection between a meter and a cell relay is broken or blocked, the meter locates another connection path through the network mesh to the cell relay.

RADIUS

See Remote Authentication Dial-in User Service (RADIUS) on page 192.

RAID

See redundant array of independent disks (RAID) on page 191.

RAM

See random access memory (RAM) on page 188.

RAN

See radio access network (RAN) on page 187.

random access memory (RAM)

A type of computer memory, usually in the form of semi-conductor chips, that the central processing unit (CPU) and other devices write information to and read information from. Information in RAM can be accessed randomly, in any order, without regard to the order in which it is stored. RAM normally holds data only while the computer is turned on and loses it when the computer is turned off.

Random phase multiple access (RPMA)

A combination of technologies owned by Ingenu which are designed for wireless machine-to-machine communication.

Range Extender

An additional node in a network that builds density or extends the perimeter of the existing network.

Raspberry Pi®

A computing solution that fits a wide range of applications. From micro-controllers to ARM-based computers, it provides robust computing power and low power draw.

rate base

The value of assets and property on which a utility is permitted to earn a specific rate of return. Rate base is usually established for a utility by a regulatory body such as the Public Utilities Commission (PUC).

rate limitation

Refers to a limitation of the number of critical command on page 54 that can be issued within a configured length of time to protect the security of the power grid. Disconnect and connect are examples of critical commands that can only be issued by individuals authorized to do so.

rate plan

See regulated price plan (RPP) on page 192.

rate structure

The various rates charged by a utility for its services.

rate threshold

A sliding window of time during which permits can be issued and, correspondingly, users can issue a valid critical command, such as a disconnection of service. After this time limit has expired, no permit on page 172 is issued.

raw materials inventory (RMI)

The total cost of all product components in stock that have not been and are not yet being used to manufacture the product.

RBAC

See role based access control (RBAC) on page 196.

RDBMS

See relational database management system (RDBMS) on page 192.

RDS

- Remote Disconnect Switch
- Remote Disconnect Service

reachable

The ability to send and receive data to and from a meter. A reachable meter is usually readable. However, a meter may be reachable with small packet sizes, but may not be readable with the larger packet sizes necessary for a successful read.

reactive energy

The electrical energy produced, flowing, or supplied by an electric circuit during a time interval, measured in units of kilovolt-ampere reactive hours (kVARh) on page 129 or standard multiples thereof. It is the integral of reactive power on page 189 with respect to time.

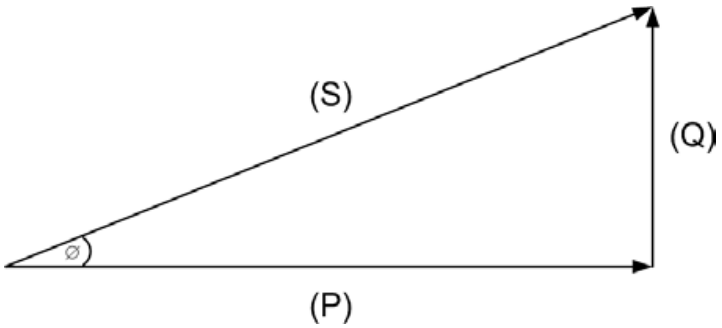
reactive power

The dissipated power resulting from inductive and capacitive loads measured in and symbolized by the letter Q.

In electrical grid systems, the power that flows back from a destination toward the grid in an alternating current scenario. In a direct current system, the voltage and load is static, and the direction of energy is "one way," but in alternating current, there are different phases.

For sinusoidal quantities in a two-wire circuit, reactive power is the product of the voltage, the current, and the sine of the phase angle between them with the current taken as reverence. In a polyphase circuit, it is the sum of the reactive powers of the individual phases.

The following figure is the Power Triangle. The Power Triangle relates true (P), reactive (Q), and apparent power (S) in trigonometric form.



Reactive power is also known as phantom power or wattless power. See also kVAR lead on page 130.

reader

A cell control unit (CCU or collector) or repeater in an Itron Fixed Network system.

read (meter read)

The collection of usage data from a meter. Collections of meter reads are referred to as read data.

read schedules

Defined time periods within which meter readings are collected.

read success rate (RSR)

Percentage of meter reads saved to the relational database management system (RDBMS) on page 192 during a 24-hour period. For example, the default interval schedule reads meters every two hours or 12 times per day. If a meter is read 11 times, the RSR is 92%.

The RSR is a useful metric for determining the reachability of a meter during various times of day. This data determines at what times of day meter reachability declines so administrators can plan schedules accordingly. Unlike BSR, which is a metric for successfully completed, intact meter reads that correspond to a business rule (completed reads from midnight to midnight), RSR

is a metric for meter reads per schedule. See also billing success rate (BSR) on page 29 and message success rate (MSR) on page 142.

ready to secure

A security level employed by ChoiceConnect endpoints that support enhanced security, such as Itron's 100 series endpoints. In ready-to-secure mode enhanced security is not enabled and the endpoint employs only the kind of basic security features supported by Itron's earlier endpoint types.

real application clustering (RAC)

A shared disk clustering technology that is used to run multiple databases instances against shared data files. over multiple hardware systems. Using RAC, multiple hardware systems in the cluster appear as a single database to the application. Most often refers to Oracle RAC, which is Oracle's premier disk clustering technology.

real time pricing (RTP)

Enables frequent price adjustments based on real-time market conditions. Prices may change hourly, with one-hour or one-day notice, and are based on actual wholesale prices or on statistical models that forecast wholesale prices. Customers are notified in advance of the price change, allowing them time to curtail demand. See also critical peak pricing (CPP) on page 55 and time-of-use (TOU) rate on page 223.

real-time clock (RTC)

A computer clock, usually an integrated circuit, that keeps track of the current time.

real-time data

Real-time or near-real-time data collection is the ability to collect data automatically on demand, and have the data analyzed immediately to effect monitoring and control decisions. This can be data directly collected from the meter (real-time) or logically derived from data in the database (near-real-time). Real-time or near-real- time data collection is a key component of Smart Grid Technology.

real-time pricing

Electricity rates that reflect the actual moment-by-moment cost of providing electricity.

reboot counter

This counter, which resides within the last gasp (LG) on page 131 trap having preceded it, due to the LG trap having been lost.

received signal strength indicator (RSSI)

A circuit that measures and indicates the strength of an incoming (received) signal in a receiver. A common example is the signal strength indicator on a cell phone.

recloser

A switch or circuit breaker that re-establishes an electrical circuit manually, remotely, or automatically after an interruption of service.

reclosure

In an electric utility distribution system, functionality executed by a recloser, which automatically opens and closes a circuit in response to a temporary interruption, such as a lightning strike, so that the fuse does not have to be replaced.

Recommended Standard 232 (RS-232)

A series of telecommunications standards for the electrical characteristics of data terminal equipment connectors, such as computers; and remote devices such as modems, printers, and display screens.

Characteristics defined in the standards include serial binary single-ended data and control signal timing, connector pinout meaning and signal direction, and the number of pinouts and their physical size and arrangement on the connector.

reconfiguration

In the context of a system, device, or application: rearranging elements and settings.

In the context of OpenWay, specified variables being written to the meter. Items not specified are not set to empty or written from program data.

recorder

A device that records a metered quantity, such as an ERT (encoder-receiver-transmitter radio-based module) or an interval data recorder. A meter can have multiple internal or external recording devices.

Recorders are devices that log load profile data. Other terms for recorders are loggers, data loggers, data recorders, or recording devices. Recorders can often be called, or will initiate a call, remotely through a modem or other communications technology.

recorder-under-glass (RUG)

A type of electric meter in which the meter and interval data recorder (IDR) are combined in one device. The recorder identifier (ID), manufacturer, and model are the same as the meter's.

Recorder-under-glass (RUG) is also called a combined meter.

recovery key

An asymmetric, elliptic curve cryptography (ECC) key that consists of a public and a private component and is unique to each OpenWay CENTRON Meter. A recovery key is placed in each meter during manufacturing and used to prove the meter’s authenticity to the OpenWay Collection Engine (CE) when the meter attempts to register. Recovery keys are also used to encrypt messages sent to meters containing other types of keys.

recovery point objective (RPO)

An amount of time, as determined by the utility, that defines the point in time to which data must be recovered after an outage. The number of minutes that an energy provider determines is an acceptable loss of data. For example, if the utility determines that their RPO is 15 minutes, then after the system recovers from a failure, data must be restored to within 15 minutes of the beginning of the failure. The data must be restored to within 15 minutes of the beginning of the failure, even if it took longer than 15 minutes for the system to be restored. The RPO is not how long the system can be down, but the acceptable amount of data that can be forfeited during the down-time.

redundancy

The number of readers that reported for a repeater or endpoint on a given day. For example, if two cell control units (CCUs) and one repeater reported for an endpoint during the reporting day, the endpoint has a redundancy of three.

redundant array of independent disks (RAID)

A method of storing the same data in different places (thus, redundantly) on multiple hard disks.

reference electrode

An electrical conductor with a stable and well-known electrode potential. The high stability of the electrode potential results from a redox system with constant concentrations of each component of the redox reaction. A reference electrode is used as a half cell to build an electrochemical cell.

reflection

When a propagating wave impinges on an object which is large compared to its wavelength and bounces off.

regional transmission organization (RTO)

An independent organization that coordinates, controls, and monitors the operation of the electrical power system and supply in a particular geographic area; similar to an independent system operator.

register

A readable device within a meter. For example, the demand or usage register read to calculate billing.

register

The component of an electricity, gas, or water meter that records consumption. There are five register types in the OpenWay meter: Energy, Demand, Instantaneous, Self-Read, and Information.

registered

The state of a device or user authorized to access program resources. The device or user must provide credentials to authenticate identity.

register multiplier

A programmable value used by a meter to calculate the energy and demand readings it displays or uses as a custom multiplier for special billing system requirements. For the OpenWay CENTRON Meter, the register multiplier is set to 1.00 and cannot be edited in the Collection Engine.

register read

Refers to a meter's register information being transmitted across the network for use in the utility back office. For example, for billing purposes.

register settings

Configurable parameters that define interval lengths, power outage recognition time, cold load pickup time, and other settings. An endpoint must register with the OpenWay Collection Engine before communications can begin. See also register operation parameters.

Registrar

A software component and dynamic domain name system (DNS) on page 73 server with a primary purpose to collect network registration and update notices from NIC-enabled devices sent using the DDNS protocol and to handle look-up requests per the DNS RFC (RFC1035). Its secondary purpose is to collect statistics from activity of the devices and to provide those statistics through a Representational State Transfer (REST) web service interface. See also Representational State Transfer (REST) on page 193.

regulated price plan (RPP)

An electricity pricing plan that provides stable and predictable electricity pricing, encourages conservation, and ensures that the price consumers pay for electricity best reflects the price paid to generators.

relational database management system (RDBMS)

A program that allows you to create, update, and administer a relational database. Most relational database management systems use the SQL language to access the database and data is organized into tables. Oracle is an example of an RDBMS.

Relay

A device on a network used to extend the reach of a network. Relays are typically placed high for best line-of-sight to meters, and can be plugged into photocell sockets on light poles. Normally, several meters are associated with each Relay and several Relays are associated with an Access Point (AP) on page 8.

Meters can also act as a Relay. Referred to as repeaters in utility and other networks. See also reachable on page 189.

Remote Authentication Dial-in User Service (RADIUS)

A distributed client/server protocol and software providing centralized authentication, authorization, and accounting (AAA) on page 23 management to secure networks against unauthorized access.

remote CHAP password

See Challenge Handshake Authentication Protocol (CHAP) on page 41.

remote device

A device controlled by a master device on page 139. A remote device is typically deployed as an edge network device, while a master device is typically deployed as a core device. Previously known as a slave device.

remote disconnect

Disconnecting a device from the back office on page 26 (instead of at the physical site location of the device).

remote provisioning

See remote service management (RSM) on page 193.

remote service management (RSM)

Refers to any job on page 127 that acts on the remote disconnect, remote service, load control, or auxiliary switches.

remote terminal unit (RTU)

A device that interfaces objects in the physical world to a distributed control system or Supervisory Control And Data Acquisition (SCADA) on page 216 by transmitting telemetry data to the system and/or altering the state of connected objects based on control messages received from the system. See also intelligent electronic device (IED) on page 117.

Repeater 100

A component of Itron ChoiceConnect systems that continuously forwards meter data from nearby endpoints to a ChoiceConnect Cell Control Unit 100 (CCU 100) on page 37. The CCU, in turn, sends the information to Fixed Network or mobile collection application software. Repeaters communicate with gas and electric endpoints and the CCU in the 900 MHz radio band.

repersonalizing

Downloading a new certificate on page 39 and credits on page 54 to a Field Service Unit (FSU) on page 93.

replay attack

A form of a network attack in which a valid data transmission is maliciously repeated or delayed. For example, repeatedly sending a fraudulent message to another meter to attempt to retrieve information from that meter.

reporting day

The 24-hour period from midnight to midnight, UTC.

report list

The list of devices for which a cell control unit (CCU) or repeater is configured to relay reads. If a CCU or repeater has a report list, it filters out readings for all devices not on the list.

Representational State Transfer (REST)

A style of software architecture for distributed hypermedia systems such as the web.

re-queue

When Advanced Metering Manager (AMM) application on page 13, or requeues it, and polls the next meter in the queue.

When the schedule reaches the end of the queue, it starts again with re-queued meters. See also retries on page 194.

reserve margin

The amount of unused available capability of an electric power system at peak demand on page 172 for a utility system, expressed as a percentage of total capability.

residential inclining block (RIB)

A rate schedule for residential utility customers under which a higher rate is charged for consumption over a specified amount per billing period. It is intended to encourage conservation.

residential meter

A watt-hour meter used to measure energy flow in a single phase of multiple currents fluctuating in unison. Single-phase meters are typically used for residential and light commercial service locations. Also called single-phase meter.

REST

See Representational State Transfer (REST) on page 193.

restore time objective (RTO)

During a period when data is being recovered, measures the amount of time that an organization will not have access to a category of data.

result set

Data in tabular form displayed on the screen. For example, if a user performs a search for all meters of a particular model, all the meters that display constitute the result set.

retries

When a schedule is unable to read a meter on the first try, all subsequent attempts to read the meter are retries.

Retroset Pay

A component of the ChoiceConnect pay solution, Retroset Pay offers smart payment capabilities for commercial & industrial (C&I) on page 46 applications. Built upon a robust shut-off valve, Restroset Pay allows utilities to ensure revenue collection.

return materials authorization (RMA)

Part of the process that allows a customer to return a material, product, or goods to the manufacturer for a refund, replacement, or repair. The RMA provides the customer and the manufacturer with a trackable authorization number for the return. Also called return merchandise authorization and return merchandise agreement.

return-to-utility (RTU) work order

A work order with a problem or issue that prevents a field service representative (FSR) from completing it and which therefore requires attention by personnel at the utility's main office.

Revenue Assurance

An Itron solution that offers analytics, tools, and workflow support to facilitate detecting, investigating, and resolving lost revenue.

reverse flow

Occurs when a meter runs backwards. Either the meter was installed backward, which would result in a consistently decrementing read, or flow is actually being generated into the meter. Reverse flow conditions could indicate a stuck or defective meter or register. Electric and water endpoints may be capable of reporting reverse flow.

reverse power flow

When power flows in the opposite direction from its usual flow.

RF

See radio frequency (RF) on page 187.

RF2Net

An Itron technology research project, completed in 2004, to develop a two-way communications network that is self-forming, self-healing, and scalable.

RFCT

See Radio-Frequency Configuration Tool (RFCT) on page 187.

RFLAN

See radio-frequency local area network (RFLAN) on page 187.

RFLAN processor

An OpenWay CENTRON Meter's processor for managing its interface to the radio-frequency local area network (RFLAN) on page 187.

RF Master 5

An all-purpose, walk-by/drive-by reader and programmer for use with Itron's meter equipped with radio interface (wMbus compatible).

RF Mesh

A dynamic and self-healing Cisco proprietary mesh network consisting of a cell relay and the smart meters that communicate with it through radio frequency connections.

RIB

See residential inclining block (RIB) on page 194.

rich client

A computer or program that requests data, files, or services or accesses shared network resources from a server computer or program. Of the client classes, rich client, hybrid client, and thin client, a rich client relies upon the server for little to no data processing. Most rich client functions can be performed without a connection to the server.

rightsizing

Analysis of consumption data recorded by a meter to determine if the meter is of the correct capacity to measure that level of consumption.

Rivest-Shamir-Adleman (RSA)

An algorithm for public-key cryptography that can be used for both encryption and signing.

RMA

See return materials authorization (RMA) on page 194.

RMI

See raw materials inventory (RMI) on page 188.

RMS

See root mean square (RMS) on page 196.

Robot Toolkit

A Java-based framework that offers scripts that remediate a variety of application-layer network problems by examining and acting on the Communication Module (NIC) of an endpoint. Robot allows users to run batches of network library commands against a list of meters.

role

A pre-defined set of user privileges that define functional security within a software application, controlling what actions a user can take. For example, you might assign some users to view-only roles for reports, while other users can also create and schedule reports.

role based access control (RBAC)

An access control on page 7 mechanism where access permissions apply to groups of individuals that have been assigned the same role. Typical roles are administrator, user, and operator.

rolling demand interval

A method of measuring power or other quantities by taking measurements within fixed intervals of the demand period.

rolling interval demand

A calculation of maximum demand derived from the moving average of the smaller consecutive sub-intervals.

root key

The top-level public key on page 184 / private key on page 181 pair of the Certificate Authority (CA) on page 39. If the private part of the root key is ever discovered, all the certificates issued under that key pair are compromised.

root mean square (RMS)

A statistical measure of the magnitude of an AC signal or peak modulation.

rotations per minute (RPM)

For gas meters, the number of rotations per minute of the wriggler, or per signal from the pulser.

round-robin DNS

A load-balancing method in which multiple servers take turns responding to network requests. A round-robin domain name server (DNS) algorithm continuously directs network traffic to the server next in line, regardless of the number of connections.

route

The route from an endpoint on page 82 to an egress device, usually an Access Point (AP) on page 8 or a Bridge on page 31 Master. Routes are discovered dynamically. However, when performing an On Demand ping in Advanced Metering Manager (AMM) application on page 13, users can specify a one-time route that is discarded after use.

route cost

See path cost on page 171.

route ID

A meter reading route identification number including area number, route number, and cycle number.

Router Rules

An installable set of routing rules for each Itron application that uses them. Routing rules determine whether a trap is published to a JMS queue.

rpm

See rotations per minute (RPM) on page 196.

RPMA

See Random phase multiple access (RPMA) on page 188.

RPO

See recovery point objective (RPO) on page 191.

RPP

See regulated price plan (RPP) on page 192.

RS-232

See Recommended Standard 232 (RS-232) on page 190.

RSA

See Rivest-Shamir-Adleman (RSA) on page 195.

RSM

See remote service management (RSM) on page 193.

RSR

See read success rate (RSR) on page 189.

RSSI

See received signal strength indicator (RSSI) on page 190.

RTC

See real-time clock (RTC) on page 190.

RTO

- See regional transmission organization (RTO) on page 191.
- See restore time objective (RTO) on page 194.

RTP

See real-time pricing on page 190.

RTU

See remote terminal unit (RTU) on page 193.

See return-to-utility (RTU) work order on page 194.

RTU work order

See return-to-utility (RTU) work order on page 194.

rubber duck antenna

An antenna designed for indoor use and testing purposes only in conjunction with an Itron Bridge. It is suited for 900MHz ISM band applications, as well as 900MHz cellular applications. The rubber duck antenna has a tilt-and-swivel SMA-male connector, allowing it to be aligned at any angle.

RUG

See recorder-under-glass (RUG) on page 191.

rule

A user-defined limit that allows or denies permits for load shedding on page 135 events and critical command on page 54.

run

A schedule run consists of the initial attempt and all retries of all meters associated with the schedule on page 200, plus the initial attempt and all retries of requeued meters.

rural electric cooperative

A nonprofit, customer-owned electric utility that distributes power in a rural area.

S

S&OP

See Sales and Operations Planning (S&OP) on page 199.

SA

- See secure association (SA) on page 201.
- See software alpha (SA) on page 210.

SaaS

See Software as a Service (SaaS) on page 210.

SaaS Detection and Response (SaaSDR)

A product offering of Qualys®, SaaSDR is a security and compliance platform used to give an organization continuous visibility into all their Software as a Service (SaaS) on page 210 applications and fix security and compliance issues.

SAC

See signing application core (SAC) on page 207.

SACU

See signing application core utility (SACU) on page 207.

sag and swell

When voltage increases or decreases.

SAIDI

See System Average Interruption Duration Index (SAIDI) on page 217.

SAIFI

See System Average Interruption Frequency Index (SAIFI) on page 217.

Sales and Operations Planning (S&OP)

An integrated business management process through which the executive/leadership team continually achieves focus, alignment, and synchronization among all functions of the organization.

salt shaker antenna

An antenna that works with Access Point (AP) on page 8s and Meter Antenna Couplers for both GSM and CDMA networks to ensure uninterrupted video and data transmissions in urban canyons and rural drop-off areas.

SAM

See FSU-Secure Access Manager (FSU-SAM) on page 96.

SAML

See security assertion markup language (SAML) on page 202.

SAN

See storage area network (SAN) on page 214.

Satellite Access Point (AP)

A device ID on page 67 that enables Itron to read smart meters in areas where cellular service is not available.

Saturne

A solution which enables utilities to collect and manage a wide range of residential and C&I meter data. It is an enterprise solution built on open standards and designed to provide a secure, highly scalable and flexible platform for advanced meter data collection. Saturne collects and analyzes data including load profile, multi-tariff billing registers, meter status information, events and alarms for reporting and export.

SBAP

See Solar Battery AP (SBAP) on page 211.

SBR

See socket based router (SBR) on page 210.

sBridge

A device that uses multiple serial connections to provide robust, two-way RF standards-based communications to support .

SBR PMR Management Tool (SPMT)

A software tool that performs update functions on Socket Based Routers (SBRs) and Pole Mount Routers (PMRs).

SCADA

See Supervisory Control And Data Acquisition (SCADA) on page 216.

scalability

The ability, ease, and cost effectiveness with which a solution, network, or process can increase workload with its existing architecture, cloud resources, and hardware resources.

scale factor

In Advanced Metering Manager (AMM) application on page 13, converts the value read from the meter (such as deciwatt hours) to engineering units (such as kWh).

SCEP

See Simple Certificate Enrollment Protocol (SCEP) on page 207.

schedule

Determines what meters are read and when. A schedule consists of a start date and time, an optional end date and time, and a list of devices that will be read when the schedule executes. See also run on page 197 and billing cycle on page 29.

SCM/SCM+

See standard consumption message (SCM/SCM+) on page 213.

See Smart Energy Water (SEW) - Smart Customer Mobile (SCM) on page 209.

scope

In the context of Tenant Management on page 221, a pre-defined set of access privileges within the Itron Identity Service represented as access token claims for API resources or as requests for specific sets of information defined by claim values associated with certain identities or roles.

SCP

See Secure Copy (SCP) on page 201.

SCT

See standard completion time (SCT) on page 213.

SDEE

See Security Device Event Exchange (SDEE) Protocol on page 202.

SDK

See software development kit (SDK) on page 211.

season

A configurable amount of time that a rate schedule is in effect. In OpenWay, season start dates are configured in the format MM/DD (Month/Day).

secondary Access Point (AP)

The next best performing, most reliable device ID on page 67.

seconds since last reboot (SSLR)

Seconds since last reboot. This is how long the NIC had been running at the time of the event that caused it to reboot.

securable device

An endpoint or network component that supports security, regardless of whether it is secured or not. This includes devices such as the 100W ERT Module, for which earlier phases do not support security but current phases do.

Secure Access Manager

See FSU-Secure Access Manager (FSU-SAM) on page 96.

secure association (SA)

A session that conveys a critical command on page 54 from the back office over the Secure Network Manager port of the NIC firmware in a meter. The firmware performs a verification that the command has a signed permit on page 172 and meets other criteria. Secure associations use Elliptical Curve (EC) keys for authentication. Expiration period is configurable in the back office. See also secure maintenance link on page 202.

secure command

A command sent to a secure device that has been authenticated and encrypted for that device.

Secure Copy (SCP)

Transfers files between local and remote hosts using the Secure Shell Protocol. See also file transfer protocol (FTP) on page 93.

secured endpoint

A meter or Encoder/Receiver/Transmitter (ERT) module on page 81 configured to respond only to secure, or signed, commands issued by the Itron Security Manager (ISM).

Secure DNS

Secure DNS protects the domain name system (DNS) infrastructure. It prevents denial of service and rogue actors from changing the DNS.

Secure DNS may be deployed in two basic modes:

- Static Secure DNS implements the protection measures using a symmetric secret key that is shared across the environment.
- Dynamic Secure DNS uses the key exchange capabilities of Itron devices to generate a unique Secure DNS key for each device automatically.

secure hash algorithm (SHA)

An algorithm that turns a variable-sized amount of data into a fixed-sized output (hash value) to create digital signatures. SHA employs cryptographic hash functions designed by the United States National Security Agency (NSA) and published by the National Institute of Standards and Technology (NIST) as a Federal Information Processing Standard. There are three types of SHA algorithms, SHA-0, SHA-1, and SHA-2.

Secure Key Generator (SKG)

A software component of the Itron Security Manager (ISM) on page 125 suite that resides at Itron manufacturing facilities. The SKG provides cryptographically sound and randomly generated keys that are placed in Itron's enhanced security-capable devices at the manufacturing facility.

secure key transfer file (SKTF)

A secure file used to transfer device keys between external systems.

The Itron factory generates an SKTF containing security key information for each secured or ready-to-secure ChoiceConnect network on page 41 securable device. The SKTF is imported into the destination utility's Itron Security Manager (ISM).

secure maintenance link

Similar to a secure association, but, it differs in the following ways: a) used to send a command from the FSU to an endpoint; b) the FSU cannot issue a command to an endpoint not in the immediate vicinity (for instance, an FSU in Sacramento cannot send a command to an endpoint in Bakersfield); c) a secure maintenance link expires in one hour unless the FSU is idle, in which case, it expires in five minutes; d) they use RSA keys, not Elliptical Curve (EC) keys, for authentication. See also secure association (SA) on page 201.

SecureNAT, SNAT

See secure network address translation (SecureNAT, SNAT) on page 202.

secure network address translation (SecureNAT, SNAT)

An extension of the Microsoft® Windows® network address translation (NAT) feature. NAT involves rewriting the addresses of Internet Protocol (IP) packets as they pass through a router or firewall, substituting a global IP address for the internal IP addresses. Because the global IP address is valid on the Internet, this process lets multiple hosts with private IP addresses share a single public IP address, while remaining protected by the firewall.

Secure Sockets Layer (SSL)

The Internet security protocol used to validate the identity of a website and create an encrypted connection for secure data transmission. SSL uses a public key to encrypt data transferred over the SSL connection.

security assertion markup language (SAML)

An XML-based format established by the Organization for the Advancement of Structured Information Standards (OASIS) for the exchange of security information between security domains.

security certificate

A digital document containing a data set that uniquely identifies an entity. The certificate is signed by a trusted party, thereby binding the key to the entity. Data contained in a certificate can include (but is not limited to) the certificate's serial number, a signature algorithm, credentials that identify the certificate user, the certificate validation and expiration dates, and the public key.

Security Device Event Exchange (SDEE) Protocol

Standard proposed by the International Computer Security Association (ICSA) to specify message communication formats for events that are generated by security devices.

security event manager (SEM)

A dedicated appliance that tracks, stores, and analyzes security event data that is generated by other software within the network.

Security Hash Algorithm (SHA)

A cryptographic hash function often used to secure government agencies. SHA employs cryptographic hash functions designed by the United States National Security Agency (NSA) and published by the National Institute of Standards and Technology (NIST) as a Federal Information Processing Standard. There are three types of SHA algorithms, SHA-0, SHA-1, and SHA-2. The most commonly used version is SHA-1 on page 206, which is a Federal Information Processing Standard. See also hash value on page 107.

security identifier (SID)

A unique alphanumeric value of variable length that is assigned to users and user groups in Windows® operating systems. Access control lists (ACLs) use SIDs to identify these users and user groups and to then permit or deny actions based on the user and user group privilege level.

security information and event management (SIEM)

Collection of log data from a network's hardware and applications and presentation of a real-time analysis of security alerts in a single interface. Through the SIEM interface, the user can organize data, log security data, respond to attacks, and generate reports for compliance purposes.

security level

Any of four security configurations (no enhanced security, ready to secure, command security, or full security) to which an Itron ChoiceConnect network on page 41 enhanced security capable device can be set.

security manager

The person responsible for managing a utility's endpoint security configurations, secure commands, and key exchange commands on the Itron Security Manager (ISM) server.

Security Monitoring Tool (SMT)

Monitors the application layer of the network for problems with secure associations and configuration settings. System administrators monitoring for security anomalies can monitor for things like the status of sensitive ports; privileges for hard coding devices; and device security levels.

security server

A term used to describe one computer containing both the OpenWay decryption and key update server (DKUS) and the signing and encryption server (SES), usually in smaller OpenWay deployments.

security state

Any of four security configurations (no enhanced security, ready to secure, command security, or full security) to which an Itron ChoiceConnect network on page 41 enhanced security capable device can be set. Also called security level.

security token

Markup language representations of claims. Examples of claims include, but are not limited to, names, passwords, identities, certificates, groups, and privileges. Security token services issue security tokens to clients and are presented by clients to services as part of authentication.

OpenWay Web Services security provides a general-purpose mechanism to associate security tokens from the OpenWay Collection Engine (CE) with messages for single-message authentication.

security token service (STS)

A service that brokers authentication between a web service and a client by validating the client's credentials. After the STS validates the client's credentials, it issues a security token to the client. When the client then requests direct communication with the web service, the web service validates the security token and establishes a security context for the client.

seed NIC

NIC on which a new firmware image is uploaded. Each NIC can store two complete images. During a firmware upgrade, the old unused one is deleted to make space for the new one. The new image is uploaded to about three percent of all NICS. A code float on page 45 enables all non-seed NICs to acquire the image from any directly neighboring NIC, seed or non-seed, that has the image. See also code push on page 45.

SELC 4-Pin External Networked Lighting Controller (NLC)

An external networked lighting controller that provides network connectivity and control for LED fixtures.

SELC 5 / 7-Pin External Networked Lighting Controller (NLC)

An external networked lighting controller that provides secure and proven two-way control for LED streetlights while simultaneously enabling a powerful industrial Internet of Things (IIoT) network canopy across a city or utility's deployment.

SELC Internal Networked Lighting Controller (NLC)

An internal networked lighting controller embedded with Itron industrial Internet of Things (IIoT) communications to provide reliable and secure two-way monitoring and control for outdoor street and area lighting.

self-read

In electricity meters, when the meter performs a self-read and transfers usage data from ST23 to ST25. A periodic read by a meter of register values which it stores in non-volatile memory for later retrieval by the OpenWay Collection Engine or by a meter programming and reading application such as Itron's Field-Pro.

self-signed certificate

A security certificate that is not signed by a certificate authority (used in smartphone apps).

SEM

See security event manager (SEM) on page 203.

sensor

A feature that can be enabled on the Itron network interface card (NIC) on page 157 to monitor one or multiple data points on the attached device (for example, a meter or load control switch) to facilitate the collection of data. This feature is used by SensorIQ Application on page 204. The supported Sensors may vary depending on the device vendor or model.

Available sensor bundles are:

- Rapid DR Telemetry: Supports demand response at all times of the year with up-to-the-minute data collected on demand response (DR) on page 64 event performance for all DR customers, and facilitates integration of distributed energy resources
- Electricity Bundle: Includes voltage, temperature, current, usage, power, and power factor Sensors

SensorIQ

Interface for viewing details about information collected on the meters.

SensorIQ Application

A back-office application for collecting data from Itron-enabled electricity meters, direct-to-grid devices, load control switches, and Zigbee load control switches that communicate with Itron-enabled devices. The SensorIQ server cluster can collect sampled

data from NICs at regular intervals. SensorIQ provides a critical part of increasingly important utility solutions such as grid-side energy efficiency applications, power quality monitoring, polyphase meter support, and high-frequency data sampling.

Also bundled with SensorIQ is SensorIQWSRoute on page 205, the web services routing application used by SensorIQ. Older versions of SensorIQ include Data Transfer Agent (DTA) on page 61. See also Power Monitor on page 178.

SensorIQWSRoute

An Itron component that allows SensorIQ Application on page 204 users to route web service calls for SensorIQ. It provides the public API and serves the WSDL and XSD files needed by integration tooling and routes public and legacy API calls. It is required by SensorIQ on page 204.

Sensor Network

An Itron open-standards software solution designed to collect and use data from networked sensor devices such as usage, voltage, theft, and energy-audit sensors. The solution enables utilities to aggregate and organize these devices, and to analyze smart grid data quickly and cost effectively, which is particularly applicable for mission-critical operations and for customer engagement. The solution can be configured for broad integration and access by utility and consumer applications, utility business systems (such as meter data management (MDM) on page 143, customer information system (CIS) on page 57, and billing and operations systems), and through Itron networks, home area networks, third-party networks, and legacy systems.

SENTINEL Meter

A solid-state, polyphase meter. This self-contained or transformer-rated meter is designed for use with high-end commercial and industrial (C&I) customers, including large industrial sites and substations.

SEP

See Smart Energy Profile (SEP) on page 209.

serialized inventory

Inventory items that have serial numbers. Serialized items can be consumable—those that get installed or used, such as endpoints, meters, and leak detectors—or non-consumable, such as data collection devices and cell phones.

server

A computer or program that responds to commands or fills requests for data, files, services, or shared network resources from one or more client computers or programs.

service address

The mailing address of a meter location.

service-level agreement (SLA)

A critical component of technology contracts between service providers and customers in which the services provided are described, expectations and metrics for measuring reliability are defined, and issue resolution response times are agreed upon, among other things.

service limiting

A feature that when enabled, the meters are programmable to open the disconnect switch based on a service limiting type; current or demand.

service-oriented architecture (SOA)

A set of methods and principles for designing and developing software and computer system architecture so that the services are interoperable. SOA services can be distributed over a network to be combined and reused to create business applications.

service pack

Refers to a cumulative set of all hotfixes, security updates, updates, and critical updates that address problems found in all components of a product since its original release. See also hotfix on page 110 and patch on page 171.

service point

A unique identifier associated with a premise ID on page 179. There can be multiple service points associated with a premise ID.

The point where a utility service such as electricity, water, or gas physically connects to a service location.

service point ID

See service point on page 206.

service principal

In the context of Tenant Management on page 221, an authority that represents a deterministic piece of code that is requesting access after a programmatic authentication process within the Itron Identity Service.

service set identifier (SSID)

A 32-character alphanumeric sequence that uniquely identifies a wireless local area network (WLAN). For the devices on a WLAN to communicate with one another, they must all employ the same SSID.

SES

See signing and encryption server (SES) on page 207.

SESAA

See signing and encryption server authorization agent (SESAA) on page 207.

set

When a device is physically installed and connected to electricity. Also known as energized.

SEW

See Smart Energy Water (SEW) - Smart Customer Mobile (SCM) on page 209.

SHA

See Security Hash Algorithm (SHA) on page 203.

SHA-1

The most widely-used cryptographic hash function of three secure hash algorithms (SHAs) designed by the National Security Agency (NSA) and published by the United States National Institute of Standards and Technology (NIST) as a Federal Information Processing Standard.

shadow

See dead area on page 62.

Shared Services Components (SSC)

A set of packaged applications and utilities that provide common services to Itron applications. Refer to the *GenX Compatibility and Requirements Matrix for a full list of SSC components.*

SID

See security identifier (SID) on page 203.

SIEM

See security information and event management (SIEM) on page 203.

signed blob format

A "signed blob" is a binary object that can be thought of as a small attribute certificate, which contains a signature header (information to identify the signer), the signing algorithm, and the signature (the data over which the signature is performed, for example key, permit, broadcast command, and so on).

signing and encryption server (SES)

The dedicated appliance responsible for signing command messages sent by the OpenWay Collection Engine (CE) to meters. The SES includes a hardware security module to provide protection for the signing keys.

signing and encryption server authorization agent (SESAA)

Signing and encryption server (SES) software component that determines whether signing operations should be performed or denied for signature requests received from the OpenWay Collection Engine (CE).

signing application core (SAC)

Software component of the Certicom® API contained in the OpenWay signing and encryption server (SES) that receives signature requests from the application protocol module daemon (APMD) to perform signatures and optionally encrypt responses, which it then sends back to the APMD.

signing application core utility (SACU)

A command line configuration utility component in the OpenWay signing and encryption server (SES) that provides the interface for configuring the signing application core (SAC) and provides commands for user administration, key pair operations, SAC maintenance, and other commands.

Silver Spring Networks

Silver Spring Networks was a leader in networking technologies that modernize today’s power grid. Itron acquired Silver Spring Networks in 2018.

SIM card

A removable integrated circuit that stores data for GSM cellular devices. A subscriber identity module (SIM) card stores device or user information, phone number, security keys, and encryption data. Itron's cellular- enabled electricity meters that use the AT&T and Rogers cellular networks contain SIM cards.

Simple Certificate Enrollment Protocol (SCEP)

An Internet Engineering Task Force (IETF) protocol that is designed to simplify the issuing and revocation of digital certificates to make usage more scalable.

simple metering cluster

Provides a means to retrieve energy use information for individual HAN devices (for example, HAN-enabled meters and load control switches) through Zigbee on page 242-based communications. This is used, for example, by HAN Communications Manager (HCM) on page 106 to obtain information not provided through standard meter reads. See also home area network (HAN) on page 109.

Simple Network Management Protocol (SNMP)

An Internet standard protocol based on the manager/agent mode that is used for managing and controlling devices on Internet Protocol (IP) networks.

Simple Object Access Protocol (SOAP)

A protocol based on Extensible Markup Language (XML) on page 89 for the exchange of structured information in the implementation of web services in computer networks. Soap can be used over any transport protocol, such as Hypertext Transfer Protocol (HTTP), HTTP Secure (HTTPS), Simple Mail Transfer Protocol (SMTP), and so on.

singlephase

Consisting of only one phase.

singlephase meter

A watt-hour meter used to measure energy flow in a single phase of multiple currents fluctuating in unison. Singlephase meters are typically used for residential and light commercial service locations. Also called residential meter.

single sign-on

A session or user authentication process that permits a user to enter one name and password to access multiple applications.

SIQ

See SensorIQ on page 204.

SKG

See Secure Key Generator (SKG) on page 202.

SKTF

See secure key transfer file (SKTF) on page 202.

SLE

See Streetlight Essentials (SLE) on page 215.

SLG

See standard last gasp (SLG) on page 213.

sleepy

A term used to describe home area network (HAN) on page 109 devices. These devices are inactive (asleep) most of the time and active (awake) only for short periods when sending data or event information up to the meter.

SL uAP

See Streetlight MicroAP (SL uAP) on page 215.

slug

In the context of Tenant Management on page 221, a unique short name for a tenant, application, or client within the Itron Identity Service.

SLV

See Streetlight.Vision (SLV) software on page 215.

small and medium business (SMB)

Refers to small and medium business energy and water customers. SMB customers typically have fewer than 500 employees, demand of less than 75-kW, are energy-only metered, and do not use building management systems. Examples of SMB customers are restaurants, coffee shops, and start-up companies.

smart card

A magnetic card with an embedded authentication chip.

Smart Energy Platform

The Itron platform based on open Internet Protocol (IP) standards, allowing continuous, two-way communication between the utility and devices on the grid.

Smart Energy Profile (SEP)

A low-power public communication standard developed by the Zigbee Alliance that provides the necessary tools to allow wireless communication between utility companies and common household devices.

Smart Energy Water (SEW) - Smart Customer Mobile (SCM)

SEW's SCM is a digital customer experience (CX) platform for energy and water utilities and cities that enables customers to make informed decisions for how to conserve energy and water through simple and intuitive ways to track electric, water, and gas usage.

smart grid

Refers to technologies that enable a highly communicative, predictive, and self-healing utility grid.

Smart Grid Sales and Partner Support

Abbreviation of an internal Itron team name.

smart inverter

A device on page 66 that integrates solar and other distributed energy resources (DERs) into the electric grid.

smart meter

An electric meter that is capable of measuring and recording usage data in time differentiated registers. The meter allows electric consumers, suppliers, and service providers to participate in price-based demand response (DR) programs and provides data and functionality to address power quality issues. Also known as an advanced meter.

Smart Metering Integration Profile (SMIP)

Supports the consistent technical implementation of smart grid technologies over Internet Protocol (IP)-based networks, which leverage Institute of Electrical and Electronic Engineers (IEEE)-standard communication technologies.

Smart NIC

A universal, smart, communications module with integrated Adaptive Communications Technology (ACT) designed to be used with third party meter vendors.

smart plug

An electrical outlet that can be plugged into a standard wall outlet to turn off or on any connected electrical appliance or device. When used in conjunction with a power monitoring software application, utility consumption of the connected devices can be viewed and managed.

Smart Pressure Management

See Advanced Water Management on page 13.

Smart Street Lighting

A solution that allows utilities and municipalities to manage, control, and monitor, and provide analysis for streetlights across the Itron mesh network. Itron NICs are installed in streetlight control devices (such as in control node on page 52s in luminaires and controllers in cabinets) and communicate through to Central Management Software (CMS) on page 38 applications and Advanced Metering Manager (AMM) application on page 13 for integration with other Itron applications. See also photocell on page 174 and street light controller on page 215.

SmartSynch

SmartSynch was a leading provider of point-to-point smart grid solutions that utilize a cellular network for communications. Itron acquired SmartSynch in 2012.

SMB

See small and medium business (SMB) on page 208.

SMIP

See Smart Metering Integration Profile (SMIP) on page 209.

SMT

See Security Monitoring Tool (SMT) on page 203.

SNAT

See secure network address translation (SecureNAT, SNAT) on page 202.

SNMP

See Simple Network Management Protocol (SNMP) on page 207.

SNTP

See Simple Network Management Protocol (SNMP) on page 207.

SOA

See service-oriented architecture (SOA) on page 205.

SOAP

See Simple Object Access Protocol (SOAP) on page 207.

SoapUI

An open-source software suite used for testing interoperable applications in service-oriented architecture (SOA) environments. SoapUI is instrumental in the development of MultiSpeak methods for utility system interfaces.

SoC

See State of Charge (SoC) on page 214.

SOC

See System On a Chip (SOC) on page 218.

SocketAP 5

An Itron Access Point (AP) on page 8 that provides the central network resource for delivering data generated by endpoint devices at the network edge and IT/OT systems—enabling high performance applications, network control and monitoring. Its flexible communication features extend the reach and coverage of the network to hundreds of customer sites, and its support for up to 250 endpoints per SocketAP dramatically lowers costs. The SocketAP 5 offers multiple paths to each endpoint device through sophisticated mesh network routing that ensures greater reliability and redundancy.

socket based router (SBR)

A device that communicates between the internet and the devices that are connected to the internet. See also OpenWay Riva Socket-Based Router on page 166.

software alpha (SA)

A product milestone that indicates the first limited feature build of the software product has completed functional testing. Feature set aligns with hardware alpha (HA) on page 107 and firmware alpha (FA) on page 94 releases for early system testing, if applicable.

Software as a Service (SaaS)

A software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted.

software development kit (SDK)

A collection of common developer tools presented in one installable package to facilitate the creation of applications. Common tools might include a compiler, debugger, application programming interfaces (APIs), sample software, documentation, and tutorials. SDKs are normally specific to a hardware platform and operating system combination.

software (SW)

Computer programs, which include operating systems, applications, networking programs, and computer language programs.

Solar Battery AP (SBAP)

A device that provides a lower cost backhaul for gas-only and water-only deployments. The device communicates using EFC+ with a limited number of gas and water meters, and then backhauls the data over a cellular network. See also Access Point (AP) on page 8.

solar disconnect switch

A switch designed to disconnect a solar array from a service location that is also connected to the grid. The switch is located between a solar meter and a building with an installed utility meter. It is used to disconnect solar power for utility maintenance or other electrical work.

solid state meter

An electronic, multiple-function electric or gas meter that relies on solid-state circuitry, rather than mechanical and electromechanical technology, to measure energy usage and generate metering data more accurately and reliably. Solid state meters can measure advanced metering functions including kWh, demand, kVA, and kVAR.

solution

A collection of systems, subsystems or components enabled to work together to fulfill the needs of a particular customer or set of customers, but not necessarily a single set of requirements. This definition applies to the Global Development Process (GDP).

SOP

See standard operating procedure (SOP) on page 213.

source select

Corresponds to a measurement channel configured on an electricity meter. Each channel measures a particular source, such as energy delivered in dWh.

SPAN

See Switch Port Analyzer (SPAN) on page 216.

Sparklog

A data logger on page 61 able to manage four channels in the same device for electricity, gas, water, and heat metering.

sparse deployment

A range-limited deployment where relatively few endpoints operate at minimum signal strength. See also spot deployment on page 212.

SPCS

See State Plane Coordinate System (SPCS) on page 214.

spectral inspection

A spectrum analyzer can be used to determine potential sources for out-of-band interferers on page 168.

spectrum analyzer

A device used to measure the spectral composition of some electrical, acoustic, or optical waveform.

spinning reserve

Reserve generating capacity running at zero load.

SPMT

See SBR PMR Management Tool (SPMT) on page 200.

spot deployment

Deployments to read a small number of relatively contained endpoints, such as in an office park. See also sparse deployment on page 211.

spot read

A meter read, which is not within the collection route, is collected because the data collector happened to be in a specific location (on the spot). The utility company can request spot reads while the data collector is out in the field. Spot reads can be used for off-cycle reads such as move-in reads, move-out reads, and billing verification.

spyware

Software that is secretly or surreptitiously installed into an information system to gather information on individuals or organizations without their knowledge; a type of malicious code.

SQL

See Structured Query Language (SQL) on page 215.

SQL Server Integration Services (SSIS)

A component of Microsoft® SQL Server® that enables extraction, transformation, and loading of large amounts of data into and out of a database.

SQL Server Reporting Services (SSRS)

A Microsoft® SQL Server® component that lets users guild and view reports containing data in a SQL Server database.

SRead technology

Itron's 80-channel 2-way radio technology designed to communicate with Itron ERTs using mobile radios (FC200SR, FC300SR, MC3, MC4, IMR) and ChoiceConnect network on page 41ed units. The technology is also used in all ERT gateways. Using SRead technology, mobile and stationary devices are able to support a full complement of advanced AMR capabilities.

SRT RAL

The Itron Routing Route Accept List. The Itron routing table's list of accepted routes.

SSC

See Shared Services Components (SSC) on page 206.

SSID

See service set identifier (SSID) on page 206.

SSIS

See SQL Server Integration Services (SSIS) on page 212.

SSL

See Secure Sockets Layer (SSL) on page 202.

SSLR

See seconds since last reboot (SSLR) on page 201.

SSNEFP

See SSN Export Format Processor (SSNEFP) on page 213.

SSN Export Format Processor (SSNEFP)

An application which provides multi-tenant export file splitting, enabling the Data Transfer Agent (DTA) application to transport SSN Export Format data to SSN-EFP, consume data it generates, and transport it to a receiving endpoint.

SSNIAgent

An Itron component that runs as a daemon and provides a secure gateway to a subset of web services for Itron applications such as Advanced Metering Manager (AMM) application on page 13 and HAN Communications Manager (HCM) on page 106. The application also provides fast and secure data transfer from a customer environment to the Data Platform when used with related components SSNIAgent Forwarder and TransferAgent.

SSNIAgentForwarder

See SSNIAgent on page 213.

SSN Root

The top-level private key in the PKI chain, maintained by Itron.

SSRS

See SQL Server Reporting Services (SSRS) on page 212.

stack version

The Zigbee on page 242 stack version used in either the electric meter or HAN Device. Both the electric meter and the HAN device can request the stack version from each other.

standard completion time (SCT)

The amount of time typically required to complete an order type. The SCT equals the average of completion times for all job codes in the order type plus the standard travel time for the area in which the job site is located.

standard consumption message (SCM/SCM+)

A message containing the current meter reading and tamper/status indicators that is sent by an Itron Encoder/Receiver/Transmitter (ERT) module on page 81 to a meter data collection device.

standard last gasp (SLG)

An asynchronous message from an electricity meter that indicates the meter has lost power. Also known as a power out message. SLGs can result when the loss-of-power PIN becomes active, when zero crossing on page 242 events are missed, or when a transition from utility power to battery power occurs. Also known as last gasp (LG) on page 131.

standard load

A list of consumable inventory items used by warehouse employees in stocking FSRs' vehicles. Knowing the standard load and the vehicle assigned to a particular FSR enables a warehouse employee to make sure the vehicle contains the items needed by that FSR to perform his or her job.

standard operating procedure (SOP)

A clearly defined procedure or set of procedures followed when completing tasks or assignments. SOPs are typically designed and used to achieve a desired level of quality and efficiency.

standard tables

Tables in electricity meters that conform to ANSI Standard C12.19 on page 34.

standby facility

A facility that supports a utility system and is generally running under no-load. It is available to replace or supplement a facility normally in service.

standby key

Of security key types that are provided in pairs, the key that is not being used by the system for communications. Only one key from a pair can be active (in a state actively usable by the system); the other key from the pair is held in standby until needed.

> **Note:** In OpenWay on page 163 systems, the key status (active or standby) has meaning only to the decryption and key update (DKUS) server. Key status means nothing to the OpenWay Collection Engine on page 164 or devices (cell relays, meters, and others). The key status can be toggled between active and standby by the system administrator.

standby service

Support service that is available as needed to supplement a consumer, a utility system, or to another utility if a schedule or an agreement authorizes the transaction. The service is not regularly used.

Starfish

An Internet of Things (IoT) on page 119 network service.

start word

A two-byte sequence in the GenX PHY frame used by the system to identify the start of a frame, or data unit. The start word's value is set according to the regulatory region-specific default value in all production environments. The start work is determined and programmed during the manufacturing of or installation of a device in the network. It is not altered in the field. You can locate your start word by logging into Network Center and executing the `startword_get` command.

State of Charge (SoC)

The percentage of usable battery power available from an electric vehicle battery. For example, 75% SoC describes a battery that has 3/4 of its power remaining.

State Plane Coordinate System (SPCS)

A coordinate system (N-S and E-W lines are perpendicular) in which each individual state has from one to six zones, depending on the state's size and shape.

stock-keeping unit (SKU)

A number or code used to identify each unique product or item for sale in a store or other business, enabling the company to systematically track its inventory or product availability, such as in warehouses and retail outlets.

In Itron's Field Deployment Management (FDM) software, each inventory item type is uniquely identified by a SKU.

storage area network (SAN)

A high-speed special-purpose network or subnetwork that interconnects different kinds of data storage devices with associated data servers on behalf of a network of users.

stored procedure

In database management systems (DBMSs), such as SQL Server and Oracle, a set of Structured Query Language (SQL) statements that are compiled and stored in the database data dictionary for use by other applications that access the same relational database. Stored procedures can be used for many reasons, for example, as a way to control access to data, ensure that the applications that call upon them leverage data in a consistent manner, and to simplify processing that is otherwise complex.

street light controller

An outdoor lighting controller (OLC) on page 168 device that resides in a streetlight control cabinet or other location separate from the streetlight luminaire and used to control lights across the Itron mesh network on page 142. See also Smart Street Lighting on page 209.

Streetlight Essentials (SLE)

A comprehensive roadway lighting control solution for communities of all sizes to grow into a complete Smart City platform. SLE contains the same robust and market-leading streetlighting control technology used by Itron's largest utility and city customers but packaged in a flexible and expandable model, making it simple, affordable, quick to deploy, and easy to maintain.

Streetlight MicroAP (SL uAP)

A member of Itron's Access Point (AP) on page 8 family, which offers secure, flexible connectivity between the Itron network and back-office applications via built-in cellular technology. See MicroAP (uAP) Module on page 146.

Streetlights

See Smart Street Lighting on page 209.

An Itron application used to interact with streetlight devices on the Itron mesh networks.

Streetlight.Vision (SLV) software

A leading smart cities central management software application that delivers advanced asset management, analytics, and control capabilities to improve energy efficiency and optimize smart streetlight system performance.

Structured Query Language (SQL)

A standard syntax which allows most relational database management system (RDBMS) on page 192 users to extract and manipulate data.

STS

See security token service (STS) on page 204.

subinterval

Basic unit of a demand interval.

submetering

Individually metering all the apartments in an apartment complex or strip mall rather than using one master meter to determine usage for the entire complex.

subnetwork

The logical division of a network into smaller networks. Examples are Tower/Sector, Internet Protocol (IP) on page 119 subnet.

Subnetwork Actor

The component of Network Abstraction that manages the pacing for a subnetwork on page 215.

substation

A facility in an electricity distribution system used for switching and / or changing or regulating the voltage of electricity. A substation is the location where high voltage transmission lines connect to switchgear and step-down transformers to produce lower voltages at lower power levels for local distribution networks.

subsystem

A set of components that work together to fulfil a set of requirements that are a subset of the full set of system requirements or lower-level requirements. This definition applies to the Global Development Process (GDP).

Summer Advantage

The Residential Direct Load Control program, referred to as the Summer Advantage Program, is designed to reduce peak electricity demand at the point of use in Entergy Arkansas' service territory.

SunSpec profiles

Industry group definitions as to how the function sets will be utilized by the clients and the servers, and the mutually agreed upon tests that will demonstrate their compliance.

super group

A group composed of other groups.

supercapacitor

An energy-storage component used in devices that require relatively little current and low voltage. This component is used in cellular smart meters, enabling them to send last-gasp power outage notifications, even in very low temperatures (where conventional batteries may fail).

Also known as an ultracapacitor.

SuperRaptor

A nickname commonly used to refer to SRead technology on page 212.

Supervisory Control And Data Acquisition (SCADA)

A process control application that collects data from sensors and machines on the shop floor or in remote locations and sends them to a central computer for management and control.

Supplemental Services

A service offered by Itron's Technical Support Services on page 216 team to help customers improve operational efficiencies and derive more value from their business solutions.

Support Services

Itron's worldwide network of regional customer service teams that provide global services to make the operations of wireless fixed network a success. See also Supplemental Services on page 216.

SW

See software (SW) on page 211.

switching station

Facility equipment used to tie together two or more electric circuits through switches. The switches are selectively arranged to permit a circuit to be disconnected, or to change the electric connection between the circuits.

Switch Port Analyzer (SPAN)

Cisco® Systems' port mirroring feature. Port mirroring (also called port monitoring) is used on network switches to send a copy of network packets seen on one switch port to a network monitoring connection on another switch port. This is commonly used for network appliances that require monitoring of network traffic, such as an intrusion-detection system. Network administrators use port mirroring to analyze and debug data or diagnose errors on a network. It helps the administrator keep a close eye on network performance and generates an alert when problems occur.

Switch Status Application

An Itron component that can be used to generate daily reports—in comma-separated values (CSV) format— to utilities by email to provide load control switch status data. Data for these reports is drawn from the utility's HAN Communications Manager (HCM) database. The component also sends commands to the meters to set up a trap listener process.

symbol rate

In digital communications, the data transmission rate in symbols per second. When measuring the line code transmission speed, the baud rate is measured in pulses per second.

symmetric encryption algorithm

An encryption algorithm that uses the same secret key for encryption and decryption.

symmetric key

A key that is used to both encrypt and decrypt the same data. Unlike asymmetric keys, both parties have a copy of the same key. Also called a secret key.

synchronization

The process by which the Itron Field Deployment Manager (FDM) server sends to a handheld or laptop computer any work orders assigned to the field service representative (FSR) for completion and retrieves any completed work orders. During synchronization, the server also performs routine maintenance tasks, which may include updating the FDM endpoint and meter configuration information, upgrading the FDM mobile application when necessary, and, if applicable, upgrading the handheld's operating system.

system

A combination of integrated or interdependent elements/components/subsystems organized to collectively achieve a common set of requirements. This definition applies to the Global Development Process (GDP).

system administrator

A person who manages the technical aspects of a computer system.

System Average Interruption Duration Index (SAIDI)

The average customer-minutes of service interruption (outages) or the average length of time of interruption of all customers. The SAIDI is commonly used as a reliability indicator by electric power utilities.

System Average Interruption Frequency Index (SAIFI)

The average number of interruptions (power outages) for all customers. SAIFI is commonly used as a reliability indicator by electric power utilities.

system integrity

A system's ability to perform its intended function in an unimpaired manner, free from unauthorized manipulation of the system, whether intentional or accidental.

system key

A system-wide Advanced Encryption Standard (AES)-based key that can be used to provide confidentiality for command messages. Each OpenWay CENTRON Meter has two system keys. These keys are used to encrypt command messages sent from the OpenWay Collection Engine (CE) to meters on a system-wide basis.

system management mode

An internal operating mode for handling power management of the handheld data collector.

System MK

A water meter designed to meet the special requirements of the apartments segment, mainly for the allocation market.

system of record

The authoritative or master data storage system for a given entity that overrides other sources for the same data. Advanced Metering Manager (AMM) application on page 13 can be configured as the system of record for the utility.

System On a Chip (SOC)

The SOC (Intelligent Processor System On a Chip) is the part of the Smart Street Lighting on page 209 that includes an embedded security engine for key management, link layer authentication, and packet encryption.

The SOC supports network communications, GE I-210+, I-210+c, and kV2c electricity meters, and other Itron field tools such as Electricity Communications Module Tester (ECMT) on page 78 and Communications Tester on page 48.

System V

A water meter designed to be used in apartments to measure the exact use of water by the resident.

T

TACAS+

See Terminal Access Controller Access-Control System Plus (TACAS+) on page 221.

TAD

See technical architecture design (TAD) on page 220.

TaleXus Vendor

A two-way multi resource revenue collection system that provides efficient revenue collection, enhanced data capture, and reporting for both electricity and gas utilities.

TALQ

An interoperability standard for the control and management of outdoor lighting and for interfacing outdoor lighting networks (OLN) with Central Management Software (CMS) on page 38 applications.

TALQ Gateway

A Streetlight.Vision (SLV) software on page 215 component that manages network traffic between Streetlight.Vision software and Advanced Metering Manager (AMM) application. TALQ Gateway is a required component for integrating Streetlight.Vision with an Electric UtilityIQ software stack.

TAM

See total available market (TAM) on page 224.

tamper counter

An Encoder/Receiver/Transmitter (ERT) module on page 81 component that increments whenever a tamper event occurs, such as a meter removal, cut cable, meter inversion, or reverse disk rotation. The types of tamper events that are detected depend on the ERT type.

Also called a tamper indicator.

tamper debounce

The amount of time, in milliseconds, required for the mechanical contact on a meter's tilt switch to settle before a signal from the switch is considered to be valid on the Encoder/Receiver/Transmitter (ERT) module on page 81. This parameter is used to adjust the sensitivity of the meter removal tamper indicator.

tamper detector

An Encoder/Receiver/Transmitter (ERT) module on page 81 component that senses when a meter has been tampered with. The types of tamper events that are detected vary according to the type of ERT module, and each detector detects a particular type of tamper. Examples of tamper events include meter removal, a cut cable, meter inversion, and reverse disk rotation.

Also called a tamper sensor.

tamper event code

Any alarms (including outage and restore) and tamper flags currently recorded by the meter and output as an event or alarm to the collection system. Events are typically delivered to the meter data management software as part of a response to a scheduled read request. Alarms are typically delivered as they occur.

tamper indicator

An Encoder/Receiver/Transmitter (ERT) module on page 81 component that increments whenever a tamper event occurs, such as a meter removal, cut cable, meter inversion, or reverse disk rotation. The types of tamper events that are detected depends on the ERT type.

Also called a tamper counter.

tamper sensor

An Encoder/Receiver/Transmitter (ERT) module on page 81 component that senses when a meter has been tampered with. The types of tamper events that are detected vary according to the type of ERT module, and each detector detects a particular type of tamper. Examples of tamper events include meter removal, a cut cable, meter inversion, and reverse disk rotation.

Also called a tamper detector.

tariff

A meter program on page 144 on Secure Meters, Ltd meters.

tariff time slice

Several interlinked sub-elements including time slice intervals, day profiles, profile definitions, and allocation of day profiles that define the season and time of use (day/time). A tariff time slice defines which day profile to use on each day of each time slice interval.

TCO

See total cost of ownership (TCO) on page 224.

TCP/IP

See Transmission Control Protocol (TCP) / Internet Protocol (TCP/IP) on page 225.

TCXO

See temperature-compensated crystal oscillator (TCXO) on page 221.

TD8 DN20-25-32

A volumetric piston meter for residential cold-water metering.

TDEA Block Cipher

See Triple Data Encryption Algorithm (TDEA) Block Cipher on page 226.

TDMA

See time division multiple access (TDMA) on page 223.

technical architecture design (TAD)

An artifact from a solution requirements workshop that contains the customer-specific hardware requirements. The technical architecture design (TAD) outlines the overall solution architecture designs for the proposed environment and provides a recommendation for hardware sizing. It also includes a diagram of the solution.

technical losses

Electricity losses due to expected loss between the generation source and the customer location meter. These can be due to normal losses through transmission and distribution, equipment failures, and non-optimized transmission loads and voltage.

Technical losses between 6 to 8% are considered normal. See also non-technical loss on page 160.

telemetry module

A low-power radio frequency device that attaches to a third-party device (for example, a rotary meter, a cathodic protection system, or gas line) to collect data. Itron telemetry modules allow remote measurement and reporting of utility system data not directly-related to meter reading and billing and transmit it to Itron data collection devices and systems.

Temetra

A cloud-based mobile meter data collection and management solution. All data is securely stored on servers that meet the ISO 27001 information security standard.

Temetra Analysis

An outcome that improves operational visibility, minimizes leaks, maximizes ROI on meter replacements, streamlines pressure management, reduces labor costs, optimizes network operations, and proactively improves the customer experience. Previously known as Water Operations Management (WOM) on page 236.

Temetra Mobile

The Temetra software in an application format. This format is compatible with all Android-based mobile devices (V 4.4 or higher).

Temetra Reader

A mobile data collection application compatible with all Android™-based mobile devices (version 4.4 or higher).

Temetra web platform

A SaaS on page 199 platform for data collection and management.

temperature-compensated crystal oscillator (TCXO)

A component of the SRead radio board used in Itron handheld computers and belt-clip radios. It supplies local oscillator and digital timing signals throughout the radio's components.

temperature compensation meter

A gas meter in which the measurement of gas volume is automatically corrected for the variation in gas temperature.

tenant

A representation of a customer, usually a utility, within a software application.

In the context of Tenant Management on page 221, a user can belong to one or more tenants, but the access token issued by Identity Server must refer to a single tenant context. A customer can have multiple tenants if needed. A single tenant query scope must always be specified in the user-authentication process.

tenant client

In the context of Tenant Management on page 221, a client with a pre-defined tenant context within the Itron Identity Service. Depending on its configuration, a standard client will provide a service principal with a set of requested tokens that contain either a consistent tenant context or no tenant context. A tenant client is intended to provide access tokens for different tenants but with similar claims. A separate tenant client should be created for each tenant.

Tenant Management

An identity service that provides user authentication and authorization for platform applications and provides a single location for managing tenants, applications, users, and roles. The service identifies authenticated users, applications, and tenants (utilities) and can determine the level of authority granted to a user or group of users. The service integrates with Azure Active Directory (AAD) on page 25, allowing administrators to centrally manage accounts for an organization's users and to control user authentication with policies and other AAD configuration settings.

Terminal Access Controller Access-Control System Plus (TACAS+)

A scalable, open-standard, Cisco security protocol that uses Transmission Control Protocol (TCP). This protocol separates the authorization functionality and provides granular access controls, which allows system administrators to specify what commands can be run on devices and who can run the commands. TACAS+ also encrypts the content of each packet. For more information, see tacas.net or cisco.com.

test mode

A mode of register operation. It allows testing of the register without altering billing data.

Th

See therm on page 222.

theft detection

An indicator that a meter was tampered with and a potential energy theft has occurred.

therm

The metered unit of natural gas energy. 1 therm equals 100,000 BTUs.

thin client

A computer or program that requests data, files, or services or accesses shared network resources from a server computer or program. Of the client classes, thin client, hybrid client, and rich client, a thin client relies upon the server the most heavily, for both data processing and data storage.

Third Generation Partnership Project 2 (3GPP2)

A collaboration between groups of telecommunications associations to standardize 3G (third generation) mobile phone system specifications. The specifications are those established by the CDMA2000 family of standards.

3GPP2 is the standard body behind the competing 3G standard CDMA2000 that is the 3G upgrade to networks used mostly in the United States (and to some extent also in Japan, China, Canada, South Korea, and India). 3GPP2 should not be confused with Third Generation Partnership Project (3GPP) on page 222.

Third Generation Partnership Project (3GPP)

A collaboration between groups of telecommunications associations to standardize 3G (third generation) mobile phone system specifications. The specifications are those established by the Universal Mobile Telecommunications System (UMTS).

3GPP should not be confused with Third Generation Partnership Project 2 (3GPP2) on page 222.

third-party configurator

The software components of the third-party that provides the meter configuration file in the required format.

third-party field tool

The software tool of the third-party meter partner used to communicate on the optical port of the device.

third-party firmware upgrader

The software components of the third-party that provides the firmware image files for the meter in the required format.

third-party meter

The Itron integrator partner’s device responsible for taking the required meter hardware measurements.

third-party meter manufacturing

The manufacturing facility of the third-party metering company.

TIBCO Conf files

Configuration files used with TIBCO EMS on page 222 that contain a list of all Itron queues. When TIBCO EMS is started, it reads these files and initializes the queues.

TIBCO EMS

A third-party software component customized with Itron software to provide JMS functions for a number of Itron applications.

tier

Under tiered rate plans, the customer's cost per kilowatt hour (kWh) on page 130 changes as more electricity is used within a billing period. Depending on your price plan, this cost can either go up or down at higher tiers.

tilt

A change in the direction or incline of a meter. A tamper tilt indicates that the meter has been illegally moved.

TIM

See translation interface module (TIM) on page 225.

time division multiple access (TDMA)

A digital wireless communication transmission technology that allows many users to access a single radio frequency channel without interference. Each signal is divided into different time slots, which are uniquely assigned to users. With each user transmitting in rapid succession using their own time slot, multiple stations can share the same transmission medium while using only part of its frequency channel capacity.

time drift

The number of seconds a meter's time is different from the network time.

time of use (TOU)

An electricity billing rate where the rate varies by time. TOU metering divides the day into periods, such as 8:00 AM to 12:00 PM, 12:00 PM to 4:00 PM, and 4:00 PM to 8:00 AM. Each period has a corresponding rate, expressed in terms of $/kWh, where $ is the currency type configured for your rate plans (for example, $0.05/kWh). The rate is usually based on expected average cost (where prices are usually higher during peak periods) and is generally fixed for several months in advance. Rates can also change seasonally. HAN Communications Manager (HCM) on page 106 supports 24 tiers per day.

time-of-use (TOU) rate

A rate with different unit prices for usage during different blocks of time, usually for a 24-hour period. TOU rates reflect the average cost of generating and delivering power during those time periods. Daily pricing blocks might include an on-peak, mid-peak, and off-peak price. In a time-of-use rate structure, higher prices are charged during utility peak-load times. Such rates can provide an incentive for consumers to curb power use during peak times.

time slice

The amount of processing time allocated to each user in a multi-user system. Also see tariff time slice on page 220.

time synchronization

To assure the proper operation of network devices, the calculation and storage of usage data, utility customer service, and accurate billing calculations, the meter clock synchronizes to the NIC clock and reports discrepancies to the Advanced Metering Manager (AMM) application on page 13 resolve to the time on the Access Point.

time to live (TTL)

A mechanism, implemented as a counter or time stamp attached to or embedded in data, used to limit the lifespan of data on a network or within a caching system. When the prescribed event count is reached or timespan elapsed, the data is discarded or revalidated. Prescribing a TTL policy to data prevents the data from circulating indefinitely.

TLS

See transport layer security (TLS) on page 225.

TLV

See type-length-value (TLV) on page 227.

TMB

See Trap Messaging Bridge (TMB) on page 225.

TMC

See total manufacturing cost (TMC) on page 224.

TNS

See transparent network substrate (TNS) on page 225.

tnsnames.ora

A file containing client-side network configuration parameters that are used by an Oracle client to connect to an Oracle server.

to-host file

A file containing work order information exported from a workforce management application other than Field Deployment Manager (FDM), such as Itron's Endpoint-Link Pro, in a format that allows FDM to import the information into its database.

token

A hardware or software device that performs cryptographic functions and stores public-key certificates, cryptographic keys, and other data. See also private key on page 181 and public key on page 184.

topology

The physical layout of a distribution network infrastructure with specific hierarchical identification of all components.

total available market (TAM)

The total market demand for a product or service, calculated in annual revenue or unit sales if 100% of the available market is achieved.

total cost of ownership (TCO)

A financial estimate intended to help buyers and owners determine the direct and indirect costs of a product or service. It is a management accounting concept that can be used in full cost accounting or even ecological economics where it includes social costs.

total manufacturing cost (TMC)

The total material, labor, overhead, and other expenses associated with the fabrication, assembly, and testing of a product.

TOU

See time-of-use (TOU) rate on page 223.

traceroute

A networking utility to track the routes taken by packets across a network. See also ping on page 175.

TransferAgent

See SSNIAgent on page 213.

transfer request

A request generated by an inventory manager at one warehouse (the to-warehouse) for transfer of an inventory item from another warehouse (the from-warehouse).

transformer

A device in electric utility distribution systems that receives electricity from a feeder and changes the voltage of alternating current (AC) before delivering electricity to the customer's premises.

Transformer Load Management

A user interface within Itron's Active Smart Grid Analytics (ASA) that leverages SAP Business Intelligence analytics applications to continually monitor and identify under-utilized, over-utilized, and at-risk transformers throughout the distribution system. The kit evaluates kVA utilization, percent loss of life, and top oil and hot spot temperatures, increasing the visibility and management of this utility asset.

transitioning

In the context of OpenWay, the state of an endpoint when it is entering a new version of the same group of which it is a member. An endpoint in transition is tracked to prevent it from being incorrectly counted multiple times.

translation interface module (TIM)

Itron software used to collect time-of-use (TOU) and interval data recorder (IDR) data from meters. Once data is gathered, TIM decode pairs are used to decode designated chunks of that data—per user-defined read item lists—for billing purposes.

Transmission Control Protocol (TCP) / Internet Protocol (TCP/IP)

A transport layer protocol within the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite. TCP uses retransmission strategy to ensure that data is sent accurately and completely across a network, and that the data is not lost in transmission. Major Internet applications such as the web, email, and File Transfer Protocol (FTP).

transmission mode

The communication method by which an Encoder/Receiver/Transmitter (ERT) module on page 81 transmits meter reading and related data to a data collection device. ERT modules may be configured to operate in either of two modes—wake-up mode or bubble-up mode.

transparent network substrate (TNS)

A set of Oracle networking architecture services used to facilitate peer-to-peer communication between Oracle components where no machine-level connectivity can occur.

transport layer security (TLS)

An authentication and security protocol widely implemented in browsers and web servers. TLS is based on the Secure Sockets Layer (SSL) 3.0 protocol. It uses digital certificates to authenticate both the user and the network. The TLS client uses the public key from the server to encrypt a random number and send it back to the server. The random number, combined with additional random numbers previously sent to each other, is used to generate a secret session key to encrypt the subsequent message exchange.

trap

An asynchronous message sent from a device in the field. Unlike most events, it does not require an application to send a request for data. Rather, the device sends it, as the metaphor suggests, because of specific conditions on the device. An example of a trap is a last gasp (LG) on page 131.

Trap Forwarder

An obsolete name for Trap Messaging Bridge (TMB) on page 225.

Trap Messaging Bridge (TMB)

An Itron software component that asynchronously captures, displays, and logs traps from network devices, and allows users to instantaneously view alert notifications from any network device that supports SNMP. Trap Messaging Bridge contains an NMR_Listener feature to capture and forward all communication between applications and the neighborhood area network (NAN) on page 155 through the Access Point (AP) on page 8. Trap Messaging Bridge was previously called Trap Forwarder and Trap Receiver. See also Trap Router on page 226.

Trap Receiver

An obsolete name for Trap Messaging Bridge (TMB) on page 225.

Trap Router

An Itron component used by Trap Messaging Bridge (TMB) on page 225 to enable routing configuration for traps.

trim

To set a bit value from 1 to 0 (used in the context of Virtual Log ID on page 233s). Is used to remove a log entry from a Virtual Log.

Triple Data Encryption Algorithm (TDEA) Block Cipher

A symmetric block cipher that uses three 64-bit-long keys to encrypt data in three passes. Data is encrypted with the first key, decrypted with the second key, and encrypted again with the third key. Also called Triple Data Encryption Standard, Triple DES, and 3DES.

Triple Data Encryption Standard, (3DES)

See Triple Data Encryption Algorithm (TDEA) Block Cipher on page 226.

tri-state checkbox

A type of checkbox employed by the user interface of some applications that indicates an indeterminate state in addition to the two (selected and cleared) provided by a standard checkbox. This third state appears as a square or dash in the checkbox and indicates that its state is neither selected nor cleared.

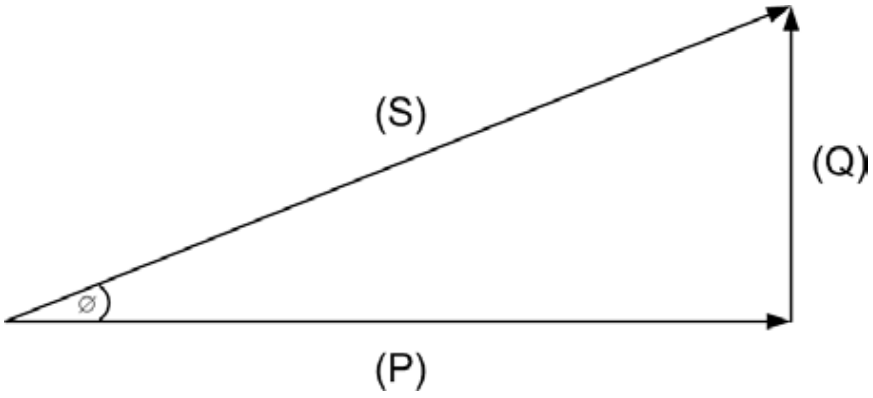
trouble code

A utility-defined code that a field service representative (FSR) or meter reader uses to indicate a problem encountered while reading a meter or completing a work order. For example, a utility might define a particular code to indicate the presence of a vicious dog on the premises or a locked door that prevents access to the meter.

true power

Power dissipated and used by a load. True power is symbolized by the letter P and is measured in watts (W).

The following figure is the Power Triangle. The Power Triangle relates true (P), reactive (Q), and apparent power (S) in trigonometric form.



trust center link key

A 128-bit key used by a Zigbee on page 242 network to apply encryption to radio frequency (RF) packets being sent between a network trust center device and a Zigbee device being added to the network. The key can be either pre-installed in the Zigbee device or generated and distributed by the trust center device.

TTL

See time to live (TTL) on page 223.

tunnel

In networking, a tunnel allows the encapsulation of the data of one protocol within another protocol. By using a tunnel, the system passes the encapsulated data over an incompatible network or provides security for transferring data over an untrusted network.

type-length-value (TLV)

Within data communication protocols, optional information may be encoded as a type-length-value or TLV element inside a protocol. TLV is also known as tag-length-value.

U

uAP/µAP

See MicroAP (uAP) Module on page 146.

UART

See universal asynchronous receiver / transmitter (UART) on page 229.

UCE

See Universal Calculation Engine (UCE) on page 229.

UDP

See User Datagram Protocol (UDP) on page 230.

UID

See utility ID (UID) on page 231.

UIQ

Trademarked term for UtilityIQ software on page 231. Not used as a product abbreviation.

ultracapacitor

An energy-storage component used in devices that require relatively little current and low voltage. This component is used in cellular smart meters, enabling them to send last-gasp power outage notifications, even in very low temperatures (where conventional batteries may fail).

Also known as a supercapacitor.

UMTS

See Universal Mobile Telecommunications System (UMTS) on page 229.

unassociated

With HAN Communications Manager (HCM) on page 106, the unassociated state is established by importing a new device through device import or by removing a device from an ESI.

UNC

See Universal Naming Convention or Uniform Naming Convention (UNC) on page 229.

Underground AP and Relay

An Access Point (AP) on page 8 and optimized for use in subterranean utility vaults in dense urban areas where pole top or pad mount infrastructure is not available.

unfillable gap

An instance of discontiguous meter data that cannot be filled. Unfillable G5RM on page 98s can occur for several reasons: the meter never recorded the data, the meter was reprogrammed, the meter's flash memory was corrupted, time shifts, physical damage, and so on.

See also end gap on page 82.

unicast

The sending of packets over a network to a single device. The bulk of packets in Advanced Metering Manager (AMM) application on page 13.

uniform resource identifier (URI)

A string of characters used to identify a network resource, such as an electronic document, or image. A URI can be further classified as a uniform resource locator (URL), uniform resource name (URN), or both.

Unimag+

A domestic single jet meter that combines the turbine single jet technology with the proven reliability of the extra dry register.

Unimag+ PE

A single jet water meter especially designed for use in apartments. Its modular registar enables it to be transformed anytime into a communicating device and integrated into the Itron data collection solution.

unit under test (UUT)

A manufactured item undergoing testing to determine whether it will function adequately. Also called device under test (DUT). Used in the IMU Accuracy Tester on page 114 software to refer to the gas IMU being tested.

universal asynchronous receiver / transmitter (UART)

An interface for serial communication between devices. Itron Communications Tester on page 48 UART commands set and show serial communication information.

Universal Calculation Engine (UCE)

UCE performs logical and mathematical operations on data from interval streams. UCE returns either a vector representing a new stream of interval data, or a scalar, depending on the calculation. The UCE is also the means through which all internal Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 and external applications request interval stream data through an XML on page 241 API.

Universal Mobile Telecommunications System (UMTS)

The Global System for Mobile Communications (GSM) implementation of the 3G wireless phone system. Part of the IMT-2000 standards for mobile telecommunications services, UMTS provides service in the 2 GHz band and offers global roaming and personalized features. Also called 3GSM.

Universal Naming Convention or Uniform Naming Convention (UNC)

A standard system for identifying servers, files, folders, printers, and other resources on a local area network (LAN). The basic UNC format is \\servername\sharename, where servername is the host name or IP address of a network file server and sharename is the name of a shared directory on the server.

Universal Transverse Mercator (UTM)

A system that divides the globe into 60 North-South zones, each measuring six degrees wide in longitude. Zones are numbered consecutively from West to East.

Positions on the globe are given by zone coordinates, then the number of meters East (easting) or West (westing) from the center of the zone, and finally by the number of meters North (northing) or South (southing) from the center of the zone. UTM coordinates for the Golden Gate Bridge are zone 10 S, 545980m E. 4185742m N.

unjoin

To remove or separate an Itron NIC from its meter as part of a troubleshooting operation. Gas Interface Management Unit (IMU) on page 99 that are to be retrofitted in the field to their corresponding gas and water meters are said to be unjoined up until the time they are joined.

With HAN Communications Manager (HCM) on page 106, unjoin means to move a device from the join to the associated state. Also known as deprovision.

See also join on page 127.

unreachable meter

A meter transitions to this state if a route exists but if the device has not been read for a configurable period. See also reachable on page 189.

unread meter

Schedules attempt to read meters in two passes. Each pass consists of several read attempts. After the first round of attempts, the schedule places the meter in a requeue list and makes another, later pass. After the second set of retries, the meter is flagged for inclusion in the recovery schedule. Depending on the context, it may appear in the UI as an unread meter. See also remote terminal unit (RTU) on page 193.

unsigned data

Data included in an authentication token, in addition to a digital signature.

UPN

See user principal name (UPN) on page 230**.**

Uptime

A metric that represents the percentage of time that hardware, a network, or a device is operational and available. It refers to when a system is working, opposed to downtime, which refers to when a system is not working.

URI

See uniform resource identifier (URI) on page 229.

use case

A list of actions or steps that define the interactions between a role and a system to achieve a goal. In the Unified Modeling Language (UML), a role is known as an actor. The actor or role can be a human, an external system, external hardware, or other similar subjects.

user account type

Either of two categories of users of Itron's Field Deployment Management (FDM) software in a business unit—server user accounts and mobile user accounts. Server user accounts only have access to the FDM server software. Mobile user accounts only have access to the FDM mobile application software. User accounts may also be designated as both server and user account types, which have access to both the server and the mobile software.

User Datagram Protocol (UDP)

A protocol that allows computer applications to send messages (datagrams) to other hosts on an Internet Protocol network without previously setting up transmission channels or data paths.

user principal name (UPN)

In the context of Tenant Management on page 221, the part of a user account that precedes a domain within the Itron Identity Service. The UPN format generally has the user's first name initial and the last name (elric@eastcitypower.com). Do not enter an email address for the UPN. An email address generally has both the first and last name of the user (edward.elric@eastcitypower.com).

UTC

See Coordinated Universal Time (UTC) on page 52.

utility enrollment group

Defined groups within HAN Communications Manager (HCM) on page 106 that can be selected to participate in demand reduction programs a utility provides.

utility ID (UID)

A utility-specific, one byte, numerical identifier from 0 to 255, that is programmed by Itron into all Encoder/Receiver/Transmitter (ERT) module on page 81s, meters, and cell relays that it manufactures for a specific utility. The utility ID functions as a security code that prevents another utility and other unauthorized persons from performing certain functions on the ERT module, meter, or cell relay, and prevents two or more utilities with adjoining service areas from accessing each other's ERT modules, meters, or cell relays.

UtilityIQ software

A head end software suite that includes applications designed to help utility operators collect and manage AMI meter consumption data. These applications, which include Advanced Metering Manager (AMM) application on page 13, Meter Program Configurator (MPC) on page 144, Firmware Upgrader (FWU) on page 94, and Meter Plugins on page 144, are secure and scalable solutions which support meter reading, management, and analysis for power quality, meter status, peak pricing and more.

UtilOS firmware

The open standards-based network operating system for devices equipped with Itron NICs. UtilOS provides a suite of utility networking services, including network discovery, addressing, routing and switching, health, network time, security, and encryption.

UtilOS includes a metering interface that provides load profile functionality for electricity meters and water and gas IMUs. It records usage data and allocates it to the appropriate intervals so that it can be processed by back end systems.

UTM

See Universal Transverse Mercator (UTM) on page 229.

UUT

See unit under test (UUT) on page 229.

V

V2 security

See application layer security on page 19.

VA

See volt-amperes (VA) on page 234.

validation exit (VE)

A product milestone that indicates the product is customer ready (limited production). Hardware, firmware, software validation deliverables have been completed with acceptable results. There are no priority 1 or priority 2 bugs. Internal First Articles checklist and quality plan meets expectations. Manufacturing documents are ready (assembly process, bill of materials (BOM) status is active, and so on) and regulatory and certifications are complete. Upon approval, the manufacturing process can begin for pilot builds, if applicable. See also limited availability (LA) on page 133.

value analysis and value engineering (VAVE)

Value analysis is the process of identifying a product or service's function and making it available at the lowest cost. Value engineering refers to a systematic method to improve the "value" of the product or service by examining its function. An example of value engineering is using less expensive parts to manufacture a product without decreasing the quality of the product.

vampire

Electronic devices that, when turned off, can remain on in “standby mode” and can represent as much as 10 percent of a consumer’s total electricity consumption.

VAR

See volt-amperes reactive (VAR) on page 234.

var-hours delivered

The total (integral+fractional) of the aggregate var-hours delivered.

var-hours received

The total (integral+fractional) of the aggregate var-hours received.

variable peak pricing (VPP)

A power billing structure whereby rates can vary throughout the day depending on system load conditions.

VAVE

See value analysis and value engineering (VAVE) on page 232.

VE

See validation exit (VE) on page 232.

VEE

Validation, Estimation, and Editing. Software tools that manage data collected from endpoint on page 82s.

vehicle dock

A hardware device installed in a vehicle that provides mounting, storage, communications, and battery charging for a handheld data collection device.

vendor-managed inventory (VMI)

A method of inventory management in which a supplier or manufacturer of goods takes responsibility for monitoring and maintaining a customer’s or buyer’s inventory levels of those goods.

verified single outage (VSO)

A last gasp (LG) on page 131.

view

The contents of the display pane in the user interface of some software applications.

virtual inventory location

A physical location within a warehouse that is set aside for inventory items of a designated status, such as return materials authorization (RMA) items, quarantined items awaiting inspection, items that are newly received from the manufacturer, and so on.

virtual light output (VLO)

VLO allows a user to set the light output percentage that will be considered to be 100%. For example, if a 100-watt light is deployed in the field, and the user wants it to run at a maximum of 80 watts, they would set the VLO value to 80%. As an example application, with this value set, a calendar or program that indicates the light should turn on at 100% at 7 PM will actually turn the light on at 80% after applying the VLO value. If the program indicates that the light should dim to 50% at midnight, the light will actually be set to 40% after the VLO value is applied.

virtual local area network (VLAN)

A VLAN enables devices on different physical local area network (LAN) on page 136 segments to communicate as if they are on the same LAN segment.

Virtual Log ID

A number that represents a log group. Log groups have a number, name, and a single event ID on page 87 range associated with them.

virtual machine (VM)

A computer resource, typically called an image, that behaves like an actual computer but uses software instead of a physical computer to run programs and deploy applications.

virtual private network (VPN)

A computer network that uses a public telecommunication infrastructure such as the Internet to provide remote offices or individual users with secure access to their organization’s network. It is established, at the application layer of the Open Systems Interconnection (OSI) model over an existing physical network.

VPNs aim to avoid expensive systems of owned or leased lines that can only be used by a single organization. A VPN typically does not include every node present on the physical network.

virtual relays

Used through physical relays on page 174 in a Direct-to-Grid on page 69 load control switch (LCS) on page 135to physically control and connect one or more assets, which can be, for example, HVACs, water heaters, and pool pumps. Each physical relay allows control signals to turn the asset behind the switch on or off.

An HVAC, for example, could include multiple components (such as a first stage compressor, second stage compressor, fan, and heat strip), each of which is connected to and controlled by a separate physical relay.

When sending a DRLC event, you might want to control only certain components. For example, the utility might want to turn off the compressors but keep the fan on. The switches accomplish this through the virtual relays, each of which is associated with multiple physical relays.

virus

A malicious, self-replicating program that spreads by modifying other programs or files.

VLAN

See virtual local area network (VLAN) on page 233.

VLO

See virtual light output (VLO) on page 233.

VM

See virtual machine (VM) on page 233.

VMI

See vendor-managed inventory (VMI) on page 232.

volt (V)

The practical unit of electromotive force, or potential difference. One volt causes one ampere to flow when impressed across a one-ohm resistor.

voltage

The electrical pressure that exists between two points, measured in volts. In the circuit of an electrical system, voltage is generally a nominal rating based on the maximum normal effective difference of potential between any two conductors in that circuit.

Voltage Optimizer

An Itron application that provides utilities with a turnkey solution for maximizing voltage savings based on sophisticated EPRI-validated methods while maintaining compliance with regulatory settings. The software combines voltage alerts, polling, and sophisticated algorithms to provide up-to-date voltage optimization.

The solution leverages real-time alerts from Power Monitor on page 178 to create a holistic understanding of voltage levels throughout the distribution network. A third-party product (EDGE from Dominion Voltage Inc.) then analyzes that data, looking for areas where it can tune DA device settings to optimize voltage levels.

voltage standing wave ratio (VSWR)

The ratio of maximum to minimum voltage. When a transmission line is terminated by an impedance that does not match the characteristic impedance of the transmission line, not all of the power is absorbed by the termination. Part of the power is reflected back down the transmission line. The forward (or incident) signal mixes with the reverse (or reflected) signal to cause a voltage standing wave pattern on the transmission line.

volt-amperes (VA)

The unit of electrical measurement equal to voltage times the current feeding an electrical load.

volt-amperes reactive (VAR)

In an alternating current (AC) electric power system, the unit used to measure the reactive power (Q) in a circuit.

volts root mean squared (Vrms)

A measurement of the magnitude of an AC signal or peak modulation. See also kilovolt-ampere reactive hours (kVARh) on page 129.

Volt-VAR Optimization (VVO)

A technique for reducing the amount of energy waste or over provisioning on the distribution grid. VVO is a process used to actively manage voltage levels and reactive power on distribution circuits in order to reduce energy losses, improve reliability, and power quality. VVO is typically achieved through the use of real-time information and controls that activate capacitor banks, voltage regulators, and transformer load-tap changers, and, in some cases, distributed generation to adjust voltage and VAR levels on the primary and secondary distribution circuits.

VPN

See virtual private network (VPN) on page 233.

VPP

See variable peak pricing (VPP) on page 232.

Vrms

See volts root mean squared (Vrms) on page 234.

VSO

See verified single outage (VSO) on page 233.

VSWR

See voltage standing wave ratio (VSWR) on page 234.

VT

A device that measures a proportion of the voltage on a conductor. Where a voltage in excess of x volts is supplied to a site, it is not possible to pass all of the voltage to a meter. VTs are used to measure a proportion of the voltage supplied.

vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source.

VVO

See Volt-VAR Optimization (VVO) on page 234.

W

wakeup

An indication for a device to turn itself on.

wake-up mode

One of two transmission modes (the other being bubble-up mode) used by Itron endpoints to transmit meter reading and tamper data to data collection devices. In wake-up mode, an endpoint waits until it receives a wake-up tone from a data collection device before transmitting its meter reading and tamper data in a standard consumption message (SCM).

walk-by

The process of collecting meter data by using a radio-equipped handheld collector. When the meter is equipped with an ERT the utility company representative can walk by to read module-equipped electric, gas, or water meters without the need to access the meter or customer premises. Previously called off-site meter reading (OMR).

wall-mount booster

See AMI Endpoint on page 15.

WAN

See wide area network (WAN) on page 238.

WAN board

A circuit board in an OpenWay cell relay, connected to the main board, that adapts the cell relay to a particular WAN technology.

Also called a WAN personality module (WPM) on page 236.

WAN-enabled Itron NIC

See MicroAP (uAP) Module on page 146.

WAN personality module (WPM)

A circuit board in an OpenWay cell relay, connected to the main board, that adapts the cell relay to a particular WAN technology.

WAN processor

An OpenWay CENTRON Meter's processor for managing its interface to the wide area network (WAN) on page 238.

Warehouse Adapter

A productized component adapter between Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 and the Itron Analytics (IA) Data Warehouse. The IA Warehouse Adapter employs a change data capture (CDC) mechanism to keep the two systems in sync without the risks associated with developing ad hoc custom data update processes. The Warehouse Adapter can be configured to import other enterprise data, enabling more analytics.

Water ERT module

An obsolete term for the 500W ERT Module on page 6.

Water Module

A two-way radio integrated with water meters that provides consumption reads and that can be remotely configured. Zigbee on page 242-based water modules are typically installed above ground to enable transmission on the 2.4 GHz frequency.

Water Operations Management (WOM)

Obsolete name for Temetra Analysis on page 221, an outcome that improves operational visibility, minimizes leaks, maximizes ROI on meter replacements, streamlines pressure management, reduces labor costs, optimizes network operations, and proactively improves the customer experience.

WaterSmart® Customer Portal

WaterSmart's customer portal is a cloud-based SaaS on page 199 offering with the consumer presentment provided through intuitive browser-based interfaces. Through the customer portal, consumers can get context on their water usage, check and resolve leaks, manage billing preferences, and connect with the utility for conservation on page 50 recommendations.

watt (W)

Standard unit of power equal to one joule per second, and is used to measure the rate of energy conversion.

watt-hour (Wh)

The practical unit of electric energy that is expended in one hour when the average power during the hour is one watt. The watt-hour is not a standard unit in any formal system, however, it is commonly used in electrical applications.

watt-hours delivered

The total of the aggregate watt-hours delivered. It is primary or secondary rated depending on the multiplier chosen.

watt-hours received

The total (integral+fractional) of the aggregate watt-hours received. It is primary or secondary rated depending on the multiplier chosen.

watt-hours uni-directional

The sum of watt-hours delivered and watt-hours received.

WCF

See Windows® Communication Foundation (WCF) on page 238.

Weather Data API

An Itron-developed API that provides weather data to various Itron applications. Itron applications that use weather data may only utilize some of the data types, such as temperature or humidity. Weather data is provided in CSV (comma-separated values) file format, which is described in this guide. Daily weather files are the preferred frequency of delivery because they provide coverage if there is a problem with the weather feed from Itron's weather provider. Historic hourly weather data is available for North American sites and most international sites. Basic data includes temperature, dew point, and barometric pressure and is generally updated hourly. Optional weather data is available for some locations and includes wind speed and direction, gusts, sky, ceiling, visibility, heat index, wind chill, snow depth, 6-hour and 24-hour maximum and minimum temperatures, and 3-hour, 6-hour, and 24-hour precipitation amounts. For many stations. forecast data is also available, including daily maximum and minimum temperatures for the next two days.

Web services

A set of programming standards used to support communication between different types of software and machines over a network, without the need for human interaction. Web services share three types of computer programming: Extensible Markup Language (XML), Standard Object Access Protocol (SOAP), and Web Services Definition Language (WSDL).

Web Services Description Language (WSDL)

An XML-based language document used to describe a web service, and to specify the service location and operations the service exposes.

A WSDL is used to describe the protocols and formats used by Itron products including OpenWay Collection Engine on page 164 web services and Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 web services.

web services security (WSS)

Standards approved by Organization for the Advancement of Structured Information Standards (OASIS) that build upon existing security technologies such as XML digital signature, XML encryption, and X.509 certificates to secure web services message

exchanges.

Web UI

A web-based user interface for Itron Enterprise Edition (IEE) Meter Data Management (MDM) on page 124 version 10 or later. Previously known as Edge Explorer on page 77.

WFM

See workforce management system (WFM) on page 239.

Wh

See watt-hour (Wh) on page 237.

WhatsUp® Gold

A network management tool marketed by Ipswitch™, Inc. The tool provides visibility into the status and performance of applications, network devices and servers in the cloud or on-premises.

wide area network (WAN)

A geographically dispersed communications network with a specific user group; that is, any network that links across metropolitan, regional, or national boundaries. A WAN may be privately owned or rented, but the term usually implies the inclusion of public (shared user) networks.

wide area synchronous grid

A power grid operating at a synchronized frequency that is made up of electrically connected regional (or greater) power grids. In North America, this is called an interconnection. North American interconnections operate at 60Hz, European wide area synchronous grids operate at 50Hz.

Windows Management Instrumentation (WMI)

A non-proprietary infrastructure for management data and operations on Microsoft® Windows®-based operating systems. WMI defines a set of environment-independent specifications that allow management applications to share management information.

In OpenWay systems, WMI is used to communicate with the OpenWay Operational Reporting System (ORS).

Windows® Communication Foundation (WCF)

A set of Microsoft® Windows .NET® technologies for building and running connected systems. WCF is built around the web services architecture.

wireless

Communications service transmitted via cellular, PCS, satellite, or other means.

Wireless M-Bus

See Wireless Meter Bus (wM-Bus) on page 238.

Wireless Meter Bus (wM-Bus)

An open standard developed for power-efficient smart metering and Advanced Metering Infrastructure (AMI) applications. This standard is quickly spreading in Europe for electricity, gas, water, and heat metering.

Wi-SUN Alliance

An association of companies working together to enable reliable, cost-effective, low-power, wireless utility products based on the open global standard Institute of Electrical and Electronic Engineers (IEEE) on page 116 802.15.4g. The Wi-SUN Alliance certification regimen helps ensure conformance of and interoperability between IEEE 802.15.4g implementations. Itron has completed certification starting with the Gen4 technology on page 100 portfolio.

wM-Bus

See Wireless Meter Bus (wM-Bus) on page 238.

WMI

See Windows Management Instrumentation (WMI) on page 238.

Woltex

A robust water meter with capabilities to measure high flow rate conditions and frequent peak flows.

WOM

See Water Operations Management (WOM) on page 236.

WOMS

See work order management system (WOMS) on page 239.

workbench

A group of related views and functions within an application, accessible by clicking the applicable navigation pane button. Also called a domain or dashboard.

workflow

A sequence of screens that the Itron Field Deployment Manger mobile application displays to guide an FSR through the steps necessary to complete a work order. FDM's Endpoint Tools are a collection of standard workflows for reading and programming Itron Encoder/Receiver/Transmitter (ERT) module on page 81s (endpoints) and for modifying and configuring features that are specific to particular endpoint types. Custom workflows are workflows that Itron designs to meet the specific requirements of a particular utility's work orders.

workforce management system (WFM)

A sub-category of Itron products. WFMs combine hardware and software with wireless, web-based communications and automated field service dispatching solutions to streamline utility daily field operations.

work order management system (WOMS)

In the utility industry, a software application used to dispatch work crews to perform repairs. Such a system is often integrated with an outage management system (OMS or OM) on page 168.

work set

The term used internally by the Field Collection System (FCS) for a route.

work type

A code that is assigned to a work order in Itron's Field Deployment Manager that describes the category of work required to complete the order. A work type is typically associated with specific kinds of work orders and market types.

WPM

See WAN personality module (WPM) on page 236.

wriggler

A rotating mechanical component of a 4c on page 6 or 500W ERT Module on page 6. As gas passes through the meter, the meter's drive dog rotates, turning the ERT module wriggler and shaft. The ERT module's microprocessor (counter) interprets the turning of the shaft as a measure of gas consumption.

WSDL

See Web Services Description Language (WSDL) on page 237.

WSS

See web services security (WSS) on page 237.

WUG

See WhatsUp® Gold on page 238.

X

X.509

A cryptographic ITU-T standard for a Public Key Infrastructure (PKI) on page 184 for single sign-on (SSO) and Privilege Management Infrastructure (PMI). X.509 specifies, among other things, standard formats for public key certificates, certificate revocation lists, attribute certificates, and a certification path validation algorithm.

xiCOMM

An MV-90 xi software application that works with communications hardware on MV-90 xi workstations to gather data from remote devices.

xinetd

Extended Internet daemon. An open-source super-server network daemon that runs on many Unix-like systems and manages Internet- based connectivity.

xmDNS

See eXtended mDNS (xmDNS) on page 89.

XML

See Extensible Markup Language (XML) on page 89.

XML Schema Definition (XSD)

An XML-based language that is used to describe the structure and syntax of XML elements and attributes in other XML documents. An XSD file can be used to validate XML files against the structure and syntax defined in the XSD. For example, if you are using an XML API to import data into an application, the XSD describes how to structure the incoming XML file so that the API can process the data. The API can compare the incoming XML to the XSD to verify that the incoming file is valid.

XSD

See XML Schema Definition (XSD) on page 241.

Z

ZCU Tool

See Zigbee Certificate Updater Tool (ZCU Tool) on page 242.

zero crossing

The event of standard AC line voltage crossing the zero volt, or reference level, from positive to negative or negative to positive. An electricity meter monitors its zero crossings and interprets their absence as a loss of power.

Zero Touch Provisioning (ZTP)

ZTP is a RESTful API for storing and retrieving information about Milli on page 146-based devices, and it enables application clients to register these devices and their associated meta data to the Device Management Service (DMS) on page 67 repository.

Zigbee

A specification for a suite of high-level communication protocols using small, low-power digital radios. A wireless network used for home, building, and industrial control. It operates in the 2.4 GHz (ISM) radio band. The specification supports data transmission rates of up to 250 kbps at a range of up to 30 meters. For Itron metering purposes, it is the application chosen to run home area networks (HANs). Each OpenWay CENTRON Meter comes factory-equipped with a Zigbee radio chip to enable in-home communication for purposes of customer communication, data presentment, load control, and demand response. Zigbee technology is a registered trademark of the Zigbee Alliance.

Zigbee Certificate Updater Tool (ZCU Tool)

A tool that allows customers using Zigbee on page 242 devices to apply Zigbee HAN device certificates (that they order from Itron) over the air to their intended meter NICS. Any meter with a Zigbee radio requires one of these certificate to connect with other Zigbee SEP 1.0 (ECC) devices. Currently, Itron does not apply Zigbee HAN device certificates and private keys as part of the manufacturing process, so the ZCU tool is used for this purpose instead.

ZTP

See Zero Touch Provisioning (ZTP) on page 242.