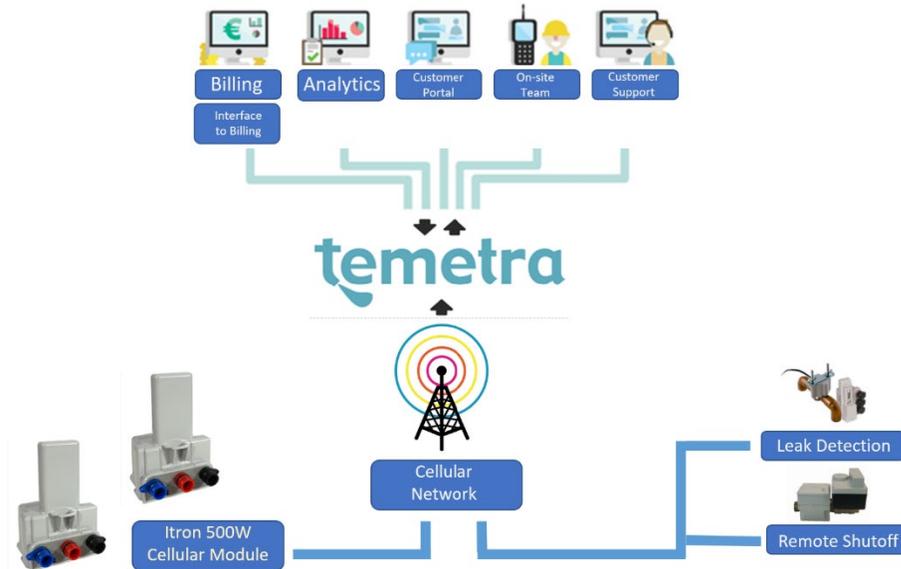


# Itron

## 500W Cellular Network



Itron's cellular solution offers advanced two-way communications over the latest generation **cellular network** and is specifically designed for Itron's AMI Network platform.

Cellular removes the need for hanging infrastructure hardware and expands coverage into pits and building installations. The Cellular network is an actively managed network designed with redundant network architecture, which provides reliable data transmission and network operation. As a regulated licensed air interface with defined spectrum and operating frequencies, cellular operation helps to eliminate many traditional interference issues that reduce AMI Network efficiency. That higher efficiency directly translates into better AMI network and device performance.

50W modules support two-way communications with 15 – 30 – 60 minute intervals, 160 days of internal datalogging and can support either Itron's leak sensing solution or Itron's remote disconnect module.

### Contents.....

- Itron Cellular Overview
- Itron 500W Cellular Module
- Itron Leak Sensor
- SET Remote Shut off Valve



# Itron Cellular Solution



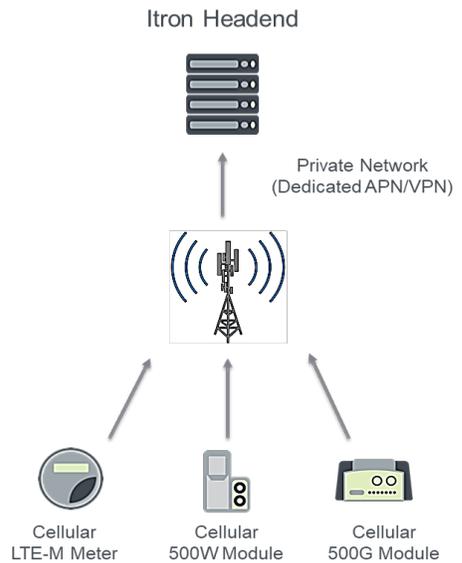
## AMI Network Over Cellular

Itron's cellular solution offers advanced two-way communications over the latest generation **cellular network**, and is specifically designed for Itron's AMI Network platform. The cellular solution also features RF support, enabling our cellular devices easy migration from mobile to network operations as well as deployment into diverse service areas and territories. With Itron's complementary Cellular and RF communications technologies, our AMI Network can be deployed side-by-side in hybrid configurations of RF Mesh and Cellular endpoints to ensure maximum efficiency and reliability in both high- and low-density meter populations.

### Communication Protocols

Itron's AMI network over Cellular uses open IPV4/IPV6 protocol and operates over licensed cellular bands/frequencies from Tier 1 Mobile Network Operators (MNOs) such as Verizon, AT&T, and T-Mobile.

Itron cellular meters and modules communicate via direct point-to-point connections to Itron's headend over current 4G LTE cellular networks or next generation Low Power Wide Area (LWPA) LTE-M Cat-M1 and NB-IOT Cat-NB1 networks. Itron's Cellular solution also features support for private network connections via dedicated APN and VPN configurations.



Itron's Cellular AMI Network

### Two-Way Communications

Active two-way communication over cellular enables the Itron AMI network to perform over-the-air (OTA) firmware and configuration updates, ensuring the latest features and firmware. With network speeds of up to 1 Mbps, Itron's cellular AMI solution also supports on-demand reads, remote disconnect and valve control, and less than one-minute alerts and alarms.

### Benefits of Cellular Networks

Cellular removes the need for hanging infrastructure hardware and expands coverage into pits and building installations.

The Cellular network is an actively managed network designed with redundant network architecture, which provides reliable data transmission and network operation. As a regulated licensed air interface with defined spectrum and operating frequencies, cellular operation helps to eliminate many traditional interference issues that reduce AMI Network efficiency. That higher efficiency directly translates into better AMI network and device performance.

## 500W Cellular Endpoints



### Cellular 500W Water Module Pit Model

- » *Height: 4.5 inches*
- » *Maximum diameter:*
  - *Lower: 3.90 inches*
  - *Upper: Approx. 1.70 inches*
- » *Weight: Approx. 9.6 ounces*
- » *20-Year battery life*
- » *Operating Temperature*  
*-20°C to +60°C*
- » *Humidity limits: 0 to 100%*  
*(submersible)*

Itron's battery-powered **Cellular 500W Water Module** is the latest addition to Itron's portfolio of advanced metering devices for water utilities. Function, performance, and accuracy is identical to its RF counterparts. In addition, the 500W features *both* cellular and RF communications capabilities, offering the most flexible meter reading options of any Itron module.

### Communications

The Cellular 500W water module is designed to accommodate a wide range of deployments and topologies. The module operates in the narrower 1.4 MHz and 180 Hz bandwidths, allowing it to penetrate buildings and in/out of pits while still operating in enhanced power saving modes.

The endpoint communicates via direct point-to-point connections between Itron's headend system and cellular next-generation Low Power Wide Area (LWPA) LTE-M Cat-M1 and NB-IOT Cat-NB1 networks. These communication standards promote extended battery life, extended coverage, and reliable connectivity to existing cellular infrastructure.

### Data Capture and Storage

The cellular modules support two-way communications, offer configurable interval data collection (at 15-, 30-, or 60-minute intervals), and collect a wide range of events and alarms. The modules capture and store 160 days of synchronized interval data. The modules can also take over-the-air firmware and configuration updates, allowing them to adapt and maximize operational stability throughout the life of the product.

### Physical Features

The Itron modules come in a compact design and feature an industry-leading 20-year battery life. The 500W water module also comes with an interface that can support either Itron's leak sensing solution or Itron's remote disconnect module.

Please refer to the product specification sheet for more information about the Itron Cellular 500W Module.

## Water Meter Compatibility

The Itron Cellular 500W Module is compatible with water meters from all major manufacturers such as Badger, Elster AMCO, Hersey, Master Meter, Neptune, Kamstrup, Sensus and Diehl – enabling water utilities to consolidate all their water meters under a single communication platform.

## End to End Security

The Itron Cellular 500W Module is an Itron Enhanced Security device. Itron Enhanced Security provides auditing of both security activities and events returned by the module, managing of encryption keys, and managing the larger set of security components deployed with the AMI system. Itron Enhanced Security operates from the headend system to the endpoint; therefore, the module only operates on authenticated control commands.

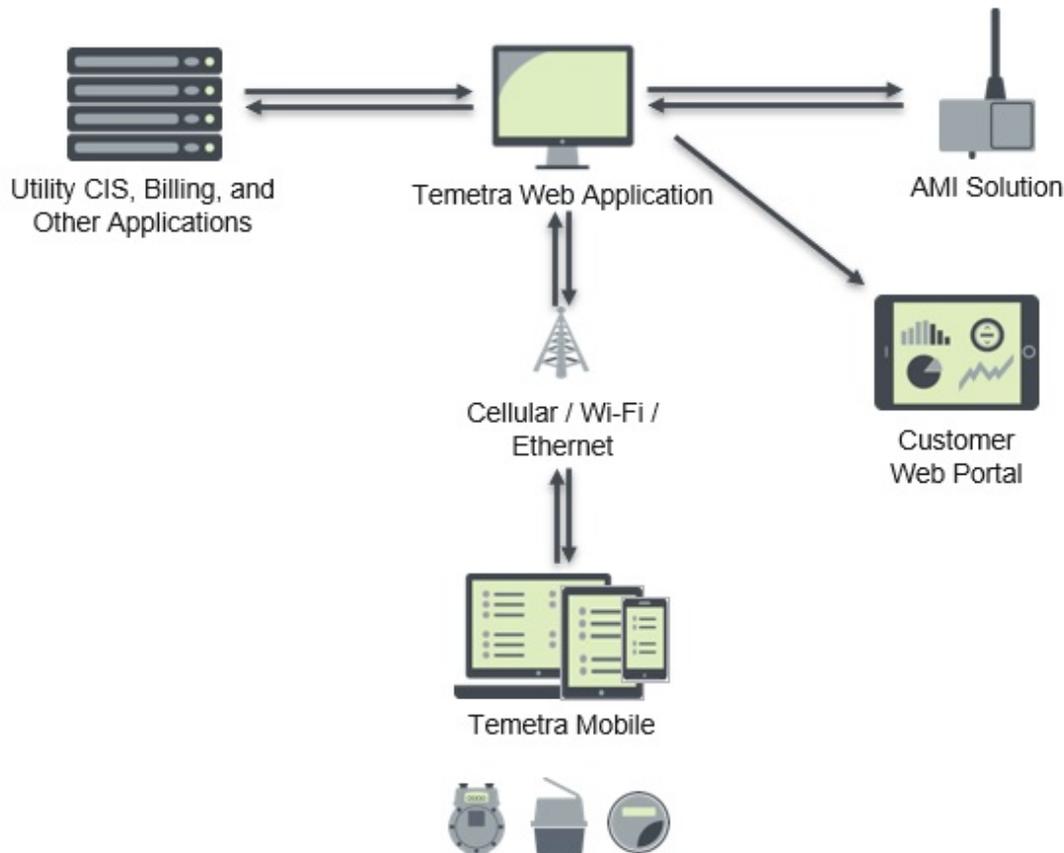
Itron Enhanced Security leverages the following hardened security appliances and applications:

- » **Itron Security Manager (ISM):** ISM manages encryption, authentication, decryption, and validation of meter reading data and commands to and from enabled endpoints. ISM also manages the key exchanges and security state for endpoints in a cellular network. ISM digitally signs meter commands using public/private key material. Each endpoint has a unique private key used to validate the signature. ISM encrypts meter traffic using the AES algorithm.
- » **Hardware Security Module (HSM):** HSM generates and secures asymmetric signing (command and revocation) keys (ECC, 256-bit). The HSM is considered an integrated part of the ISM and connects to the ISM via secure API. No other devices or systems connect to the HSM.

Each cellular carrier has its own compression, encryption, and authentication schemes to protect data within their networks.

# Itron Temetra

Temetra is a complete **cloud-based** solution for **automated and manual meter data collection** for **electricity, gas, and water services**. Temetra centrally manages and optimizes meter data collection activities, and then stores, processes, analyzes, and visually presents meter data, meter events and alarms, and collection routes.



**Temetra solution architecture for AMI solutions**

## Centrally Manage Data Collection Activities

Temetra brings you everything you need to centrally manage meter data collection activities, regardless of which collection technologies you use—network, drive-by AMR, walk-by AMR, or even manual reads. Temetra’s comprehensive data collection infrastructure can import the data feeds from many common meter data collection devices and systems to support a wide range of AMI, AMR, and IoT solutions. Temetra combines data collection, storage, and management features into a simple, cost-effective platform.

## Using the Latest Technologies to Improve Efficiency

However, Temetra provides much more than meter reading. Temetra comes with powerful tools and the latest innovations to help you optimize your meter reading operations, so you gain the greatest

value from your investment. These innovations improve the efficiency of data collection operations and maximize the potential benefits from metering and event data.

### Simple Back-Office Integration

Temetra's straightforward approach to integration facilitates data exchanges with other back-office business systems that rely on specific metering and event data, such as billing systems, asset management systems, and work order management systems. Such exchanges keep your back-office systems in sync and ensure that your billing system receives the right data at the right time.

## Temetra Components

Itron's proposed Temetra base offer consists of the following key items:

- » **Temetra Cloud Services** provides a secure, web-based solution that the City can access anywhere with an Internet connection. Itron manages IT system performance and availability.
- » The **Temetra web application** is the system's cloud-based headend software for data collection and data management. Functions include:
  - Browser-based user interface with integrated endpoint mapping
  - Managing data collected the network as well as mobile and walk-by AMR meter reading
  - Long-term data storage
  - Displaying detailed endpoint, metering, and event data
  - Data analytics and reporting tools
  - Basic meter data management functions
- » The **Temetra Mobile** application and **Itron radios** support mobile (drive-by) and walk-by automated meter reading (AMR), and manual meter reading. This application can be used with Android, iOS, and Windows devices, such as smart phones, tablets, or laptop computers (sold separately).
- » **Temetra Transfer**, a desktop file management utility that manages on-demand file transfers to import data into Temetra from outside business systems, when needed. (**Note:** Most data transfers are fully automated).
- » Professional services, including:
  - Temetra system implementation
  - Temetra integration
  - Training with the Temetra web application

# Solution Features

## Flexible Data Collection

Temetra serves all your meter data collection needs by supporting the following data collection technologies:

- » AMI network data collection
- » drive-by and walk-by automated meter reading (AMR)
- » manual meter reading
- » any combination of these meter reading technologies

### AMI Network Data Collection

Temetra supports fully automated remote daily data collection for electricity, gas, and water meter endpoints that communicate via AMI networks. Upon collecting the data, the AMI network's headend system automatically transfers gas and water data to the Temetra web application.

When paired with Itron AMI networks, Temetra also supports two-way commands, allowing you to perform such activities as on-demand meter reads and service dis/connects.

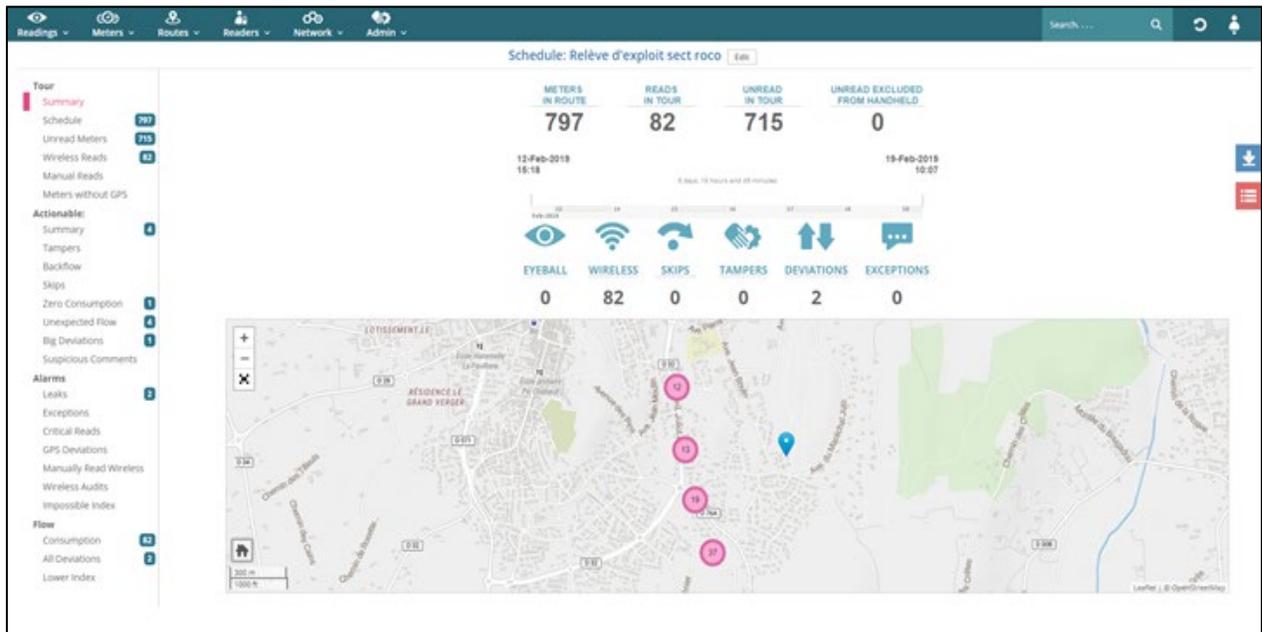
### Drive-By/Walk-By AMR and Manual Data Collection

To support mobile and walk-by AMR and manual meter data collection, Itron provides the **Temetra Mobile application** (app). Temetra Mobile runs on Android and Apple iOS based smartphones and tablets and on Windows 10 laptops provided by the utility. Field devices are used in conjunction with **Itron radios**, which automatically collect the metering data for the app, and then securely transmits and syncs the data to the Temetra web application.

# Temetra Web Application

## General Description

Temetra is a mature, user-friendly, and secure cloud-based meter reading and data collection system for gas and water services. The **Temetra web application** is the heart of the system. It provides all the functionality you need to centrally manage and monitor your meter data collection operations, and to store, access, view, and manage your gas and water meter data, regardless of which data collection technologies you employ.



**Temetra is simple, intuitive, and efficient**

Temetra's user interface features dashboards, integrated mapping, high-speed searches, and a rapidly evolving set of features. The intuitive design ensures a smooth, efficient, and consistent way to manage all your gas and water metering devices.

Temetra's comprehensive reporting and search features are also straightforward, requiring minimal training to interpret and understand. Your Operations, Meter Reading, and Billing Teams can all easily access the meter data they need, and any other associated information you choose to collect.

Furthermore, Temetra displays all collected data the same way, regardless of how it was collected (manual reads, drive-by AMR reads, automated fixed network reads, or any combination of these technologies). Thus, the Temetra user experience remains the same for cities and utilities that grow from manual reading to AMR on up to fixed networks. You get the same instant response to your data, whether it is two manual reads per year or 10 years of 15-minute interval data from a fixed network.

## Key Functionality

Temetra provides all the functionality you need to manage data collection operations, including:

- » dashboard-based system monitoring

- » device provisioning (via AMI headend system files)
- » meter asset management (geolocation, device photos, field notes)
- » data collection scheduling
- » collection route management and optimization
- » ad hoc routes based on specific report criteria
- » automatic route assignments (to meter reading teams)
- » advanced search-based reporting
- » system administration (passwords, user roles, etc.)
- » long-term data storage
- » basic meter data management capabilities
- » customer service support tools
- » extensive standard reporting
- » flexible data export capabilities (MVRS, XML, and CSV)
- » REST APIs and standard file formats for back-office system integration

## Browser Compatibility

Utility personnel can securely access and connect to this web-based application from anywhere with an Internet connection. Temetra is optimized for use with the following web browsers:

- » Apple Safari
- » Google Chrome
- » Microsoft Edge
- » Mozilla Firefox

## Dashboards and System Monitoring

Temetra has four primary dashboard views:

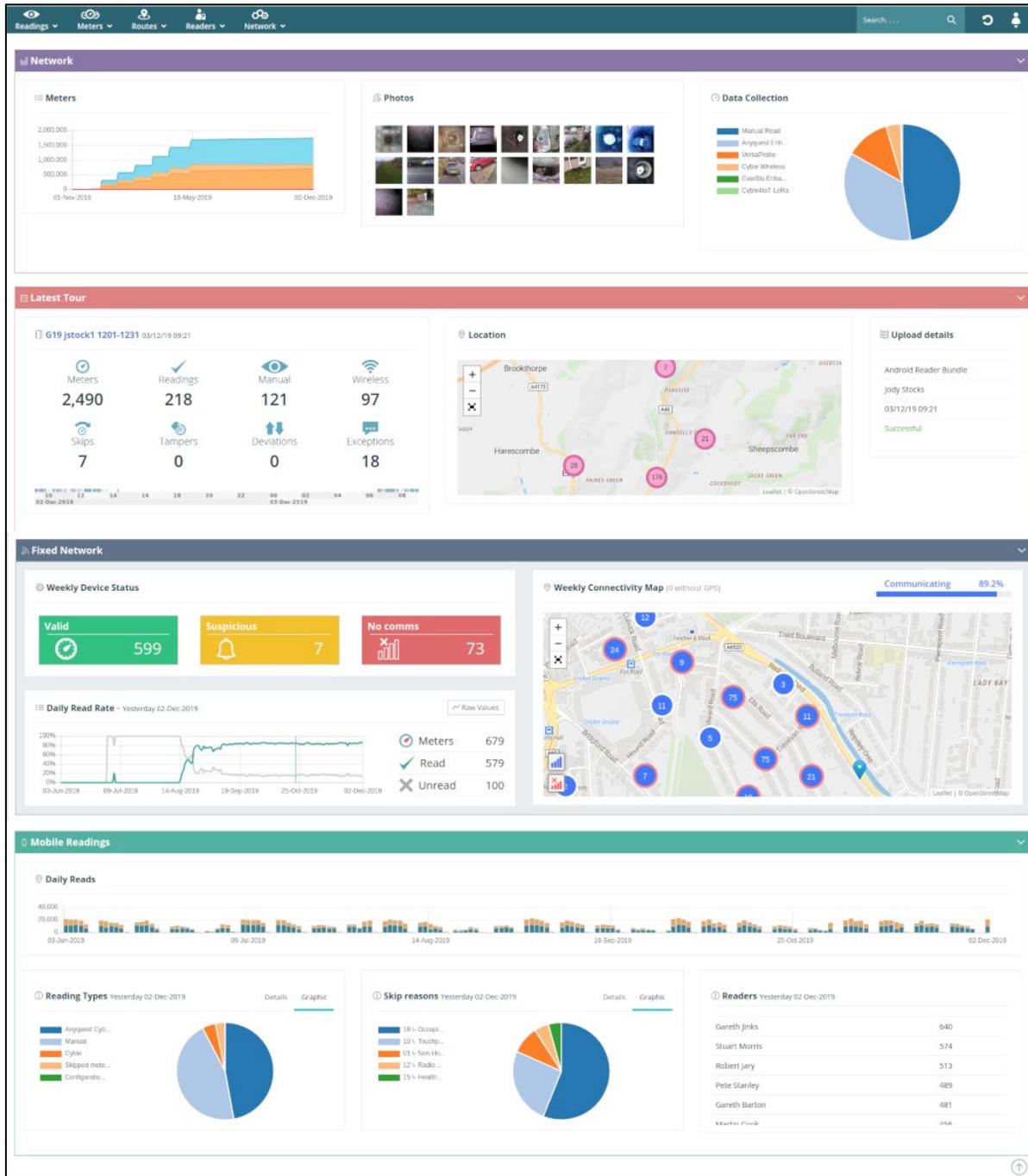
- » **Network** summarizes meter data collection activities from *all* data collection sources.
- » **Fixed Network** summarizes data collection coming in from an AMI network.
- » **Mobile Readings** provides statistics about automated meter reading performed via drive-by data collection and manual data collection activities.
- » **Latest Tour** displays information about the last schedule created.

Each dashboard summarizes a wealth of essential information about these topics. Furthermore, you can click any item on the dashboard to drill down for additional detailed information.

The primary data collection method proposed is fixed network; however, Temetra supports mobile and walk-by AMR and a brief description of these Dashboards is included as well.

## Network Dashboard

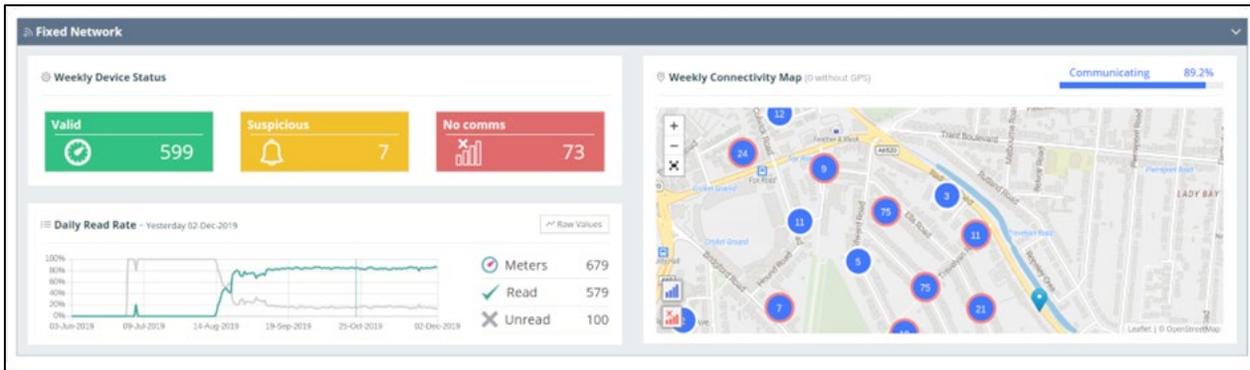
The **Network** dashboard summarizes meter data collection activities from *all* data collection sources—the AMI network, automated meter reading (AMR) via mobile collection systems, and manual data collection. It also provides photos of any endpoints that need follow-up or remediation.



The Network view summarizes all meter data collection activities from an AMI network, mobile AMR, and manual data collection

## Fixed Network Dashboard

The Network dashboard's **Fixed Network** pane summarizes data collection coming in from an AMI network linked to Temetra, when applicable. It tracks each week's total valid readings, suspicious readings, non-communicating meters or endpoints, and other problems that require further analysis.

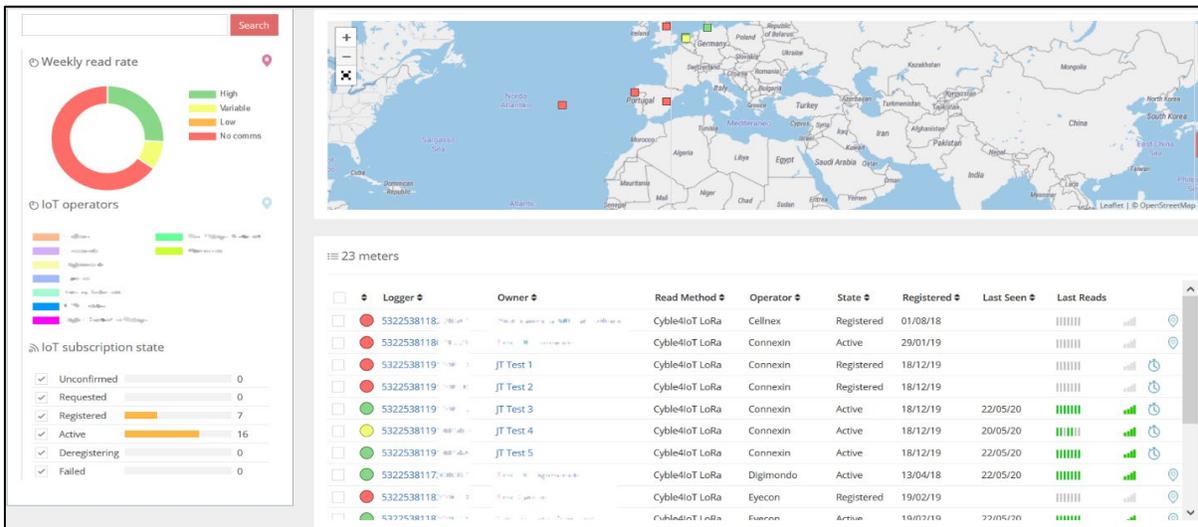


### Quick Access to Detailed Data Views

Clicking items on a dashboard lets you drill down to detailed information about each summary item. For example, clicking the **Suspicious** box opens a list of those endpoints that are reporting suspicious readings. Similarly, clicking the **No comms** box list those endpoints that are not communicating as expected. Hovering over an endpoint on a map displays information about that endpoint.

### Provisioning New Devices

When used with Itron’s AMI network, Temetra can import the AMI headend system’s CSV device files and device location data to begin automatically provisioning meter modules. This allows you to manage existing devices and to provision and activate (Start/Stop) newly installed devices directly from Temetra. Temetra logs and reports successful provisioning.



### Provision new meter modules and manage existing modules

### Connectivity Reporting

Temetra reports endpoint device connectivity data by read technology. Summary data appears in simple graphs. Reporting on individual devices appears in tables and map views. Devices appearing in red indicate those requiring investigation. Sorting and filtering let you quickly refine views to show only those devices that require investigation.

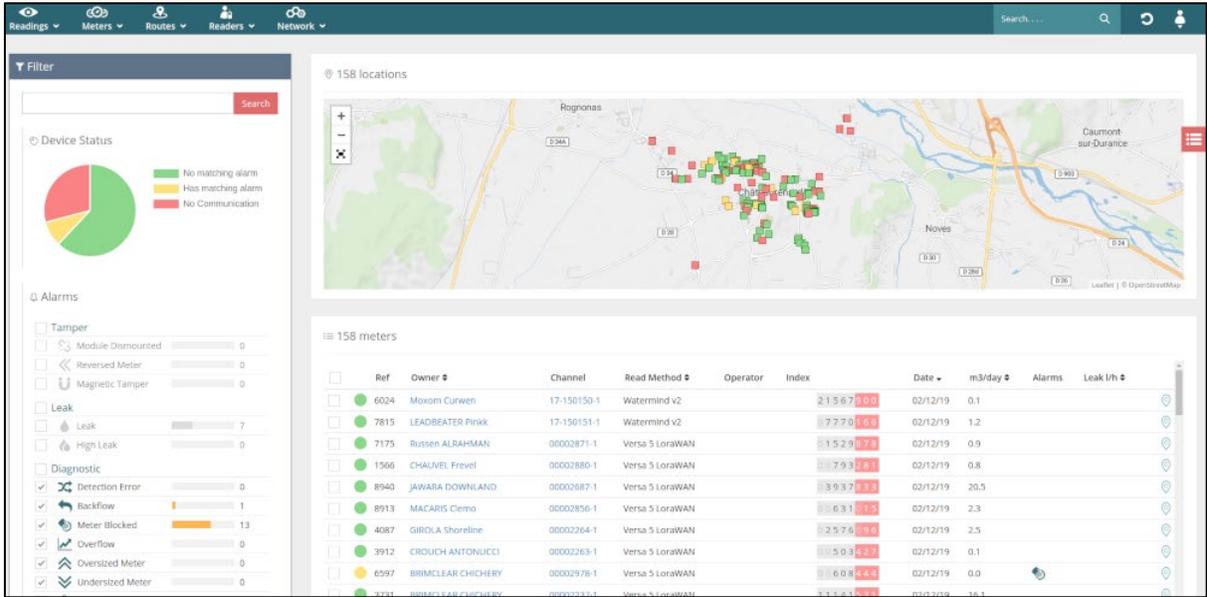
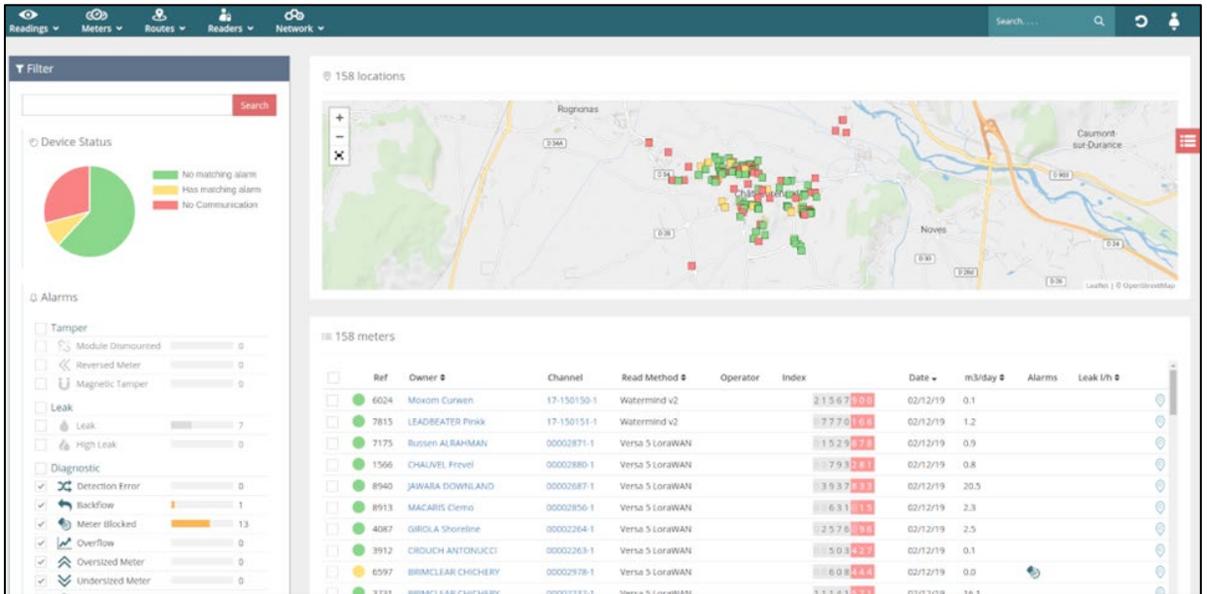


Table and map views identify specific devices that need investigation.

### Events and Alarms

The **Fixed Network Alarms** dashboard provides filters and search tools for working with endpoint alarms, tamper conditions, and other events. Filters are simple check boxes for common tamper, leak, and diagnostic issues. Simply selecting a check box lists those endpoints reporting the associated condition. You can also perform searches to identify endpoints reporting specific conditions. A map view displays the targeted endpoint's locations.



Quickly obtain locations and data for meters reporting specific events and alarms

## Leak and Flow Detection

Temetra has built-in non-revenue water (NRW) tools that tag meters with unexpected usage. For example, Temetra's **Leak** and **High Leak** filters identify unusual flows to identify and report potential customer-side leaks. You can choose from a selection of deviation algorithms to identify outlier index readings. Itron's standard algorithm is absolute standard deviation from median flow.

## Diagnostics

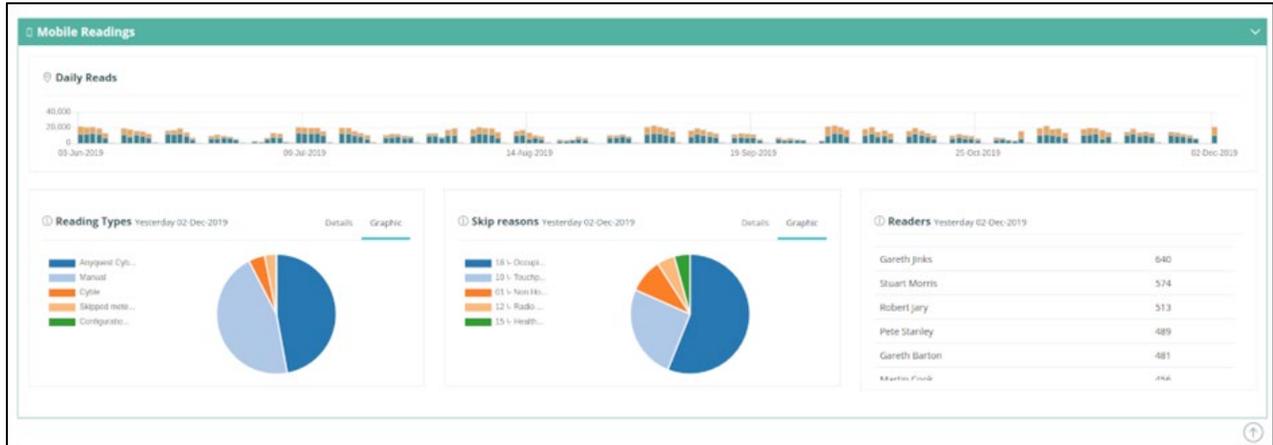
The **Fixed Network** dashboard provides diagnostic feedback that can be useful in identifying common field conditions. You can easily list the devices associated with each alarm, leak, and diagnostic condition. Furthermore, this information can help you optimize your network by "right-sizing" any undersized or oversized meters.

## AMR Support

Temetra provides the flexibility to obtain mobile and manual meter readings within the same system.

### Mobile Readings Dashboard

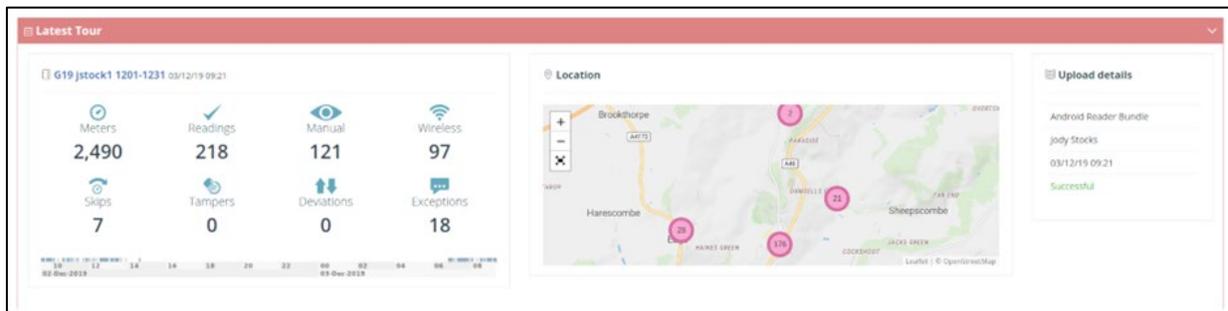
The **Mobile Readings** dashboard summarizes recent mobile automated meter reading and manual meter reading activities. Data includes recent statistics on daily mobile reading (last 6 months), the types of readings performed, a breakdown of reasons for skipped readings, and the readers who performed the reading tours.



Mobile Readings Dashboard

### Latest Tour Dashboard

The **Latest Tour** dashboard displays the current or most recent active Scheduled Route. Summary information includes the number of meters on the tour, the number read, the number requiring manual readings, and the number captured via automated drive-by readings. It also reports common issues, such as skipped meters, meters reporting tampering events, and other exceptions.



The Latest Tour dashboard summarizes the current or most recent active Scheduled Route

# Data Collection, Storage, and Management

## Meter Data Management Capabilities

Temetra provides several important meter data management capabilities, including:

- » Centralized long-term data storage
- » Powerful search/querying functions
- » Consistent views of gas and water data, regardless of how it was collected
- » Event and alarm tracking
- » Protecting revenue by identifying low-flow and tamper alerts
- » Storing and accessing meter photos, associated site photos, and meter reader notes
- » Supporting automated billing schedule responses and workflows
- » Tracking and auditing of data changes

## Central Data Repository

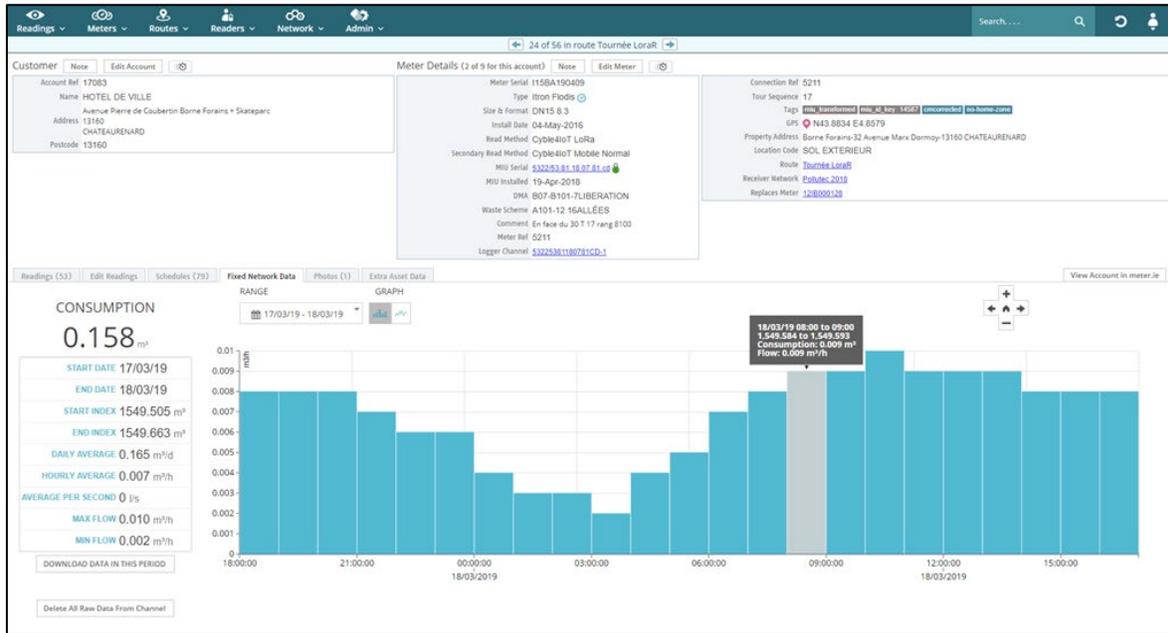
Whether you capture gas and water meter data manually, via drive-by automated meter reading (AMR), via a fixed AMI network, or some combination of these data collection methods, Temetra acts as a central repository for your business data collection needs. Temetra records, stores, and returns a wide variety of data content, depending on each metering device's data capture capabilities.

For example, in addition to the manual data collection possibilities mentioned above, metering data can include simple register reads, leak alarms, tamper alarms, backflow alarms, and daily meter read values (if the device contains memory to store such data). This data can then be accessed for use by your meter reading and field service teams, customer service representatives, billing teams, and any business systems that support these activities, such as your billing system or work order management system.

Temetra offers unlimited data storage for as long as you have an active subscription.

## Daily Data Collection

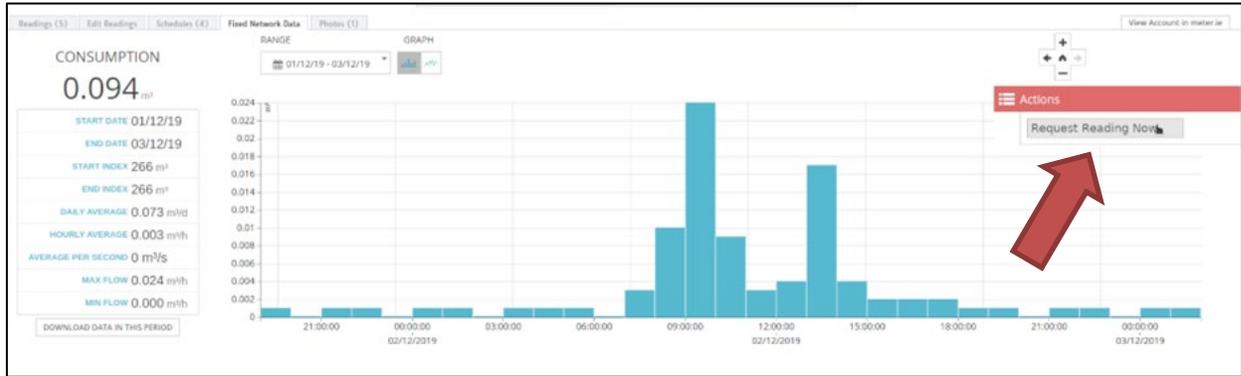
The network headend system sends meter interval and alarm data to Temetra on a regular (configurable) basis. Temetra's **Meter View** page then displays energy or water usage in hourly or 15-minute intervals, based on how the meter is configured to record interval data. Temetra's display shows an hourly data profile.



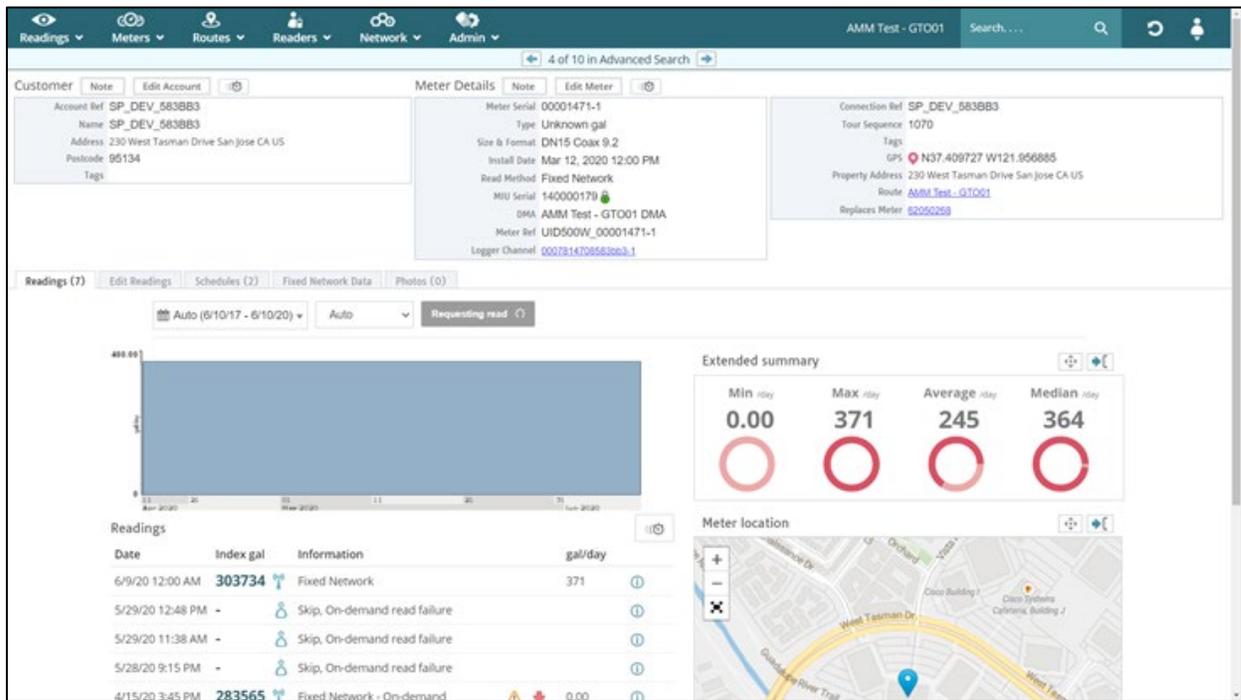
Temetra showing meter interval data

## On-Demand Meter Readings

Temetra's **Meter View** page lets you issue an on-demand meter read request for any meter linked to the network. On-demand reads can be used to determine current meter readings or to complete a billing schedule.



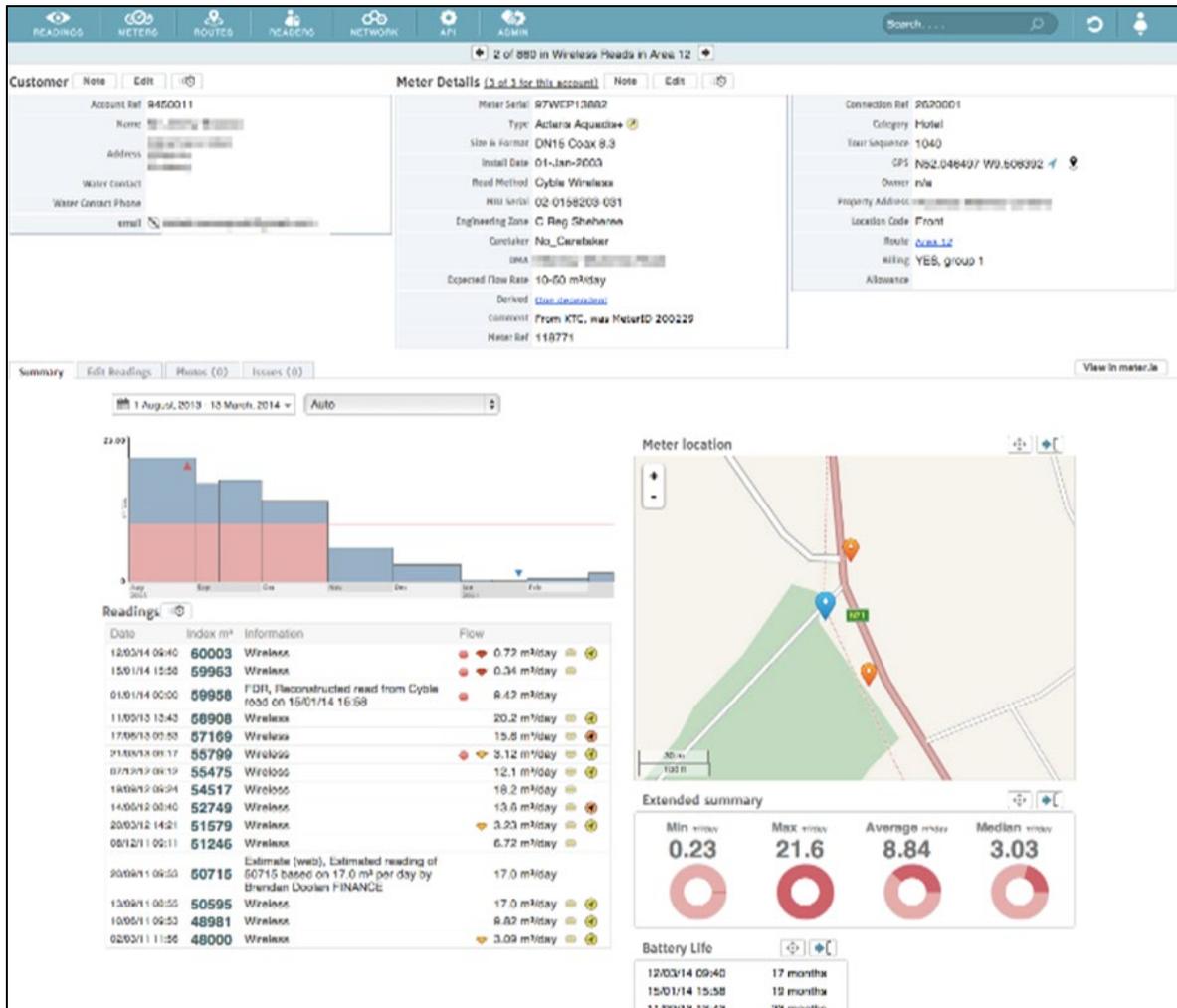
Temetra lets you perform on-demand readings to request the latest data from a specific meter ▲



With on-demand reading, you can quickly complete a billing schedule ▲

## Unified Data Presentation

Temetra summarizes account information, meter data, event data, historical account data, and key account metrics on a single screen. Temetra presents the gas and water information the same way, whether it was collected manually, by drive-by AMR, by walk-by, or through a network.



**Temetra provides consistent views of gas and water data, regardless of how it is collected—via network, AMR, or manual readings**

## Alarm and Event Tracking

Temetra stores meter alarms and events, including any alarms and events received by a connected AMI network. Operations personnel can then use Temetra to search for specific alarms and events and to create custom reports or AMR routes based on these items.

The screenshot displays the Temetra web interface for monitoring a specific channel. At the top, there is a navigation bar with tabs for Readings, Meters, Routes, Readers, Network, and Admin. A search bar is located on the right. Below the navigation, a timeline shows network faults for the channel from March 22, 2020, to June 21, 2020. The main content area is divided into two sections:

- Logger Channel: 1 (0007814708583bab)**: This section provides details for the selected channel, including:
  - Logger: 0007814708583bab
  - Active: YES
  - Attached to Meter: 00001468
  - Type: Volumetric Index
  - Reference: [blank]
  - Installation Date: April 11, 2020
  - Comments: [blank]
  - Tags: [tag icon]
  - FDI Schedule: [blank]
  - Ignore Retired: NO
  - Ignore Missing Data: NO
  - Ignore Word Rules: NO
- 10 recent alarms on this channel**: This section displays a list of recent alarms with a search filter. The search criteria are set to "All" and the date range is from 5/22/20 to 6/22/20. The list includes the following entries:

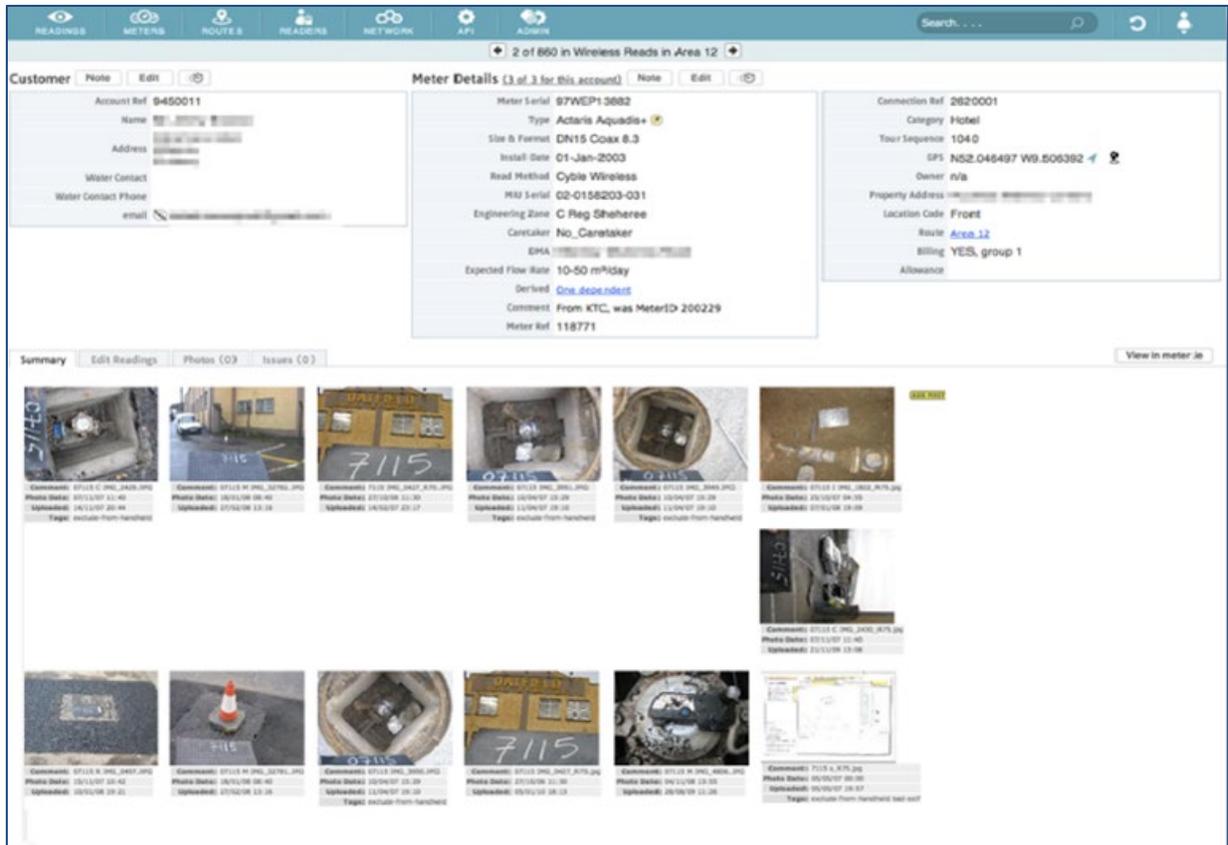
When	Message	Action
6/22/20 5:00:01 PM	Intellis Water Meter: Empty Pipe alarm reported   Alert notification	Meter: Active Reverse Flow   Image verification initiated
6/21/20 5:00:01 PM	Intellis Water Meter: Empty Pipe alarm reported   Alert notification	Meter: Backflow   Image activation initiated
6/20/20 5:00:01 PM	Intellis Water Meter: Backflow alarm reported by Itron Event Log	Image verification succeeded
6/20/20 5:00:01 PM	Intellis Water Meter: Empty Pipe alarm reported   Alert notification	Image activation succeeded   Meter: High Temperature Alarm
6/19/20 5:00:01 PM	Intellis Water Meter: Backflow alarm reported by Itron Event Log	Meter: Historic Leak Alarm
6/19/20 5:00:01 PM	Intellis Water Meter: Empty Pipe alarm reported   Alert notification	Meter: Active Burst   Reverse Pipe End
6/18/20 5:00:01 PM	Intellis Water Meter: Backflow alarm reported by Itron Event Log	System Restart   Image transfer cancelled
6/18/20 5:00:01 PM	Intellis Water Meter: Empty Pipe alarm reported   Alert notification	Meter: Empty Pipe   Image transfer initiated
6/17/20 5:00:01 PM	Intellis Water Meter: Backflow alarm reported by Itron Event Log	Takeover Package Rejected
6/17/20 5:00:01 PM	Intellis Water Meter: Empty Pipe alarm reported by Device 0007814708583bab. Received: Alert notification	

**Temetra stores all meter events and alarms. These can be searched and filtered to create custom reports and field service routes.**

## Long-Term Photo Storage

Temetra's asset management features allow you to store and maintain photographic records of all your meters. This helps improve efficiency by keeping a photo of the meter's location that your meter readers can view or use to address billing complaints. For readers that are read manually, you can also easily store and access a photo of the meter register the last time it was read. Photos also record evidence of possible theft or tamper attempts.

Photos are automatically stored in the Temetra cloud, where thousands of photos can be stored and associated with a given account or meter. Stored photos can then be viewed and managed in the Temetra web application. There is no limit to photos on the Temetra web app, unless specifically limited by an "max-allowed-photos" tag.

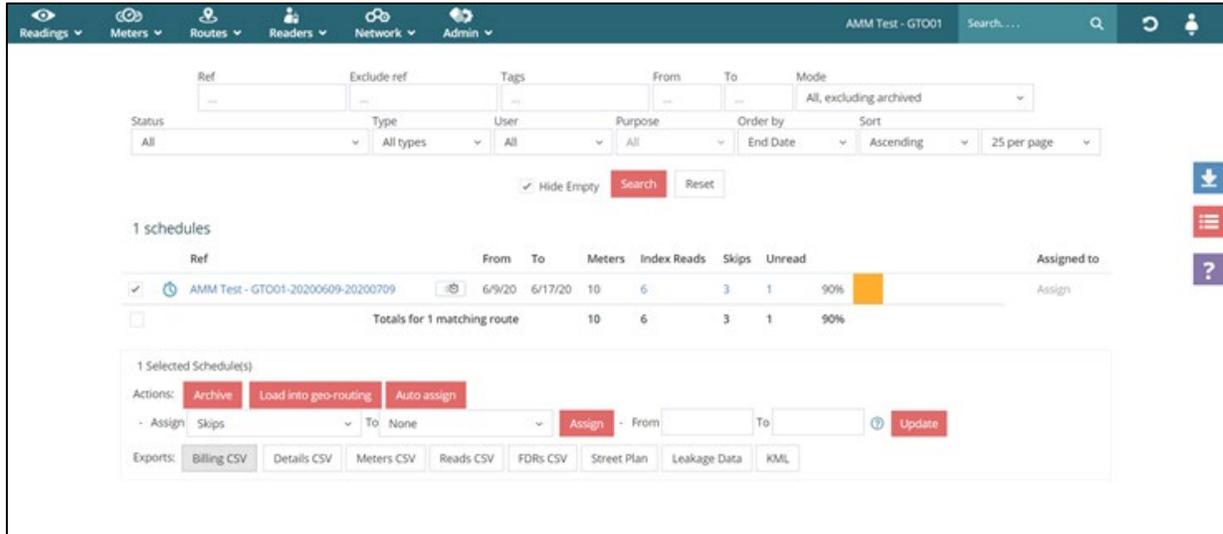


**Long-term photo storage provides increased accuracy, site context, and meter population management**

## Schedule Workflows

The ideal billing workflow is for your billing system to send requests to Temetra for route-based readings within a specified timeframe, and for Temetra to automatically respond with the appropriate billing data.

Temetra manages these workflows through its **Schedules** page. For example, you can use the **Schedules** page to create new schedules for specific meters, assign schedules to meter readers, download location data, and export reading data to billing systems.



Ref	From	To	Meters	Index Reads	Skips	Unread	Assigned to
AMM Test - GTO01-20200609-20200709	6/9/20	6/17/20	10	6	3	1	90%
Totals for 1 matching route			10	6	3	1	90%

### The Schedules page manages workflows to support meter reading schedules and billing cycles

During the system's integration process, Temetra can use either of two strategies for filling automated billing schedules: **First available** responds with the first available data read in the billing cycle, and **Last available** responds with the last available data read in the billing cycle.

Temetra's standard data files can be exported in many common formats. Formats include CSV, XML, MV-RS, Gentrack, GPX, Oracle CC&B, Oracle MDM, RAPID, SAP, TechOne, and others. Files can be exported or downloaded through the Temetra user interface, or via automated API calls. Temetra's online help provides detailed instructions on managing file transfers.

Temetra also provides a desktop utility application called **Temetra Transfer**, which manages on-demand file transfers to import data into Temetra from outside business systems.

If needed, Itron's Professional Services team can provide custom billing system files upon request. Iron Professional Services can also schedule automated SFTP transfers to and from your SFTP server.

# Data Change Logging and Auditing

Temetra provides a complete audit trail. Temetra logs every change made to your system and every edit made to data records, and records who (or what system) made each change, with indefinite storage of all changes. This ensures full visibility to data changes, recording who changed what, when the change occurred, and under which login session.

Time	Item	Who	Action	Field	Change
Apr 27, 2016 5:08:24 PM	0988007860	6170 Julien Nicolas	Modified	GPS	N43 8874 E4 8554 ↔ N43 886363 E4 851696
Apr 27, 2016 9:55:43 AM	1060278464	7839 Fabrice Roux	Modified	MU	↔ 100229607
Apr 26, 2016 2:12:43 PM	1206212027	3774 Julien Nicolas	Modified	GPS	N43 882402 E4 855798 ↔ 43 882426 A 8556619
Apr 26, 2016 2:11:26 PM	1206212027	3774 Julien Nicolas	Modified	GPS	N43 88306 E4 85559 ↔ N43 882402 E4 855798
Apr 20, 2016 5:13:45 PM	0956219827	2255 Julien Nicolas	Modified	GPS	N43 883263 E4 855923 ↔ 43 883267 A 8556516
Apr 20, 2016 5:13:12 PM	0956219813	2255 Julien Nicolas	Modified	GPS	N43 8833 E4 8510 ↔ 43 883400 A 850392
Apr 20, 2016 5:11:26 PM	0956202000	1483 Julien Nicolas	Modified	GPS	N43 8890 E4 8543 ↔ 43 884996 A 8542162
Apr 20, 2016 5:10:32 PM	0956213965	4621 Julien Nicolas	Modified	GPS	N43 8899 E4 8543 ↔ 43 884901 A 8542661
Apr 20, 2016 5:09:36 PM	0305122749	1498 Julien Nicolas	Modified	GPS	N43 884807 E4 852208 ↔ 43 884904 A 8527464
Apr 20, 2016 5:09:26 PM	0305122749	1498 Julien Nicolas	Modified	GPS	N43 8848 E4 8527 ↔ N43 884807 E4 852208
Apr 20, 2016 5:08:38 PM	1084169927	8878 Julien Nicolas	Modified	GPS	N43 8760 E4 8576 ↔ N43 874665 E4 857762
Apr 20, 2016 5:07:32 PM	1206218806	1947 Julien Nicolas	Modified	GPS	N43 87263 E4 857598 ↔ 43 879378 A 8561457
Apr 20, 2016 5:07:06 PM	1206218806	1947 Julien Nicolas	Modified	GPS	N43 8791 E4 8576 ↔ N43 879293 E4 857898
Apr 20, 2016 5:03:36 PM	1206217300	4222 Julien Nicolas	Modified	GPS	43 872792 A 851068 ↔ N43 872448 E4 860339
Apr 15, 2016 12:04:00 PM	78_368532018_2	Christophe Jimenez	Modified		Christophe Jimenez ↔ Jeremy Chauvet
Apr 15, 2016 12:03:11 PM	78_368532018_2	Christophe Jimenez	Modified		Assigned to Jeremy Chauvet ↔ Christophe Jimenez
Apr 15, 2016 12:02:58 PM	78_368532018_2	Christophe Jimenez	Modified		Assigned to Christophe Jimenez ↔
Apr 15, 2016 12:02:26 PM	78_368532018_2	Christophe Jimenez	Modified		Assigned to Jeremy Chauvet ↔ Christophe Jimenez
Apr 15, 2016 11:59:52 AM	78_368532018_2	Christophe Jimenez	Modified		Assigned to Fabrice Roux ↔ Jeremy Chauvet
Apr 15, 2016 11:59:29 AM	78_368532018_2	Christophe Jimenez	Modified		Assigned to Christophe Jimenez ↔
Apr 15, 2016 11:57:08 AM	78_368532018_2	Christophe Jimenez	Modified		Assigned to Jeremy Chauvet ↔ Christophe Jimenez
Apr 15, 2016 11:53:26 AM	78_368532018_2	Julien Nicolas	Modified		Assigned to Fabrice Roux ↔ Jeremy Chauvet
Apr 15, 2016 10:58:45 AM		Christophe Jimenez	Modified	Sequence	61 ↔ 13
Apr 15, 2016 10:55:45 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:54:58 AM		Christophe Jimenez	Modified	Sequence	31 ↔ 11
Apr 15, 2016 10:54:58 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:54:58 AM		Christophe Jimenez	Modified	Sequence	54 ↔ 36
Apr 15, 2016 10:54:01 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:53:49 AM		Christophe Jimenez	Modified	Sequence	53 ↔ 35
Apr 15, 2016 10:53:49 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:53:38 AM		Christophe Jimenez	Modified	Sequence	52 ↔ 34
Apr 15, 2016 10:53:38 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:52:57 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:52:48 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:52:32 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:52:21 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:52:07 AM		Christophe Jimenez	Modified	Sequence	18 ↔ 29
Apr 15, 2016 10:51:54 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:51:54 AM		Christophe Jimenez	Modified	Sequence	42 ↔ 28
Apr 15, 2016 10:51:54 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔
Apr 15, 2016 10:51:43 AM		Christophe Jimenez	Modified	Sequence	38 ↔ 27
Apr 15, 2016 10:51:43 AM		Christophe Jimenez	Modified	Parent Reader comment	Unknown ↔

**Temetra's auditing logs every system and data change and who or which system made the change**

# Reporting and Custom Queries

## Standard Reports

Temetra comes with a wide variety of standard reports that support common performance, operations, and system reporting needs, such as meter reader efficiency, network health, anomalies with utility assets, and more. The following table summarizes Temetra's standard reports.

### Standard Temetra Reports

Report	Description
<b>Schedule</b>	Provides an overview of every meter in the Route, including the read collected, whether that read failed validation, and any comments or trouble codes that were entered.
<b>Unread Meters</b>	Lists the unread meters for the selected schedule.
<b>AMR Reads/Wireless Reads</b>	Lists the AMR reads for the Tour.
<b>Keyed Reads/Manual Reads</b>	Lists the manual reads for the Tour.
<b>Meters without GPS</b>	Lists those meters read as part of the Route for which Temetra does not have GPS coordinate information.
<b>Summary</b>	Summarizes any events for the Route that may require action on the part of the utility, such as leaks, tampers, reverse flow events, or validation failures.
<b>Leaks</b>	Wireless read devices that reported leaks.
<b>Tampers</b>	Wireless read devices that reported tamper events.
<b>Reverse Flow</b>	Wireless read devices that reported reverse flow events.
<b>Skips</b>	Lists meters skipped on the tour.
<b>No Usage</b>	Lists meters with no reported usage between tours.
<b>Unexpected Flow</b>	Lists meters with a flow rate that differed from the expected flow.
<b>Large Deviations</b>	Lists those meters that failed Hi/Lo validation by a significant amount.
<b>Suspect Reads</b>	Lists mobile readings that need extra attention and may be rescheduled.
<b>Exceptions</b>	Lists any read that came back with a comment or trouble code.
<b>Critical Reads</b>	Lists any AMR reads that came back with a critical alarm associated with it, such as a Cut Cable alarm.
<b>GPS Deviations</b>	Lists manual reads that captured GPS coordinates a significant distance away from the location of the meter stored in Temetra.

Report	Description
Manually Read AMR	Lists AMR meters that had to be read manually.
Usage	Shows total usage for every meter over the consumption period.
All Deviations	Lists all meters that failed Hi/Lo validation.
Lower Index	Lists reads where the index value decreased over the consumption period but register rollover does not appear to be the cause.

## Exporting Report Data

All standard Temetra reports can be exported to CSV format for viewing in applications such as Microsoft Excel. If you need to take a specific action on the meters in a report, then you can also use the report as the basis for creating a new Scheduled Route.

## Queries and Custom Reports

Temetra comes with intuitive advanced search and filtering features that you can use to find very specific information and to create custom reports. As with standard reports, you can export your search results as a CSV file or convert the report to an ad hoc Scheduled Route for those meters that meet your search criteria.

The screenshot displays the Temetra search interface. At the top, there is a search bar with 'St. Thomas' entered, a 'Using:' dropdown set to '10 per page', and a red 'Search' button. Below the search bar, there are several filter sections:

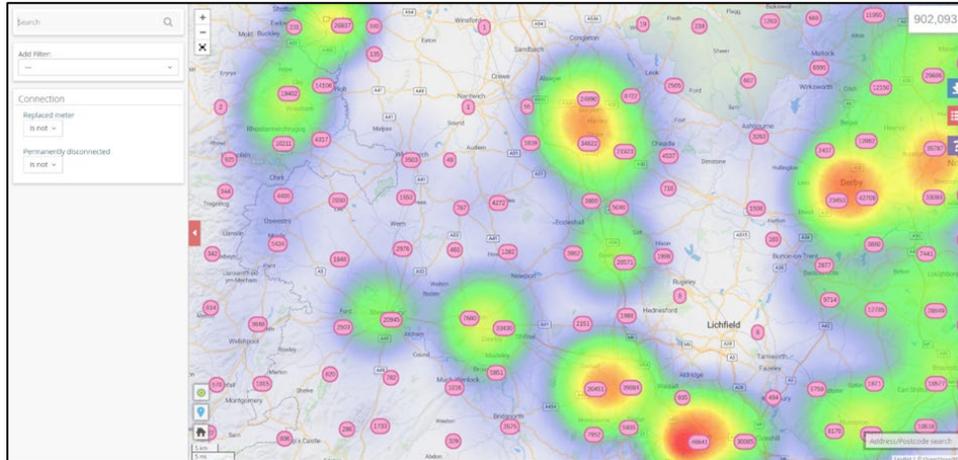
- Meter Details:** Includes 'Meter Type / Brand' with dropdowns for 'is', 'Itron', and 'Intelis'. It also has a 'Fixed Network' dropdown set to 'is'.
- Connection:** Includes 'Replaced Meter' with a dropdown set to 'is not' and 'Permanently disconnected' with a dropdown set to 'is not'.
- Accounts:** A dropdown menu is open, showing options like 'Accounts with active meter', 'Meter Details', 'Meter Type / Brand' (checked), 'Meter Units', 'Meter Format', 'Fixed Network' (checked), 'Meter State of Repair', 'Meter Commissioner', and 'Expected Flow Rate'.

Below the filters, it shows '40 results' and a list of meter entries. The first entry is: '118VB001902 99000009 Customer9 Padmore Village St. Thomas Padmore Village St. Thomas BWA DEMO ROUTE 98000009 DN20 62 Installed: Jul 6, 2020'. The second entry is: '118VB001903 99000010 Customer10 Padmore Village St. Thomas Padmore Village St. Thomas BWA DEMO ROUTE'.

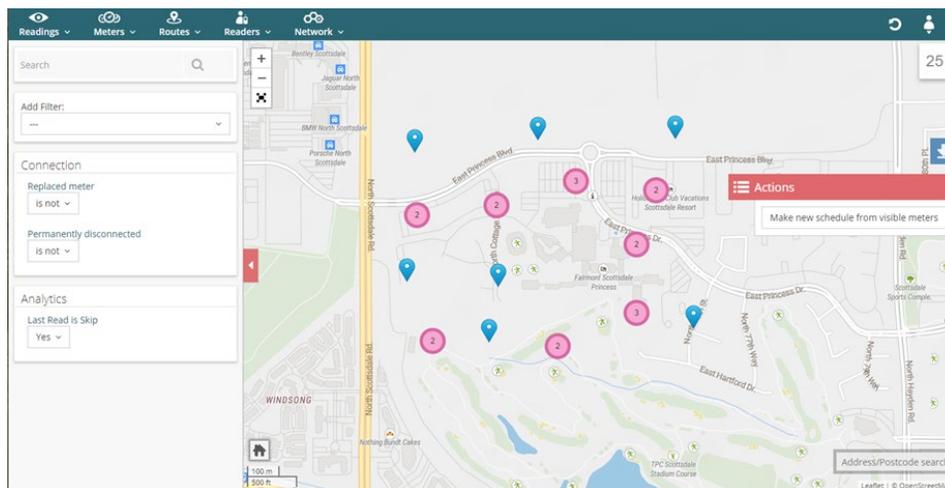
**Temetra's advanced query options let you search by many meter attributes and conditions and then export the results to a CSV file or save them as a Scheduled Route**

## Map-Based Search Capabilities

When combined with searches, Temetra's advanced mapping features let you to access specific information, complete with instant geographic map views associated with your search parameters. With such information, you can quickly access geographic views of system and route status. Customizable filters allow you to further modify the view based on a variety of criteria. You can then create and assign ad hoc routes based on search results and filtered criteria.



**Easily perform geographic searches within a region.  
This “zoom-out” view includes heat map data.**



**Quickly zoom-in to view details for a specific area**

For example, a utility going through a meter change-out effort can take advantage of Temetra to identify meters that were installed more than 20 years ago. You could then put these meters into an ad hoc route “meter change-out route” and assign the route to the appropriate meter technician.

# Customer Service

## CSR Support

Temetra features user-friendly **Customer Service Representative (CSR) support tools** that your CSRs can use to quickly locate and access detailed account information and promptly resolve common customer service issues.

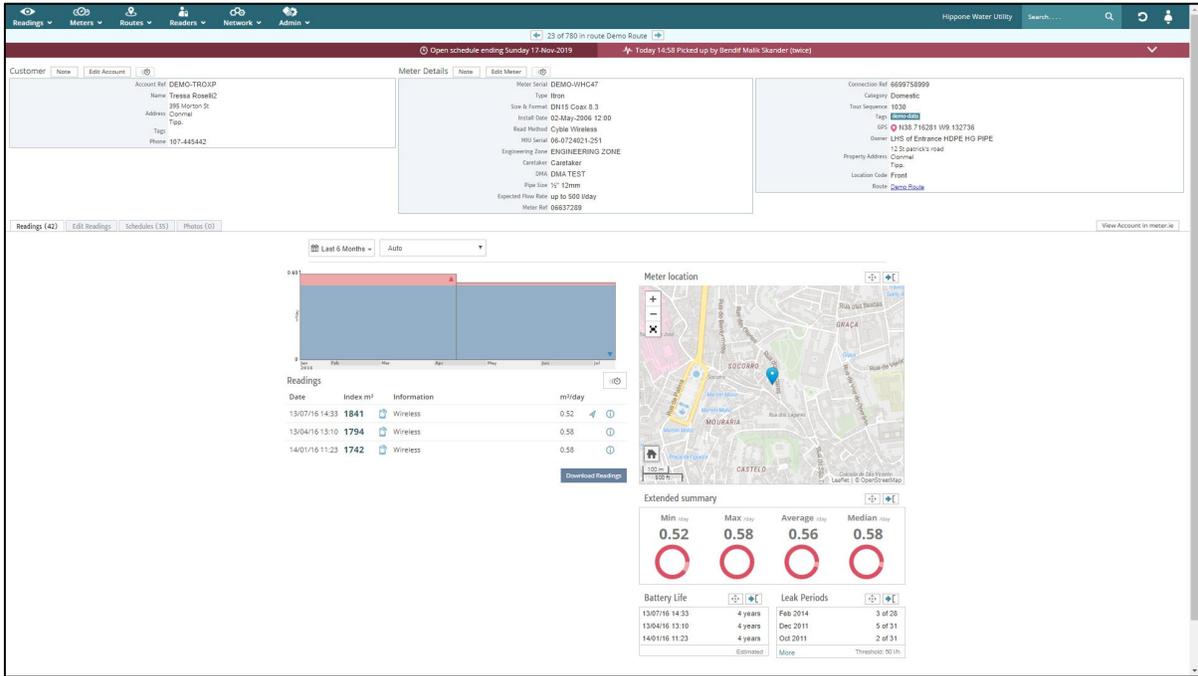


**Your CSRs can quickly search for and access essential account information to promptly resolve customer service issues**

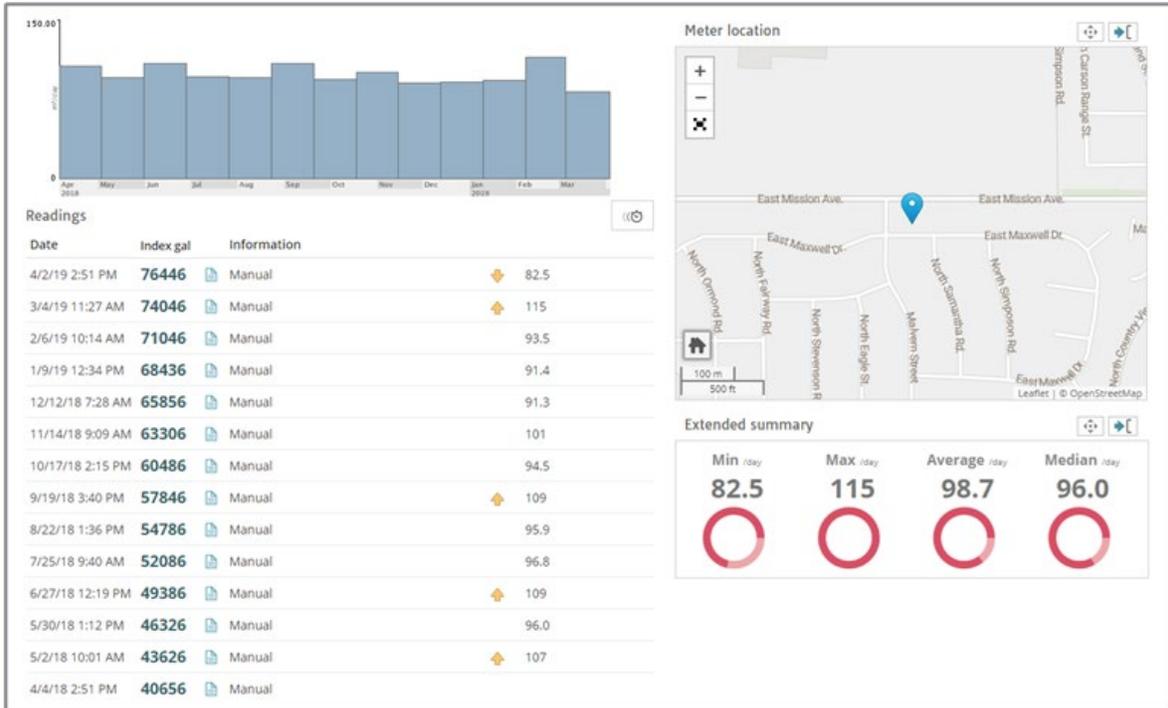
Account information includes:

- » account and location information
- » fixed network data
- » schedules
- » the account's meter read history
- » detailed historic consumption data
- » large deviations in consumption
- » tamper events
- » meter and associated site photos
- » meter reader comments
- » other pertinent asset data

Temetra presents both summary and detailed information in a simple format. This information helps your CSRs quickly address and resolve customer billing complaints, build customer trust, and increase overall customer satisfaction. However, this data also helps support utility conservation efforts by allowing the utility to identify meters that may not be properly sized, to identify meters with high consumption deviations, and to address meters with frequently reported leaks and tamper events.



CSRs can view both summarized and detailed account and usage information from a single view



# Supporting Network Data Collection

## Hybrid (Network + AMR) Solutions

Many multi-service utilities use a combination of network, drive-by, walk-by, and manual meter reading technologies to capture all their metering data. Temetra supports *hybrid* solutions that make use of both the network and mobile automated meter reading (AMR).

Temetra is an ideal solution for utilities that want to enhance their networks with mobile AMR, walk-by AMR, and manual data collection efforts for gas-only and water-only service areas outside the network's reach. Temetra's AMR features are also useful for optimizing data collection routes, performing network contingency reads, and planning targeted field investigations.

## Contingency Reads

Finally, Temetra is a practical solution for managing contingency reads. Even fully network solutions sometimes require drive-by, walk-by, or manual data collection to capture intended reads that are missed during the normal data collection process. This can occur for many reasons, such as spotty network connections, weather interference, theft and tampering, device auditing, or to accommodate opt-out customers.

# Solution Benefits

## Itron Experience

Itron solutions bring the most industry knowledge to meter data collection systems. Itron has decades of engineering experience and has created multiple generations of collection systems by carefully considering and implementing the input and feedback of thousands of utility customers.

## Temetra Benefits

Temetra has many practical features and benefits:

- » Temetra supports all data collection technologies—AMI network, drive-by and walk-by AMR, and manual data entry
- » Built-in csv file format makes Temetra ready for an integration with any modern Customer Information System
- » Built-in support for MV-RS file formats makes Temetra a ready replacement for MV-RS systems
- » Temetra supports the largest number of choices for gas and water ERTs
- » Temetra's intuitive user interface is easy and enjoyable to use
- » Long-term data storage and advanced search functionality allows Temetra to fill the role of a "light" meter data management system
- » Meter readers can collect and attach meter, site, and device photos and field notes
- » Map-based routing and locations improve Manual and AMR data collection efficiency
- » Multiple built-in system interfaces provide fast integration with CIS and billing systems
- » The SaaS deployment model means quick implementation

## Temetra Value Summary

Temetra is a sound long-term investment. Temetra improves meter reading and other operations, allowing you to get the most from your field workforce, while reducing your operational costs and keeping your field workforce safe. Immediate tangible value includes:

- » Temetra is a leading, proven best-in-class solution
- » The solution makes meter reading safer and more efficient
- » Gains in operational efficiency and performance lower the solution's total cost of ownership
- » Itron brings the comfort of world-class customer support

# System Integration

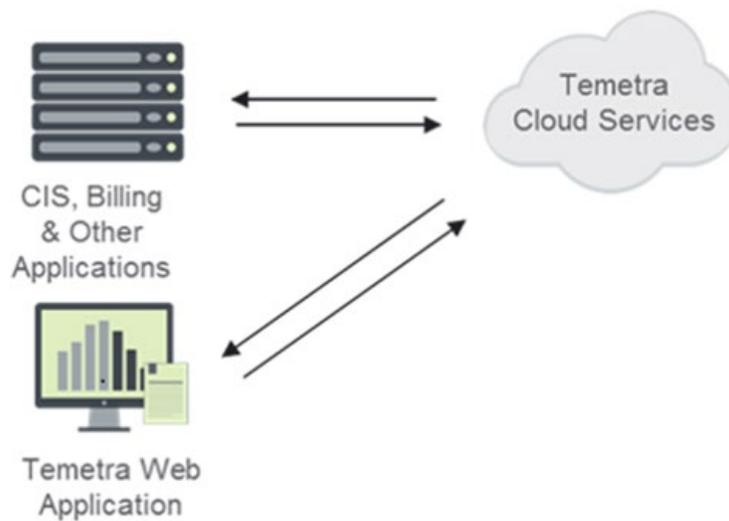
Temetra comes with multiple options to streamline integration activities and to facilitate data exchanges with other back-office systems, such as AMI headend systems, billing and customer information systems, asset management systems, meter data management systems, and analytics and business intelligence systems.

System integration is an essential component of the Temetra solution, as it streamlines internal business processes and improves the overall efficiency of utility operations. Temetra's straightforward integration approach minimizes project implementation risk, schedule, and cost.

## Integration Approach

### Automated File Transfers

In most cases, system integration occurs via automated file transfers, where interactions between Temetra and utility back-office systems are provided through a secure two-way file service. Files are deposited into a designated directory and are then transferred to or from Temetra either on a schedule or as an ad hoc request.



**Temetra integration with back-office systems is straightforward, efficient, and secure**

Files can be downloaded through the Temetra user interface or imported through a tool called Temetra Transfer. Itron can also schedule automated file transfers to and from an SFTP server. More complex interfaces may require using web service REST APIs, which can transfer data via automated API calls. However, the simple file transfer approach described here works for most customers.

## Broad Integration Experience

Temetra can interface with virtually any utility back-office system. Historically, Temetra has been integrated with many different systems, including:

- » Authority
- » Gentrack
- » High Affinity
- » Oracle CC&B
- » Oracle MDM
- » RAPID
- » SAP
- » TechOne
- » As well as other common CIS and SCADA systems

Temetra interfaces with many different systems using many different file formats. Fortunately, most common business systems use well-established flat-file formats to transfer data, so developing custom interfaces is often not required. However, even when implementing existing system interfaces, some level of customization is still required to accommodate specific customer requirements.

## Common Integration Use Cases [Optional]

Some of the world's largest water utilities use Temetra with complex and automated interfaces into billing, work order management, analytics, and asset management systems. Such integration capabilities include:

- » **Billing and CIS:** This interface associates Temetra data with meter reading schedules, route management, the receipt of billing read data, and managing and reporting on the meter fleet.
- » **Asset and work order management:** Linking Temetra to these systems improves work schedules by identifying and optimizing service routes for new meter additions, audits, surveys, repairs, replacements, and other field service activities.
- » **Meter data management:** Temetra uses several methods to integrate with meter data management systems (MDMS). The most common option is to pass data files from Temetra to the MDMS, which then stores the data from all the metering devices in the network.
- » **Data analytics:** While Temetra comes with essential analytics tools for gas and water services, linking Temetra to data analytics or business intelligence tools makes the very most of your metering and event data. These systems provide detailed views, reporting, and insights into your operations, resources, finances, and other key aspects of your business.

## Standard Integration Tools

### Standard Temetra File Formats

Temetra's standard data files can be exported in Temetra CSV, Temetra XML, and Itron MV-RS (HDL/HUL) file formats that are compatible with most back-office systems. Temetra's standard web app export/reporting is in CSV and JSON API formats.

Built-in support for MV-RS file formats makes Temetra a ready replacement for MV-RS systems. Furthermore, if the utility billing system can import/export data through any of these standard file formats, then there can be an "out-of-the-box" integration.

### Data Exchanges

Utility back-office systems exchange data with Temetra via secure (HTTPS) Internet file transfers. File transfers are normally automated; however, Temetra also has built-in tools for managing on-demand file transfers. Typical data transfer options include:

- » **Temetra interface:** Temetra's user interface comes with file management tools. You can export data, navigate to files, and drop import files directly into Temetra. Temetra's online help provides detailed instructions on managing file transfers.
- » **Temetra Transfer:** Temetra comes with a Windows desktop file management utility called Temetra Transfer, which lets you import data from outside business systems into Temetra. For example, you might use Temetra Transfer to capture new meter installation data.
- » **Automated SFTP file transfers:** Itron Professional Services can also schedule automated SFTP transfers to and from your SFTP server.
- » **REST APIs:** Temetra supports automated data exchanges via REST API calls between Temetra and utility back-office systems. Customization is required. Itron provides complete online API documentation for our standard REST APIs.

### Custom Integration

If needed, Itron can prepare custom interfaces that match Temetra to the exact fields needed for fully automated integration with your billing system or other back-office systems.

With custom integration, Itron typically uses a REST application programming interface (API) that ties Temetra directly to back-office applications. Data exchanges between systems occur via automated API calls. The API enables real-time two-way data exchanges between Temetra, external software systems, and capable network endpoint devices.

Itron would be pleased to assess and estimate the effort needed to modify one of our existing interfaces to meet your specific system requirements.

# System Implementation and Services

The cost and risk of implementing a new solution can be a barrier to change. Not so with Itron. We recognize that many of our customers run similar processes, applications, and technologies, and therefore have similar integration needs. This means that for many small- to medium-sized Temetra installations, there is little need for custom integration. With this in mind, we can offer Temetra as an “out-of-the-box” solution that features set fees and implementation activities with optional support for customization, when it is needed.

## Standard Temetra Implementation Package

Itron's standard implementation plan includes a standard set of activities designed to get utilities that conduct most of their meter reading through hand-held or AMR walk-by/drive-by technologies quickly deployed with Temetra. The following diagram shows standard mandatory (red) and optional (blue) activities.

**Table 1. Standard (Red) and Optional (Blue) Implementation Activities**

Activity	Description
<b>Implementation</b>	<ul style="list-style-type: none"> <li>• Temetra tenant setup and configuration</li> </ul>
<b>Training</b>	<ul style="list-style-type: none"> <li>• Audience: Meter Readers, Operators, and Network Administrators</li> <li>• Temetra Web Application</li> <li>• Temetra Mobile</li> </ul>
<b>Subscription</b>	<ul style="list-style-type: none"> <li>• Temetra Web Application</li> <li>• Temetra Mobile</li> <li>• Support and Maintenance</li> <li>• Follow-up training (as needed)</li> </ul>
<b>Billing System Integration (Out-of-the-Box Option)</b>	<ul style="list-style-type: none"> <li>• Billing system exchanges via standard Temetra import/export files (MV-RS, CSV, XML formats)</li> </ul>
<b>Back-Office System Integration</b>	<ul style="list-style-type: none"> <li>• Custom billing / back-office system interfaces</li> </ul>
<b>Options</b>	<ul style="list-style-type: none"> <li>• Other specific features</li> </ul>

**Standard and optional features allow you to tailor the Temetra solution to your needs**

## Implementation Procedure and Responsibilities

Temetra is a cloud-based Software-as-a-Service (SaaS) offering. Itron hosts the software and IT infrastructure needed to provide Temetra on a cloud server that is remote from your IT systems. Therefore, the first step is for Itron technical staff to create secure *tenancy*. The tenancy defines a unique and personal Temetra network area for your meters and data, which is only accessible by your users.

The following table summarizes the standard Temetra setup procedure. This procedure includes activities that are to be conducted by both Itron and the utility to efficiently provision the working system. The table lists each key activity in the form of a RACI matrix, where RACI determines each stakeholder's roles and responsibilities as follows:

- » R **Responsible** for an activity
- » A **Accountable** for ensuring the completion of the activity
- » C **Consulted** in the execution of the task
- » I **Informed** about the progress and status of the task

In this manner, each party can be assured of how each element of the service will be provided for transparency of costs and responsibility.

Ideally, the system setup is completed prior to Itron conducting onsite training. This allows the Temetra instance and base data to be available for actual use immediately after your team has completed their training program.

**Table 2. Temetra Implementation Responsibilities**

Activity	Description	Itron	Galveston
Define intended Temetra system users	Prior to system setup and training, provide a list of user details for your intended Temetra system administrators, meter readers, and daily operations users.	CI	RA
Setup of Temetra Cloud Service Platform	Itron takes your broad network requirements and configures the tenancy to match your requirements.  Itron accounts for your business size and if you already have use of a Temetra demonstration system. For large utilities or if a demo system has not already been preconfigured, Itron configures the system while performing onsite Administrator training, and then finalizes your installation shortly afterwards.	RA	CI
Enroll and configure utility's Temetra system users	Itron sets up the first system user. The utility System Administrator then defines and configures the remaining Temetra user access roles and permissions.	CI	RA
Configure Temetra to utility standards (when needed)	Itron trains the utility how to configure Temetra to use utility Skip Codes, Trouble Codes, Read Instruction Codes, Meter Location Codes, Endpoint Translation, etc.	CI	RA

Create a meter data file that lists the meters to interface with Temetra	The utility Operations team prepares an import file that lists the assets to be imported into Temetra. Temetra has several ways to populate meter data, with the simplest way being to import a list of meters in a predefined MV-RS, CSV, or XML file format.	CI	RA
Validate and import the meter data file	Itron technical staff validates the data content of the import file before importing the data into Temetra. Once imported, the data becomes available in Temetra.	RA	CI
Verify correct import	The utility now performs verification checks to confirm that Temetra now contains the necessary meter data content.	I	RA
Temetra Administrator Training	Itron trains the utility's designated Temetra system administrators.	RA	I
Temetra User Training	Itron trains the utility's designated Temetra meter reading and back-office system users.	RA	I
Temetra Mobile Training	Itron trains the utility's meter readers how to set up the Temetra Mobile on mobile devices and configure the radios, per Itron user guides.	RA	I
Ongoing meter addition and configuration maintenance (business as usual)	To support ongoing operations, the utility adds, configures, and maintains meters within Temetra. Customers typically allocate 2-3 hours per month for these activities, depending on system size and maturity.		RACI
Backup and replication of data on SaaS platform	Itron regularly backs up Temetra data. The utility can request a copy of the database, which Itron will provide according to an agreed time and material charge based on the system size.	RAC	I
Meter data investigations	To support ongoing operations, the utility is responsible for investigating field meter data issues. However, Itron support and expertise is available, per the terms of the subscription's service agreement.	I	RAC

## Training

Training normally takes two days, with one day for allocated for administrator training and one day for user training. Customers who choose additional integration options or use multiple meter reading technologies may require more time. Itron provides training remotely but can offer it on site, if requested.

The training program provides your operations team with the key concepts and skills needed to proficiently operate the system. Itron uses a “train-the-trainer” approach, where we train your staff to the point that they can train others.

Target audience:

- » System administrators
- » Back-office operations staff
- » Meter readers
- » Billing users
- » Customer service representatives (CSRs)

Focus topics include:

- » Using the Temetra web application
- » Using the Temetra Mobile app, as applicable
- » Managing reading cycles
- » Using Temetra Transfer to import data into Temetra
- » Using Temetra CSR Tools, if applicable
- » Custom Temetra system configuration (Administrator level training)

Temetra’s online help and user manuals also provide ongoing user support.

## Business Process Consulting

Fitting any new application into existing business processes naturally requires updates to working practices. The impact can vary from minor operational changes to the need for automated transfers, security, custom interfaces, and custom reports. Itron’s Professional Services team would be pleased to tailor implementation services to match your requirements.

# Temetra Cloud Services

## Temetra Cloud Services

Itron provides Temetra as a cloud-based software-as-a-service (SaaS) or network-as-a-service (NaaS) solution that resides in regional data centers.

### Why Cloud Services?

Temetra's cloud-based model eliminates all utility IT maintenance work associated with the system. There is no onsite IT hardware or associated costs. By providing Temetra via cloud services model, Itron can deliver cutting edge data management tools to individual, discrete networks without the need for costly infrastructure at every site.

Furthermore, by leveraging the existing IT infrastructure at Itron data centers, Itron can bring new IT environments online rapidly. This significantly reduces the implementation schedule, which is always one of the largest operational risks for any AMI deployment. Shared infrastructure (routers, storage, database, servers, backups, etc.) allows utilities to avoid additional costs and delays associated with acquiring dedicated hardware without sacrificing data integrity and security.

Cloud-based deployments reduce project risks, reduce upfront costs, reduce deployment times, and let you concentrate on supporting your business needs and your customers, rather than complex IT equipment.

### About Software as a Service (SaaS)

Software as a service (SaaS) is a cloud-based model, where Itron hosts, monitors, manages, and maintains the Temetra IT system infrastructure, software, and its availability in a regional state-of-the-art data center. Itron also offers test and staging environments for testing and learning purposes and for upgrade/patch validation. Itron's 24x7 operations center and staff monitor and manage all SaaS environments. Itron guarantees the performance of the system through business SLAs and service credits.

### System Access for Daily Operations

To perform daily operations, the City users and back-office systems access Temetra and perform data transfers via a secure HTTPS via SSL connection. The City is responsible for any associated business outcomes. Users can securely connect to Temetra from anywhere with access to an Internet connection.

### Regional Data Centers

Itron hosts Temetra in highly secure and reliable global data centers. Service providers can vary, based on the utility, country, or region's data storage requirements. Security is assured through SSAE 16 Type II data centers and adherence to operation and maintenance best practices.

For example, Itron commonly uses OVH data centers in the United States to host Temetra solutions. OVH is an international cloud computing company that offers VPS, dedicated servers, and other web services. OVH is the third largest hosting provider in the world based on physical servers.

Itron's 24x7 operations center staff manage and monitor all hosted IT environments. Itron guarantees the performance of the system through business SLAs and service credits.

## Solution Communications

Temetra and Temetra Mobile support common Internet communication technologies, such as cellular and Wi-Fi. Your data collection network and mobile AMR teams can securely collect, connect, and transfer data from anyplace with access to an Internet connection.

## Communication Security

Temetra provides secure access, connectivity, and data transfers to back-office teams, systems, and field personnel. System security features include user authentication, password management, role-based access controls, and secure data exchanges via HTTPS.

## Data Backups and Disaster Recovery

The Temetra platform includes data backups. Temetra uses streaming replication to keep a hot failover database always available, with automatic switchover in the event of failure. Daily backups are kept for 120 days, allowing complete recovery to any daily point since the last billing cycle. After 120 days, the backups are pruned to keep a weekly backup for every point since the Temetra service was started. These backups are held indefinitely, with copies held offsite on CD.

In the unlikely case you need to recover data, such activities will be regarded as a one-time service expense for the time and materials required to cover the costs of Itron SaaS staff activities.

# Support and Maintenance

## Temetra Platform Upgrades

Temetra's annual SaaS subscription licensing includes software upgrades, bug fixes, and ongoing daily system maintenance for Itron Temetra software. The Temetra platform is therefore subject to period software updates. Itron performs such updates behind the scenes. However, Itron will provide advance notice if any system downtime is required for such updates.

## Technical Support

Managing day-to-day activities with Temetra is a straightforward process. However, ongoing Itron support is still available as part of the subscription.

Technical Support Services (TSS) has 75 dedicated resources to respond to technical questions or requests from Itron customers. There are two primary TSS locations in North America, Liberty Lake, WA and Raleigh, NC. Customers have access to TSS resources via telephone – 1.877.487.6602, email – [support@itron.com](mailto:support@itron.com), and web submittal – <http://support.itron.com>, for assistance in resolving customer issues. All issues are logged in our call tracking system (Salesforce.com) for accuracy, metrics, accountability, and closure of customer issues.

Technical Support Services is staffed from 5:00 a.m. through 5:00 p.m. Pacific time, Monday through Friday. Customers experiencing a critical service issue outside of Technical Support Services staffing hours may page an after-hours staff member on standby.





# OpenWay® Riva Leak Sensor

It's estimated that up to 30 percent of water pumped through distribution systems is lost to leaks. In today's conservation-driven environment, water losses and associated pumping and treatment costs add up quickly. Distribution leak detection, and keeping system losses minimal, are important operational concerns for water providers.

The OpenWay® Riva Leak Sensor (OLS) is the latest addition to Itron's advanced approach to distribution system leak detection. Part of Itron's OpenWay Riva multi-purpose IoT solution, for the OpenWay Riva Network, the OLS is the result of merging an OpenWay Riva water module with an advanced acoustic sensor to create a single point for collecting meter data and monitoring for distribution system leaks. The OLS utilizes the cutting-edge OpenWay Riva network. It offers a scalable solution that allows for parameter adjustments based on the environment.

The OLS has increased detection accuracy by being able to more readily identify noise sources/leaks. This solution reduces non-

revenue water losses, associated costs and potential service disruptions caused by major leak events.

The innovation behind the OpenWay Riva Leak Sensor is the new sensor technology. The OLS examines the pipe network more intensely over what the OLS considers the best period for detection of leaks. This results in providing a higher quality of data to mlogonline™, which in turn improves leak identification.

Every day the acoustic sensors analyze sound patterns in its environment, detecting and categorizing new, evolving and pre-existing leaks automatically. The recording period is adaptive and will self-adjust to get the best reads between 10

p.m. and 6 a.m. local time. Sensors attach to an OpenWay Riva Water Module and transmit vibration recordings along with other metering information through the OpenWay Riva network to the utility. An Itron web interface—mlogonline Network Leak Monitoring System—handles data classification and analysis of the recordings and graphically displays all sensor locations using visual maps and satellite images, highlighting the status of leak locations.

Simple, affordable and technically superior, the OpenWay Riva Leak Sensor provides advanced leak detection technology at optimal cost. Best of all, the OpenWay Riva Leak Sensor leverages the investment in Itron's OpenWay Riva multi-purpose IoT solution.

## SPECIFICATIONS

### How It Works

#### Step 1:

An Itron OpenWay Riva Leak Sensor is deployed in the water distribution system.

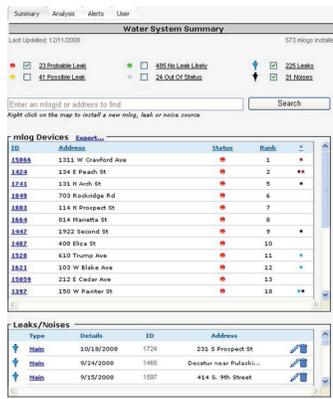
#### Step 2:

The Analyze process receives readings by e-delivery to mlogonline.

#### Step 3:

mlogonline Network Monitoring System computes a leak index for each Leak Sensor and assigns a leak status:

- Probable leak
- Possible leak
- No leak likely
- Out of Status



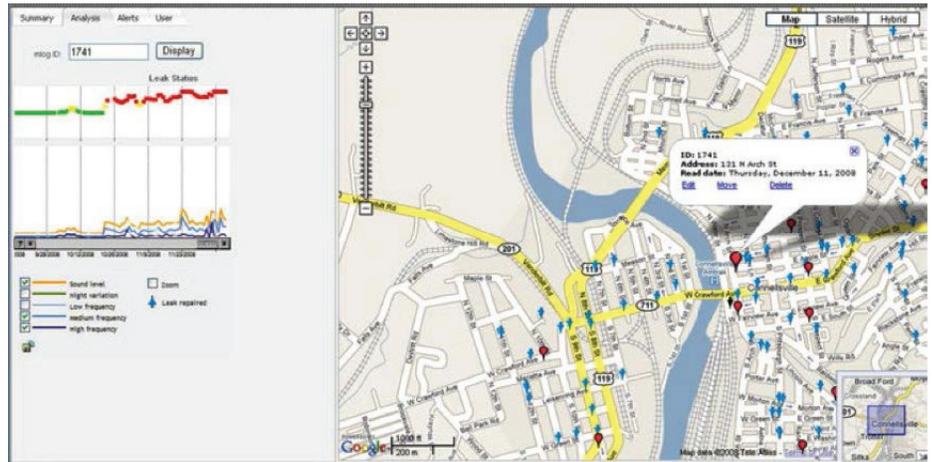
OpenWay Riva Leak Sensor information table displays all OpenWay Riva Leak Sensor data from one or more water distribution systems—sorting, searching and ranking all sensors by leak status:

- Probable Leak
- Possible Leak
- No Leak Likely
- Out of Status

#### Step 4:

The OpenWay Riva communication module generates messages, alerts and reports to direct leakage investigations and pinpointing activities.

The map in mlogonline Network Monitoring System shows leakage at a glance. OLS locations are overlaid, and allow highlighting of increased leak probability from green (no leak) to yellow (possible) to red (probable leak). This is all made possible using the



OpenWay Riva Leak Sensor's advanced digital signal processing.

### TECHNICAL SPECIFICATIONS

mlogonline Network Monitoring System

- » Operating systems: MS Windows®
- » Maximum number of sensors: Unlimited
- » Integrated water system maps

### SPECIFICATIONS BENEFITS

The OpenWay Riva Leak Sensor delivers unprecedented leak detection capabilities including:

- » Advanced acoustic leak detection monitoring and meter data collection
- » Compact form for easy field installation
- » Low cost of ownership (one sensor can cover multiple homes in a residential area)
- » Automated capture and data transmission (of actual vibration recordings)
- » Advanced analysis and applications available for in-depth analysis.
- » Stores a minimum of one year of spectral data for interpretation, prioritization and mitigation

### Sensing

- » Resolution < 2µg √Hz
- » Range Up to:
  - ±500 linear feet of pipe (metal <12")
  - ±100 linear feet of pipe (PVC <6")
- » Bandwidth: 36Hz-2048Hz

- » Noise signature detection and subtraction (ex. busy highways, trains, factories, etc.) for improved leak detection in high noise environments.

### Power

- » Source: Powered by an OpenWay Riva Pit or Remote Water module

### Physical/Environmental

- » Operating temperature: -10°C to +50°C
- » Operating humidity: Up to 100%
- » Product identification: Numeric and barcoded serial number
- » Exposure rating: Sealed, waterproof and submersible IP68
- » Housing: Stainless Steel 316
- » Cover: ABS
- » Weight: .2 lbs, .90 grams
- » Dimensions: Height with mounting bracket from pipe to top of sensor: 2.21" 56.2 mm Diameter: 2", 51mm

### Installation options:

The OpenWay Riva Leak Sensor is installed permanently either indoors or outdoors on the water service pipe (1-2"), valve nut, or even on a meter itself. Allowing for installations in most pit environments.

- » The OLS can be mounted using the pre-assembled ground clamp/mount assembly kit: CFG-1601-10X



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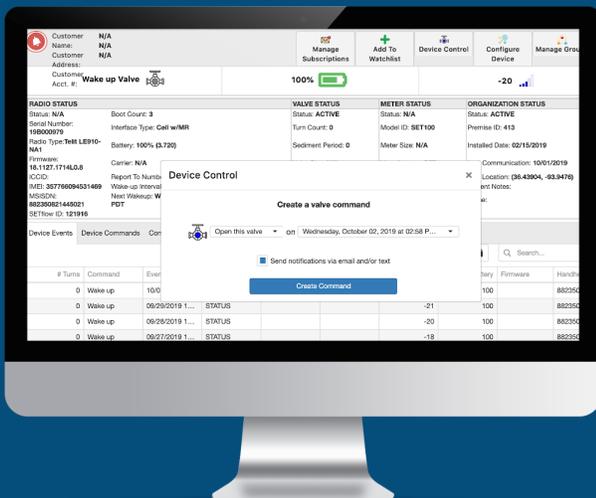
## 100C LTE-M REMOTE SMART VALVE

The SETflow™ 100C provides water utilities with a low-cost and secure way of managing customer disconnects and reconnects that traditionally require on-site visits. This helps to lower utility operational costs, reduce on-site worker safety concerns, and improve revenue stability.

Turning water services on or off for new or delinquent customers is a time consuming process for field staff which takes resources away from urgent maintenance projects and adds costs to water operations. By implementing remote shut-off valves over existing cellular networks, utility staff reduce truck rolls, decrease unauthorized water consumption, and improve revenue collection. SET is the only technology provider in the water utility industry to offer a meter-neutral shut-off valve that may be selectively deployed at remote or high-turnover accounts.

### SMART VALVE FEATURES

- The 100C Smart Valve utilizes a durable chrome plated ball valve shutoff system.
- The lithium battery provides up to 15 years of remote valve control and is contained within a potted solution, providing IP68 protection from water intrusion.
- The minimal mechanical functions of the SETflow Smart Valve allows for quick installation by adding only 2 inches to standard lay lengths.
- The 100C Remote Smart Valve is offered in sizes ranging from 1/2 inch up to 2 inches to meet a variety of residential, commercial, and industrial applications.
- Valve positions include open, closed and reduced flow and may be controlled remotely from the SETflow MDMS.
- The valve may also be configured for full meter reading and data transmission capabilities, eliminating the need for a discreet endpoint.



SETflow MDMS Remote Smart Valve Control Screen

## UTILITY BENEFITS

In addition to freeing field staff time and driving down operational costs, remote controlled shut-off valves create the opportunity to offer pre-paid water services that automatically shut off when a customer has used up their allocation of purchased water.

This allows for increased flexibility on how customers purchase water services, helps manage unauthorized use in areas of frequent turnover (college towns for example), and allows utility staff to focus on more urgent, higher priority maintenance activities.

## CUSTOMER BENEFITS

End-users can remotely schedule water service shut-off when they will be traveling or on vacation. This avoids unauthorized water use or accidental leaks when no one is available to monitor usage. Alternatively, customers can remotely enable water services for winter vacation homes to avoid pipe freezing or automatically shut-off water if pipes inadvertently burst.

This not only helps protect property from costly water damage, but it also increases customer satisfaction of their water services. In the event of a shut-off due to delinquent payment, customers can have service quickly reinstated after making their account current. Customers may also receive a text communication notifying them that water service is slated to resume and to turn off any open faucets or valves in their homes to avoid flooding events.

## TECHNICAL SPECIFICATIONS

<b>Communication Type</b>	Two-Way LTE-M LPWA Cellular, WiFi, and Bluetooth 5.0
<b>Firmware Updates</b>	All endpoints can be updated from the SETflow™ MDMS or Field Mobile application.
<b>Valve Operations</b>	Valve positions include open, closed, and reduced flow (<1 gpm) and may be controlled remotely through the SETflow MDMS.
<b>Battery Monitor</b>	Remaining battery life is expressed as a percentage of total remaining battery life within the SETflow™ MDMS.
<b>Data Security</b>	Remote smart valve transmissions are encrypted using AES 256.
<b>Dimensions</b>	5.5 in. (H), 1.75 in. top diameter, 2.75 in. bottom diameter
<b>Cellular Network Providers</b>	US Territories - Verizon / AT&T Bahamas – Aliv / BTC Providenciales – Digicel Mexico – Claro UAE - Orange
<b>Battery</b>	Non-replaceable D-Cell Lithium thionyl chloride
<b>Operating Temperature</b>	-20° to 60° C / -40° to 140° F

License Requirements: All SETflow™ Remote Smart Valves comply with Part 15, Part 22, Part 24, and Part 27 of the FCC Rules. No license is required by the utility to operate the SETflow™ endpoints or management system.

Smart Earth Technologies - The Future of Water Utility Management  
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