

The Importance Advanced Data Collection System Maintenance

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Introduction

In today's efficiency- and operations-driven world, most utilities use some form of system to collect meter data from the field. For many years, meter readers would go around and record meter register values on paper, and then return that data to the utility office where workers would enter readings and issue bills to customers. As fewer and fewer utilities rely on pen and paper, a variety of systems have been implemented around the world to ensure that essential utility data is retrieved in a reliable and efficient manner—because without this data, the utility cannot issue accurate bills and therefore manage its water supply or its revenues.

As the need for data moves beyond invoicing for water consumed and into the realm of greater operational efficiency and resource management, the decisions for network management, investment planning and customer service systems are becoming more complex—both in terms of architecture and integration. Even those systems which are relying on meter readers in the field are now able to collect large amounts of data, and as such require more thought, planning and maintenance. Complex systems acquire and can leverage more data, but also create the need for new or revised processes to be adopted.

As one of the world's leading providers of utility systems, Itron has built extensive experience in the selection, implementation and maintenance of data collection systems and software. In most cases, our customers keep a system for many years since it is central to the utility's activities. With that in mind, one can easily see the importance of maintenance services for such systems.

This paper discusses the various aspects of maintenance on meter data collection, management and analysis systems within a utility.

Utility Systems: Growing Awareness Across the Enterprise

When evaluating meter data collection systems within utilities, you will quickly notice that they are most often managed by the meter reading department or the customer service department—or some combination of both. Daily interaction with the system can make some of these utility stakeholders real experts in the functionalities, capabilities and quirks of the system.

In addition to the daily users, most systems will also require the input and maintenance from the IT department, although smaller organizations will often have very limited support available. The finance department is usually involved in the data from the system, as it processes the bills based on usage data. Finally, there is growing interest from a water network perspective—understanding water usage, leakage reporting, pressure information, and so on—which can all lead to better manage of our precious water resources.

With more advanced systems supplying more and more data from meters and consumers, additional utility stakeholders have taken an interest in the data from the system—and will require access to that data. Modern meter data collection and management systems are connected to several parts of the utility, and the number of interfaces is growing. Regular updates to the machines running the applications and the evolution of security policies will require closer supervision of all parts of the system to ensure continued optimal performance and minimal downtime to the data collection and management process. Web portals and thin clients will allow additional users to access the data, but will also add complexity to the system. Slowly but surely, we can see the system becoming a more integral part to the utility as a whole—one that distributes key information to stakeholders throughout the organization.

System Maintenance: What's Included

Meter data collection and management systems are usually automated to a fair extent. Experienced providers of these systems, such as Itron, have worked with customers to define a range of parameters and processes to ensure that collection activities are mostly done without direct supervision.

However, automation does not imply that no daily supervision is required. One of the key elements of implementing advanced systems is putting in place the appropriate supervision structure. This structure implies resources and tools, within the framework of the overall organization. A typical example is a water utility moving from a walk-by system to a fixed data collection; in this scenario, the position of the meter reading supervisor must be redefined to that of a network supervisor. This person will use the tools within the system—as well as certain external tools—to manage the daily data collection and management activities. Features like reading rates, RSSI levels and network architecture diagrams within the data collection system help to monitor the incoming data, whereas applications such as HP OpenView* and specific scripts can help to monitor the IT infrastructure on which the system is running.

In order to keep the performance of the system at its expected level, some system maintenance must be performed. Just as a car needs regular maintenance (such as oil changes, new brakes, new wiper blades, and so on), a data collection and management system needs maintenance and small corrections in order to keep it running smoothly.

The maintenance on data collection and management systems include activities like:

- **Analysis**
 - Network performance: identifying which network elements are not providing the expected data
 - Data gaps: identifying which data was not provided as expected
 - Data accuracy: identifying which data is different from expectations and possibly an indication of error
 - Alerts: processing of various alerts and alarms like leakage, backflow, and filtering repeat alerts

- **Recovery**
 - Missing data: initiating manual retrieval of missing data from various elements in the network

- **Update + Reconfigure**
 - Customer data: identify new accounts and meter change outs, apply account status changes
 - Collection software and/or management system: install and maintain new versions with additional functionalities or corrections
 - Software/firmware of network elements: ensure new versions are applied as needed for improved performance, new parameters and new capabilities
 - Communication network architecture: reconfiguration as needed, taking into account network expansion or changes in topography
 - IT infrastructure: move to newer versions of OS, apply security updates
 - IT operating system migration: change of hardware, use of virtualization, separation of backup storage, changes in directories

- **Application**
 - IT policies: enforce new security procedures, monitor and backup systems
 - IT system infrastructure: integrate additional interfaces

System Maintenance: Management Best Practices

In order to achieve maximum benefit from any system, your utility must consider how to manage the technology. Often, the introduction of a system leads to a need for fewer resources to manually collect part or all the previous data (again, typically used for billing). However, maintenance of an advanced system requires a new set of resources.

Ideally, resources can be retrained to cover the needs, but this may not always be the case. The profile of the maintenance and support organization will be very different from the typical meter reading and customer service organization.

Here are some examples of profiles required for a fixed network organization:

- Application specialist: understands the ins and outs of the software application
- Communication network specialist: has a thorough knowledge of the network used for the actual data collection, with expertise in radio frequency (RF) and cellular technology
- Deployment engineer: manages the deployment, extension and field maintenance of the network
- Database administrator: performs maintenance and backup of the system database, as the volume of data collected will be significantly higher than manual collection methods
- IT network specialist: manages the interfaces between the system and the various IT assets, such as the billing software, the SCADA system and the CRM. Also manages the IT infrastructure required for running the network software
- Business process specialist or data specialist: understands the best usage of the data in view of the processes applicable to your utility

The maintenance activities can be managed by a supervisor, with input from the profiles mentioned above, following a maintenance plan. This plan gets defined before and during the implementation of the system, and gets updated on a regular basis as needs are reevaluated and new business challenges arise.

Operating an advanced data collection and management system requires setting up an internal support organization; this ensures that users of the system can get immediate help when encountering problems. This support organization also plays an important role in training new users.

Finally, by doing regular maintenance, the organization is also better prepared to deal with unexpected events. The maintenance plan gives a thorough insight of the system, which can help in dealing with unforeseen problems or changes in the operating environment.

System Maintenance: The Vendor's Role

As shown above, system maintenance includes a number of fairly technical activities. Therefore, one of the first responsibilities of the system vendor (or supplier) is to provide thorough training on the system. This training should include proper configuration and use of the system's functionalities to ensure that the system runs optimally and data is collected correctly. It should also include deployment training to make sure that data collected in the field is reliable. And finally, the vendor should supply specific training on system maintenance, which would focus on troubleshooting, monitoring of performance and implementation of updates and upgrades.

Another responsibility is to provide a support organization that your utility can turn to when experiencing difficulties and implementing system changes. This organization usually has multiple levels, with increasing levels of expertise. Whereas Level 1 support is the direct interface with the customer, Level 2 support manages the relation with the vendor's product management and development teams to address issues according to established severity levels. By choosing a global, well-established provider, you can take advantage of the experience gained by other utilities that have implemented the same system.

A third responsibility is the provision of regular updates and upgrades of system software (and possibly firmware). These updates will include corrections to issues and new functionalities, whereas new upgrades will usually provide some major changes to either functionalities or architecture.

These responsibilities are in general covered under a maintenance and support agreement, which also indicates the procedure for managing the relationship between utility and supplier.

In the maintenance and support agreement, it is also critical to define the responsibilities of third-party suppliers, such as telecom or software suppliers. The services of these suppliers can have a significant impact on the performance of the system and need to be taken into consideration when performing maintenance.

In case a utility is not interested in or comfortable with the investment in resources required for proper maintenance, it can consider using a “Hosted Services” approach, whereby a service provider, such as Itron, can manage the performance of the data collection and IT infrastructure for a monthly fee.

Conclusion

As modern data collection and data management systems have become more complex and closely integrated into the utility’s organization, the requirement for maintenance grows. In order to be able to perform maintenance, your utility must clearly define roles and responsibilities in a new organization. With these new responsibilities, training becomes very important, both internally organized as well as given by the supplier.

In addition to training, the supplier should also provide a support organization to assist with the maintenance activities, as detailed in a maintenance agreement. The evolution of the system through regular updates and upgrades requires that a maintenance plan is put in place.



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