Meter Integration Service

Leveraging Itron AMI Infrastructure to Integrate Partner Meters or Advanced Utility Applications

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Itron Meter Integration Services help partners integrate their meters with Itron's GenX mesh network and the Advanced Metering Manager (AMM) software, which is part of our UtilityIQ (UIQ), the Headend System. Utilities around the world use Itron's networks and meter management software to connect to a variety of industry-leading meters supplied by members of Itron's partner ecosystem to manage and optimize electricity grids with Advanced Metering Infrastructure (AMI) capabilities.

Itron Meter Integration Services are available to any meter supplier that shares Itron's vision for partnering to deliver grid-edge capabilities to utilities worldwide. We work closely with our metering partners to initiate and guide them through the various integration opportunities enabled by Itron technology. This whitepaper outlines the services we offer and details the integration process that allows meter suppliers to connect with production AMI systems.

METER INTEGRATION PROCESS

Itron supports meter suppliers throughout the integration process, from initial exploration to projects that connect meters to our customers' production environments. We also provide ongoing support for lifecycle management after deployment.

Based on project requirements, Itron offers metering partners a range of integration options. All integration projects include seamless software integration with Itron's UIQ platform. As part of this process, Itron develops a meter plug-in that translates either ANSI c12.19 or Device Language Message Specification/Companion Specification (DLMS/COSEM) operations supported in the meter with AMM. This enables utilities to manage daily meter operations over their AMI infrastructure.

Cellular integration projects involve only the AMM software component. Itron GenX mesh network integration projects involve adding an Itron Network Interface Card (NIC) to a partner meter. The GenX network supports wireless mesh networking between all meters and devices connected to the utility AMI infrastructure. NIC integration involves hardware design and testing to ensure performance on the mesh network. Both design and testing are supported by Itron Meter Integration Services.

Finally, sustaining projects add new features to an existing meter integration. This could involve any combination of the following:

- Switching to a new NIC type
- Taking an integration to a new country
- Adding new firmware to meters
- Adding new features to AMM

Our dedicated integration team is available throughout all phases of each project type to ensure partners get the support they need. The focus of each phase is to help partners get to market quickly with tools, testing, and engineering design services.

Phase 1 - Engage

The first phase for new partners is exploration of the tools and design practices needed to complete a successful meter integration with Itron AMI solutions. For mesh network integrations, this includes understanding available NIC options, and helping partners select and prepare for mechanical and electrical integration of the most suitable NIC.

Itron supports partners exploring integration with consulting and design services to help them understand integration steps and available options. We also train partners on the tools needed to design a viable solution. In addition, Itron begins to work on hardware, firmware, and software to prepare partners for completing the integration project.

Itron Meter Integration Services makes the following tools and services available to partners during the Engage Phase:

- Technical documentation for Itron NICs
- Software to communicate with Itron NICs
- Training for NICs
- Tools for developing the NIC interface to meters
- Design best practices for meters integrating NICs
- Over-the-air configuration tools for meters
- Training to understand integration steps
- Specifications for meter firmware

Phase 2 - Integrate

Once a meter design is ready for production deployment, Itron initiates an integration project with project management, research & development, and manufacturing engineering staff committed to complete the integration. The focus of an integration project is threefold; first, Itron helps the partner complete hardware testing to ensure the product will perform to utility requirements. Second, Itron develops AMM software to integrate the partner's meter features and capabilities into utility back-office systems for managing AMI operations. Third, for mesh network integrations, Itron helps the partner with manufacturing engineering that ensures Itron NICs integrate seamlessly into the partner meter and utility production AMI systems.

Throughout the integration project, Itron Project Management ensures that Itron resources are available to assist the partner. Since an integration project touches firmware, software, hardware, and manufacturing, several Itron subject matter experts are needed at various stages of integration. A dedicated project manager is needed to guide the partner through the process and engage the right SMEs at each stage of the project. Itron Meter Integration Services also includes Product Management support throughout the integration project, to ensure continuity with the partner between the Engage and Integrate phases of the partner journey.

Once the firmware and software are complete, Itron also performs end-to-end solution testing to ensure everything is ready for utility operations. Each feature of partner meters that needs to be exposed in the utility back office is tested to ensure that the meter, NIC, network, and AMM back office are working correctly, assuring our utility customers that the resulting integration solution is ready to be immediately deployed in production environments. A typical meter integration project is shown in Figure 1 below, with emphasis on the major milestones and objectives of the project.

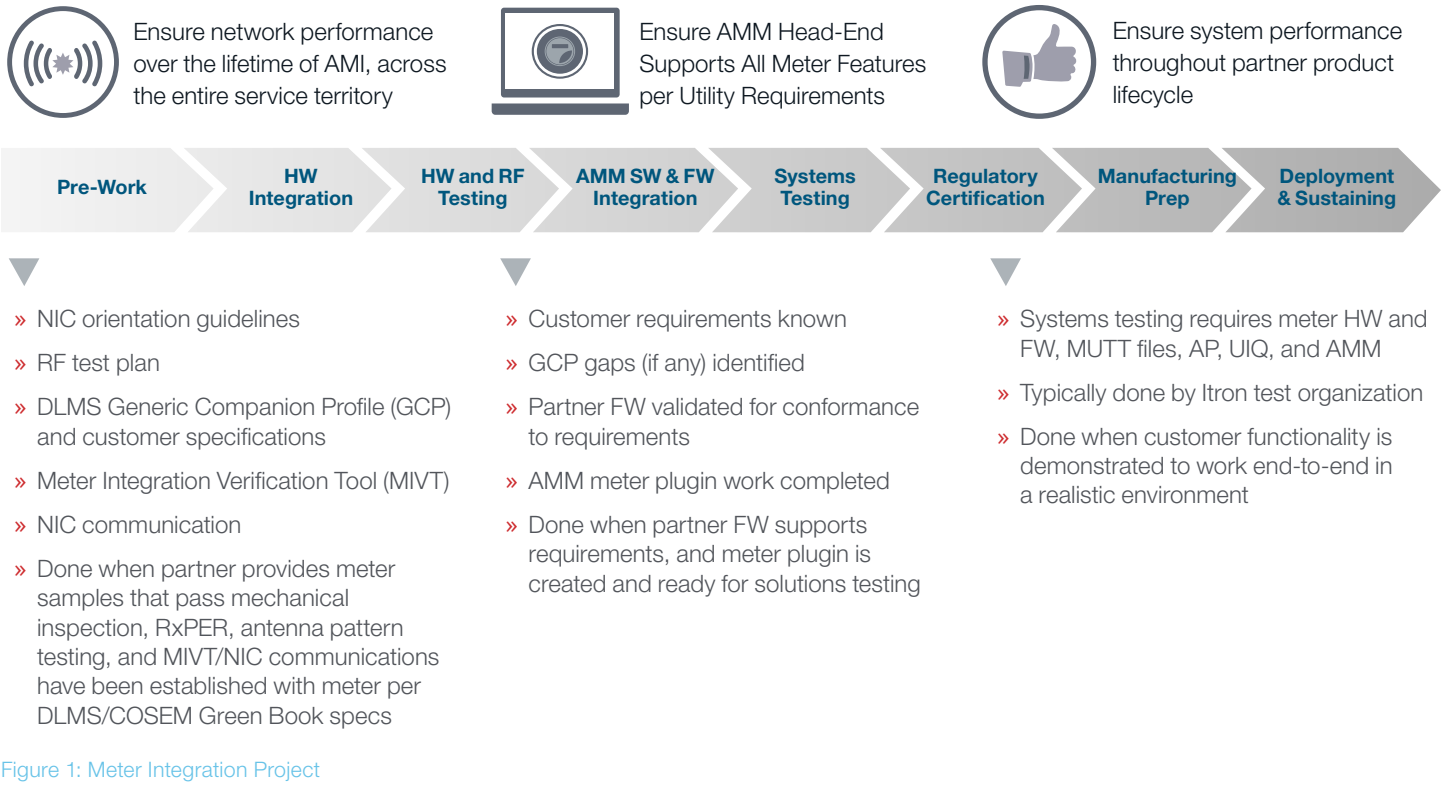

Figure 1: Meter Integration Project

Phase 3 - Sustain

Even after an integration project is complete, sustaining activities are supported by Meter Integration Services to ensure partner meters continue to create value for utilities throughout the meter lifecycle. We also help our partners to leverage their integrations by making meters available to new customers around the globe, adding new features to existing integrations, and ensuring new partner releases of meter firmware can be pushed to deployed meters on utility production systems.

Meter Integration Services supports each of these activities even after integration projects are complete. We are always available to discuss a range of topics to support our partners. This includes new meter firmware, adding new capabilities to AMM software, and transitioning to different NIC models. We also support testing for deployments to utility customers across various countries and regions. By using the same team throughout the partner lifecycle, we build on the knowledge of partner solutions to ensure a quick path to new markets and solution capabilities.

TOOLS AVAILABLE FOR ALL PHASES

Throughout the lifecycle of meter integrations with Itron technologies, the Meter Integration Services team supports partners with the tools below. Most of these are introduced during the Engage phase, but they can be used during integration projects and for sustaining activities.

Meter Integration Verification Tool (MIVT) - Simulate NICs with DLMS/COSEM

The MIVT tool is NIC emulation software that runs on a PC. MIVT uses the same 12-pin interface to an Itron NIC card to use DLMS/COSEM profiles to communicate with meter firmware using DLMS/COSEM objects. Get, set, and execute operations are supported on any object the meter supports, including metering registers, events, load profiles, etc. MIVT allows meter firmware teams to prepare for NIC integration without needing a physical NIC or network.

MIVT can also be used to automate testing of every operation on each object support in meter firmware. Itron can help partners create XML files customized to represent their supported firmware features.

NIC Samples

Itron Meter Integration Services provides documentation about available NIC cards so meter suppliers can determine the best fit for integrating into their products. We also support the evaluation of design options for powering, mounting, and communication between the host meter and the NIC. NIC samples can also be provided to help partners test physical mounting, powering, and communications with Itron NICs in preparation for an integration project. Design best practices are also included so partners understand the best radio frequency performance and antenna options to ensure reliable network performance.

Field Service Unit (FSU) and Communication Tester (CAT) Software

To enable communications with a NIC locally during development, an Itron FSU can also be provided to communicate wirelessly with a NIC for configuration and meter reads locally. The FSU connects to a PC via USB, and simulates an Itron GenX mesh network, to perform basic operations on meters using wireless communication with a NIC. We also provide our Communication Tester software, which runs on a PC, and is the graphical interface for initiating commands through FSU.

Firmware Upgrade Support

Itron supports over-the-air upgrades of meter firmware on our GenX mesh network using our Firmware Upgrader utility (FWU). Before an integration project for the GenX network, we provide documentation and tools to help partners wrap their firmware binary images in an XML format that can be imported into a utility system and used to upgrade groups of meters over the GenX network.

Meter Program Configurator

Meters are typically deployed with a utility-specified configuration, which determines the quantities to be measured, the granularity of meter data capture, and any information needed to ensure utility operations are supported by the meter. To support over-the-air changes to meter configurations post deployment, Itron provides the Meter Program Configurator (MPC) in our back-office environment. Meter Integration Services includes documentation and tools to help partners create MPC-compatible XML files. These files support operations such as program seal creation to identify the program running on a meter, and meter audits to help utilities determine what programs are running on populations of deployed meters. The services also assist with programming configuration changes over-the-air to groups of meters and verifying that changes were correctly made after re-programming is complete.

DLMS/COSEM GCP Standards

Meter Integration Services also provide access to standard implementations of DLMS/COSEM for meters, including guides to implementing the Generic Companion Profile (GCP). Standards-based implementations help ensure that meters can deliver AMI functionality to multiple utilities around the world. GCP, combined with integration of Itron NICs and AMM software, ensures the broadest reach of utility production systems in the industry. Itron also enables our MIVT tool to help partners automate firmware validation of GCP with an automated XML file that includes GCP objects and operations.

Sharepoint and Teams Collaboration Site

During the Engage phase, Itron will set up a collaboration site and add partner personnel to the site, so they have access to all the tools and documentation mentioned here. These sites can be accessed by partners through SharePoint in a web browser, or through Microsoft Teams. The Teams site also includes text capabilities for getting answers to questions, and the ability for partners to upload files for design team review.

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