SMART Meter Data Acquisition System

MDAS100

a Smarter Approach

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MDAS100 – Meter Data Acquisition System

Meter data acquisition is critical to determine consumption and baseline data. However, the meters are geographically dispersed and meter communication infrastructure is the core. Inesh provides MDAS with a comprehensive communication infrastructure for data acquisition from various brands of Single Phase and Three Phase meters.

The following are the options for the communication infrastructure with Inesh MDAS

- GPRS
- CDMA
- Low Power Radio (Zigbee Stack)
- Power Line (6LowPAN Stack).

Inesh provides the entire suite of products (modems, gateways, data concentrators, front-end processors, etc) for acquiring the data from various meters.

Features

- Highly Scalable Enterprise-class Software System
- Alerts when field meters are tampered, along with Energy Audit and Analytics.
- Different profiles of meter data along with historical views are stored in large-scale databases, for further consumption by upstream Utility systems such as – Billing, CIS, OMS, PLM, SCADA, etc.
- Key Server-side Software System that maintains two-way communication with downstream Smart Meters (at customer locations) and their Data Concentrator Units (DCUs) and upstream Meter Data Management System (MDMS).
- Works with multiple Head End Systems (from different vendors) and scales to handle millions of Smart Meters

Objective

The main objective of the MDAS is to acquire meter data from meters within the distribution system and consumer meters for:

- System performance monitoring and decision support
- Network analysis and system planning
- Monitoring and collecting data of consumer energy usage, billing, CRM, tamper, outage detection and notification
- Monitoring energy flows in the energy supply chain to provide information for energy auditing.

System Architecture
**Components**

Inesh MDAS application consists of three components:

1. **Communication server application**: Communication server application will establish communication with modem associated to DCU and process the data sent by the device.

2. **OPC Server application**: OPC server will read the raw data which was received by communication server application and convert the raw data to actual meter data.

3. **User interface using web based application**: Web server provides web based user application which will access using public IP where user should be able to login and get to know the details of their meter status and data. Utility Operation/Dashboard user will have the interface for supervisory activities involved in meter data acquisition, processing and analysis. The business logic tier would service the requests made by the client tier. These requests could be automated, based on user-defined schedules or on-demand from the user. The collected data can be viewed in the form of customized reports. User can take print outs of these reports, export the data into spread sheets, or convert the data in the form of flat files.

**Implementation**
An MDAS implementation commences with the installation and connection of modems to various makes of Energy meters in the field across an entire state. The modem has to be configured with the appropriate parameters (baud rate, make of meter, network service provider (NSP) access point name (APN), etc.). It must be installed with the right communication cables for the different makes of meters. Meter data should be successfully polled to a back-end compatible application at central data centre (CDC) over a GPRS network. That data should be sent at regular intervals, i.e. hourly or daily, based on requirements.

**Meter Data Acquired**

- Instantaneous – 15 Minutes
- Historical – Once in 10 days
- Tamper – On Occurrence
- Load Survey – Daily
- Event Logs – Daily
- Outage – after Power resumed

The Intervals for meter data acquisition is programmable for each blocks of data. The default times are as below
MDAS Application Modules

Registration Module

Registration Module is used to configure the Meter with the following Information’s

1. Make of the Meter
2. Type of the Meter (Single Phase, Three Phase, DT Meter, HT Meter or ABT)
3. Meter Serial Number
4. Make of the Modem Connected
5. Physical Layer of Communication (GPRS, LPR, PLC etc)
6. Directly Connected to Meter or through DCU
7. Location of Installation
8. Customer Info
9. Feeder Info
10. DT Info
11. Circle Info

Scheduler Module

The Scheduler Module is used to schedule the data pull from the meters at predefined intervals.

This module is configured with the following variants

1. Modules to be pulled (Load Profile Block, Day Survey block, Power outage block, Tamper block, Transaction blocks etc.)
2. Interval for pulling (On demand, Hourly, Daily, Weekly or Monthly)

PUSH Data Capture Module

The PUSH Data Capture Module captures the entire baseline data's pushed from the meter using a socket interface and transfers to the Database Server.

PULL Data Capture Module

The PULL Data Capture Module is responsible for pulling the data’s from the meters by looking on the scheduler module. Pulled Meter data’s are stored in the Database Server.
**Connect Disconnect Module**

Connect Disconnect Module handles connection / Disconnections decided by the utilities. This module remotely handles connect and disconnection mechanism.

**Prepayment Gateway Module**

Prepayment Gateway module handles Coupon charging transactions, communicating the Utility and Payment Gateway on credit information's collected from the meter.

**Communication Tracker Module**

The Communication Tracker Module keeps track on the Meters reporting & Non-reporting. Information is available on Circle, Division, Feeder, DT and DCU wise.

**Data Export Module**

Data Export Module will accept request for Meter data, compiles and export to user requested formats like CSV, Excel, and XML etc