

MICROSTAR

TMR-2012

Advanced Metering Infrastructure (AMI) System

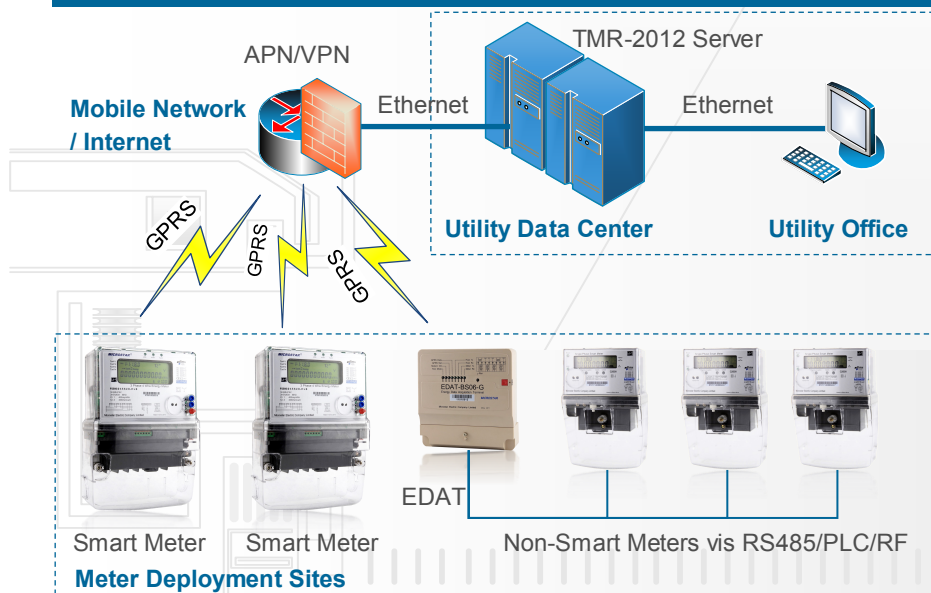
Scalable Smart Metering Solution



FEATURES

- Distributed service oriented architecture to ensure scalability
- Supports both Windows Server and Linux operating systems
- Flexible deployment options both on premise & private/public cloud
- Multiple layer of redundancy and clustering to ensure high availability
- High system capacity with network load balanced multi-instance
- Industrial-grade backup and recovery software for disaster recovery
- Supports multiple communication protocols and network topology
- Data acquisition task management and system status reporting
- Fully customizable data analysis and report generation
- Instantaneous email or SMS alarm for metering events or faults
- Role-based user management and access control for security
- Flexible data import/export from/to XML, EXCEL, PDF formats
- Multi-vendor compliant with third-party integration APIs
- STS certified electricity vending system for prepaid meters (Optional)

EXAMPLE SYSTEM DIAGRAM



APPLICATION

- Automated meter reading and configuration management
- Commercial energy billing, line loss calculation and other reporting
- Collect instrumentation data for power quality analysis
- Power plant, transmission and sub-station automation
- Electricity vending for prepayment meters (Optional)

BENEFITS

- Proven track record of high reliability and low to zero maintenance
- Distributed system at service and database level to ensure scalability
- Service oriented architecture to allow easy customizations and third-party integrations
- Automated failover and network balanced cluster for high availability and auto recovery from disaster
- Future proof with options to deploy on both traditional server or private/public cloud solutions
- Fully customizable data analysis and reporting engine to realize the potential of "Big Data"
- Web based application with no need to install or update client
- Support multiple database management systems
- One data store contains all information

AUTOMATED METER READING

Communicate with meters via GPRS/GSM, Wi-Fi, or Ethernet
 Read smart meters directly, or via data concentrators
 Download energy and demand data at billing date automatically
 Collect load profile from meters periodically
 Extract event logs and receive power quality or tamper alarms
 Read history or stored values from meter
 Real-time query of meter phasor diagram

AUTOMATED METER MANAGEMENT

Remote query and management of meter configurations
 Power grid model to represent the network topology
 Configure load profile channels and recording interval
 Update clock, daylight saving, and TOU settings remotely
 Set configuration parameters and connection mode
 Change meter alarm and SMS/voice call settings
 Locate meters on map in the GIS system

REMOTE LOAD CONTROL

Query meter load control state remotely
 Configure scheduled load control date, time and duration
 Set load control limits, reconnect count and lockout time
 Issue remote on-demand load control command

DATA QUERY

Query meter and data concentrator configurations
 Query raw data collected from meters or data concentrators
 Check historical values for meters within specified time range
 Query meter load profile and event logs, view as graph
 Export data query results to XML, EXCEL, or PDF format

ANALYSIS REPORT & BUSINESS INTELLIGENCE

Powerful data analysis engine with fully customizable reports
 Generate monthly billing reports for meters in system
 Energy balance, line loss, and load analysis reports
 Connection and data collection report to monitor system status
 Tamper detection to report slow or unreachable meters
 Customer pattern analysis for trend analysis
 Export reports to XML, EXCEL, or PDF format
 Schedule periodical reports and send via email to staff
 REST APIs or XML file transfer for 3rd-party system integration

USER MANAGEMENT & ACCESS CONTROL

Role-based user management system
 Access control for all system features for maximum security
 Mapping of power grid model to user organization hierarchy
 Users can only access the meter within their organization
 Activity logging to ensure all actions are accountable

SYSTEM SPECIFICATIONS

| | |
|--------------------------|--|
| Operating System | Windows Server / Linux |
| DBMS | SQL Server / Oracle / MongoDB |
| Data Collection Capacity | 5,000 to 1,000,000 meters scalable via different hardware configurations |
| Supported Protocols | DLMS/COSEM, IEC 62056-21, IEC 870-5-102, MODBUS |
| Third-Party Integration | via REST APIs, or XML files |

RELIABILITY & AVAILABILITY

Software and hardware co-design to ensure high availability
 Windows failover cluster for application server
 Network load balanced (NLB) cluster for data collection servers
 Fully automated failover to switch within minutes to seconds
 Zero downtime roll-out of upgrades and hardware maintenance
 HP Matrix private cloud blade system with monitoring software
 Symantec backup software for data security & disaster recovery

SCALABILITY

Highly scalable distributed system at service & database level
 Multiple instances of servers to support large number of meters
 Distributed NoSQL database for large volume data storage
 Scale out deployment to offer good performance to price ratio
 Suitable for small commercial deployment to large scale utility

PREPAYMENT VENDING SYSTEM (OPTIONAL)

Fully integrated with STS based prepayment systems
 Generate tokens for vending software and print receipt
 Integration with third-party or online payment systems
 Keep customer prepayment account and usage information
 Gather energy usage data from AMI/AMR system
 One data store with all information for auditing & monitoring
 Vending station management to ensure accountability

CUSTOMER PORTAL (OPTIONAL)

Fully integrated with customer portal for AMR meters
 Allow customers to view bills and energy usage data online
 Integration with existing payment or prepayment systems
 Mobile friendly responsive web interface design
 Provide graphic views of usage data and trend analysis
 Improve customer experience with easily accessible data
 Notify customer of power breaks via SMS or email

SYSTEM INTEGRATION

Multi-vendor compliant and open system
 Service oriented architecture (SOA) for interoperability
 Third-party meter integration via DLMS or data concentrators
 Third-party system integration with XML or REST APIs
 Integrate with billing, CRM systems, call center, and more