Utility Operations & Best Practices
MDM Integration: Mobile and Fixed Network Environments

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Itron Enterprise Edition
Product Management
Agenda

Find out about the technologies, experiences and operational benefits realized through the integration of automated technologies such as mobile AMR, fixed network AMR and MDM with customer information systems – and how these benefits have contributed to enhanced customer service strategies.

• IEE Overview
• CIS Integration: Tracking Billed Data
• Mobile / Fixed Network / MDM Integration: Value Drivers
# Mobile vs. Fixed Network Readings

<table>
<thead>
<tr>
<th></th>
<th>Mobile</th>
<th>Fixed Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registers</td>
<td>12,500</td>
<td>250,000</td>
</tr>
<tr>
<td>Intervals (DL)</td>
<td>300,000</td>
<td>6,000,000</td>
</tr>
<tr>
<td>Daily Totals</td>
<td>312,500</td>
<td>6,250,000</td>
</tr>
<tr>
<td>Monthly</td>
<td>9,375,000</td>
<td>187,500,000</td>
</tr>
<tr>
<td>Annually</td>
<td>112,500,000</td>
<td>2,250,000,000</td>
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</table>
IEE Overview

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MDM Integration: Mobile and Fixed Network Environments
Itron Enterprise Edition

Utility Operational and Back-office Systems

Meter Data Management
Customer Care Suite
Curtailment Manager
Revenue Protection Suite

Itron Enterprise Edition Platform
Database and Shared Tools

ChoiceConnect
FCS, FN, MV-RS

C&I Collection Systems
MV-90 xi, Service Mode

Advanced Metering
FN, OpenWay

Data Collection Systems
IEE MDM Revenue Cycle Business Processes

Build Schedules
Assign Validation Rules
Assign Estimation Rules
Define Calculations
Define Exports Build Schedules

Data Collection
Validation
Automated Estimation

Calculations
- Aggregation
- Netting
- Losses
- Billing Determinants
- Other

Export Data

Investigate & Resolve Failures
Manual Editing and Estimation

Business Systems
System Setup
Daily Operations

FCS
Fixed Network
MV-RS
Importing Readings Data

- Customer Care Imports: ASCII, MDEFCC, & MV9CC formats
- Direct HHF Import
- Fixed Network Translation Service: DRE, IDE, Tamper formats
- MV90 Imports: Decode & MDEF formats
- Reading XML Import
  - AMI Reading Import (ARI) adapter
  - Standard Reading Import (SRI) adapter
- Service Mode
  - Modem based remote interrogation using TIMs
IEE Standard Validation Rules

**Interval Based Validation Rules**

- **Historical Comparison Checks**
  - HistoricalMaxUsagePerDiff
  - HighLowUsageCheck
- **Spike and Demand Checks**
  - DemandHighLimit
  - DemandLowLimit
  - UsageHighLimit
  - UsageLowLimit
  - SpikeTolerancePerDiff
- **Comparative Channel Checks**
  - KvarhCheck
  - Check Meter
- **Contiguous Data Checks**
  - GapCheck
  - OverlapCheck
- **Usage Tolerance Checks**
  - UsageTolerancePerDiff
  - UsageToleranceAbsDiff
  - UsageTolerancePerMMDiff

**Load Statistics Checks**
- LoadFactorHighLimit
- LoadFactorLowLimit
- PowerFactorLowLimit
- MaxZeroIntervals
- MinZeroIntervals
- Status Count
- Demand Tolerance for Consecutive Intervals

**Service Mode Only Checks**
- Time tolerance
- Interval tolerance

**Register Based Validation Rules**
- Roll-over check
- Delta high/low check
- Overflow check
- Register value high/low limit check

**Custom Validation Rules**
- Highly configurable using IEE’s Universal Calculation Engine
IEE Includes Multiple Estimation Algorithms

- Specify one or more estimation algorithms
  - Linear interpolation
  - Historical data algorithm
  - Reference data algorithm
- Can run manually or automatically
- Residential Examples:
  - Small Gaps
  - Large Gaps – historical data available
  - Large Gaps – No historical data available
Exporting Data

- AMI Billing Export (ABE)
  - Request/response API with external systems (i.e. billing or CIS)
  - Billing determinants, interval data, register reads

- Readings Data (Intervals and Registers)
  - Integrator Exports: Billing & CS formats
  - Loadstar Exports: Normal & Enhanced formats
  - MV-90 Exports: Mainframe & Spreadsheet formats
  - MV-RS Exports: Billing & CS formats
  - Premierplus4 Exports: Billing & CS formats
  - Reading XML Export
Common File Formats

• Common file formats used to integrate with Itron products
  – Common Configuration Format
    • Program Based Configuration
    • Synchronization between systems
    • IEE / FN (Roadmap 2011)
  – Common Event Format
    • Device events and tamper information
    • IEE / FN (Roadmap 2011)
    • IEE / FCS / MV-RS (Roadmap TBD)
  – Common Readings Format
    • Interval and Register information
    • Both Import and Export
CIS Integration

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IEE Configuration

- Synchronize customer data with CIS/billing via web service or XML based API
  - Supports import and export
  - Supports meter change-outs and meter re-program

- Includes program feature to simplify set-up and minimize data synchronization issues

- User interface to query and perform manual updates
AMI Billing Export: Tracking Billed Data

**AMI Billing Export**

- ABE Import
- ABE Rate Calculation
- ABE Export
- Billing Validation Stored Procedure

**IEE Integration Layer**

- ABE Request
- Correlation ID
- Bill Version Key

- ABE Response
- Reading XML

**CIS**

- Confirm Bill Batch

**XML Schema**

```xml
<tns:ConfirmBillBatch_Request
  <BillVersionKeys>
    <q6:ArrayOfStringBuilder
      <string>0..∞</string>
    </q6:ArrayOfStringBuilder>
  </BillVersionKeys>
</tns:ConfirmBillBatch_Request>
```
Indicates data was billed by CIS
Mobile / Fixed Network / MDM Integration

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Itron’s Integrated Solution Value Drivers

1. Distribution System Management
   - Meter Right Sizing
   - Reverse Flow Detection Alarm
   - System Integrity Monitoring
   - Empirical Data For Hydraulic Load Modeling

2. Conservation Program Support
   - Measure & Manage Program Effectiveness
   - Metered Leak Detection

3. Enhanced Financial Performance
   - Tamper Reporting & Consumption Monitoring
   - Suspicious Pattern Detection

4. Improved Operational Efficiency
   - Automated Billing Data Collection
   - Reduced Expenses & Overhead
   - Virtual Disconnect

5. Enhanced Customer Service
   - Daily and Hourly Consumption
   - Faster Complaint Reconciliation
   - Reconciliation Process Avoidance
   - Accelerated Customer Payment
   - Increased Customer Confidence
Flow Analysis Screen: Meter Right Sizing

- Valuable information for Meter Shop & Distribution
- Use relevant engineering design parameters to manually right-size an individual meter
- 60- and 15-minute interval granularity trended over selected timeframe
- View peak flow volume and duration
- Export values to Excel for further analysis and computation

<table>
<thead>
<tr>
<th>Flow (cf/h)</th>
<th>Time</th>
<th>Day of Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>200.00</td>
<td>8/30/2008 2:00 PM</td>
<td>Saturday</td>
</tr>
<tr>
<td>100.00</td>
<td>9/1/2008 10:00 AM</td>
<td>Monday</td>
</tr>
<tr>
<td>100.00</td>
<td>9/1/2008 1:00 PM</td>
<td>Monday</td>
</tr>
<tr>
<td>100.00</td>
<td>8/30/2008 1:00 PM</td>
<td>Saturday</td>
</tr>
</tbody>
</table>

Summary Statistics

<table>
<thead>
<tr>
<th>Flow Statistics</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Flow Factor %</td>
<td>2.25</td>
</tr>
<tr>
<td>Weekday Flow Factor %</td>
<td>4.08</td>
</tr>
<tr>
<td>Weekend Flow Factor %</td>
<td>3.11</td>
</tr>
<tr>
<td>Max Flow (cf/h)</td>
<td>200.00</td>
</tr>
<tr>
<td>Weekday Max Flow (cf/h)</td>
<td>65.00</td>
</tr>
<tr>
<td>Weekend Max Flow (cf/h)</td>
<td>200.00</td>
</tr>
<tr>
<td>Avg Flow (cf/h)</td>
<td>4.30</td>
</tr>
<tr>
<td>Min Flow (cf/h)</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Create groups of endpoints where conservation initiatives are being enforced, then view “before and after” comparisons of the effectiveness of the programs over time.

View results from “competing” programs, i.e. mailers on one side of town and emails on the other, to see which is more effective (benchmark screen).

“If you can measure it, you can improve it”
• Reports all accounts which have usage on an inactive (disconnected) account.
  – Provides indication of possible theft (or administrative error) for accounts which have inactive status.
• This report also exists in the rich client. The two reports are functionally and logically the same.
• Each time an account is set to Inactive a single use flag can trigger. This resets the next time the account gets an inactive status.
No Usage at Active Report

- Reports all accounts that have low usage on an active account
  - Useful for theft and defective meter detection
- Accounts are flagged based on use and # of day thresholds set in the ETL. The flag resets each month.
Move-In/Move-Out

- John Blutarsky contacts Utility that he is moving out of his Frat House on April 23rd. Dean does not approve of Toga Parties.
- He wants to make sure he does not get charged for Gas after this date.
- Utility notes this and gets a forwarding address.
- On May 2nd (normal read cycle) the Meter Reader reads the meter and captures the read from the 23rd of April.
Solution Benefits

- The utility did not roll a truck to read the meter twice in the same month.
- Bluto gets his bill for usage through the hour he moved out.
- The meter reader does not have to read the meter on moving day...
IEE 100G DL data

From strip mall
• 7 days of hourly usage Tues-Mon from 3 restaurants
• notice 7 am jump in load at Yard House
IEE View of Datalogging

Yard House Restaurant

- Standard reports from IEE
  - Average hourly profile for selected period
- Actual hourly load profile per day
- Load duration curve
  - Meter right sizing
Billing Disputes

• On July 31st the Groundskeeper at local Country Club calls utility complaining about his water bill. Last month was higher than normal.

• The Customer Service Rep pulls up a report for the last 40 Days and sees that on July 12th there is an excessive amount of usage compared to the rest of the month.

• The CSR asks the Groundskeeper about this and the Ah-Ha moment happens, he remembers Carl using water in order to eliminate a gopher problem.
100W Benefits

• Utility avoids costly investigations or credits.
• Happy Customer because they understand their usage.
• The Gopher lived.

OK, the 100W didn’t save the Gopher…
Thank you!

Questions?
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