Modernizing Outage Management Business Processes at City of Tallahassee

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About City of Tallahassee

• 6 services:
  o Gas
  o Electric
  o Water
  o Waste Water
  o Storm Water
  o Solid Waste

• Interlocal agreement between Leon County, Property Appraiser, City of Tallahassee

• Named “All America City” by the National Civic League
Business Drivers

• Legacy OMS was antiquated
  o Little or no technical support
  o Difficulty maintaining network connectivity
• Leverage investment in GIS
• Need for closer integration with AMI and other systems
• Availability of American Recovery Act funds
Project Charter

• Implement a new Outage Management System
• Schneider Electric Responder, integrated with:
  • ArcGIS
  • Electric SCADA
  • Customer Information System (CIS)
  • IVR
  • Smart Grid (AMI)
  • Instant Alert
Dependencies and Resources

- Elster AMI Vendor
- SE Remote Team
- OMS Responder
- Interlocal
- DOE Grant requirements & deadlines
- COT Team (Dispatchers, Power Engg, ISS Staff, UBCS Staff)
Timeline

12/1/13
Kickoff

2/23/14
Design
Complete

4/20/14
Responder
w/CIS&IVR

6/1/14
Instant Alert
& HA
Deployment
Servers

- ArcSDE/Responder Production Database Server
- Responder Business and Archive Server
- Responder Web Server
- License Server

Users

- Electric Mappers
- Outage Call Takers
- Dispatch Management, Utility Execs, Public Relations, etc.
- Elect Operations Dispatchers
Responder Components

- **Database Servers**
  - Electric Facility Geodatabase
  - Responder Database
  - Archive Database

- **Business Servers**
  - Data Services
  - Prediction Services
  - Archive Services
  - RX Line display Service
  - Query Windows Service
  - Message Router

- **Client Applications (Thick Clients)**
  - Responder Explorer
  - Archive Explorer
  - ArcMap/ArcFM

- **Web Servers (Thin Clients)**
  - Responder Web App
  - ArcGIS Server
  - IIS
Responder Integration Framework

- IVR
- SCADA
- AMI
- MDM
- CIS

Multispeak Web Services

Responder Integration Services

Responder Data Services

CIM Web Service

CIS Web Service

Responder DB
Responder Integration Framework Functions

• SCADA
  o Set device actual status
  o Create confirmed incidents
  o Sync all device statuses

• AMI
  o Submit outage notifications
  o Set restoration times
  o Ping meters

• IVR
  o Validate customers
  o Submit outage calls
  o Send callback lists

• CIS
  o Add/Delete customers
  o Update customer/meter info
  o Update connect status
Integration Challenges

• AMI
  o Message volume
  o Message duplication
  o Message delays
  o Handling of momentary incidents

• SCADA
  o Handling of momentary incidents
  o Feeder Automation
  o Interaction with AMI
  o Duplicate event times
OMS Technical Architecture
EAMS Server receives meter records from gatekeepers and electric meters in separate DMZ.

EA_MS Server (EnergyAxis)

Smart Meter DMZ

Comcast

Gatekeeper (x270)

City DMZ

City

Internet

State

Verizon

Gatekeeper (x22)

Gatekeeper (x22)

AMI Message Server (COTRXWEBP2)

AMI Secure Message Server receives all requests from EA_MS Server and forwards requests to OMS via DMZ.

"Mesh" fiber network facilitates communication from smart meters and gateways.
High Availability and Failover - Responder
High Availability and Failover - GIS

**Production**
- Public Safety Complex DC
  - License Server
  - GIS Database Server
  - ArcGIS Server

**DR**
- Leon County DR Site
  - License Server
  - GIS Database Server
  - ArcGIS Server

- IBM HA
  - SAN Replication
  - Active-Passive

- Load Balanced
System Security

- Responder DB user access managed at the application level
- All data access managed via Responder Data Services
- Responder services connect via service account
- Replicated GIS data is read-only for OMS users
- Twist: AMI notifications received over public internet
AMI Communication

Responder Integration
AMI message Web Server (HTTPS)

COT Firewall
Open on port 4443

COT internal network

COT DMZ

Reverse Proxy Web Server Or NetScaler (HTTPS)

Internet

Elster Firewall

AMI message publisher (HTTPS)

AMI DMZ
Challenges

• Meet DOE deadlines
• Hardware acquisition for servers
• Electric GIS 10.2.1 Upgrade and data issues
• Replication Geo Database creation on City Domain
• AMI Integration and working with Elster
• Work within the constraints of an old CIS & IVR system
• Work within the constraints of an old Integration BUS (HUB)
Objectives Achieved

• OMS implemented in time to receive Recovery Act funding
• Upgraded to 10.2.1
• In production before hurricane season
• Integrations working in Production:
  o CIS
  o SCADA
  o IVR
  o Instant Alert
Outage Map
## SCADA Incident Creation

<table>
<thead>
<tr>
<th>ID</th>
<th>Status</th>
<th>Region</th>
<th>Dispatcher</th>
<th>Critical</th>
<th>Cause</th>
<th>Weather</th>
<th>Call Trouble</th>
<th># Cust.</th>
<th># Crit. Count</th>
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<td>&lt;Unknown&gt;</td>
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</table>

*Created by SCADA*
# AMI Power On Notifications

<table>
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<tr>
<th>Call Requested</th>
<th>Call Origin</th>
<th>Time Received</th>
<th>Time of Outage</th>
<th>Time Restored</th>
<th>Remarks</th>
<th>Created By</th>
</tr>
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<tbody>
<tr>
<td>Regular Call</td>
<td>22/04/2015 1:46:33 p.m.</td>
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Lessons Learned

• GIS Data and network connectivity in GIS is critical
• Implementation is complex - don’t underestimate it!
• Integration with AMI is very leading edge
• Control Center Operators must be committed
• Training is critical
• People are connected – even in an outage!
• Don’t rely on public internet!
Subsequent Accomplishments

• Public Facing Outage App
  o Outage Map
  o Web outage reporting
• Internal Web Outage Map
Looking Ahead

• Upgrade Meter firmware for AMI integration
• Expansion of Instant Alert
• Push notifications
• Explore social media integration
Questions?
Thank You.