Distribution Optimization

Yesterday, Today & the Future

Alvin Razon
NRECA BTS
DSO functionality is built on the Smart Grid concept supported by Data Analytics, Secure Communication Networks and Interoperable Systems. All resting on a solid base of Cybersecurity.
YESTERDAY: Expensive & Unsecured Custom Interfaces

- Expensive Custom Integration ($300 per line of code)
- $3 Billion out of $9B DOE ARRA Grant Spent on Custom Interfaces
- Potential Attack Vector for each Custom Interface
- Unsecured! No Testing & Certification

Traditional IT Data Structure

- Meter Reading
- SCADA
- GIS
- CIS

NISC
Aclara
Milsoft
Survalent

NRECA
America's Electric Cooperatives
TODAY: NRECA Distribution Optimization (DO) Team

Ecosystem of Practical Solutions
“Enabling Value of DATA”

1. SAFETY
IEEE 1547, NESC, NEC, TDEC, Cybersecurity, Testing & Certification

2. Distribution Reliability
SAIDI Outages, Power Quality, Data Analytics, Reliability Benchmarking, DER, Dynamic Planning/Operations

3. Cost Effective Integration
MultiSpeak connectivity, De-Risking Technology Integration, Innovative Apps/Tools

Courtesy of White River Valley Electric/Chris Hamon CEO
Operations Focus

Starts with the fundamentals

• Safety
• **Cost Containment**
• Standards
• **Reliability – SAIDI, SAIFI & CAIDI**
• EMF
• Resiliency
• WQC – Wood Quality Control (Poles)
Reliability Benchmarking, Outage Analytics, and Real Time Visualization

Creating a Product Quality culture

• Leverage the power of analytics to improve distribution reliability
• Connect widely used OMS to NRECA RBG Web App via MultiSpeak for Real-time Visualization
### Cost of Outages by cause, feeder, substation etc.

#### Outage Type Sorted by Total Cost (High to Low)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number Interruption</th>
<th>Customer</th>
<th>Hours</th>
<th>Minutes</th>
<th>Residential Lost Revenue</th>
<th>Residential Restore Cost</th>
<th>Commercial Lost Revenue</th>
<th>Commercial Restore Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>430 Tree failure from overhang or dead tree without ice/snow</td>
<td>182</td>
<td>7,222</td>
<td>2.1</td>
<td>927,416</td>
<td>$5,564</td>
<td>$51,825</td>
<td>$9,892</td>
<td>$41,460</td>
<td>$108,742</td>
</tr>
<tr>
<td></td>
<td>367</td>
<td>25,612</td>
<td>3.1</td>
<td>4,703,424</td>
<td>$28,221</td>
<td>$239,682</td>
<td>$50,170</td>
<td>$191,746</td>
<td>$509,819</td>
</tr>
<tr>
<td></td>
<td>243</td>
<td>10,681</td>
<td>1.9</td>
<td>1,245,099</td>
<td>$7,471</td>
<td>$75,245</td>
<td>$13,281</td>
<td>$60,196</td>
<td>$156,193</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>4,339</td>
<td>1.5</td>
<td>399,193</td>
<td>$2,395</td>
<td>$35,682</td>
<td>$4,258</td>
<td>$28,706</td>
<td>$71,242</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$108,742</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 Lightning</td>
<td>322</td>
<td>9,393</td>
<td>1.6</td>
<td>904,726</td>
<td>$5,428</td>
<td>$57,538</td>
<td>$9,650</td>
<td>$38,359</td>
<td>$110,975</td>
</tr>
<tr>
<td></td>
<td>282</td>
<td>5,699</td>
<td>1.6</td>
<td>548,857</td>
<td>$3,293</td>
<td>$54,052</td>
<td>$5,854</td>
<td>$36,035</td>
<td>$99,234</td>
</tr>
<tr>
<td></td>
<td>394</td>
<td>6,331</td>
<td>1.3</td>
<td>492,513</td>
<td>$2,955</td>
<td>$69,322</td>
<td>$5,253</td>
<td>$46,215</td>
<td>$123,745</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>1,408</td>
<td>3.0</td>
<td>251,756</td>
<td>$1,511</td>
<td>$10,580</td>
<td>$2,685</td>
<td>$7,053</td>
<td>$21,829</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$355,784</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ECOSYSTEM of Solutions
Enabling Secure Interoperable System
## VALUE: Ecosystem of Solutions

<table>
<thead>
<tr>
<th>Cyber Security</th>
<th>RFP Templates</th>
<th>Testing &amp; Certification</th>
<th>MultiSpeak Portal</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIST-SGIP</td>
<td>Available Online</td>
<td>V5 Comprehensive Testing</td>
<td>Selection of product solutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Profile</td>
<td>Online Testing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Work Process</td>
<td>Multimedia Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Step-by-step Help</td>
<td>Function Sets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Use Cases/Best Practices</td>
</tr>
</tbody>
</table>

**MultiSpeak Marketplace, MultiSpeak App-Store & More…**
FUTURE “Tomorrow” (DO):
Interconnected systems ENABLING Real-Time 2 way DATA and ENERGY

VALUES & BENEFITS: Reduction of Losses in Capital Expenses, Outage/Restoration Cost, Custom Integration Cost, Cybersecurity and Resiliency
Contact INFO

Alvin Razon alvin.razon@nreca.coop 1-703-888-8356

Tony Thomas tony.thomas@nreca.coop 1-703-907-5824

Aliya Alimujiang Alimujiang.Aliya@nreca.coop 1-703-907-5814

Aleeta Harrington Aleeta.harrington@nreca.coop

Visit NEW website www.MultiSpeak.org