A Tale of Two Utilities: A Case Study of MultiSpeak® Integrations for Utilities

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Agenda

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- Introduction to MultiSpeak
- Introducing College Station
- Map3D MultiSpeak Export at College Station
- Introducing Welland Hydro
- OMS Outage View
- Q&A

Introduction to MultiSpeak

What is MultiSpeak®?

“The MultiSpeak Specification is a key industry-wide standard for realizing the potential of enterprise application interoperability.”

http://www.multispeak.org/about/Pages/default.aspx

“Its purpose is to define standard data interfaces to help make available cost-effective, integrated software applications to serve the business needs of [electric utilities].”

MultiSpeak® Version 3.0 Specification

What is MultiSpeak®?

- In Daily Use at 725 electric cooperatives, investor-owned utilities, municipalities and public power districts
- 70 Vendors actively contribute to the specification
- www.multispeak.org

MultiSpeak® Features?

- Standard interfaces – application independent
- Supports batch transfers and web services
- Interfaces between: Customer Information Systems (CIS), **Geographic Information Systems (GIS)**, **Engineering Analysis (EA)**, Integrated Voice Response (IVR), Staking, Supervisory Control and Data Access (SCADA), Automated Meter Reading (AMR), Load Management, **Outage Management (OA)**, **Outage Detection (OD)**, …

MultiSpeak® Interfaces?

- Batch Interface
  - Map3D MultiSpeak Batch Application
  - College Station
  - GIS-EA
- Web Service
  - Welland Hydro OMS Viewer
  - OA-OD

College Station

College Station Overview

- College Station is a city in Brazos County, Texas situated in East Central Texas
- CSU services approximately 37,000 customers
- Service territory is just over 40 square miles
- CSU started using AutoCAD/AutoCAD Map in 1987
- CSU started using Milsoft WindMil v1.0 in 1993 for engineering analysis

Benefits Realized

- MultiSpeak export from AutoCAD Map3D to create WindMil model
- WindMil model is used both for engineering analysis and for the outage management system
- Updates only in one place (AutoCAD Map3D)
- Accurate exports keep load projections and outage predictions correct

Map3D MultiSpeak Batch Export

Demo

MultiSpeak® Batch Interface: Features

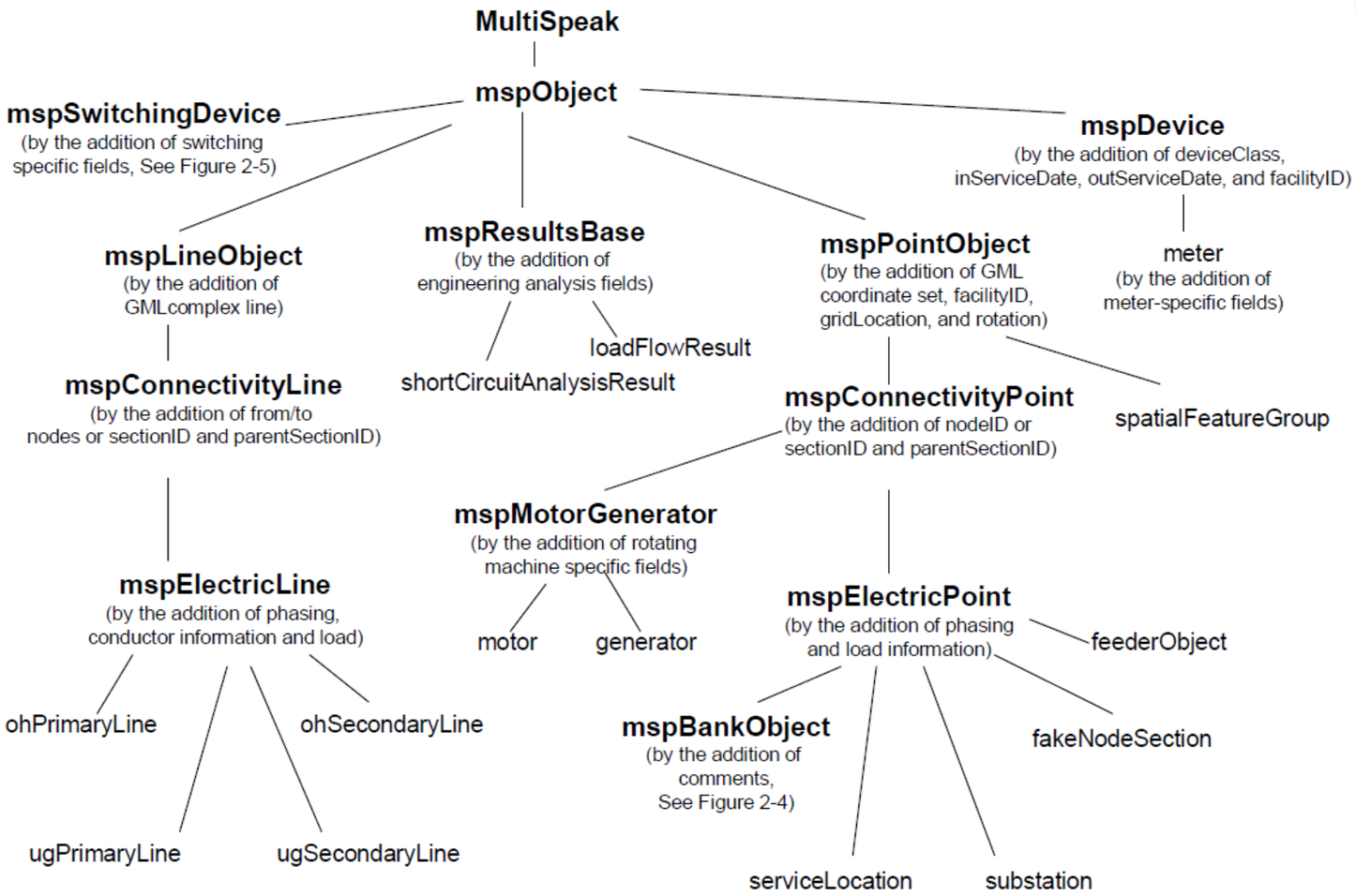
- Enterprise and File Based Industry Models
- Industry Model Independent
  - Configured “out of the box” for NA Electric Model
  - Configurable for any data model
- Supports “tight” integration with WindMil
- Batch transfer
- Configuration File Validation

Workflow - Configuring the Interface

- Define the Data Mappings
  - MultiSpeak Objects
  - Industry Model Feature Classes
  - Match Attributes
- Create Industry Model Views
- Create Configuration File

MultiSpeak® Objects

Figure 2-3
MultiSpeak Object Inheritance Hierarchy



Define Data Mappings – Identify Classes

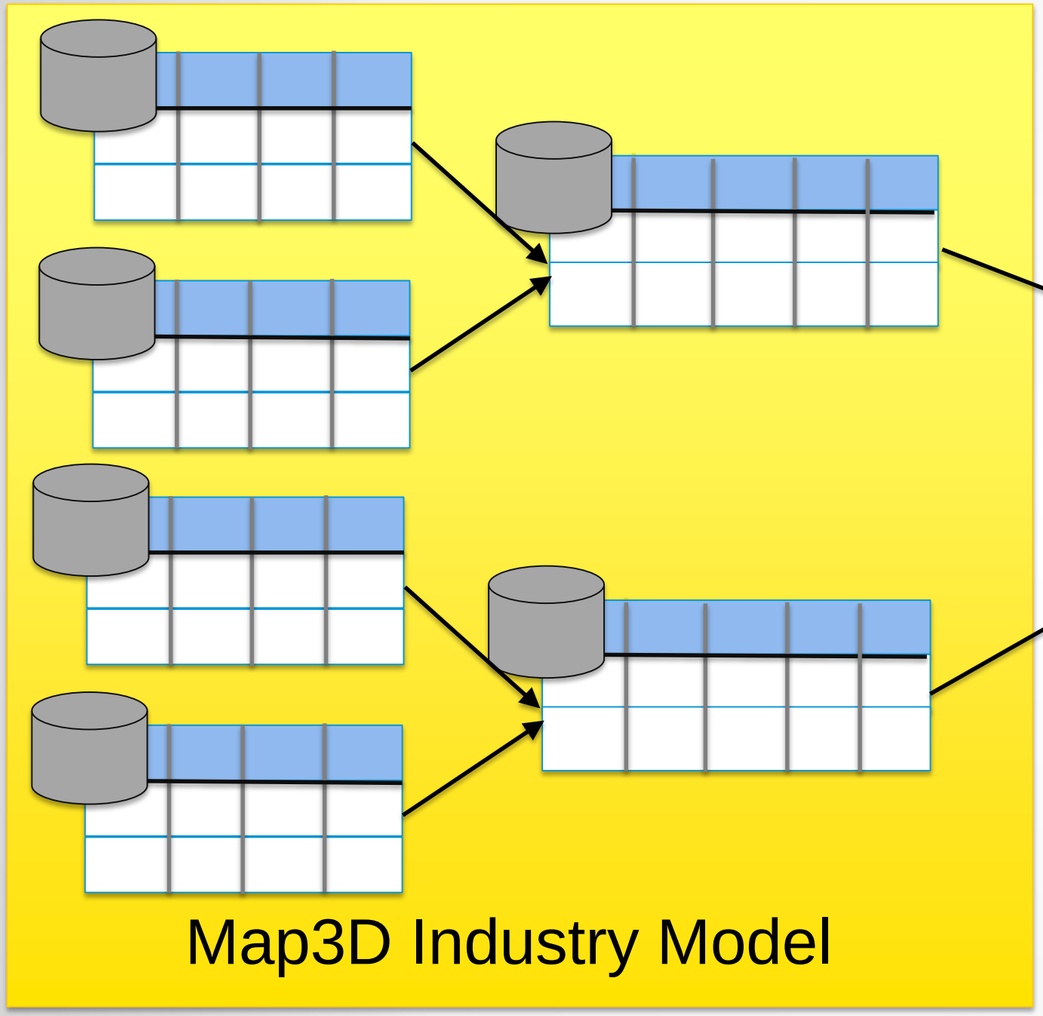
WindMil Circuit Element Types

WindMil can import all MultiSpeak nouns which are derived from mspConnectivityPoint and mspConnectivityLine. The following list indicates which WindMil element types are created when these nouns are imported.

MultiSpeak Noun	WindMil Element Type
ohPrimaryLine	Overhead
ohSecondaryLine	Overhead
ugPrimaryLine	Underground
ugSecondaryLine	Underground
fakeNodeSection	Node
capacitorBank	Capacitor
overcurrentDeviceBank	Overcurrent Device
switchDeviceBank	Switch
regulatorBank	Regulator
transformerBank	Transformer
serviceLocation	Consumer
substation	Source
generator	Generator
motor	Motor

Source: Interfacing with WindMil v8_1.doc

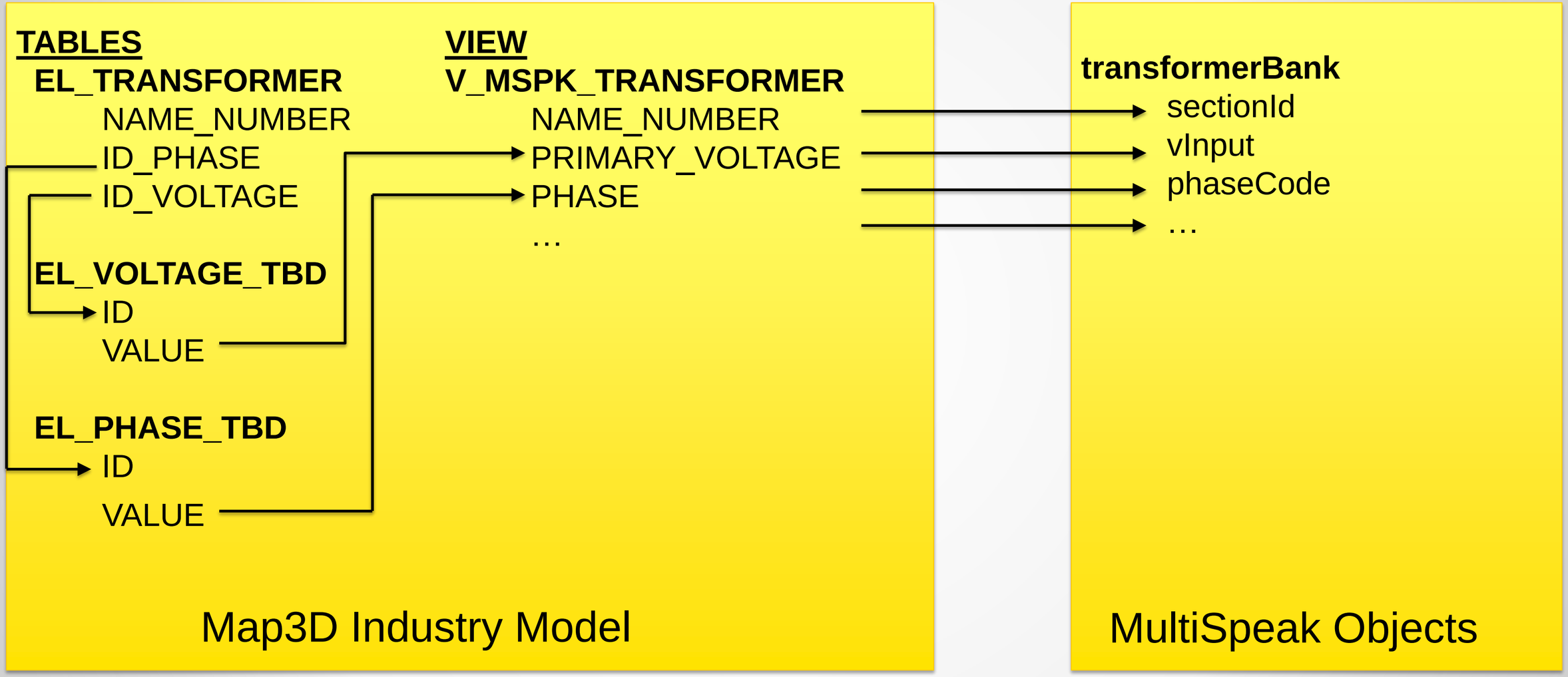
Workflow – Define Mappings



ohPrimaryLine
ohSecondaryLine
ugPrimaryLine
ugSecondaryLine
fakeNodeSection
capacitorBank
overcurrentDeviceBank
switchDeviceBank
regulatorBank
transformerBank
serviceLocation
substation
generator
Motor

MultiSpeak Objects

Workflow – Define Mappings Example



Create the Config File

```
<msElement name="transformerBank" source="V_MSPK_TRANSFORMER" feeder="CIRCUIT" sectionId="NAME_NUMBER" >
    <msGeometryProperty name="mapLocation" source="GEOM"/>
    <msProperty name="rotation" source="ORIENTATION" />
    <msProperty name="phaseCode" source="PHASE" />
    <msProperty name="utility" value="Autodesk" />
    <msProperty name="vInput" source="PRIMARY_VOLTAGE" />
    <msProperty name="vOut" source="VOLTAGE_OUTPUT" />
    <msProperty name="transDescr" source="DESCRIPTION" />
    <msElementList name="transformerList">
        <msElement name="transformer" parseBy="PHASE">
            <msProperty name="phase" autoGenerate="true" />
            <msProperty name="eaEquipment" source="DESCRIPTION" />
            <msProperty name="kva" source="KVA" />
        </msElement>
    </msElementList>
</msElement>
```

Requirements and Assumptions

- Table or Views must contain:
  - FID
  - Feeder/Circuit
- Logical connectivity model
- Column values must match MultiSpeak Specification:
  - phaseCode {A, B, C, AB, AC, BC, ABC, Unknown}
  - operVolt – in KiloVolts
  - Position {NO, NC, Unknown}

Requirements and Assumptions

- Start Feeder Device (ie. breaker) needs to be related to its substation

Configure the Interface - Skills/Tools Required

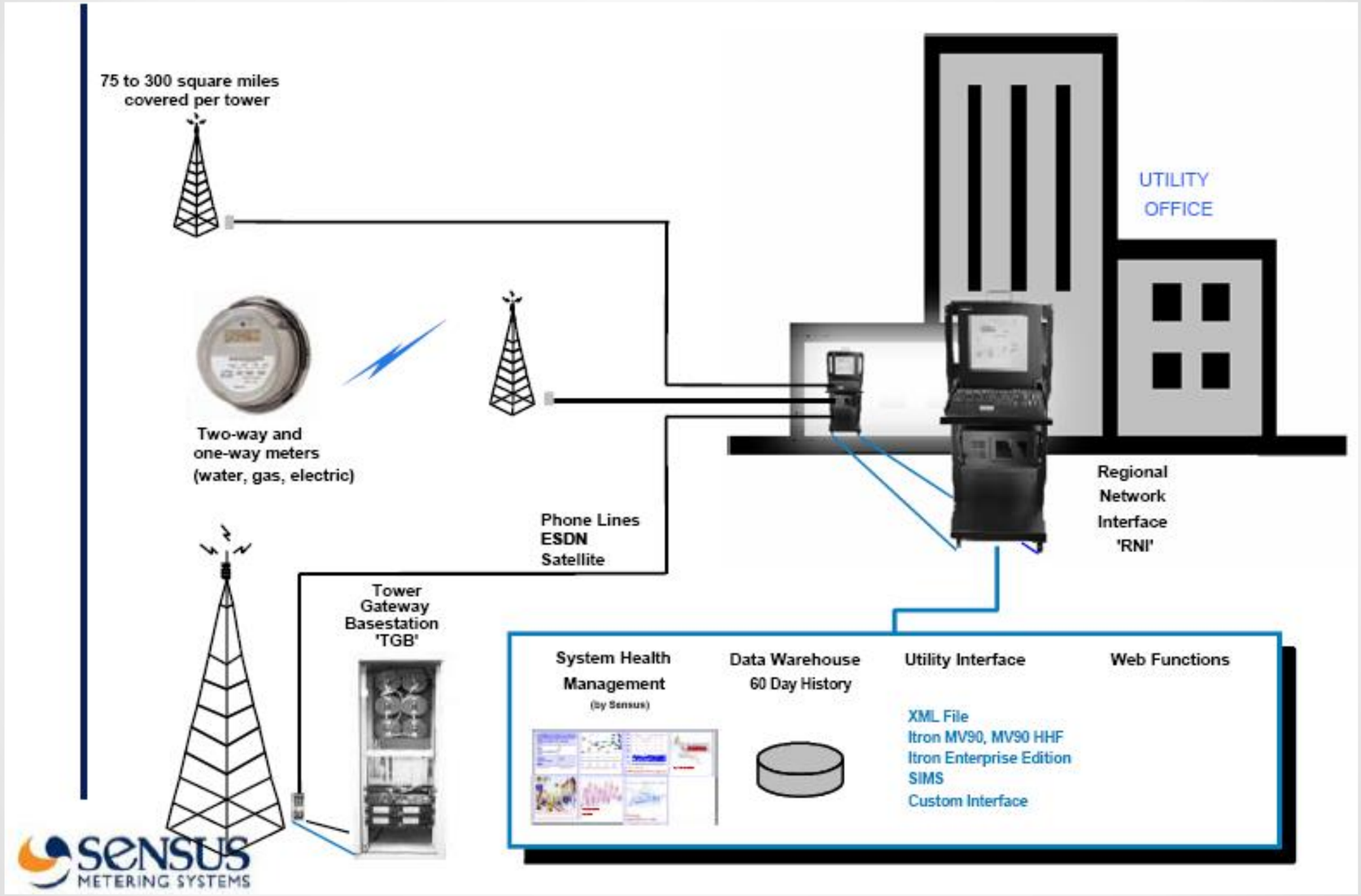
- Skills
  - Understand Data Models
  - Data Modelling Development if needed to create views
- Tools
  - Infrastructure Administrator
  - SQL Development Environment
    - SQL Sheet in Infrastructure Administrator
    - Oracle SQL Developer
    - SQL Server Management Studio

Welland Hydro

Welland Hydro Overview

- Welland is centrally located in the Niagara Region between Lake Erie and Lake Ontario
- WH services approximately 22,000 customers in Welland
- 97% of customers are in an Urban Environment

AMI/Outage Viewer Overview



Benefits Realized Using the Outage Viewer

- Probable points of failure were predicted automatically
- Outage events were prioritized based on number of customers affected
- Crews were dispatched to an event based on
  - Outage event priority
  - Proximity to the outage location
  - Existing work load

Outage Viewer Integration Challenges

- RNI located offsite and managed by a 3rd party resources
- Duplicate Messages – Multiple outage alarms for a single meter – currently being resolved by Sensus
- Message Traffic – Due to message traffic, not all Outage/Restoration alarms come all the time
- Restoration of service verified by interrogation of the customer's smart meter

Outage Viewer Expectations

- Real time customer outage reporting
- Increased accuracy in predicting a failed device
- Real time power restoration reporting
- Eliminate manual interrogation of the meter to determine restoration status

ALARMS

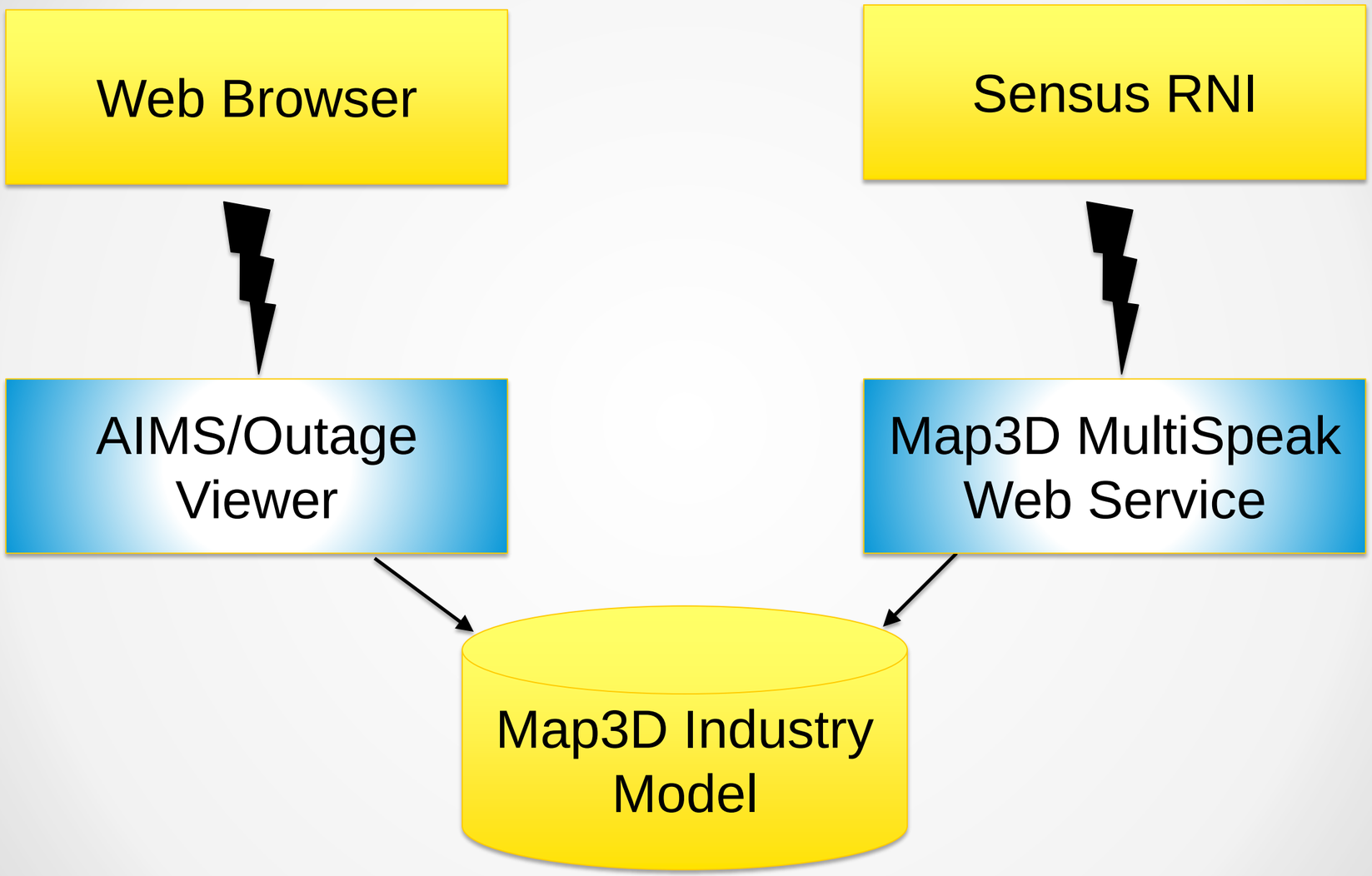
Power Failed	2011-10-19 16:32:11
Power Restored	2011-10-19 17:27:18
Failure Duration	55 minutes, 7 seconds
Meter Tamper	No current or valid value.
Power Theft	No current or valid value.
Low AC Volts	No current or valid value.

Alarm Messages

Event	outageEventType	priority	messageList/message/comment
Power failed	Outage	NeedsAttention	PowerFailedOutageEvent
Power failed (AC)	Outage	NeedsAttention	PowerFailedOutageEvent
Power restored	Restoration	NeedsAttention	PowerRestoredOutageEvent
Tamper	Outage	Urgent	TamperOutageEvent
No response (solicited)	Outage	NeedsAttention	NoResponseOutageEvent
Success response (solicited)	Restoration	Normal	SuccessEvent
Failed to send message	NoResponse	Normal	TransmissionFailedEvent

Welland Hydro Outage Viewer

Outage Viewer Overview



Demo

Sample Message

```
<ns2:outageDetectionEvent>
    <ns2:eventTime>2013-02-21T20:56:08.000-05:00</ns2:eventTime>
    <ns2:outageEventType>Outage</ns2:outageEventType>
    <ns2:outageDetectDeviceID>13081580</ns2:outageDetectDeviceID>
    <ns2:outageDetectDeviceType>Meter</ns2:outageDetectDeviceType>
    <ns2:outageLocation>
        <ns2:meterNo>912916</ns2:meterNo>
    </ns2:outageLocation>
    <ns2:messageList>
        <ns2:message>
            <ns2:comments>OutageEvent</ns2:comments>
        </ns2:message>
    </ns2:messageList>
    <ns2:priority>NeedsAttention</ns2:priority>
</ns2:outageDetectionEvent>
```

Map3D MultiSpeak Web Service

- Outage
  - Create event (EL_EVENT) for the related Meter
  - Create an Observation (EL_OBSERVATION) at Meter location related to this event and meter
- Restoration
  - Create event (EL_EVENT) for the related Meter
  - Delete existing Observation

Outage Viewer

- Observation display layer displays current Outages
- View Outages widgets periodically checks for new outages/restorations and refreshes the map
- Tabular listing of current outages is available

Questions and Answers