Semantic Modeling at Sempra Utilities:

Using a Common Information Model for Back Office Integration

CIMug

November 2011

Lynn Rodoni, Information Architect

Sempra Energy Utilities

Southern California Gas Company - 6,600 Employees

- 5.6 million natural gas meters
- 23,000 square miles, from San Luis Obispo to the Mexican border and 535 cities.
- USA's largest natural gas distribution utility
- Serving over 20 million consumers in 20,000 square mile service territory

San Diego Gas & Electric - 4,500 Employees

- 1.4 million electric meters & 800,000 natural gas meters
- 4,100 square miles, covering two counties and 25 cities.
- Serving 3.4 million consumers in San Diego region

Combined Utilities

- Regulated by the California Public Utilities Commission

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Key Sempra Business Efforts

SDG&E Smart Metering program

- Mass deployment nearing completion

SCG AMI program (in development will touch 5M

Pipeline Integrity (SmartGrid for Gas)

Sunrise Power link 500 kV

SmartGrid Initiatives

- Gridcomm, HAN, Green Button, Electric Vehicle Initiati

OpEx 20/20 (nearing completion)

- Field Force M&I and Construction work
- OMS/DMS/GIS, CBM, Asset Management

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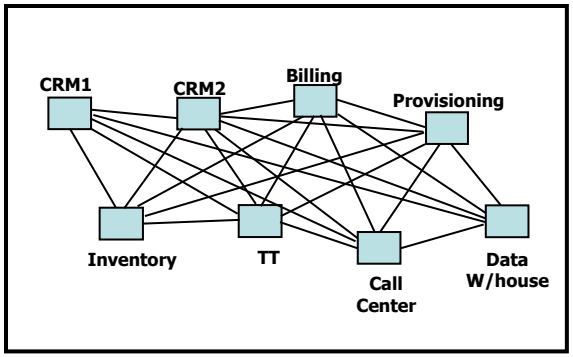
Enterprise Information Management Key Business Driver

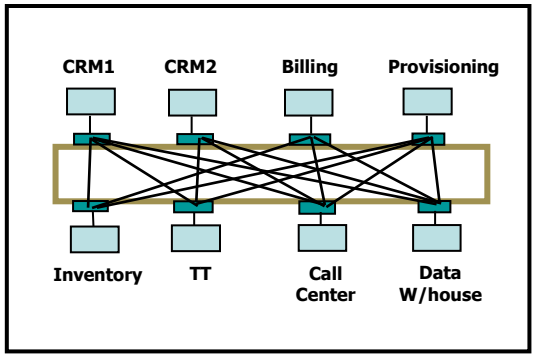
Increasing requirements to **share information efficiently**

- Creating a shared structure and terminology involves an upfront investment.
- Simplify **integration**, increase **interoperability** and **consistently** expose the information the business manages.



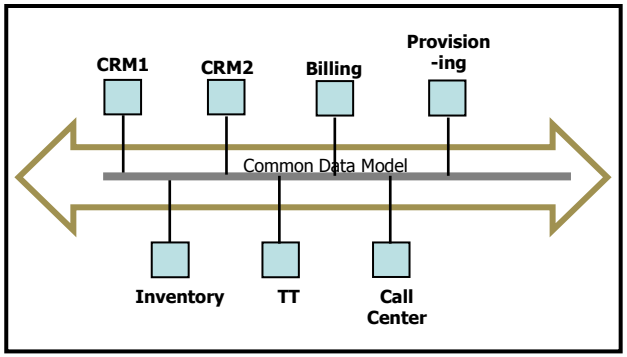
Past

No one can figure out
Who is talking to whom?



Current

Great! You are using SOA but,
Can we reuse this investment?



Future

We know what investments we have made in automating the business and we know what we can reuse to build future applications cheaper.

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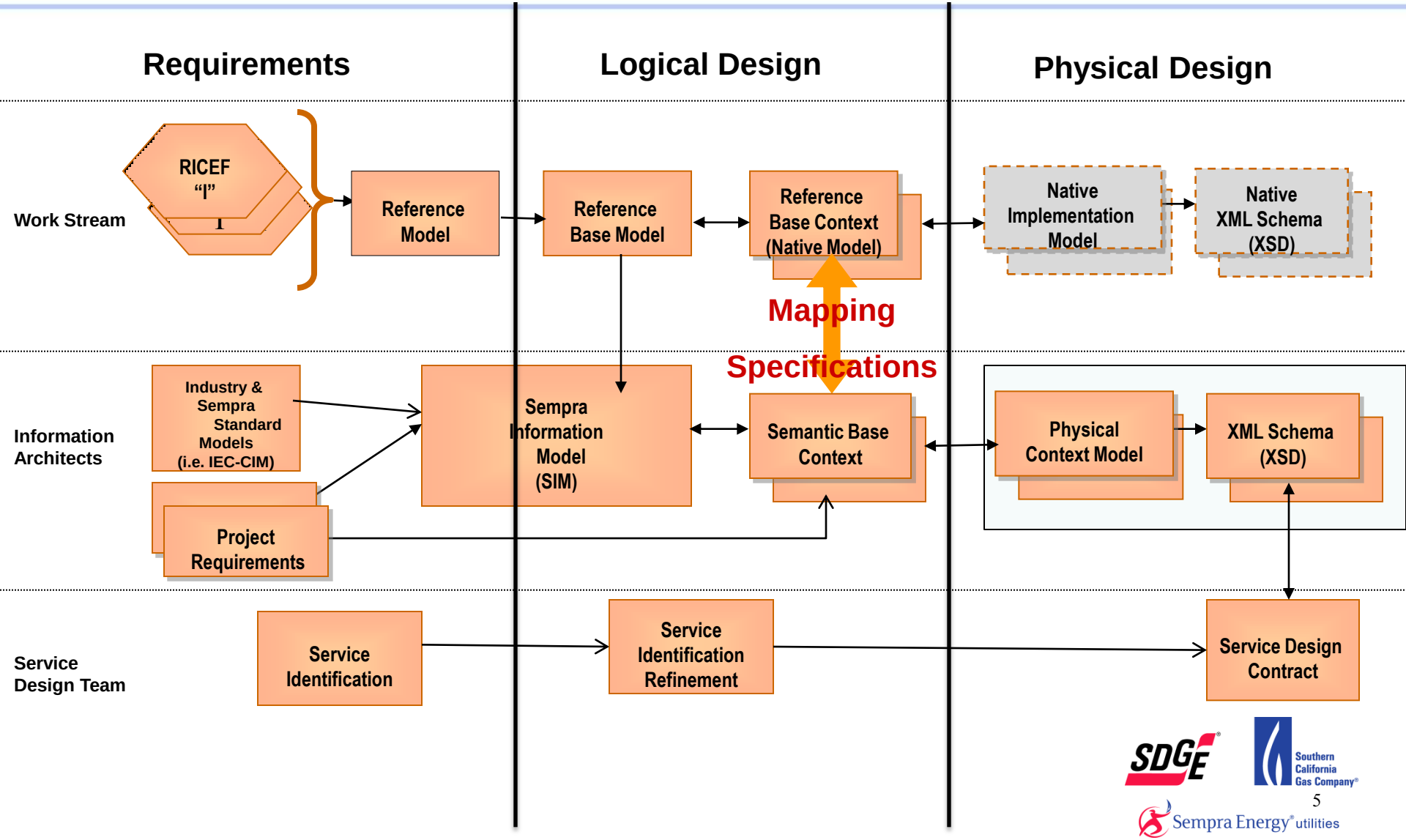
Information Model Development Steps and Phase Deliverables



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Case Study

OpEx 20/20 Initiative:

Outage Management Project (OMS)

Information Management Objectives

Develop model-based XML schemas for Outage Management Back-office system integrations using the Sempra Semantic Model (SIM) as the basis

Extend the SIM Semantic Model to support Outage Management Integration requirements

Demonstrate reuse and faster integration of LATER use cases

Refine the existing Information Management Integration methodology

- Traceability
- End-to-end data flow
- "As-designed" to "As-built" model requirements

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Outage Management Back Office Integration Environment

Multiple Work Management Systems

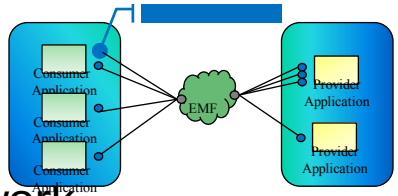
- Managing Work , assigning and tracking Crews, Work completion reporting
  - Trouble Shooting Crews
  - Field Repair Crews
  - Vegetation Management Crews

Customer Information System

- Trouble Ticket Management
- Customer Account Structure (Service Delivery Point/Customer Account Master Data)

Outage Management System

- Identifying outages, determining repairs, and assigning work
- Reporting Results of Outages to interested parties



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Outage Management Back Office Integration Environment Characteristics

Event–based interactions (SOA Services)

Batch file Master Data distribution for Customer Account/Service

Delivery Point

Business Processes based on “common” information concepts

- ✓ Customer
- ✓ CustomerAccount
- ✓ TroubleTicket (extension to SIM)
- ✓ Outage
- ✓ Work/WorkTask
- ✓ ServiceLocation
- ✓ ServiceDeliveryPoint
- ✓ Crew (extension to SIM)
- ✓ Vehicle (extension to SIM)
- ✓ Etc.

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Results: OMS Project Services Using SIM Based Schemas

Work Management

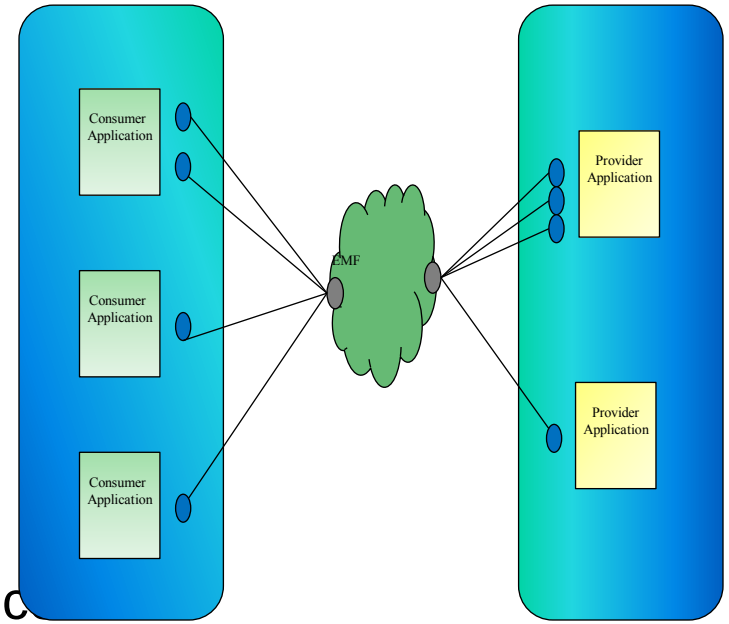
- Outage Work Execution Service
- Outage Work Status Service

Crew Management

- Crew Management Service
- Crew Availability Service
- **Vehicle Location Service**

Trouble Ticket Management

- Trouble Ticket Notification Servic
- Trouble Ticket Completion
- Outage Information Report Service



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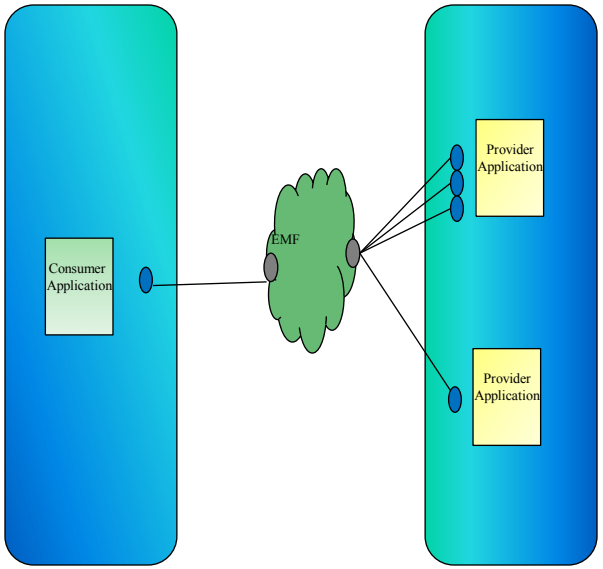
Results: OMS Project Services Using SIM Based Schemas

Master data service

- ☺ Service Delivery Point Master Data



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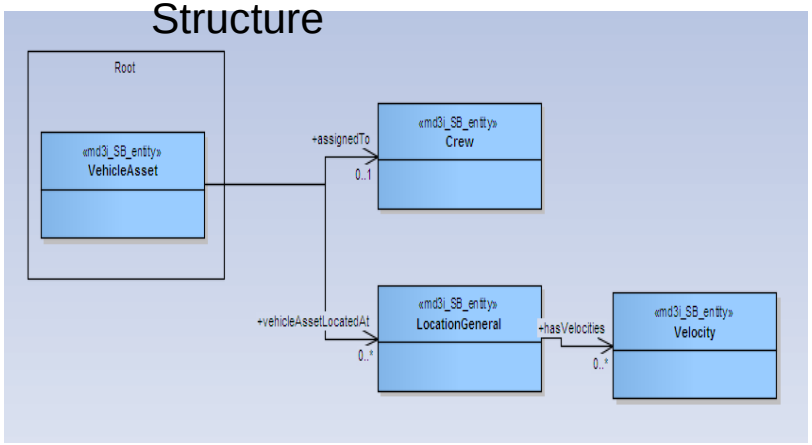
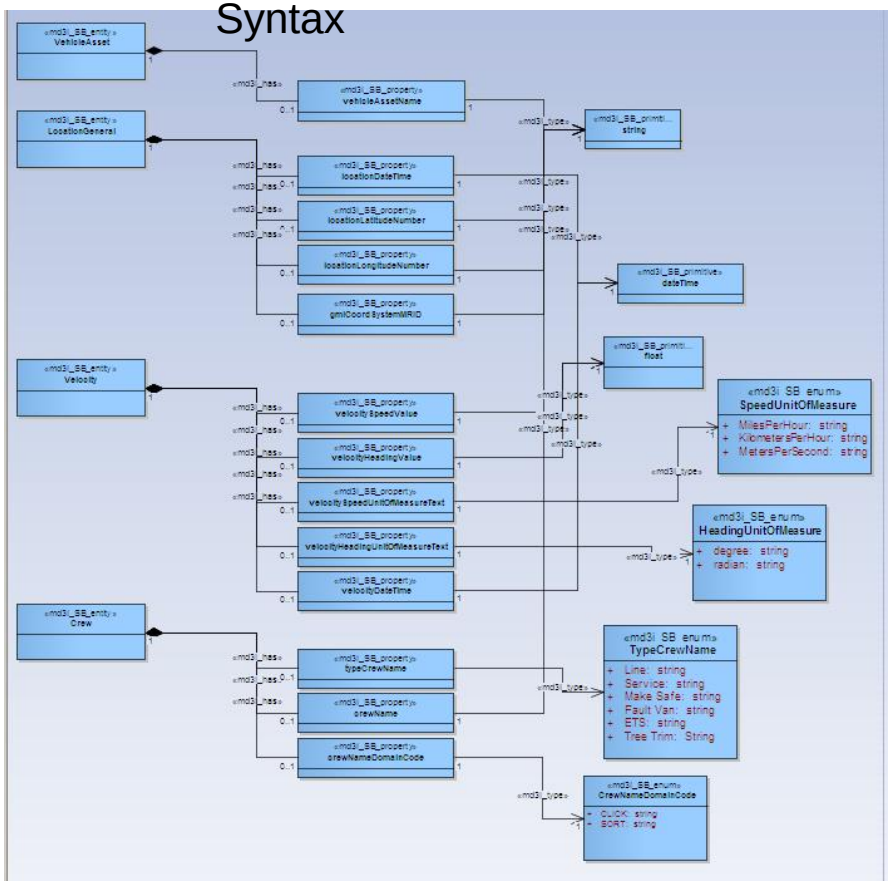
Methodology: Example of a Schema Model

Vehicle Location Schema

Concepts and Structure



Data Elements and Syntax



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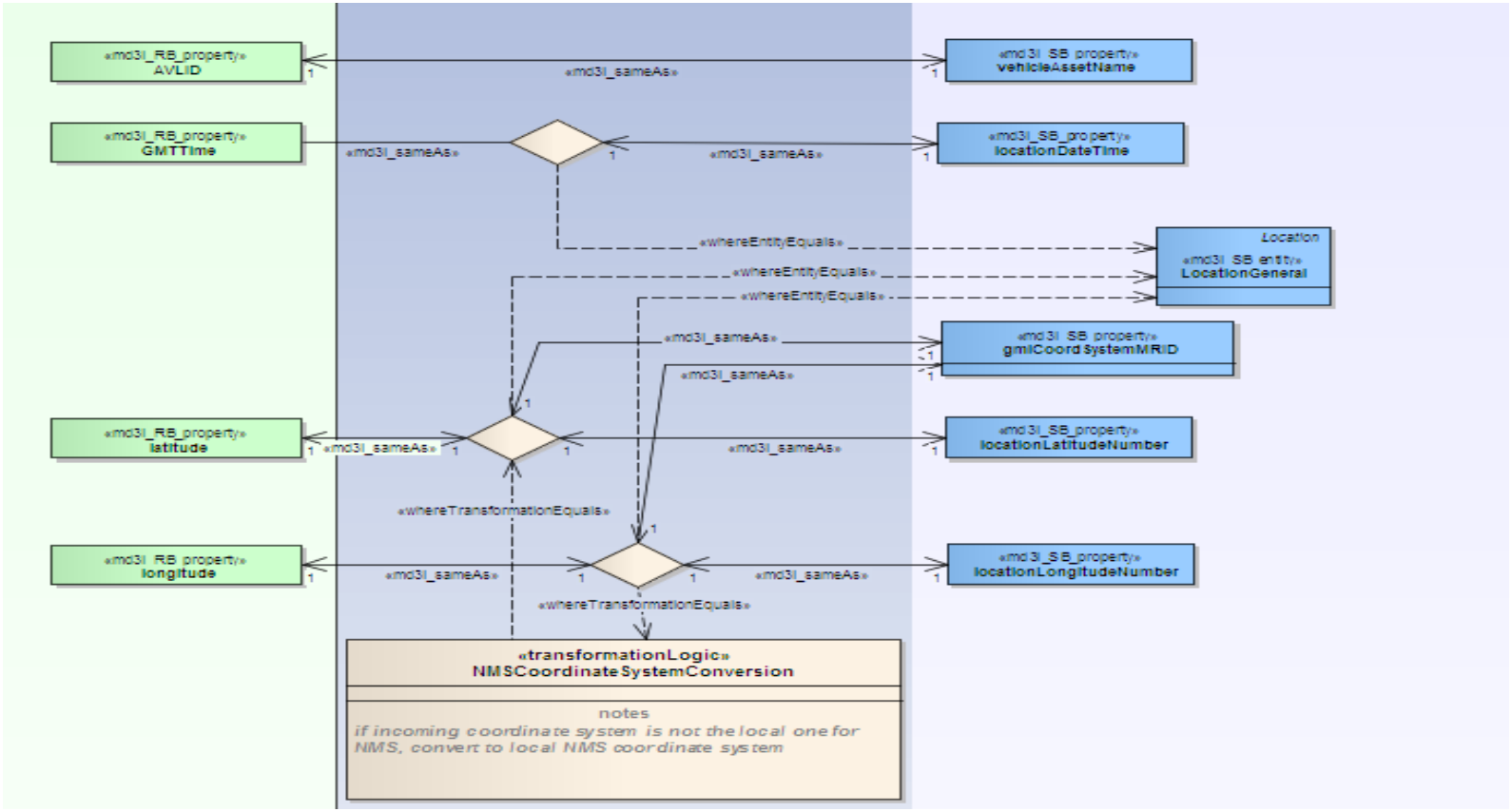
Methodology: Traceability

Vehicle Location Schema mapping to OMS Interface



Methodology: Consolidated Mapping Spreadsheet

Use of Vehicle Location Service Schema

SIM VehicleLocationV1.1 Schema				SORT .... 5020 Send			CLICK ... Send			NMS OD ... 5020 Receive		
SIM Schema Path	SIM Schema Notes	SIM Entity Name	SIM Property Name	Entity Name	Field Name	Mapping Notes	Entity Name3	Field Name3	Mapping Notes3	Entity Name2	Field Name2	Mapping Notes2
/VehicleAsset/vehicleAssetName		VehicleAsset	vehicleAssetName	SendGPSLocation	MobileUserVehicleID		Engineer	CMTRUCKNumber		Vehicle	AVLID	
/VehicleAsset/vehicleAssetLocatedA/LocationGeneral/locationDateTime		LocationGeneral	locationDateTime	SendGPSLocation	PositionUpdated		Stamp	TimeModified		AVLEvent	GMTTime	
/LocationGeneral/locationLatitudeNumber		LocationGeneral	locationLatitudeNumber	SendGPSLocation	PositionLatitude		Engineer	Latitude		GPS	latitude	
/LocationGeneral/locationLongitudeNumber		LocationGeneral	locationLongitudeNumber	SendGPSLocation	PositionLongitude		Engineer	Longitude		GPS	longitude	
/VehicleAsset/vehicleAssetLocatedA/LocationGeneral/gmlCoordSystemMRID		LocationGeneral	gmlCoordSystemMRID		hardcoded	value TBD		hardcoded	value TBD		<not persisted>	requires transformation to local
/LocationGeneral/hasVelocities/Velocity/velocitySpeedValue		Velocity	velocitySpeedValue		<not provided>			<not provided>		Telemetry	speed	incoming unit of measure
/LocationGeneral/hasVelocities/Velocity/velocityHeadingUnitOfMeasureTe		Velocity	velocityHeadingUnitOfMeasureText		<not provided>			<not provided>		Telemetry	heading	velocityHeadingUnitofMeasur
/LocationGeneral/hasVelocities/Velocity/velocityDateTime		Velocity	velocityDateTime		<not provided>			<not provided>			<not required>	
/LocationGeneral/hasVelocities/Velocity/velocitySpeedUnitOfMeasureText		Velocity	velocitySpeedUnitOfMeasureText		<not provided>			<not provided>		Telemetry	speed	incoming unit of measure
/VehicleAsset/vehicleAssetLocatedA/LocationGeneral/hasVelocities/Velocity/velocityHeadingValue		Velocity	velocityHeadingValue		<not provided>			<not provided>		Telemetry	heading	velocityHeadingUnitofMeasureText isNot

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Lessons Learned

The devil is in the details …….

Methodology Outreach

- Coordination with Business Process and Service Design teams is critical
- Engage as early in Requirements phase as possible to understand and possibly influence the “lay of the land”

Scaling, Resources and Consistency

- Different phases require different skills/focus
- Volume of details grows dramatically across the phases
- Requires oversight across projects to ensure consistency

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Lessons Learned

The devil is in the details …….

Traceability is NOT easy

- Across representations of the SAME model (logical and physical)
- Across different models (UML not the best modeling tool)
- Hard to keep everything updated when using different tools

Support requires a Separation Of Concerns between Logical and

Physical Design

- Semantics vs syntax
- COBOL/RDZ constraints (and other technology issues)
- Focus on implementation and developer concerns

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Round 3: What's Next?

- ✓ Evolve information modeling methodology based on lessons learned
- ✓ Work with new projects (Dynamic Peak Pricing and Customer Contact Management) using evolved methodology
- ✓ Extend resource capacity by training Service Design team (Physical Modeling)
- ✓ Acquire Metadata tool to support more effective mapping and traceability
- ✓ Assess emerging information ‘standards’ affecting Smart Grid objectives and extend SIM as required

Enterprise Information Management evolves incrementally and iteratively. It’s a guided journey, rather than a destination.

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