



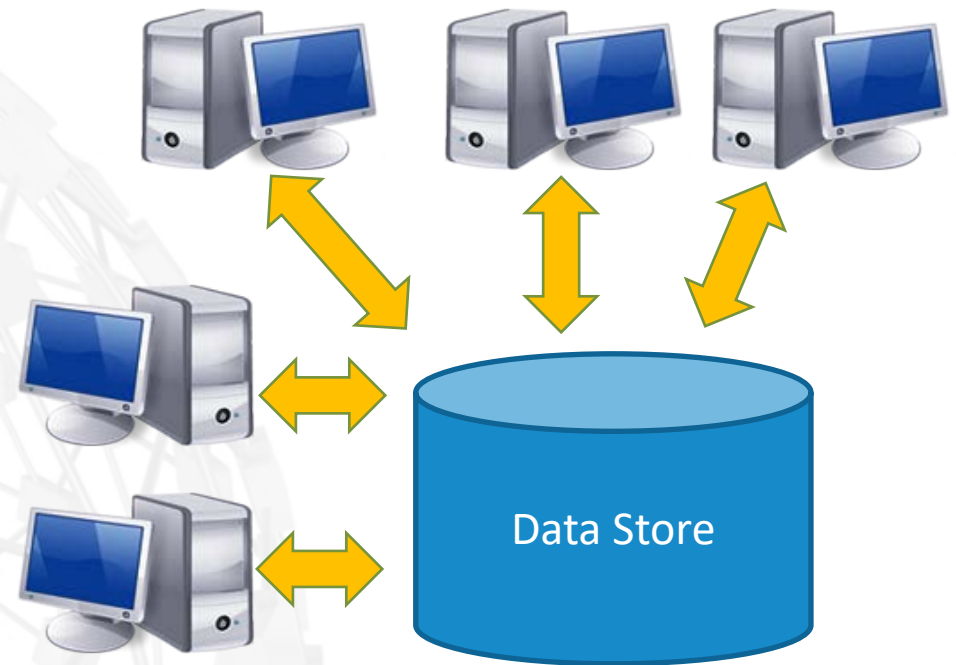
CIM Adapter for PI AF

Summary

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Legacy Approach for Analytic Data Modeling

- Each group looks at its own application needs and develops a data model that is optimized for its own use:
 - » Only data needed for its application is considered.
 - » New data model elements are added as needed based on needs of individual applications.
- The “Ad-Hoc” Approach



Ad Hoc Approach for Line Rating Application

Line Rating Application

Control Area

Corridor

Line Segment 1

Line Segment 2

Ambient Temp

Wind Speed

Wind Direction

Current

A Line

LineTemp

Sag

B Line

LineTemp

Sag

Object Defined



Data Store



Line Rating App



Ad Hoc Approach for Remedial Action Schemes

Remedial Action Application

Corridor

Same Object...Different Usage

North-South Interconnect

Line Trip RAS

Generator Trip RAS

Airport Substation

Another Object Defined

Sydney Sub

West Dam Sub

East Wind Sub

Line Status

Current

Margin

Line Rating

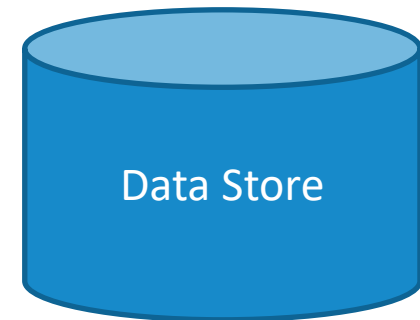
RAS Arming



C-RAS App



Line Rating App



Data Store

Ad Hoc Approach for Disturbance Monitoring

Disturbance Monitor App

Control Area

Airport Sub

Sydney Sub

East Wind Sub

Bus Monitoring

Battery

Breakers

Transformer

Voltage Level

138KV

69KV

DFR1

West Dam Sub

Same Object...Different Usage AGAIN

Disturbance Monitor



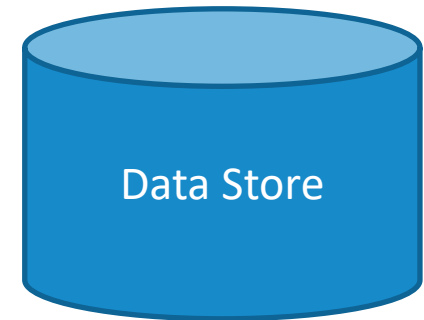
C-RAS App



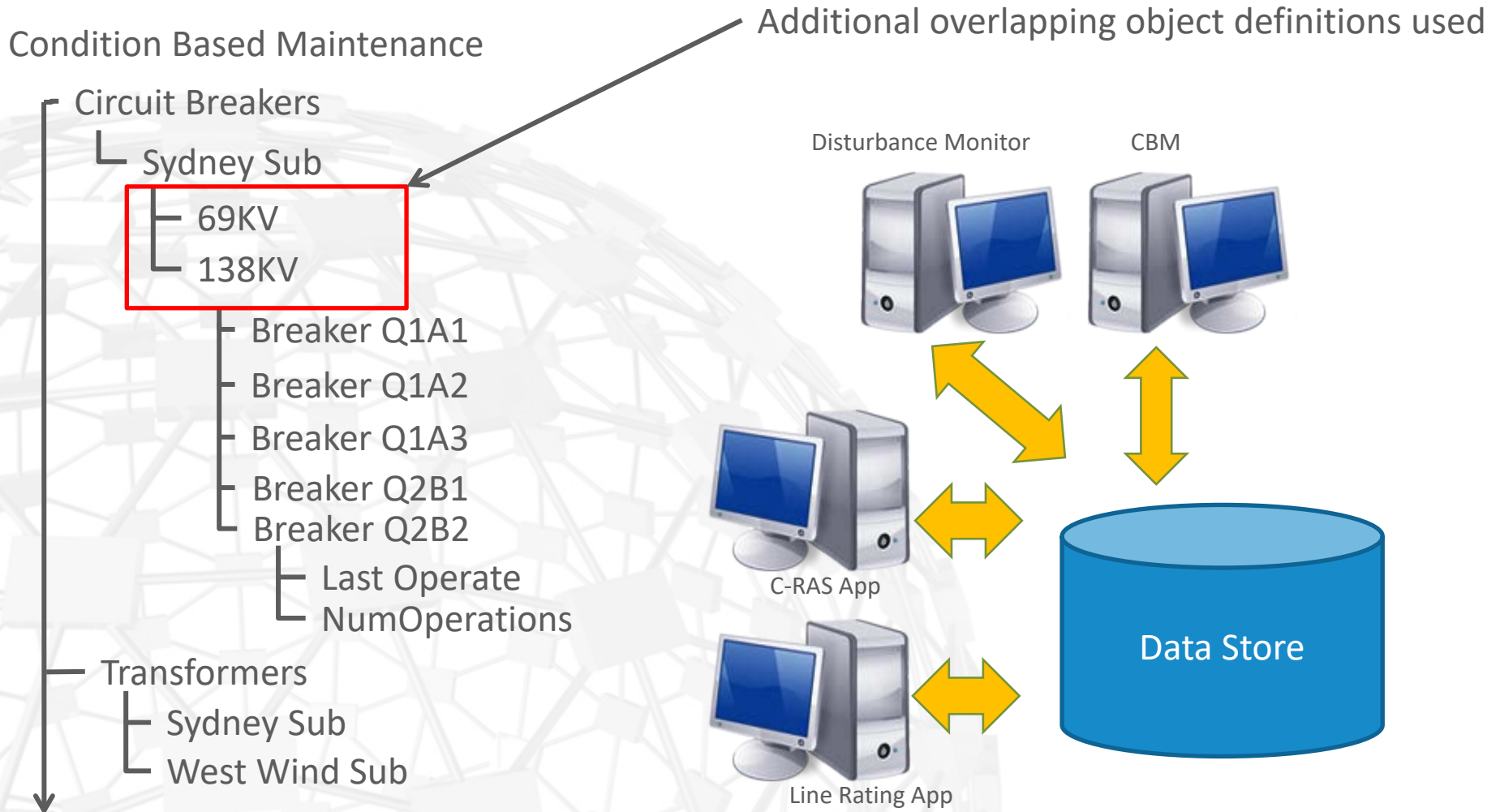
Line Rating App



Data Store

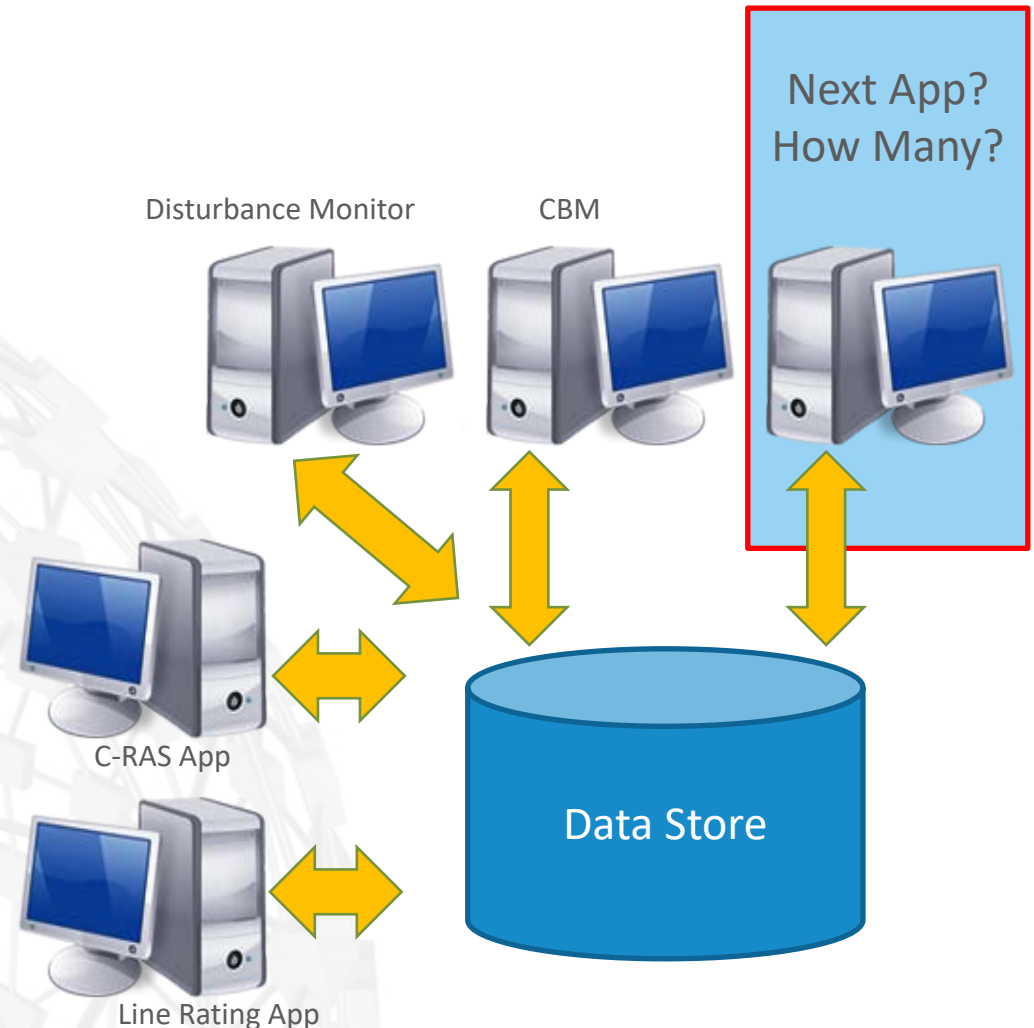


Ad Hoc Approach for CBM Applications



Impact of Ad Hoc Approach for Application Data Models

- Each Application has its own data model.
- Impact of cross-organizational integration and data sharing ignored.
- Each group is individually satisfied with their own custom view until.....

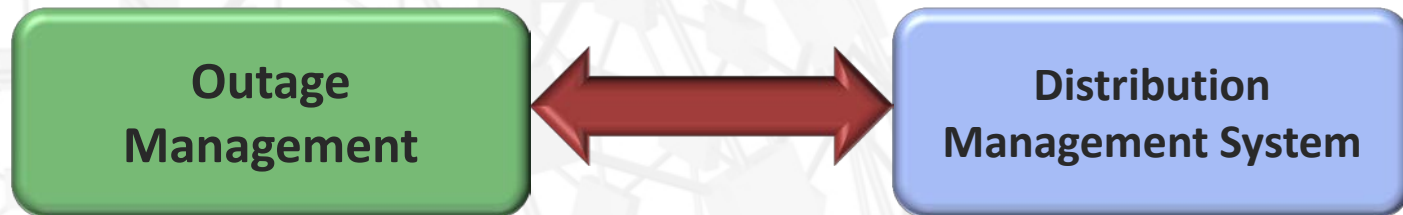


Change Happens

- Addressing change becomes too difficult when each application uses its own incompatible data modeling:
 - » Business needs demand organizational changes and new levels of data sharing and integration.
 - » New technology must be addressed (e.g. renewables, DER, “deregulation”, etc.
- Result: **Application rewrites, reintegration, project delays, barriers to data sharing.**
- **The “Bigger” the data, the bigger the negative impact will be of not using a common data model.**

How Does This Happen?

- **Misunderstanding the Integration Use Case**
 - » The tendency is to focus only on the specific project at hand
 - » Ignores the long-term cost and complexity of trying to do many projects
- Is this is the use case that drives choices (for example)?



Here is the Real Use Case

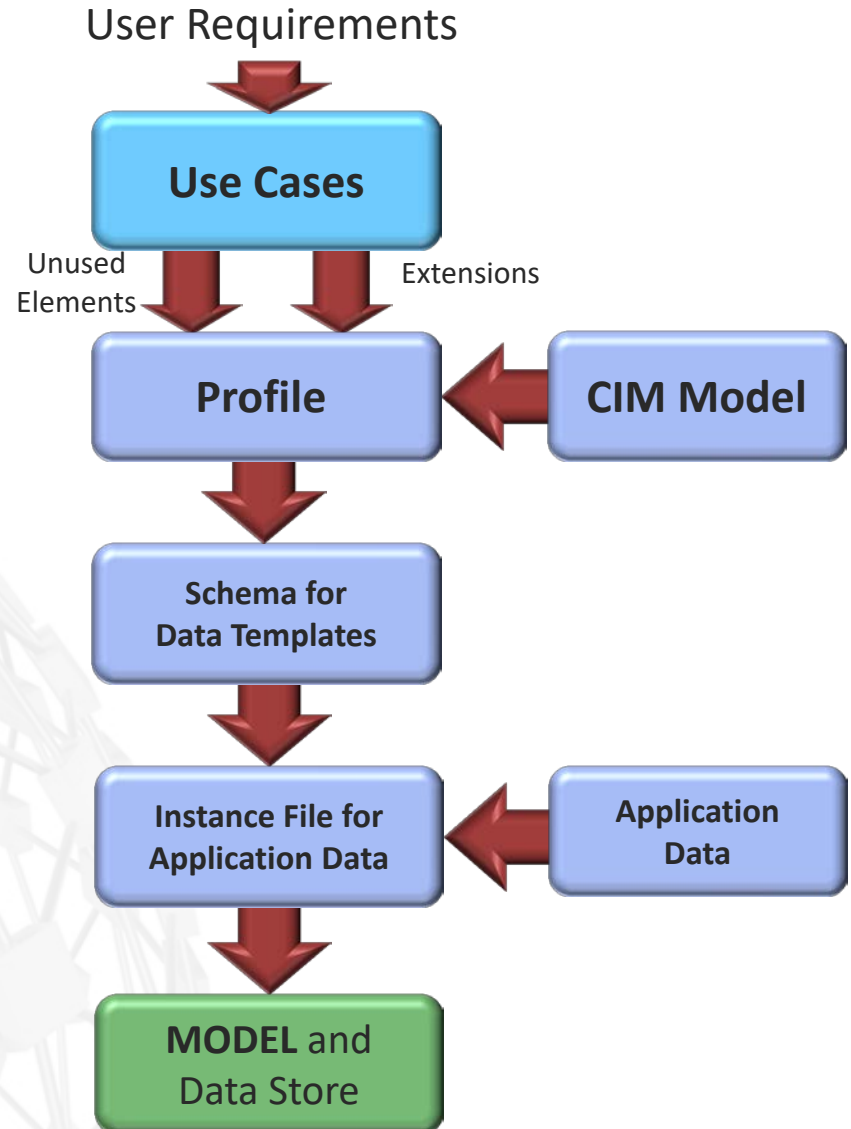


CIM Is The Only Choice for the Model-Driven Utility

- Developing your own comprehensive utility data model to replace CIM will take many decades of effort
 - How many world-class experts can your utility hire to design this from scratch?
- CIM is specifically designed to be adapted to fit the needs of individual utility use cases:
 - » Extensions and Profiles
 - » Messages and Integration Patterns
- New applications can extend independently yet share the existing models where needs overlap without breaking existing applications and integration
- SISCO's CIM Adapter for PI brings these benefits to the PI System
- CIM is not the easiest way to do any **one** thing. CIM is the only way to do everything.

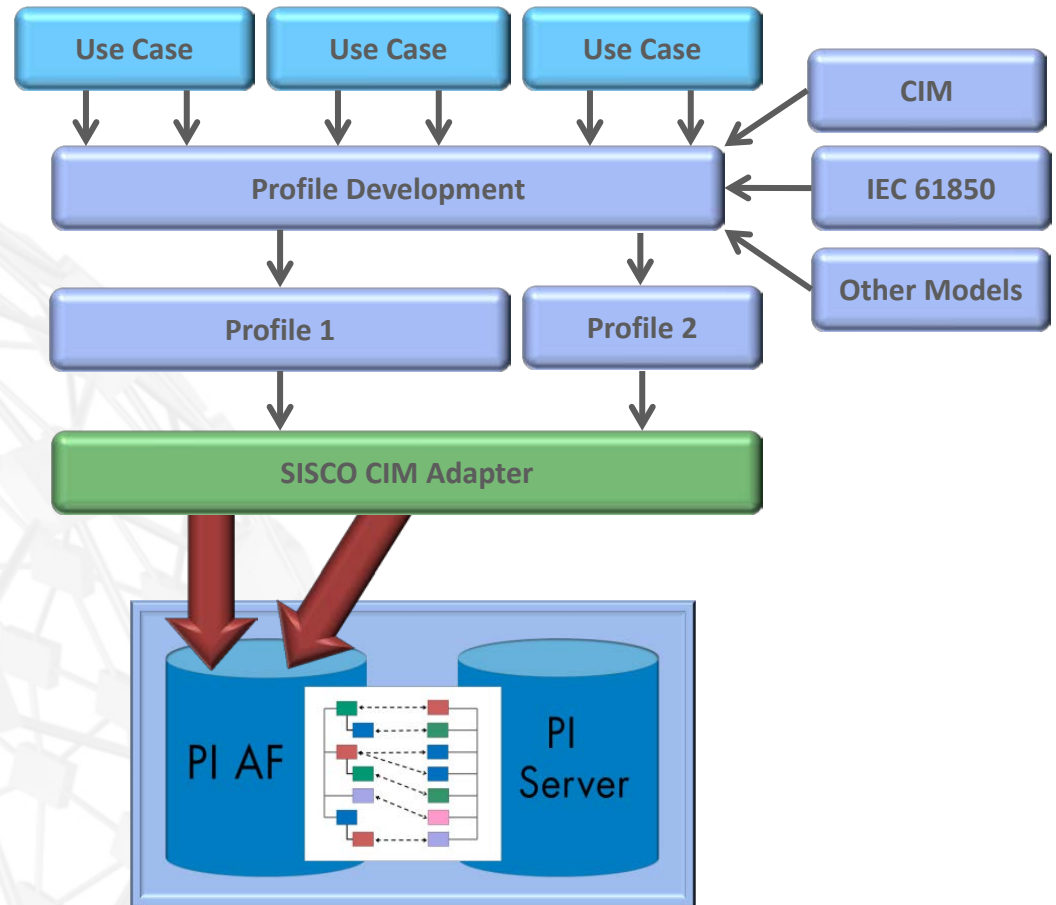
The CIM Model-Driven Process

- CIM is flexible to accommodate:
 - » Extensions for non-standard business needs
 - » Eliminate the complexity of unused models
- Profiles are created based on use cases to address your specific needs
- Instances created to relate existing data to the CIM Profile schema
- Model used to configure analytics.
- Applications use models to access data eliminating custom tag name dependency.



CIM Adapter and PI AF Deliver Flexibility

- Multiple use cases can be addressed with one profile.
- Multiple profiles can be supported for use cases that can't share a profile
- PI AF is flexible to support many models
- A disciplined modeling process with SISCO CIM Adapter brings it all into the PI System



Result of Integration with PI AF

Classes per CIM with Extensions

Substation with calculated differential frequency measurement from synchronizing relay

IEC 61850 Object Name:
AMHERST9_RSYN1\$MX\$DifHzClc\$f

The screenshot shows the PI System Explorer (Administrator) interface. The left pane displays a tree view of classes, with a red box highlighting the 'PMU' class and its sub-classes. The right pane shows the details of the 'AMHERST9_RSYN1\$MX\$DifHzClc\$f' object, including its attributes and configuration items. The object is a substation with a calculated differential frequency measurement from a synchronizing relay. The IEC 61850 Object Name is highlighted in red.

Name	Value
AnalogValue.value	0.000423431396484375
IdentifiedObject.aliasName	AMHERST9_RSYN1\$MX\$DifHzClc\$f
IdentifiedObject.description	
IdentifiedObject.localName	
IdentifiedObject.mRID	
IdentifiedObject.name	AMHERST9/RSYN1\$MX\$DifHzClc\$f
IdentifiedObject.pathName	
SISCO	

AMHERST9/RSYN1\$MX\$DifHzClc\$f Modified: 9/12/2013 5:14:50 PM. Version: 1/1/1970 12:00:00 AM, Revision 2

Result of Integration with PI AF

NorthAMHE400BOWM8/RSYN1\$MX\$DifAngClc\$f

Attribute	Value
AnalogValue.value	8.4995193481445312
IdentifiedObject.aliasName	NorthAMHE400BOWM8_RSYN1\$MX\$DifAngClc\$f
IdentifiedObject.localName	
IdentifiedObject.mRID	
IdentifiedObject.name	NorthAMHE400BOWM8/RSYN1\$MX\$DifAngClc\$f
IdentifiedObject.pathName	
SISCO	

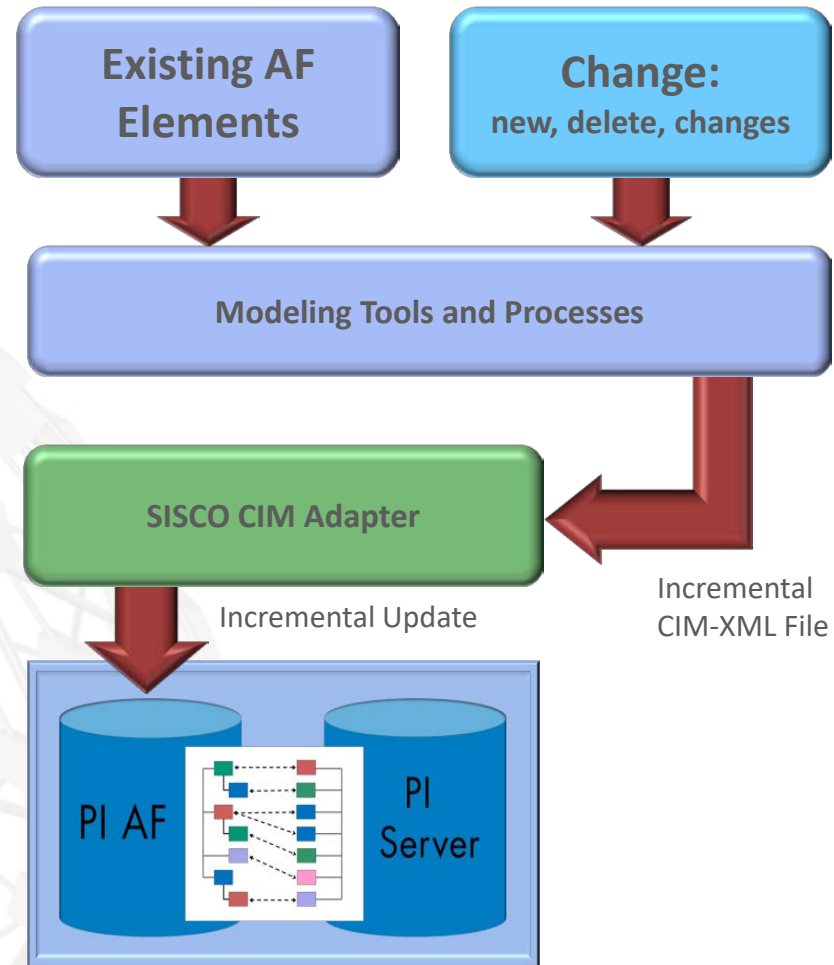
Angle separation across the Amherst Bowman line is $\sim 8.5^\circ$

NorthAMHE400BBOWM8/RSYN1\$MX\$DifAngClc\$f

NorthAMHE400BOWM8/RSYN1\$MX\$DifAngClc\$f Modified: 9/12/2013 5:14:52 PM. Version: 1/1/1970 12:00:00 AM, Revision 2

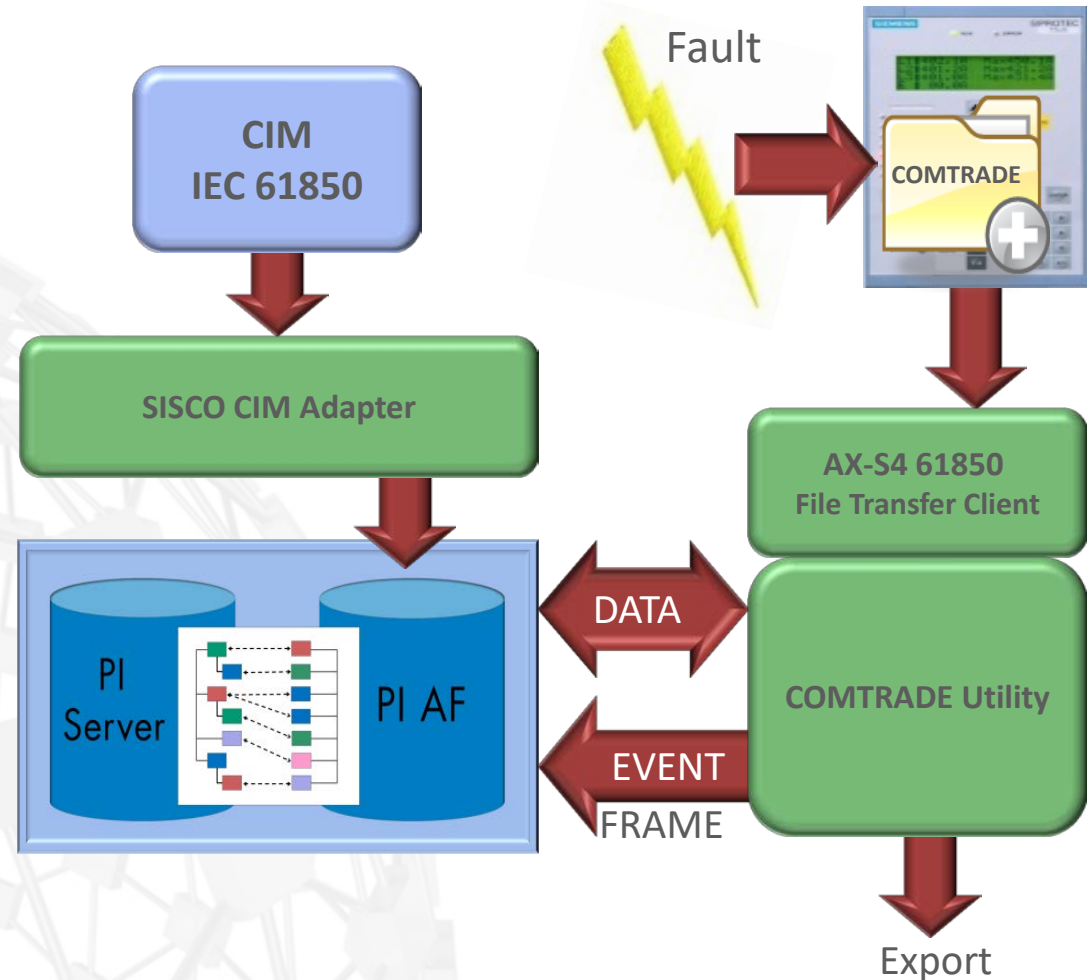
CIM Adapter Helps You Embrace Change

- The model driven process captures change and creates incremental updates
- SISCO CIM Adapter incrementally updates PI AF models.
- The individual hierarchies can be updated and kept synchronized with each other.



PI AF with CIM Works Across Applications

- SISCO COMTRADE Utility brings disturbance data into the PI System using PI Event Frames
- CIM and PI AF models help correlate all the data in the context needed by the individual application needs.



Summary

- CIM is a pre-existing standardized utility oriented data model that provides a platform to build an application data model that addresses enterprise level needs.
- IEC 61850 provides a data model that provides context and meaning to telemetry data that can be associated to CIM
- PI AF and SISCO CIM Adapter provide an excellent foundation to support effective application of application data models for utilities.

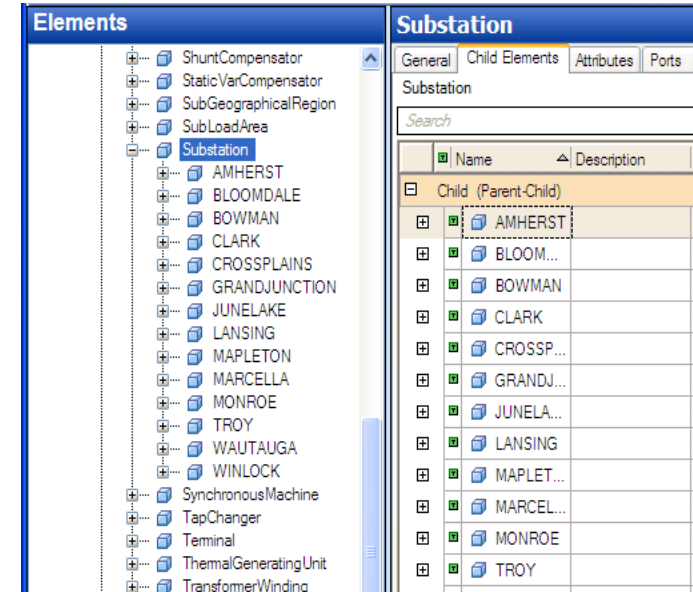


Business Challenge

- Taking advantage of application data models that meets individual group needs while supporting enterprise wide integration and data sharing that can be adapted to changes.

Solution

- PI AF to organize all PI System data
- SISCO CIM Adapter to automate PI AF modeling
- CIM based model driven process to manage change



Results and Benefits

- A single enterprise level based for PI AF that can be optimized for individual application needs
- Flexibility to minimize effort adapting to change



Thank You

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