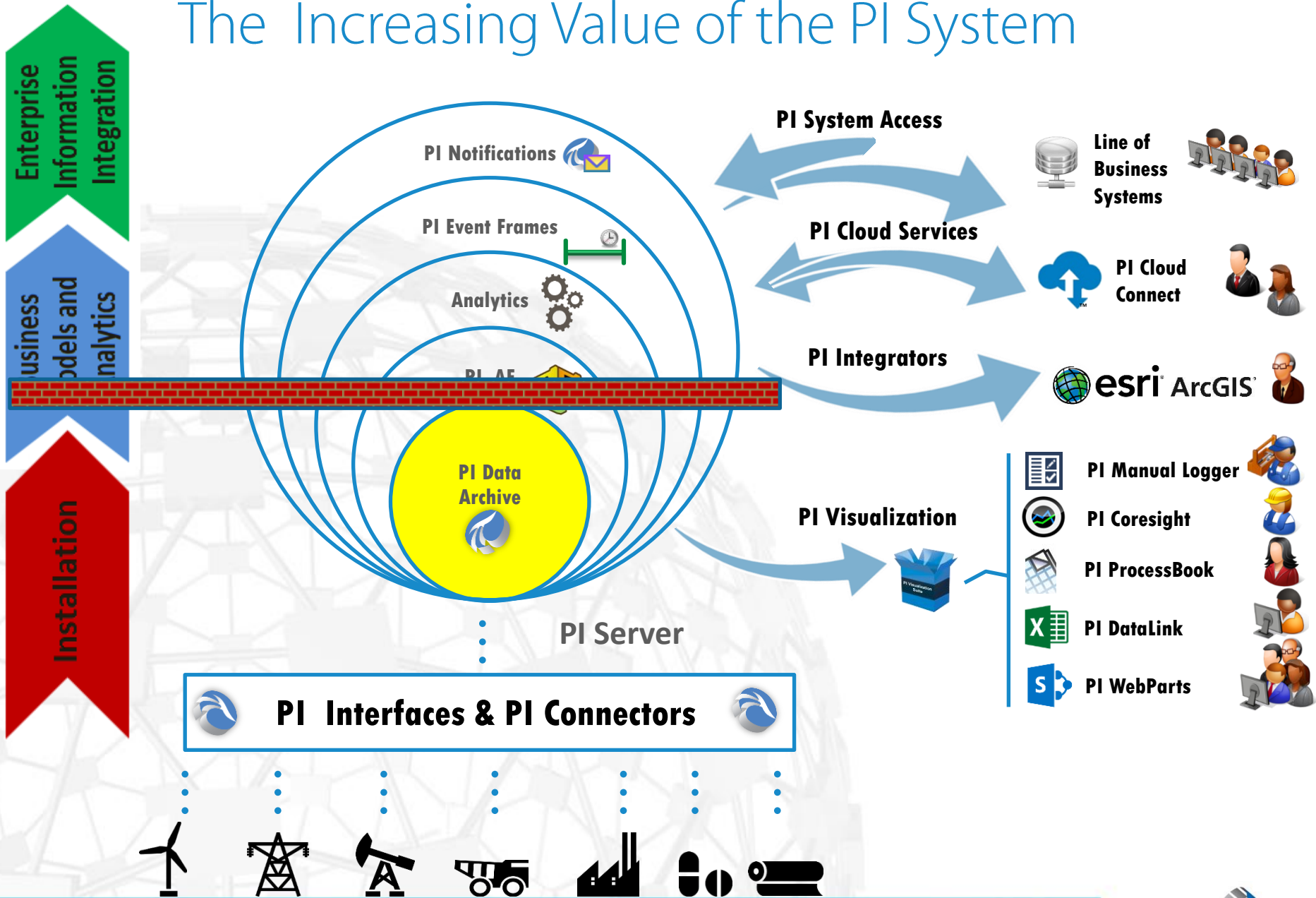# Enabling a Rapid Deployment of OSIsoft™ PI

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The Increasing Value of the PI System

Enterprise Information Integration

Business Models and Analytics

Installation

PI Notifications

PI Event Frames

Analytics

PI AF

PI Data Archive

PI Server

PI Interfaces & PI Connectors

PI System Access — Line of Business Systems

PI Cloud Services — PI Cloud Connect

PI Integrators — esri ArcGIS

PI Visualization — PI Visualization Suite
- PI Manual Logger
- PI Coresight
- PI ProcessBook
- PI DataLink
- PI WebParts

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What are the Deployment Barriers?

- Various objectives for PI Tag™ naming or naming is good enough

- Customer silos (each with different methodologies and objectives)

- Lack of communication between the silos

- Lack of customer domain expertise on how to solve problem

- Perceived or challenging maintenance issues

- Contextual model requirements .
  - » What to do with Asset Framework™ (AF)?
  - » Analysis paralysis
  - » AF configuration and maintenance is *perceived as difficult*

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How to Break the Deployment Barriers

Think Big → Start Small → Scale Fast

THINK BIG

- Address enterprise level requirements
- Use an enterprise-wide tool (PI System™) as a focus of information integration
- Use available standards as a starting point

START SMALL

- Choose a project that provides immediate results
- Leverage any existing information sources
- Implement in a manner that provides for future scalability

SCALE FAST

- Get more champions by showing what has been previously accomplished
- Keep momentum by satisfying additional business requirements
- Use recognized design patterns to build a strong foundation

Educate and communicate to increase awareness and buy-in!

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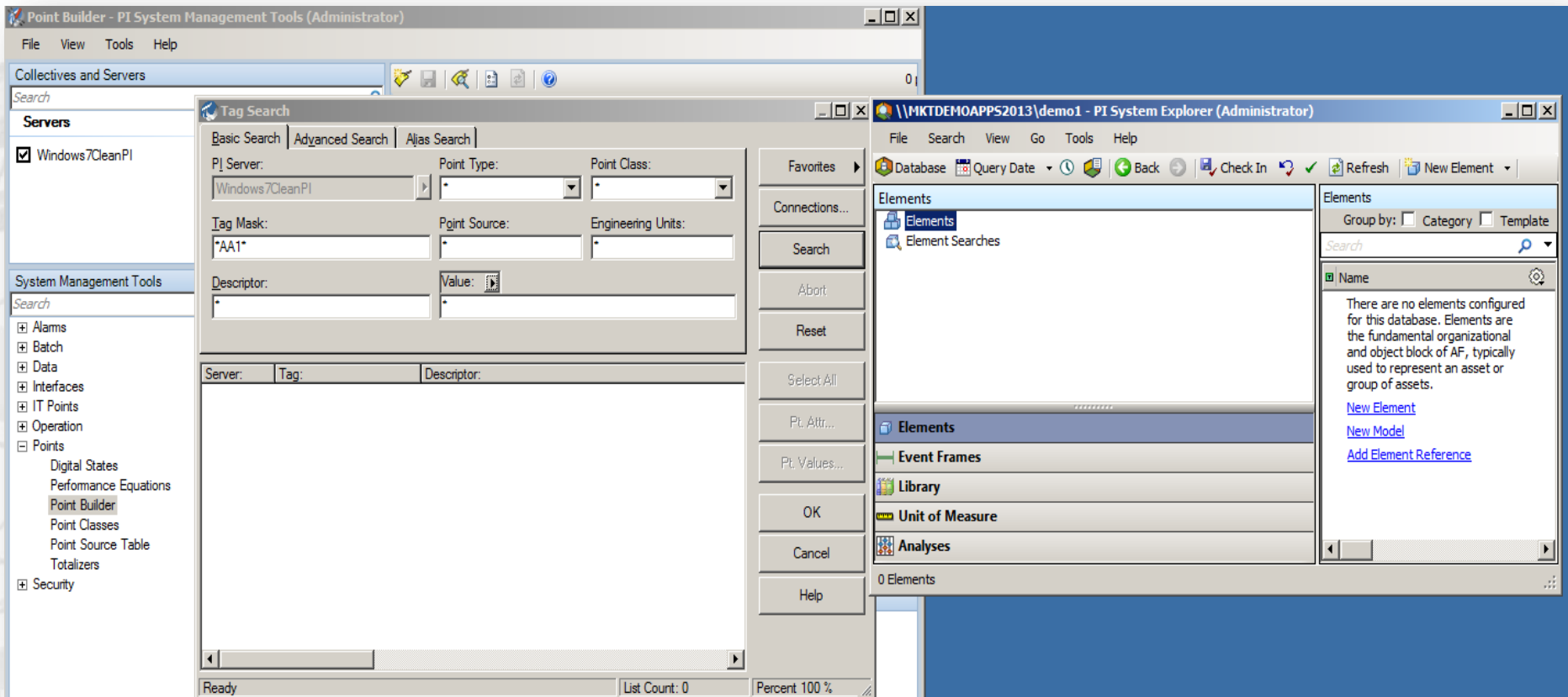
Methodology Comparison

Current Methodology:

- Design from scratch
- Manual entry of definitions, elements, and relationships
- Very time consuming (weeks, months…)
- Manual entry prone to human error
- Difficult to revise

SISCO Methodology:

- Standard used as a starting point
- Standard extended (if needed)
- Leverages existing sources of information
- Automated process saves time, alleviates errors, and allows for revisions
- Generates documentation

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SISCO Methodology

Start with a blank canvas…

No Points   No Context

SISCO Methodology

Quick results...

2255 PI Tags™ Created

4824 AF Elements
7301 Relationships

Import Results in Detail

Accumulator	2
AccumulatorValue	2
ACLineSegment	2
Analog	1665
AnalogValue	1665
Bay	7
Breaker	7
ConnectivityNode	36
CurrentTransformer	7
Discrete	590
DiscreteValue	590
Ground	7
IEC61850IED	4
LogicalDevice	9
LogicalNode	24
PotentialTransformer	6
PowerTransformer	2
PowerTransformerEnd	4
Substation	1
Switch	26
Terminal	99
ValueAliasSet	13
ValueToAlias	54
VoltageLevel	2

- An extensible AF structure that supports:
  » Conditioned Based Maintenance (CBM)
  » Topology
  » Unanticipated applications
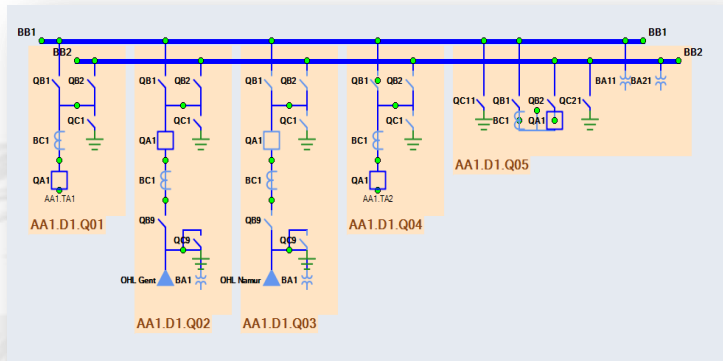 » Extension capability to support additional schema
- NO Manual Entry
- NO Errors

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Building on the Foundation

IEC 61850
Devices
(COMTRADE)

IEC 61850 Engineering
for PI Tag Creation

IEC 61850 to CIM Transformation

AF Contextual Management (CIM)
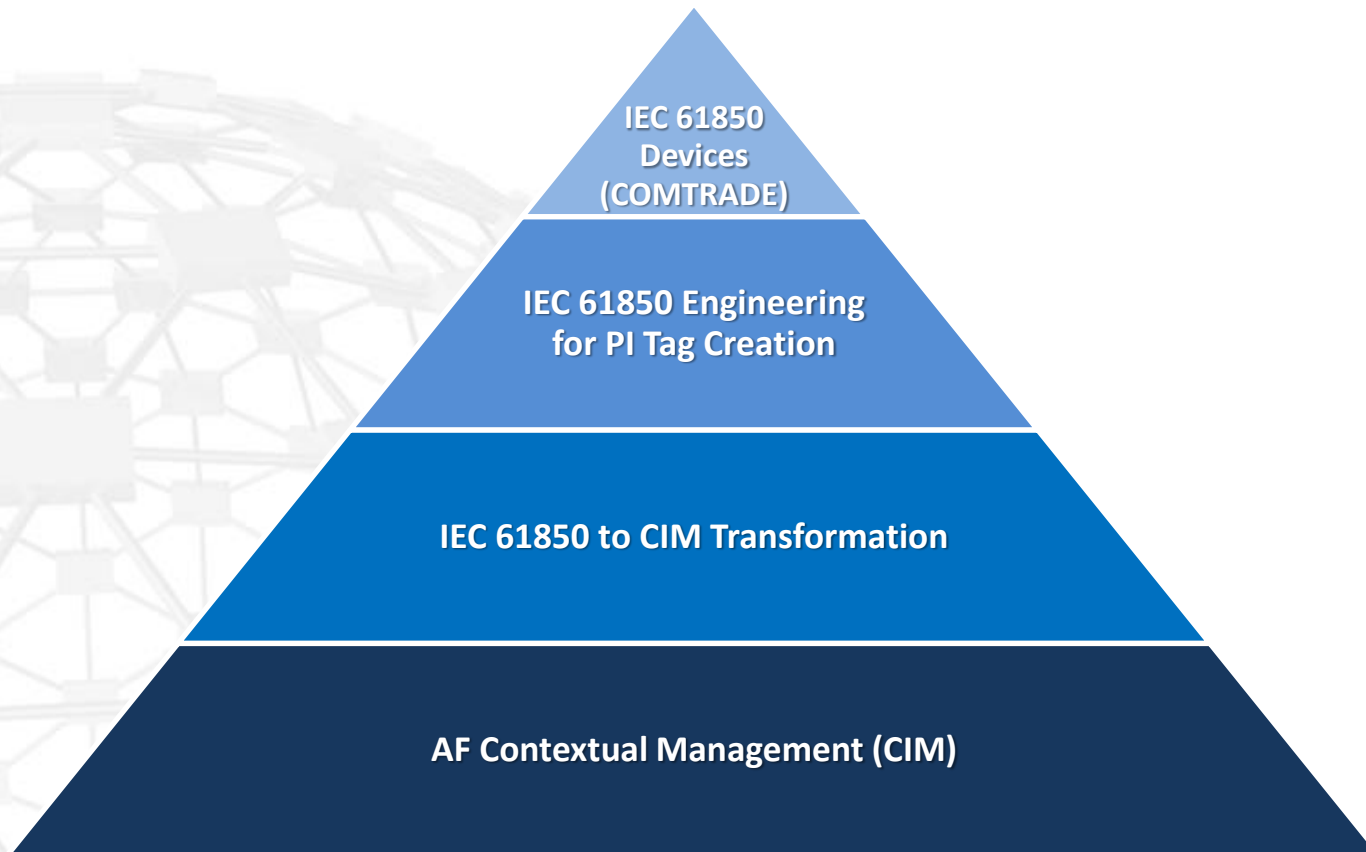
Leveraging Existing Sources of Information

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Foundation: Contextual Management (CIM)

Information contained in
EMS (model)

Export

Standardized file
formats (CIM)

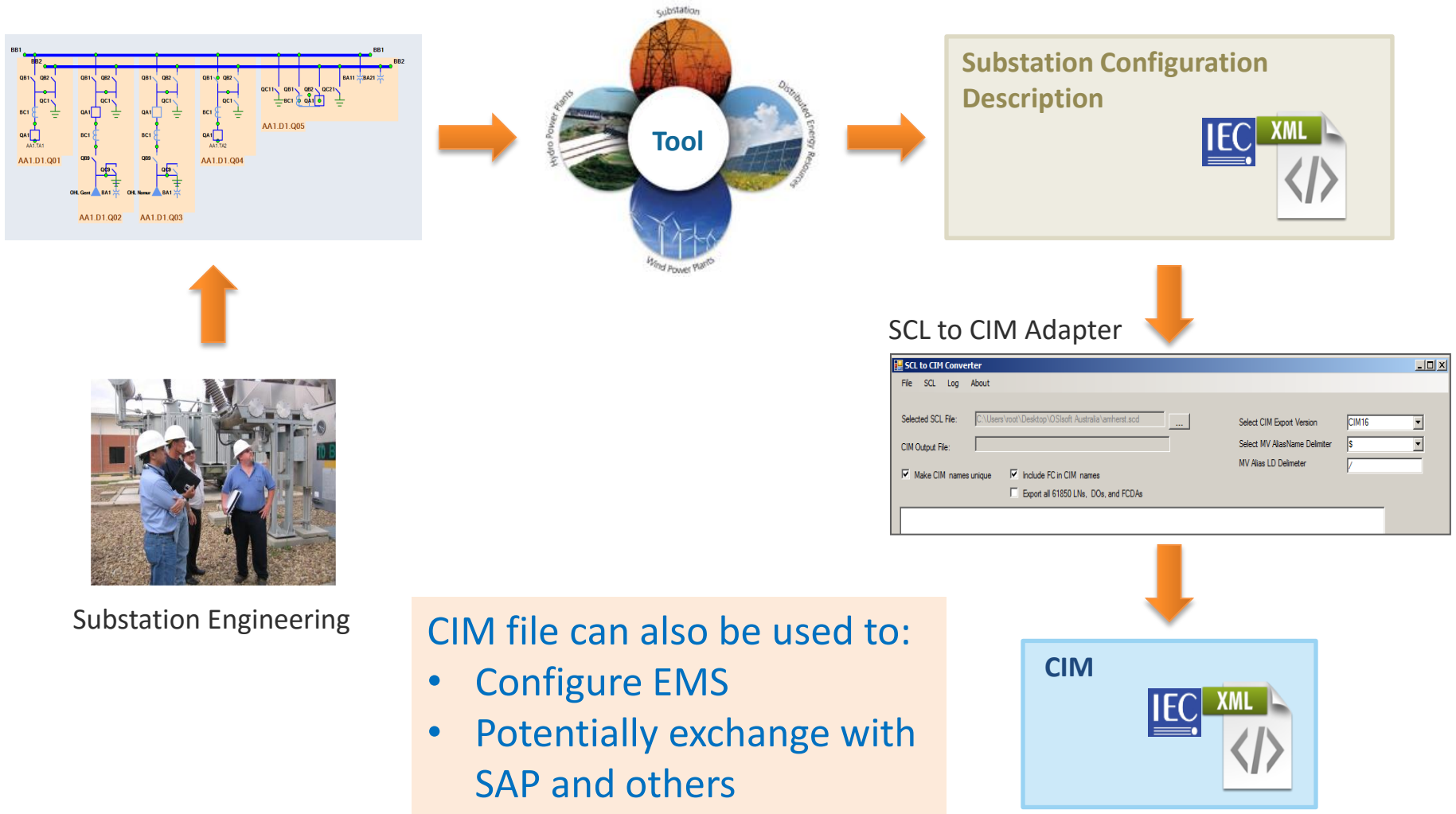**Import**

CIM ADAPTER:

- Manages AF Elements and Relationships
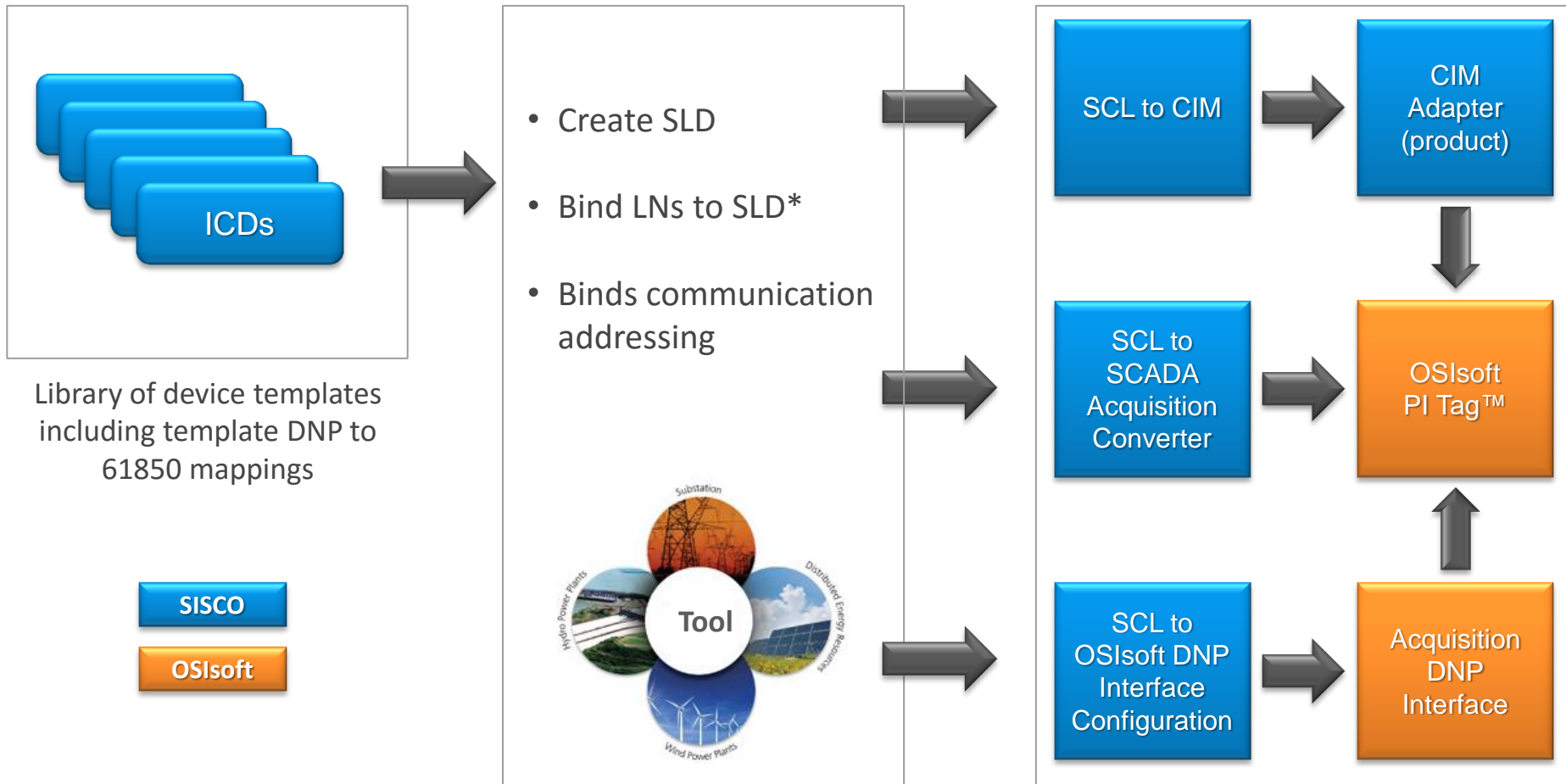- Allows for PI Tag™ creation and management

The Role of SISCO CIM Adapter

- Supports and manages multiple AF databases

- Creates and manages models that can be expressed in CIM file format:
  - » Schema in RDFS
  - » Instances in CIM XML
  - » Changes in incremental CIM XML format

SISCO: IEC 61850 to CIM Transformation
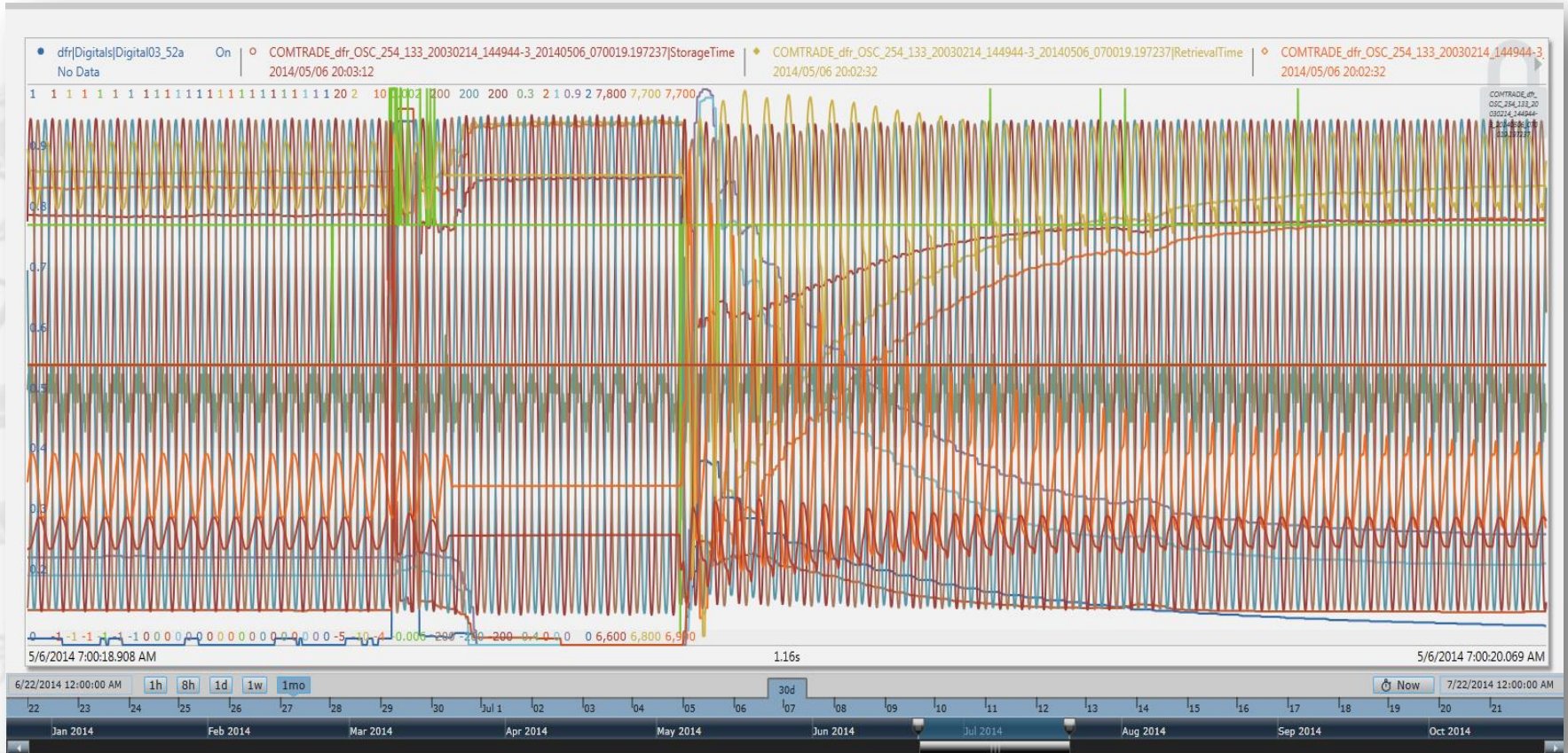

Substation Engineering

Substation Configuration Description

SCL to CIM Adapter

CIM file can also be used to:
- Configure EMS
- Potentially exchange with SAP and others

CIM

SISCO: IEC 61850 Engineering for PI Tag Creation

ICDs

Library of device templates
including template DNP to
61850 mappings

SISCO

OSIsoft

- Create SLD

- Bind LNs to SLD*

- Binds communication addressing

Tool

SCL to CIM → CIM Adapter (product)

SCL to SCADA Acquisition Converter → OSIsoft PI Tag™

SCL to OSIsoft DNP Interface Configuration → Acquisition DNP Interface

Solution can save up to 100 thousand of dollars per substation

13

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IEC 61850 & COMTRADE: High Probability

- COMTRADE is a standard format for providing transient disturbance information

- High fidelity (e.g. 8000-20,000 samples per second)

- Each device may produce 20-80 channels (tags) of disturbance information

- Utilities have an average of 20-30 devices per mid-size substation

- SISCO has a product that can retrieve this information and auto-create tags in the PI System® and produce the following…

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Transient Disturbance Information in PI Coresight™

Only SISCO Enables the PI "True View"

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SISCO COMTRADE Utility

- Leverages AF Models to provide basis to indicate which assets that may have been impacted

- Uses many features of OSIsoft:
  - » Asset Framework™
  - » Notifications™
  - » PI Tag™
  - » Event Frames™

Reinforcing the Theme: Breaking the Barriers

- Standards provide a quick start

- Using existing tools, products, and solutions further accelerate deployment

- Can be blended to address other applications such as Microgrids

- Model-driven architecture can allow extensions or non-electrical models to be developed

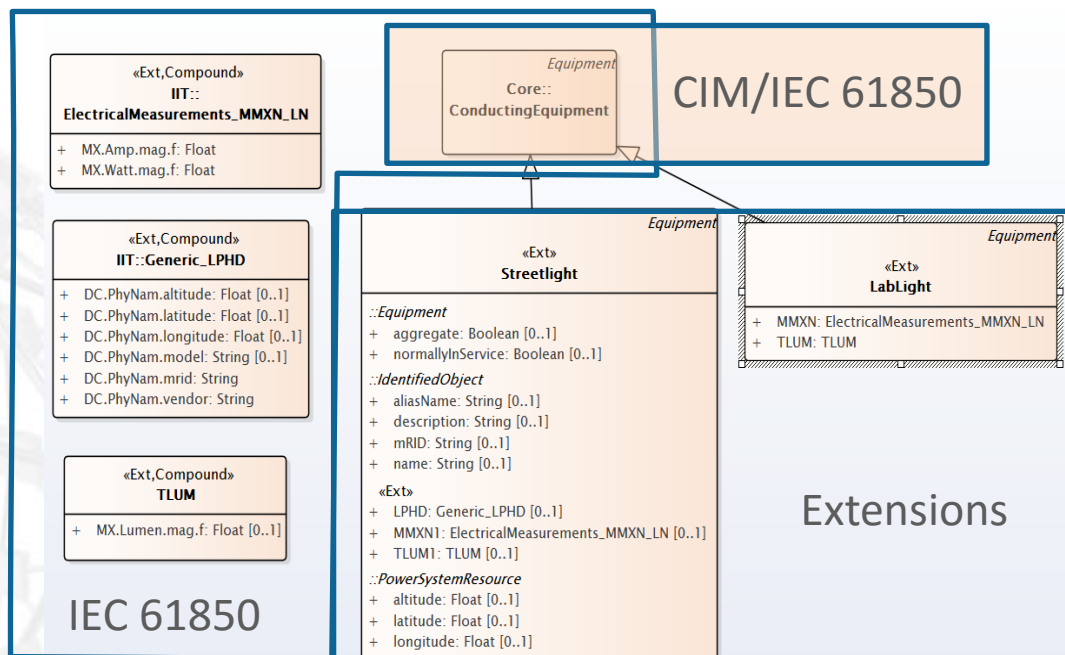SISCO
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A Blended Solution for Microgrids

- OSIsoft and SISCO have developed models and tooling to allow fast deployment of Microgrids that combine:
  - » CIM
  - » IEC 61850
  - » Synchrophasors
  - » OSIsoft Control Algorithms

- CIM Adapter is a center piece of the solution
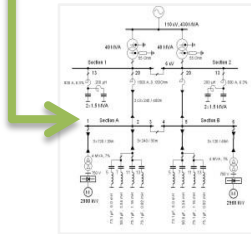
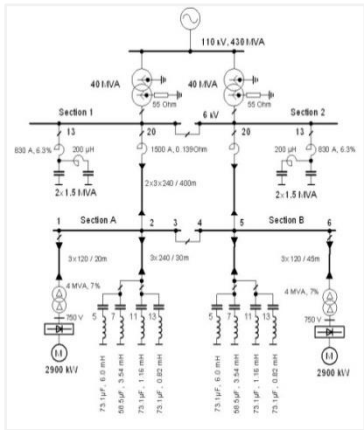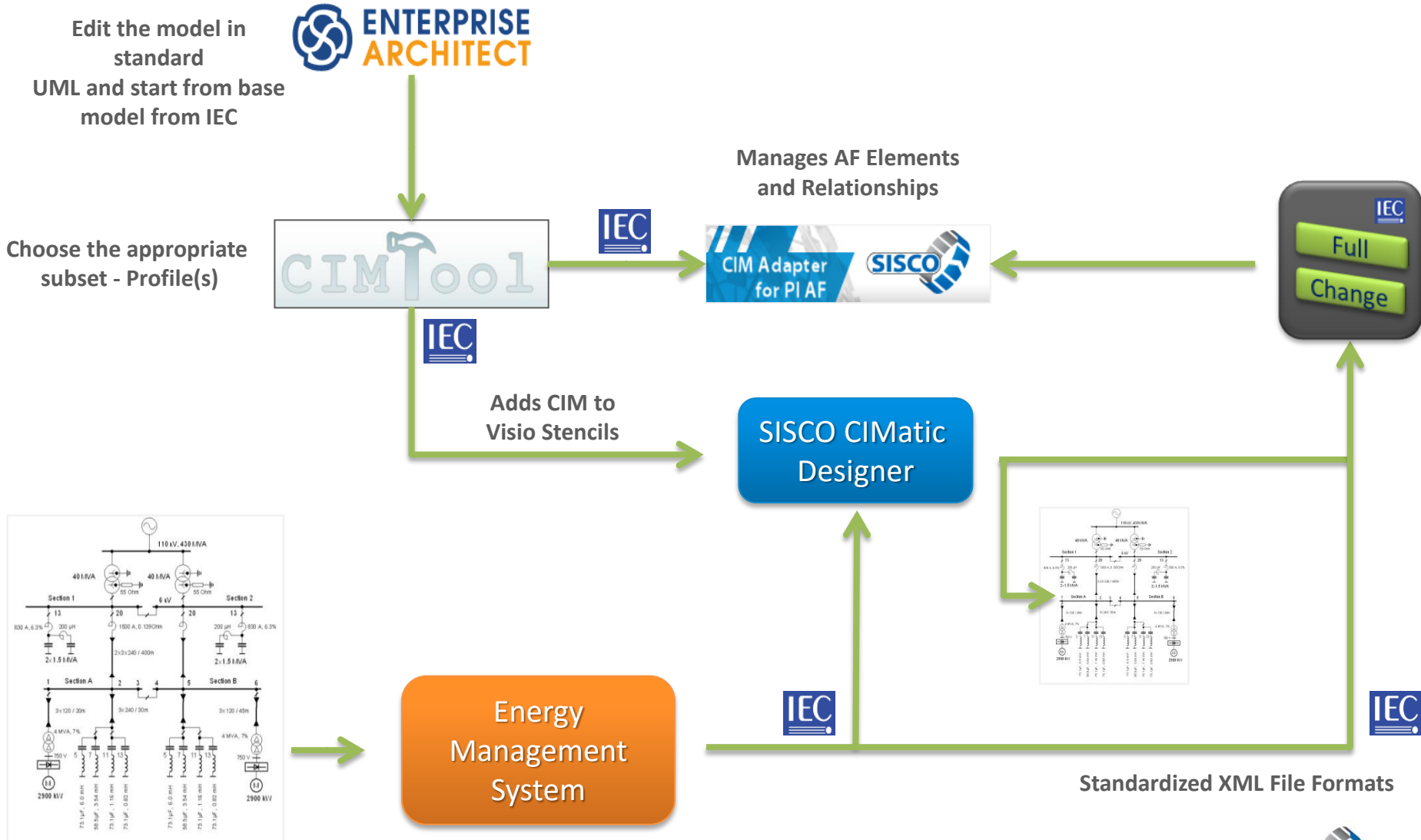SISCO
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Microgrid Solution Extends CIM Model

- 61850 models used to create standardized PI Tag names for synchrophasors

- Model extended to allow:
  - » Intelligent Electronic Devices
  - » Intelligent Streetlights
  - » Charging stations
  - » And more…

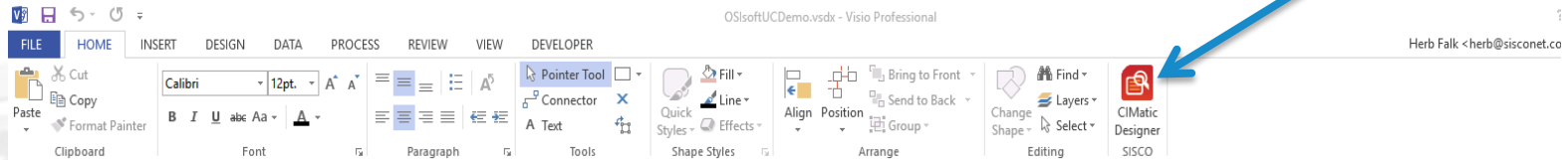- SISCO CIMatic Designer: a model driven solution for Visio to allow for low-cost model creation

Extending an Existing Model

Edit the model in standard UML and start from base model from IEC

ENTERPRISE ARCHITECT

Manages AF Elements and Relationships

Choose the appropriate subset - Profile(s)

CIMTool

IEC

CIM Adapter for PI AF SISCO

IEC Full Change

Adds CIM to Visio Stencils

SISCO CIMatic Designer

Energy Management System

IEC

IEC

Standardized XML File Formats

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SISCO CIMatic Designer for Model Entry

Visio Add-In

Schema

Instances and relationships
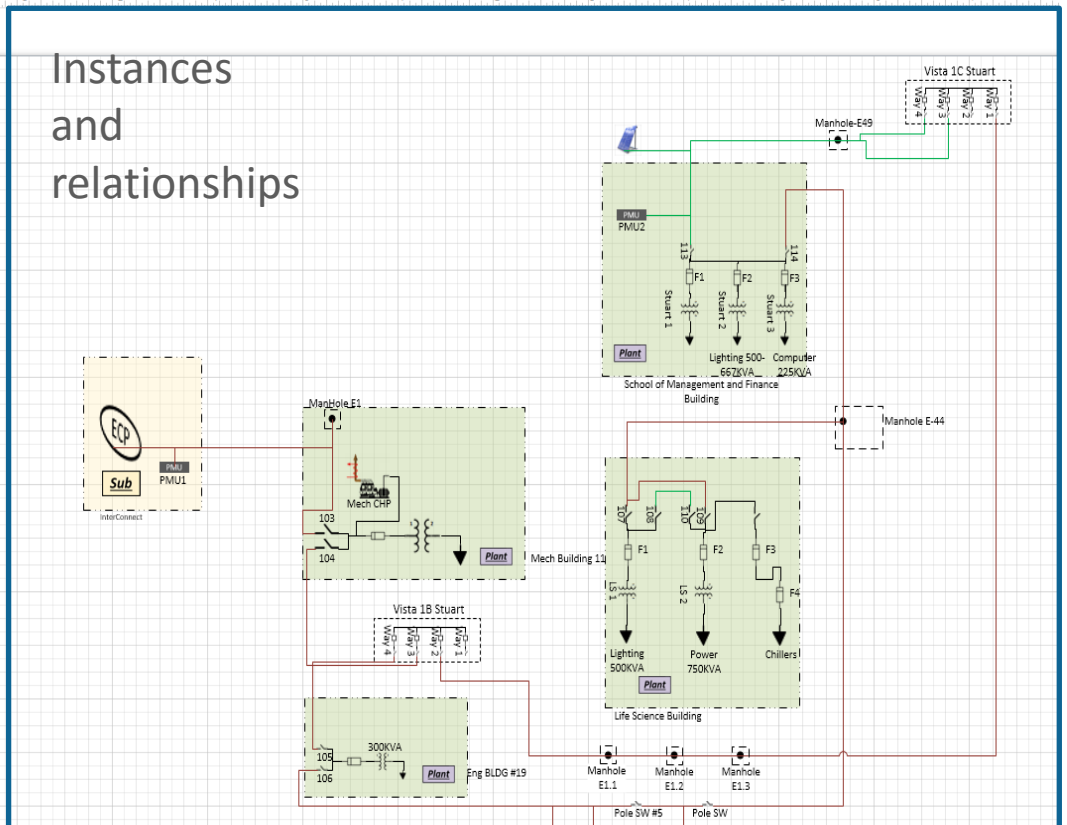
SISCO CIMatic Designer: Single Point of Entry

Model/AF Management

SISCO CIMatic Designer

Full
Change

CIM Adapter for PI AF   SISCO

SISCO SVG Converter

Display Creation
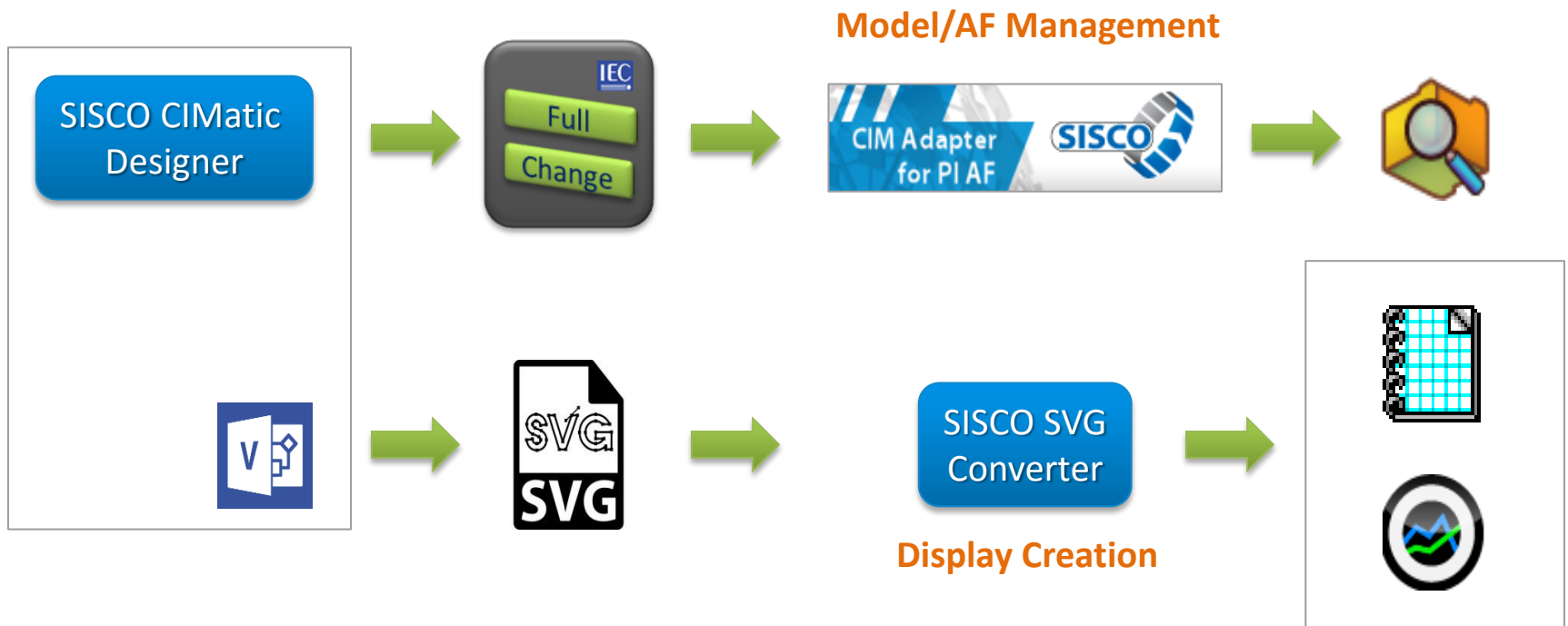
Solution and Product Methodology

Business Stakeholders

Conceptual Model

Capture business requirements (use cases, etc.)

Architects, Modelers, Domain Experts

Logical Models

Enterprise Information Model, Architecture, System Interactions

Designers of Information Exchange

Contextual Profiles

Design specifications & mappings

Developers

Canonical & Physical Data Models

Concrete exchange or repository definitions (RDFS, XSD, DDL, etc.)

Systems and Applications

Instance Information Exchange

Actual exchange of information based upon concrete exchange definitions

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In Summary….

- Provide rapid deployment of Contextual models for the PI System™ with minimal manual intervention

- Increase the business value of the PI System™

- Methodology and tooling provides a repeatable process that allows rapid revisions and minimal mistakes

- Enterprise Architect provides electronic documentation and report generation and is the tool of choice for IEC

- Can be leveraged for non-electrical applications (e.g. custom, ISA88, ISA95, etc.)

Thank You

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