



The Standards Based Integration Company

Systems Integration Specialists Company, Inc.

IEC 61850/IEC 61400



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Definitions:

Interoperability

The ability of computer systems to exchange information with other systems.

Integration

The ability of computer based applications to interact with other systems in order to perform a useful function for the user.

Interoperability and Integration

- Easy to Achieve:

Nearly anything is possible
with enough money and
development effort



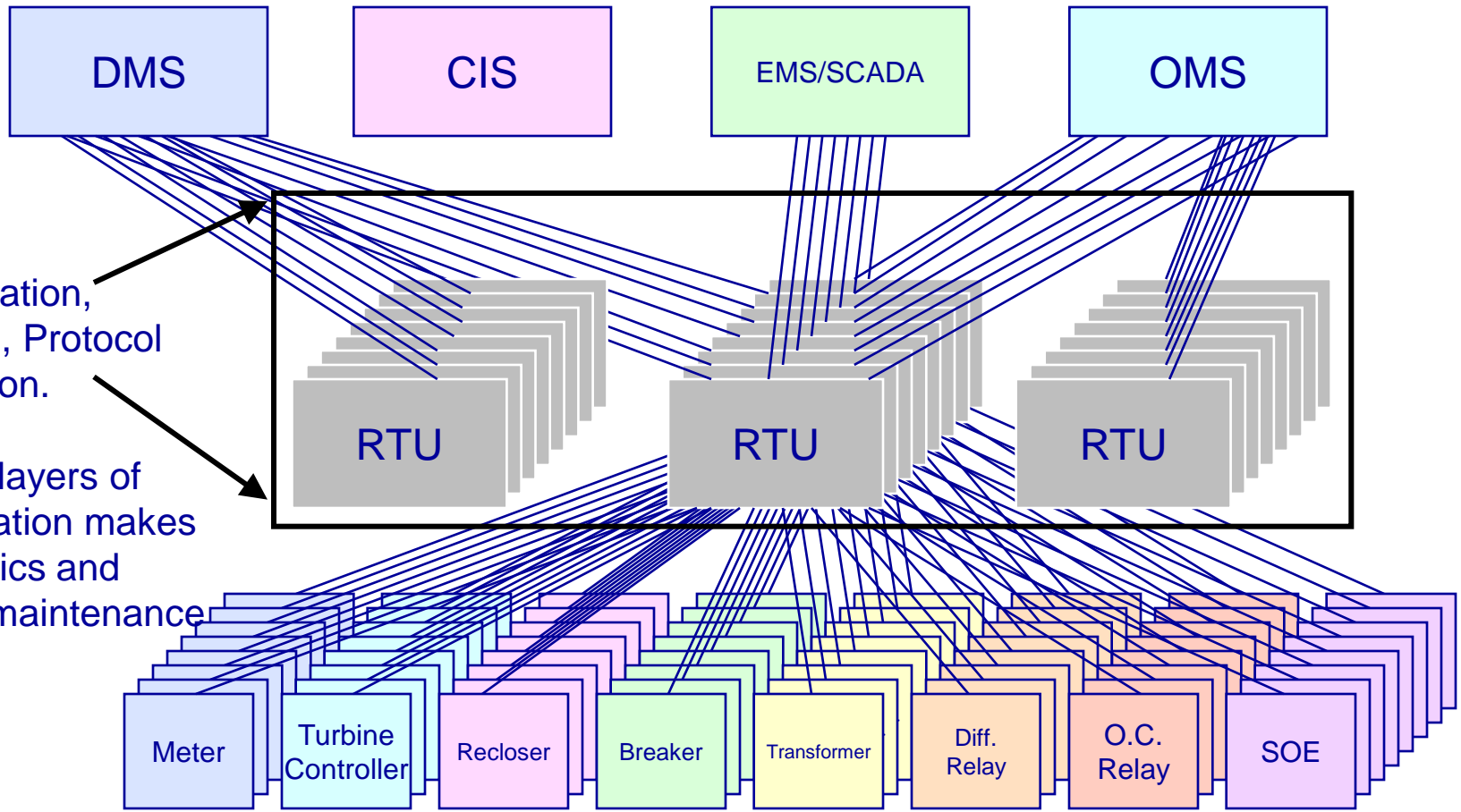
A Better Way

- Interoperability and Integration without having to program it all yourself:
 - Where applications and devices are inherently capable of interoperating with other systems and performing integrated application functions in a cooperative and distributed manner.

- This is only possible if there are standards to enable it.
 - This work is progressing.

- This is the goal of the IEC TC57 standards

The Integration Dilemma



Configuration, Mapping, Protocol conversion.

Multiple layers of configuration makes diagnostics and system maintenance difficult.

A Better Way

- Interoperability and Integration without having to program it all yourself:
 - Where applications and devices are inherently capable of interoperating with other systems and performing integrated application functions in a cooperative and distributed manner.
- A model driven approach that provides a means of dealing with the complexity of systems.
- This is only possible if there are standards to enable it.
 - This work is progressing.
- This is the goal of the IEC TC57 standards



IEC61850/61400 Key Features

- Highly functional supporting most useful power system functions.
- Object oriented standardized device and object models and naming conventions.
- Self-describing devices allow all object definitions to be retrieved over the wire.
- Standardized configuration language.
- Uses Ethernet and TCP/IP networking.

Typcial Comparison of IEC61850 versus Other Protocols

- Real-time data exchange
- Report by exception
- Mapped to MMS Protocol*
- Device Control

- Enhanced

- Minimal client config.
- Protection messaging
- SOE recording and query retrieval
- Security*

- Real-time data exchange
- Report by exception
- Pick your protocol
- Device Control

- Basic

- Manual or a priori knowledge configuration
- None
- Proprietary implementation
- Proprietary, if supported.

Basic Service: Connection Establishment

Edit Device

Enter/Select Device Information

Name:

Comment:

Model:

Btime6 Is GMT: Load from SCL File:

Select Device Refresh Options

Get Variable Access Attributes
 Get Domain Specific Journals

Select AR Names

AR Names	AR Names
RePower	<None>
<None>	<None>
<None>	<None>
<None>	<None>

Select AX-S4 61850 Client Parameters

Initiate Association
 Aggressive Packing

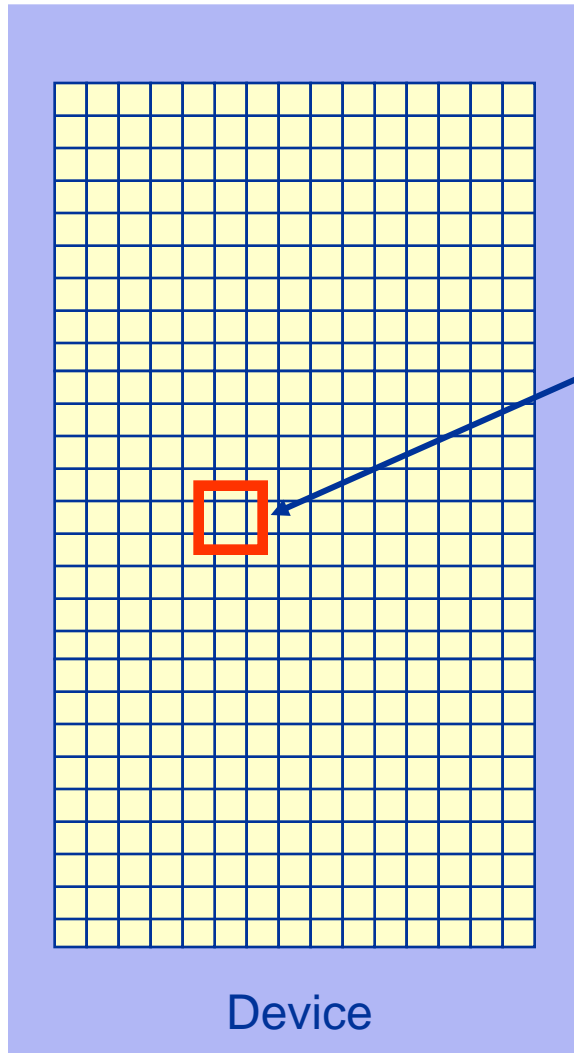
Connect Retry Time (sec):
Max Num Vars Per Read:
Heartbeat:

Update Object List

Device/IED

Multiple Access Points
for redundancy

Legacy Data Access by Tag

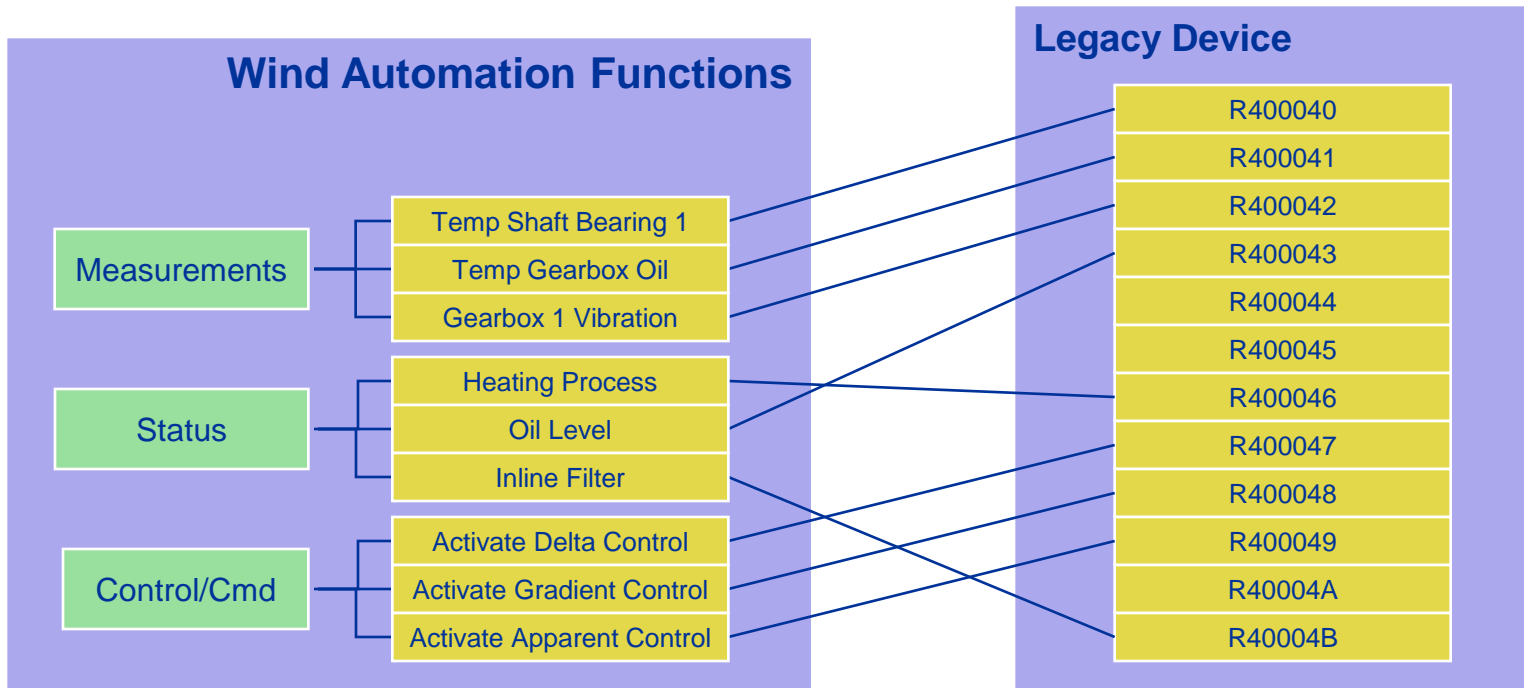


Feeder #2 Current is here in Register 400020.
That's intuitive!?

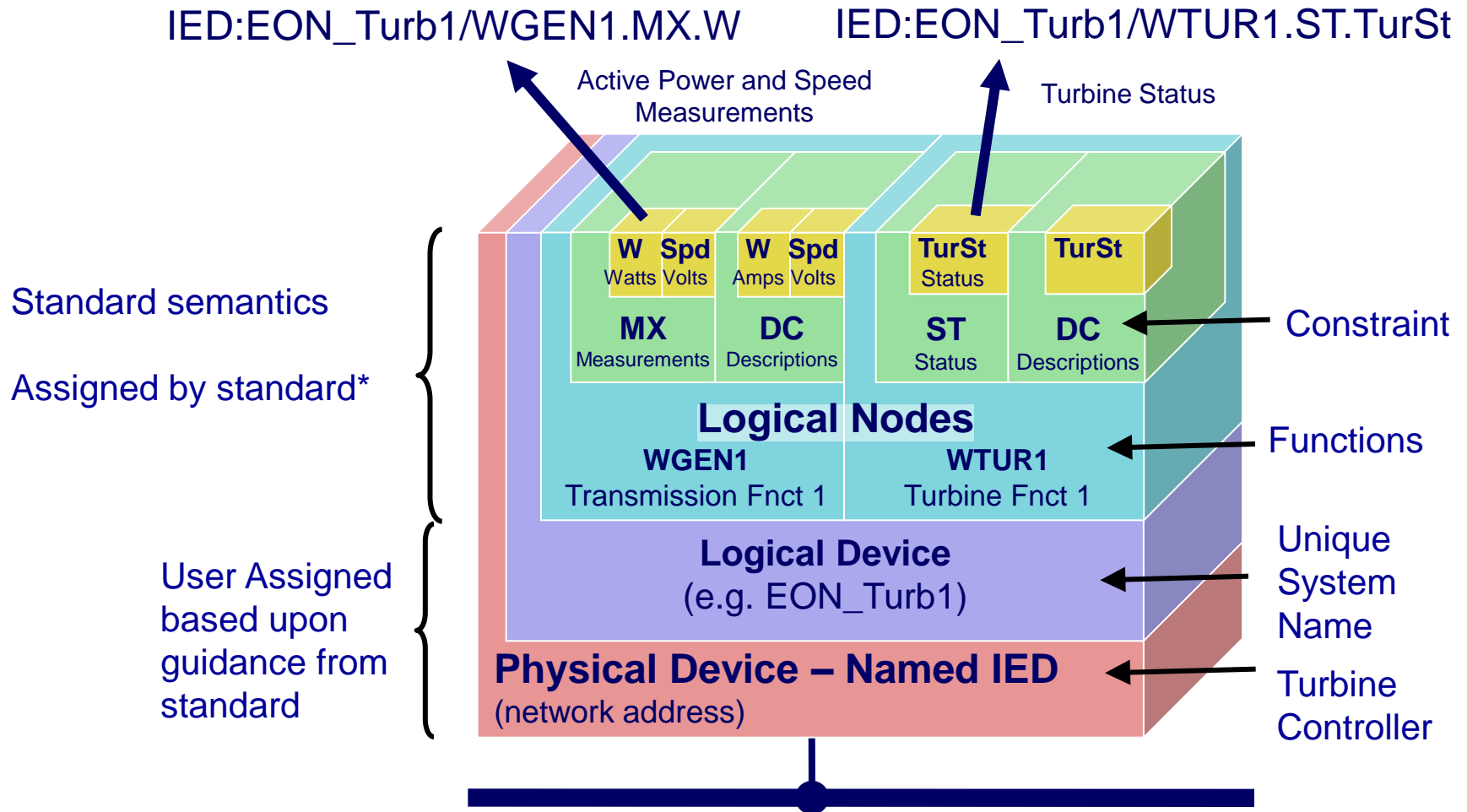


Legacy Object Mapping

- Legacy data objects must be manually mapped to power system for each different device, application, and vendor.



Anatomy of an IEC61400 Object Model



Keys: No manual mapping required. Semantics are consistent (W always means active power).

A Wind Turbine – IEC 61400-25-2

Table 1 – System specific logical nodes

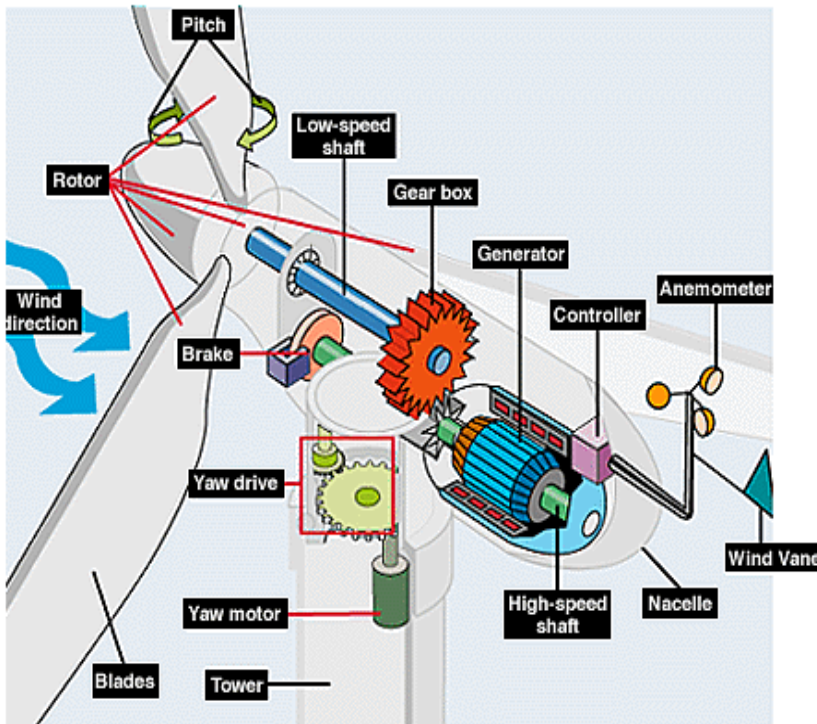
LN classes	Description	M/O
LLN0	Logical Node Zero	M
LPHD	Physical Device Information	M

Table 2 – Wind power plant specific logical nodes


LN classes	Description	M/O
WTUR	Wind turbine general information	M
WMET	Wind power plant meteorological information	O
WAPC	Wind power plant active power control information	O
WRPC	Wind power plant reactive power control information	O

Table 3 – Wind turbine specific logical nodes

LN classes	Description	M/O
WTUR	Wind turbine general information	M
WROT	Wind turbine rotor information	M
WTRM	Wind turbine transmission information	O
WGEN	Wind turbine generator information	M
WCNV	Wind turbine converter information	O
WTRF	Wind turbine transformer information	O
WNAC	Wind turbine nacelle information	M
WYAW	Wind turbine yawing information	M
WTOW	Wind turbine tower information	O
WEVT	Wind power plant event information	M
WSLG	Wind turbine state log information	O
WALG	Wind turbine analogue log information	O
WREP	Wind turbine report information	O



The big question?



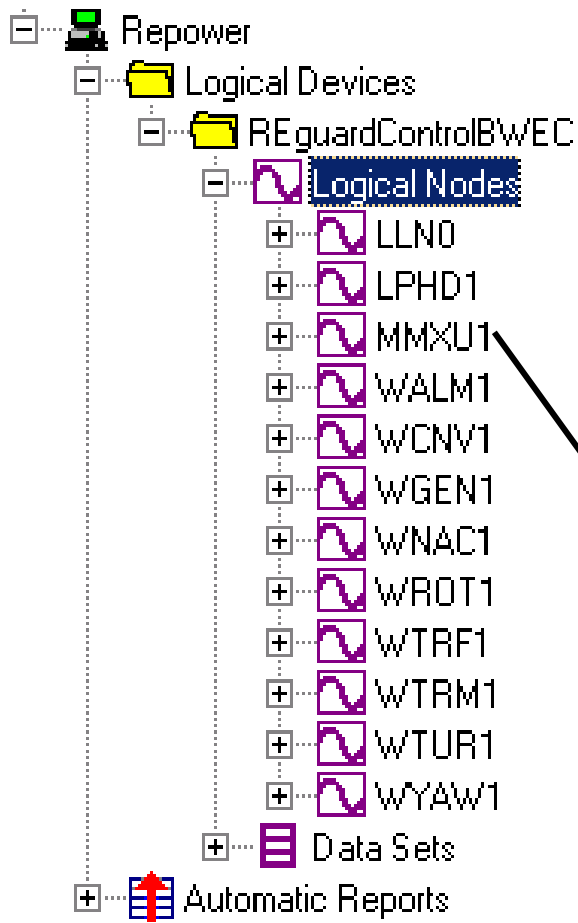
How do I know
what is present?

IEC 61850/61400 specifies:

- 1) Standardized configuration file format (SCL).
- 2) All IEDs must be self-describing and support information discovery.

Provides major benefit for OSIsoft APS.

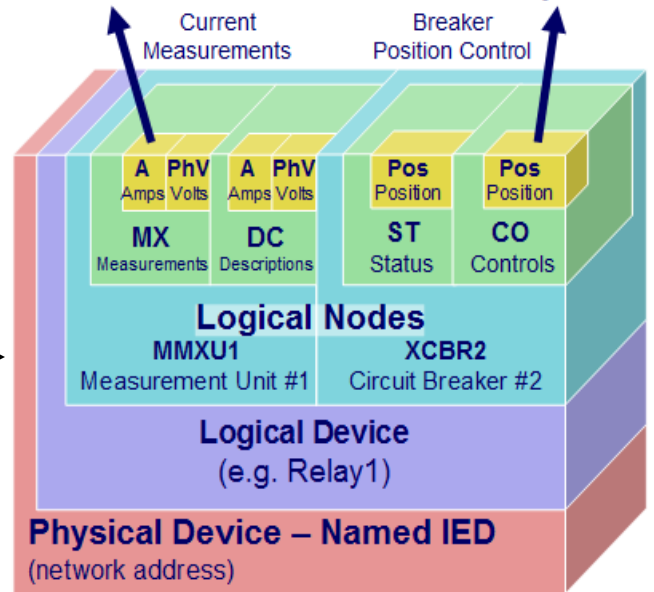
What do the results look like?




Tag
 Repower:REguardControlBWEC/MMXU1\$MX\$Hz\$mag\$f

IED:Relay1/MMXU1.MX.A

IED:Relay1/XCBER2.CO.Pos



A quick discussion of APS

A 3D white mannequin is standing next to a large, red, 3D question mark. The mannequin has its right arm resting on the question mark and its left hand pointing towards the right. Above the mannequin is a speech bubble with a black border containing the text "What does this mean?".

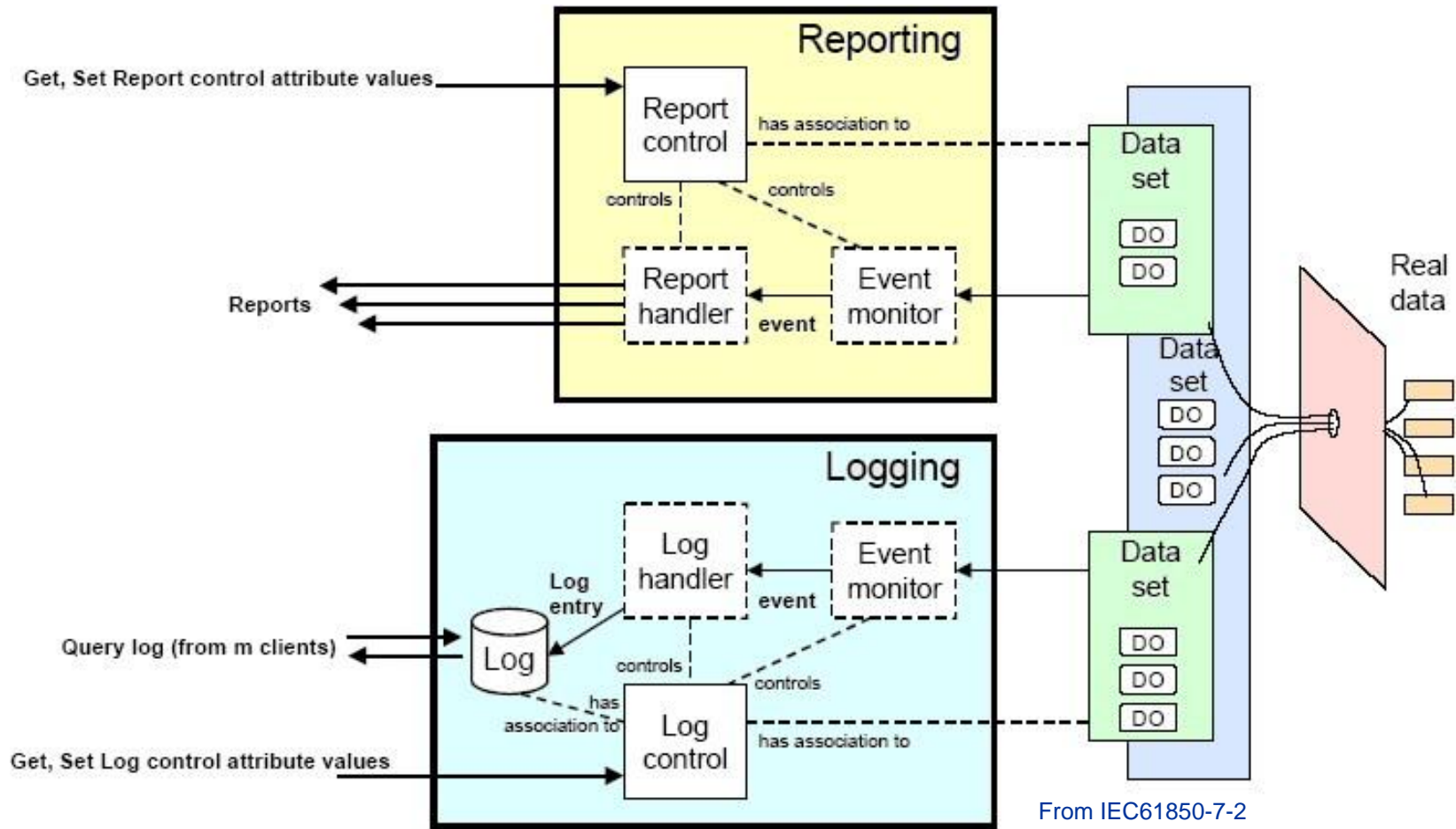
What does this mean?

- OSIssoft is working in conjunction with SISCO to develop an IEC 61850 rule knowledgeable APS.

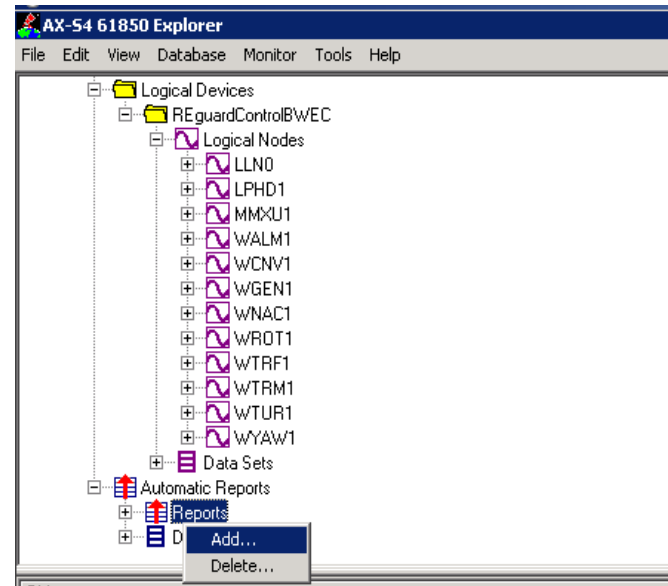
Reporting: Allows scalability at interfaces and minimizes communication bandwidth

- Unbuffered Reporting allows clients to receive data from the server without polling.
 - If network connection (association) between client and server is lost, data is lost.
 - Equivalent to UCA2.0 Reporting
- Buffered reporting enables the server to retain data if associations are lost enabling the client to retrieve ALL data

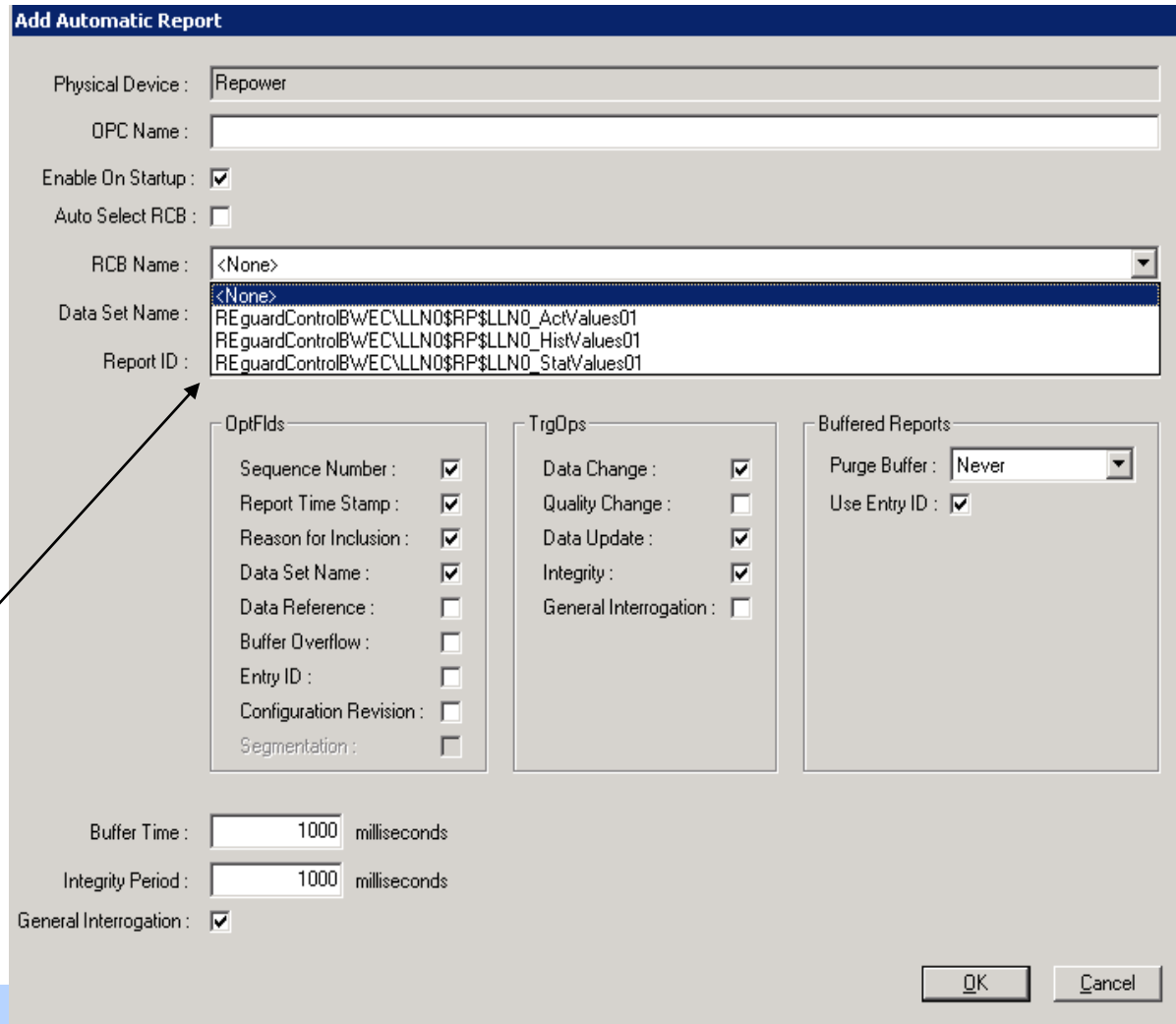
Report-Log Model



Auto-Report Configuration: Helps interface to use reporting



3 REpower Control blocks.



Discussion of Recommended Settings

Add Automatic Report

Physical Device : Repower

OPC Name : REguardControlB\WEC\LLNO\$RP\$LLNO_StatValues01

Enable On Startup :

Auto Select RCB :

RCB Name : REguardControlB\WEC\LLNO\$RP\$LLNO_StatValues01

Data Set Name : REguardControlB\WEC\LLNO\$StatValues

Report ID :

OptFlds	TrgOps	Buffered Reports
Sequence Number : <input checked="" type="checkbox"/>	Data Change : <input checked="" type="checkbox"/>	Purge Buffer : Never
Report Time Stamp : <input checked="" type="checkbox"/>	Quality Change : <input checked="" type="checkbox"/>	Use Entry ID : <input checked="" type="checkbox"/>
Reason for Inclusion : <input checked="" type="checkbox"/>	Data Update : <input checked="" type="checkbox"/>	
Data Set Name : <input checked="" type="checkbox"/>	Integrity : <input checked="" type="checkbox"/>	
Data Reference : <input type="checkbox"/>	General Interrogation : <input checked="" type="checkbox"/>	
Buffer Overflow : <input type="checkbox"/>		
Entry ID : <input type="checkbox"/>		
Configuration Revision : <input type="checkbox"/>		
Segmentation : <input type="checkbox"/>		

Buffer Time : 1000 milliseconds

Integrity Period : 60000 milliseconds

General Interrogation :

OK Cancel

Too Small



Questions and Discussions



Integrity Period

Custom Data Sets

Other?



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Thank You



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