



Smart Grid Standards Information

Version 1.6

Friday, May 28, 2010

Section I: Use and Application of the Standard

A. Identification and Affiliation

1.	Number of the standard	IEC 61968
2.	Title of the standard	Application Integration at Electric Utilities - System Interfaces for Distribution Management
3.	Name of owner organization	International Electrotechnical Commission
4.	Latest versions, stages, dates	<p>Edition 1.0</p> <p>Part 1 Interface Architecture and General Requirements – 2003, update planned for 2010</p> <p>Part 1-1 – Enterprise Service Bus Profile – CDV planned for 2010</p> <p>Part 1-2 – Web Services – CDV planned for 2010</p> <p>Part 2 Glossary - 2009</p> <p>Part 3 Network Operations – 2004, update planned for 2011</p> <p>Part 4 Records and Asset Management – 2007, update planned for 2011</p> <p>Part 6: Work Management – CD planned for 2011</p> <p>Part 8: Customer Support – CD 2009, CDV planned for 2011</p> <p>Part 9 Meter Reading and Control – 2009, update planned for 2011</p> <p>Part 11 Common Information Model Extensions – 2010</p> <p>Part 13 CIM RDF Model Exchange Format for Distribution – 2008, update planned for 2011</p>
5.	URL(s) for the standard	www.iec.ch
6.	Working group / committee	IEC Technical Committee 57 Working Group 14
7.	Original source of the content (if applicable)	N/A
8.	Brief description of scope	This standard describes a series of application messaging interfaces based on and extending the IEC 61970 Common Information Model (CIM) standard. These interfaces describe the interactions between the software applications that compose Distribution Management Systems (DMS). The messages are defined in terms of Unified Modeling Language (UML) objects that conform to the CIM methodology. The standard includes an Interface Reference Model (IRM) that identifies the common distribution management applications and their duties.

B. Level of Standardization

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1.	Names of standards development organizations that recognize this standard and/or accredit the owner organization	ISO, IEC
2.	Has this standard been adopted in regulation or legislation, or is it under consideration for adoption?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.	Has it been endorsed or recommended by any level of government? If "Yes", please describe	<input type="checkbox"/> Yes <input type="checkbox"/> No
4.	Level of Standard (check all that apply)	<input checked="" type="checkbox"/> International <input type="checkbox"/> National <input type="checkbox"/> Industry <input type="checkbox"/> de Facto <input type="checkbox"/> Single Company
5.	Type of document	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Report <input type="checkbox"/> Guide <input type="checkbox"/> Technical Specification
6.	Level of Release	<input checked="" type="checkbox"/> Released <input checked="" type="checkbox"/> In Development <input type="checkbox"/> Proposed

C. Areas of Use

1.	Currently used in which domains? (check all that apply)	<input type="checkbox"/> Markets <input checked="" type="checkbox"/> Operations <input type="checkbox"/> Service Providers <input type="checkbox"/> Generation <input type="checkbox"/> Transmission <input type="checkbox"/> Distribution <input type="checkbox"/> Customer
2.	Planned for use in which domains? (check all that apply)	<input checked="" type="checkbox"/> Markets <input checked="" type="checkbox"/> Operations <input type="checkbox"/> Service Providers <input type="checkbox"/> Generation <input type="checkbox"/> Transmission <input checked="" type="checkbox"/> Distribution <input type="checkbox"/> Customer
3.	Please describe the Smart Grid systems and equipment to which this standard is applied	Software applications deployed inside power utility enterprise networks, most commonly referred to as the "energy management system", "control center" or "back office".

D. Relationship to Other Standards or Specifications

1.	Which standards or specifications are referenced by this standard?	IEC 61970
2.	Which standards or specifications are related to this standard?	IEC 61970
3.	Which standards or specifications cover similar areas (may overlap)?	MultiSpeak
4.	What activities are building on this work?	ZigBee/HomePlug Smart Energy Profile 2.0, Open Automated Demand Response (OpenADR), Open Automated Data Exchange (OpenADE)

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E. Dept of Energy Smart Grid Characteristics

Please describe how this standard may encourage each of the following:

1.	Enables informed participation by customers	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Enables customer access to metering data
2.	Accommodates all generation and storage options	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No More options in progress - SEP 2.0
3.	Enables new products, services and markets	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Enables customer access to metering data
4.	Provides the power quality for a range of needs	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5.	Optimizes asset utilization and operating efficiency	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Includes asset management models
6.	Operates resiliently to disturbances, attacks, and natural disasters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Can be carried on reliable networks, but does not include any reliability features itself

F. Priority Areas Previously Mentioned by FERC and NIST

Please describe if and how this standard may be applied in each of the following areas. Note that there is space in section J to discuss any other significant areas where the standard may be applied.

1.	Cybersecurity and physical security	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Can be used on secure networks, but no security features have yet been defined
2.	Communicating and coordinating across inter-system interfaces	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No By definition intended to be intra-system
3.	Wide area situational awareness	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Enables coordinating applications
4.	Smart grid-enabled response for energy demand	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Enables interfaces for demand response management systems
5.	Electric storage	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No More options in progress - SEP 2.0
6.	Electric vehicle transportation	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No More options in progress - SEP 2.0
7.	Advanced metering infrastructure	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Enables exchange of metering data between back-office applications and metering head-end
8.	Distribution grid management	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No This is the purpose of this standard

G. Openness		
1.	Amount of fee (if any) for the documentation	Approx US\$2000 for all current parts
2.	Amount of fee (if any) for implementing the standard	0
3.	Amount of fee (if any) to participate in updating the standard	Fee charged for individuals or companies by National Committees. \$250/year for individual to participate through ANSI.
4.	Is the standard documentation available online?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No http://webstore.iec.ch
5.	Are there open-source or reference implementations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
6.	Are there open-source test tools?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7.	Would open-source implementations be permitted?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
8.	Approximately how many implementers are there?	>50
9.	Approximately how many users are there?	>50
10.	Where is the standard used outside of the USA?	Europe, South Africa, China
11.	Is the standard free of references to patented technology?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
12.	If patented technology is used, does the holder provide a royalty-free license to users of the standard?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Patented
13.	Can an implementer use the standard without signing a license agreement?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
14.	Are draft documents available to the public at no cost?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
15.	How does one join the working group or committee that controls the standard?	Nomination by national committee
16.	Is voting used to decide whether to modify the standard? If Yes, explain who is permitted to vote.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Voting by country
17.	Is an ANSI-accredited process used to develop the standard?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
18.	What countries are represented in the working group or committee that controls the standard?	Too many to list. URL for member list: http://www.iec.ch/dyn/www/f?p=102:14:0:::FSP_ORG_ID:2393
H. Support, Conformance, Certification and Testing		
1.	Is there a users group or manufacturers group to support this standard?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2.	What is the name of the users group or manufacturers group (if any)?	CIM Users Group and OpenSG – through the UCA International Users Group

3.	What type of test procedures are used to test this standard? (please check all that apply)	<input checked="" type="checkbox"/> Internal to the lab <input type="checkbox"/> Published by standards organization <input checked="" type="checkbox"/> Published by users group <input type="checkbox"/> No procedures, informal testing
4.	Are there test vectors (pre-prepared data) used in testing? (please check all that apply)	<input checked="" type="checkbox"/> Internal to the lab (EPRI) <input type="checkbox"/> Published by standards organization <input type="checkbox"/> Published by users group <input type="checkbox"/> No procedures, informal testing
5.	What types of testing programs exist? (check all that apply)	<input checked="" type="checkbox"/> Interoperability Testing (EPRI for WG14 and CIMug) <input type="checkbox"/> Conformance Testing (EPRI for OpenSG is in progress) <input type="checkbox"/> Security Testing <input type="checkbox"/> No Testing
6.	What types of certificates are issued? (check all that apply)	<input checked="" type="checkbox"/> Interoperability Certificate (EPRI) <input checked="" type="checkbox"/> Conformance Certificate <input type="checkbox"/> Security Certificate (text document) <input type="checkbox"/> No Certificates
7.	Are there rules controlling how and when to use the logo?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Standard has no logo. IEC logo does not imply conformance
8.	Is there a program to approve test labs?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (in definition stage)
9.	Approximately how many test labs are approved (if any)?	2 (1 EPRI lab for interoperability, 1 EPRI lab being established for conformity testing)
10.	Is there a defined process for users to make technical comments on the standard or propose changes to the standard and have these issues resolved?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (through CIM issues list on CIMug SharePoint)
11.	Is there a published conformance checklist or table?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
12.	Are there defined conformance blocks or subsets?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
13.	Approximately how many vendors provide test tools?	<10 Reference CIMug web site for examples.
14.	Are there tools for pre-certification prior to testing?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
15.	Can vendors self-certify their implementations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
16.	Is there application testing for specific uses?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
17.	Is there a "golden" or "reference" implementation to test against?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
18.	Who typically funds the testing? (check all that apply)	<input checked="" type="checkbox"/> User <input type="checkbox"/> Users Group <input type="checkbox"/> Vendor <input type="checkbox"/> Confidential
19.	Is there a method for users and implementers to ask questions about the standard and have them answered? (check all that apply)	<input checked="" type="checkbox"/> Yes, official interpretations <input checked="" type="checkbox"/> Yes, informal opinions <input type="checkbox"/> No

20.	Does the users' group (or some other group) fund specific tasks in the evolution of the standard?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
21.	Is the users' group working on integration, harmonization or unification with other similar standards?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
22.	What other standards is this standard being integrated, harmonized, or unified with (if any)?	IEC 61850, Smart Energy Profile 2.0
23.	Are there application notes, implementation agreements, or guidelines available describing specific uses of the standard?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable

J. Notes

Please present here any additional information about the standard that might be useful:

1.

Section II: Functional Description of the Standard

K. GridWise Architecture: Layers

Please identify which layers this standard specifies, as described in

http://www.gridwiseac.org/pdfs/interopframework_v1_1.pdf, and the applicable section of the standard. Note the mapping to the Open Systems Interconnect (OSI) model is approximate.

1.	Layer 8: Policy	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2.	Layer 7: Business Objectives	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3.	Layer 6: Business Procedures	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
4.	Layer 5: Business Context	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5.	Layer 4: Semantic Understanding (object model)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6.	Layer 3: Syntactic Interoperability (OSI layers 5-7)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
7.	Layer 2: Network Interoperability (OSI layers 3-4)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8.	Layer 1: Basic Connectivity (OSI layers 1-2)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

L. GridWise Architecture: Cross-Cutting Issues

Please provide an explanation in the box beside the heading for any questions answered "Not applicable". If the question is not applicable because the function is provided in another layer or standard, please suggest any likely candidates. Note that "the standard" refers to the technology specified by the standard, not the documents themselves.

	Shared Meaning of Content	
1.	Do all implementations share a common information model?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
2.	Can data be arranged and accessed in groups or structures?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
3.	Can implementers extend the information model?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
4.	Can implementers use a subset of the information model?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
	Resource Identification	
5.	Can data be located using human-readable names?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
6.	Can names and addresses be centrally managed without human intervention?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
	Time Synchronization and Sequencing	
7.	Can the standard remotely synchronize time?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Provided in another layer
8.	Can the standard indicate the quality of timestamps?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Provided in another layer
	Security and Privacy	
9.	Where is security provided for this standard?	<input type="checkbox"/> Within this standard <input checked="" type="checkbox"/> By other standards
10.	Does the standard provide authentication?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
11.	Does the standard permit role-based access control?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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12.	Does the standard provide encryption?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
13.	Does the standard detect intrusions or attacks?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
14.	Does the standard facilitate logging and auditing of security events?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
15.	Can the security credentials be upgraded remotely?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> No Credentials
16.	Can the security credentials be managed centrally?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> No Credentials
17.	Please list any security algorithms and standards used	
18.	Please provide additional information on how the standard addresses any "Yes" answers above	
19.	Please provide additional information about why any of the questions listed above do not apply to this standard	This is an object model standard and does not address security.
Logging and Auditing		
20.	Does the standard facilitate logging and auditing of critical operations and events?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
21.	Can the standard gather statistics on its operation?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable
22.	Can the standard report alerts and warnings?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
Transaction State Management		
23.	Can the standard remotely enable or disable devices or functions?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
System Preservation		
24.	Can the standard automatically recover from failed devices or links?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Provided in another layer
25.	Can the standard automatically re-route messages?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Provided in another layer
26.	Can the standard remotely determine the health (as opposed to just connectivity) of devices or software?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
Other Management Capabilities		
27.	Please describe any other system or network management capabilities the standard provides.	n/a
Quality of Service		
28.	Is data transfer bi-directional?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
29.	Can data be prioritized?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable
30.	What types of reliability are provided?	<input type="checkbox"/> Reliable <input type="checkbox"/> Non-guaranteed <input type="checkbox"/> Both <input type="checkbox"/> Either <input checked="" type="checkbox"/> Provided in another layer
31.	Can information be broadcast to many locations with a single transmission?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
32.	Please describe any other methods the standard uses to manage quality of service.	Message payloads contain QOS data as well as transactions themselves are documented in sequence diagrams in the standard.
Discovery and Configuration		

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33.	Can the software or firmware be upgraded remotely?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable
34.	Can configuration or settings be upgraded remotely?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable
35.	Can implementations announce when they have joined the system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable
36.	Can implementations electronically describe the data they provide?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable
System Evolution and Scalability		
37.	What factors could limit the number of places the standard could be applied?	Interoperability is dependent on the technology and the context of the project in which the standard is applied
38.	What steps are required to increase the size of a system deploying this standard?	No limits, but it would be useful to have a model server
39.	Is the information model separate from the transport method?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
40.	Does the standard support alternate choices in the layers(s) below it?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No layers below
41.	List the most common technology choices for layers implemented below this standard	OPC, OPC/UA, XML, RDF, message buses
42.	Does the standard support multiple technology choices in the layers above it?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No layers above
43.	List the technologies or entities that would most commonly use this standard in the layer above	
44.	Please describe any mechanism or plan to ensure the standard is as backward-compatible as possible with previous versions	UML model version numbers; website containing archive of model descriptions; yearly update cycle managed by the users group
45.	Please describe how the design of this standard permits it to be used together with older or legacy technologies	Integration layer adapters
46.	Please describe how the design of this standard permits it to co-exist on the same network or in the same geographic area with similar technologies, and give examples	This standard can be implemented in a variety of technologies
47.	Electromechanical	N/A

M. Architectural Principles

Please describe how this standard may apply any of these principles:

1.	Symmetry – facilitates bi-directional flow of energy and information	There is no directional restriction on the flow of data
2.	Transparency – supports a transparent and auditable chain of transactions	The use of XML and affiliated standards facilitate transparency
3.	Composition – facilitates the building of complex interfaces from simpler ones	The model is object-oriented and supports inheritance, association and composition

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4.	Loose coupling – can support bilateral and multilateral transactions without elaborate pre-arrangement	XSD canonical data models, derived from the Common Information Model (CIM), are used to exchange information among interfaces for applications. This facilitates loose coupling.
5.	Shallow integration – does not require detailed mutual information to interact with other components	Shallow integration is supported as all information exchange is based on industry standards vocabulary (CIM).
6.	Please list any other architectural models, reference architectures or frameworks this standard was designed to be compliant with, e.g. W3C, IEC TC57, OSI and how it fits those models	Unified Modeling Language IEC TC57 Reference Model W3C