UCAIug Home Area Network System Requirements Specification

A Work Product of the OpenHAN Task Force formed by the SG Systems Working Group under the Open Smart Grid (OpenSG) Technical Committee of the UCA® International Users Group

Version 2.0 – August 30, 2010

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITIES

THIS DOCUMENT WAS PREPARED BY A TASK FORCE OF THE UCA® INTERNATIONAL USERS GROUP COMPRISED OF INDIVIDUAL MEMBERS FROM MULTIPLE ORGANIZATIONS NAMED BELOW. NEITHER THE UCA® INTERNATIONAL USERS GROUP, ANY MEMBER OF THE UCA® INTERNATIONAL USERS GROUP, THE PERSONS OR ORGANIZATION(S) NAMED BELOW, NOR ANY PERSON ACTING ON BEHALF OF ANY OF THEM:

(A) MAKES ANY WARRANTY OR REPRESENTATION WHATSOEVER, EXPRESS OR IMPLIED, (I) WITH RESPECT TO THE USE OF ANY INFORMATION, APPARATUS, METHOD, PROCESS, OR SIMILAR ITEM DISCLOSED IN THIS DOCUMENT, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OR (II) THAT SUCH USE DOES NOT INFRINGE ON OR INTERFERE WITH PRIVATELY OWNED RIGHTS, INCLUDING ANY PARTY'S INTELLECTUAL PROPERTY, OR (III) THAT THIS DOCUMENT IS SUITABLE TO ANY PARTICULAR USER'S CIRCUMSTANCE; OR

(B) ASSUMES RESPONSIBILITY FOR ANY DAMAGES OR OTHER LIABILITY WHATSOEVER (INCLUDING ANY CONSEQUENTIAL DAMAGES, EVEN IF THE UCA INTERNATIONAL USERS GROUP OR ANY UCA® INTERNATIONAL USERS GROUP REPRESENTATIVE OR MEMBER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES RESULTING FROM YOUR SELECTION OR USE OF THIS DOCUMENT OR ANY INFORMATION, APPARATUS, METHOD, PROCESS, OR SIMILAR ITEM DISCLOSED IN THIS DOCUMENT.

THE CONTENTS OF THIS DOCUMENT REPRESENT THE OPENHAN TASK FORCE MEMBERS BEST UNDERSTANDING OF THE HAN AT THE TIME OF COMPLETION. THIS UNDERSTANDING EITHER COLLECTIVELY OR BY INDIVIDUAL MEMBERS MAY CHANGE OVER TIME.

Acknowledgements

The following individuals and their companies participated in the OpenHAN 2.0 Task Group and contributed to this document by participating in the OpenHAN 2.0 meetings and by drafting this document:

Company	Name	Company	Name
4home	Steve Hindman	Drummond Group	Timothy Bennett
Aclara	Luis Pizano	DS2	John Egan
AEP	Barry Pierce	DTE Energy	Kostas Tolios
AEP	Jorge Melean	DTE Energy	Joshua Hoepner
APS	Nilesh Kulkarni	Duke	Gary Stuebing
APS	Rich Tolway	Eaton	Brandon Rogers
Aridhio Technologies	Antonio Ranson	Ecologic Analytics, LLC	Chris Kardos
AT&T	Sam Sambasivan	Emerson /White-Rogers	David Drew
BC Hydro	Nikin Popat	emeter	Chris King
BGE	Kyle Carson	Enernex	Bruce Muschlitz
BGE	Jim Garrett	EnerNex	Erich Gunther
BSH	Larry Bell	EnerNex	Bradley Singletary
BSH	Kirat Bakshi	EnerNex	Ben Rankin
CPUC	Wendy al-Mukdad	EnerNex	Kevin Brown
CPUC	Christopher Villarreal	EnerNex	Slade Griffin
Capgemini	David Mulder	EPRI	Brian Seal
Carrier	Ray Archacki	EPRI	Chuck Thomas
CenterPoint / IBM	Andy Laskowski	FPL	Christina Harris
CenterPoint	Jim Sheppard	FPL	George Cosio
Cisco	Chuck Duffy	FPL	Julio Gutierrez
Coincident, Inc	Jason Hanna	FPL	William King
Comverge, Inc.	Brian Wright	Ford	Rich Scholer
Comverge, Inc.	John Mani	GE	Charles Smith
Comverge, Inc.	Howard NG	GE	Nate Littrell
Consumers Energy	Brad Singletary	GE	Robby Simpson
Certicom Corp	Matthew Campagna	General Motors	Dan Mepham
Deloitte Consulting	Michael Northern	Georgia Power Co.	Larry Barto
DotUI	Ishak Kang	google	Charles Spirakis
DotUI	Ken Fromm	Granitekey	Mark Schaeffer
DotUI	Christopher Sater	Granitekey	Mike Ahmadi

Company	Name	Company	Name
Gridata Inc	Michael Leppitsch	Panasonic	Chenyi Chiu
Gridata Inc	Devon Walton	Panasonic	Todd Rytting
heyCoop, LLC	Mike Coop	Pentair Water Pool & Spa	Brian Boothe
Home Automation, Inc	Ron Gumina	People Power	Yvan Castilloux
Honeywell	Clay Amb	People Power	John Teeter
HP	Ovace Mamnoon	People Power	Peter Bigot
Hypertek Inc	Ronald Pasquarelli	PG&E	Paul Carreon
IBM	Javier Torres	PG&E	Don Sturek
IBM	Tim Deloach	PG&E	Zahra Makoui
IBM	Brian MacDonald	PG&E	Robert Cragie
IBM	Steven Dougherty	PG&E	Mark Freund
I'm in Control	Kirk Oatman	Portland General Electric	Conrad Eustis
Infineon Technologies	Scott White	Progress Energy	Bill Godwin
Infineon Technologies	Shrinath Eswarahally	Proto6	Geoff Mulligan
Invaluable Technologies	Harpreet Kachroo	PSU	Linda Rankin
Itron	Ken Holbrook	Reliant Energy	Brent Hodges
Itron	Steve Johnson	Reliant Energy	Mary Zientara
Kaapco / ASR Systems	Anuj Puri	RIM	David Jackson
KCP&L	Ed Hedges	Sacramento Municipal Utility District	Craig Sherman
Konnected Universe LLC	Afshin Amini	SCE	Steve Van Ausdall
LG Electronics USA Inc.	Christopher Johnson	SCE	Ivan O'Neill
LG Electronics USA. Inc.	Koonseok Lee	SCE	Darren Highfill
LonMark International	Jeremy J. Roberts	Schneider Electric	Mike Matthews
MicroSoft	MJ Miller	Schneider Electric	Gary Kuzkin
MicroSoft	Chad Maglaque	Southern Company	Ward Pyles
MultiSpeak	Gary McNaughton	Subzero	Steven Nackers
NextGEN Consultancy Pvt. Ltd.	Revinder Singh	SunSpec Alliance	John Nunneley
N-Dimensions Solutions	Andrew Wright	Tendril	Mike Peacock
NV Energy	Eric Ohlson	Tendril	David Mollerstuen
Oncor Electric Delivery	Brad Johnson	Trilliant	Vincent Bemmel
Oncor Electric Delivery	Larry Kohrmann	Trilliant	Nathan Ota
Oncor	Tom Anthony	UISOL	Jens Winkel
PA Consulting	Justin Lowe	U-SNAP Alliance	Barry Haaser

Company	Name	Company	Name
Visible Energy	Marco Graziano	ZigBee Alliance	Tobin Richardson
Xtensible.net	Wayne Dennison		

1

2

3

4

5

Document History

Revision History

Revision Number	Revision Date	Revision By	Summary of Changes	Changes marked
1.9	1-30-10	Document Editing Team	Revisions were made to v1.04 by incorporating requirements from SEP2.0 MRD and Retail DR requirements from NAESB use cases	Yes for added requirements
1.91	3-22-10	Document Editing Team	Includes comments from BC Hydro, Itron, CenterPoint Energy, Oncor, People Power. Cisco, Google, Reliant Energy, I'm in Control, Trilliant, and GE	Yes
1.915	4-28-10	Document Editing Team	Includes comments from BC Hydro, CenterPoint Energy, Oncor, People Power, Google, Reliant Energy, I'm in Control, Trilliant, PG&E, EnerNex, LBNL & DRRC, and GE	Yes; v1.91 comments reviewed and included in 1.915 up through Section 3.4.3 Processing
1.95	5-21-10	Document Editing Team	Added changes from the 2Q OpenSG F2F meeting and remaining v1.91 comments	Yes
1.98	7-16-10	Document Editing Team	Includes comments from BC Hydro, CenterPoint Energy, Oncor, Reliant Energy, I'm in Control, Trilliant, PG&E, GE, SilverSprings Network, Coincident, SAE J2931, Ford, and Bosch & Siemens Home Appliance Corporation	Yes
1.99	8-4-10	Document Editing Team	Includes work from UCAIug OpenSG meetings in Detroit, MI and comments from CenterPoint, Oncor, Trilliant, Coincident, GE, and I'm in Control	Yes
2.0	8-30-10	Document Editing Team	Fixed typos, changed v1.99 to v2.0; added date document was approved by OpenSG for release	No

Contents

1. Introduction

In 2007, the UtilityAMI established the OpenHAN Task Force to develop guiding principles, use cases, and platform independent requirements for the utility Advanced Metering Infrastructure (AMI) projects incorporating Home Area Networks (HANs). The core development team included more than a dozen investor-owned North American utilities serving more than 28 million electric and gas customers in 17 states and provinces, as well as contributors from EnerNex Corporation, Tendril Networks, Mulligan Labs LLC, Itron, and Silver Spring Networks. The OpenHAN Task Force collaborated throughout 2007 and 2008 to draft the UtilityAMI 2008 Home Area Network System Requirements Specification and received ratification of v1.04 in August 2008 ("UtilityAMI 2008 HAN SRS").

Since that time, additional use cases and requirements have been identified. In response, the UCAIug OpenSG Technical Committee re-established the OpenHAN Task Force under the SG Systems Working Group in October 2009. The OpenHAN Task Force was directed to begin work on the next version of the HAN SRS document (UCAIug HAN SRS v2.0). The work to produce this document was a collaborative effort open to all interested parties. Participants included utilities, energy service providers, technology vendors, appliance manufacturers, software developers, and regulators.

The following conceptual diagram provides a high-level overview of the Smart Grid, its actors and their expected interactions. The red circle represents the area of focus for this HAN SRS document.

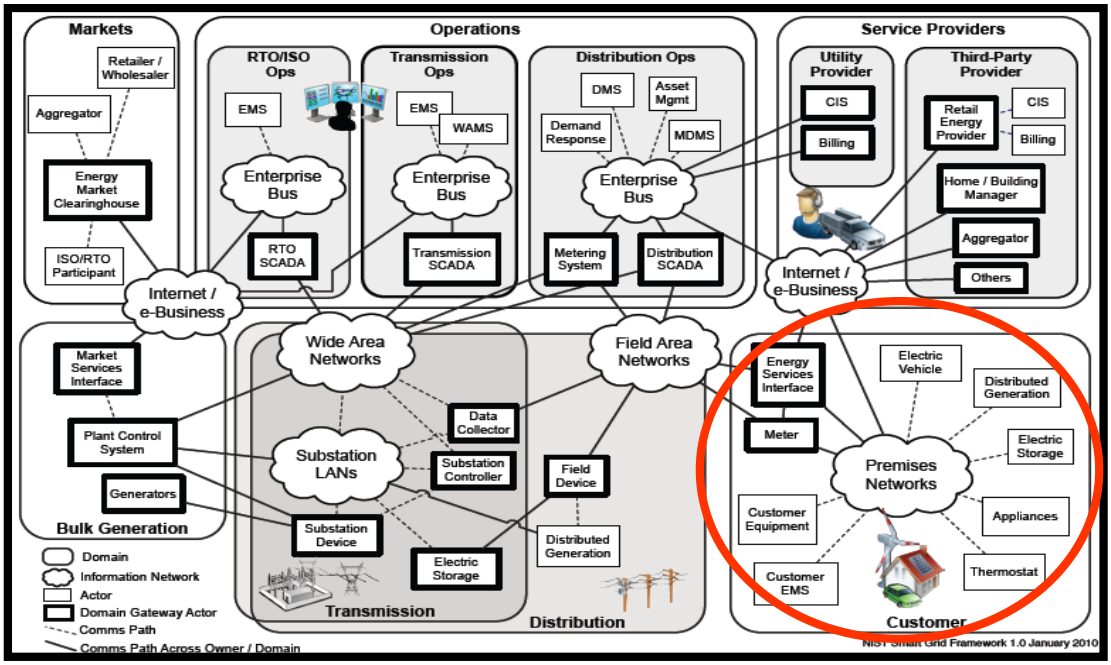

Figure 1 NIST Conceptual Reference Diagram for Smart Grid Information Networks[1]

[1] NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0, page 35

This HAN SRS is organized as follows:

Section 1 – Introduction: outlines the purpose, scope, policy directives, and HAN security consideration that have shaped the HAN SRS. Also included is a comprehensive list of acronyms and definitions to help the reader interpret the HAN SRS.

Section 2 – Overall Description: describes the premises energy ecosystem, its guiding principles, and relevant architectural considerations.

Section 3 – System Requirements: provides context for and categorically lists all HAN System Requirements, then maps each to specific logical device types. Requirement categories for the HAN SRS are defined as follows:

- Application
- Communication
- Security
- Performance
- Operations, Maintenance, and Logistics

Section 4 – Appendices: offers supporting high-level system use cases and describes additional security considerations.

Although this document is a system requirements specification, it follows the IEEE 830-1998 Recommended Practice for Software Requirements Specifications[2] given the focus on Home Area Network (HAN) applications for utilities and consumers.

1.1 Purpose

One of the key outcomes of Smart Grid deployments is enabling informed participation by end-use consumers in retail and wholesale electricity markets. When consumers are given timely information about their electrical usage, this will empower them to manage their electricity usage, promote energy efficiency, and lower overall energy costs. Home Area Networks will play a role in achieving these goals by giving consumers more information than they have ever had before on how they use electricity and the cost of their usage. In addition, by using interoperable standards, utilities, device manufactures, vendors, and energy service providers can develop innovative and cost effective solutions and products which help consumers manage, optimize, and control their electricity usage.

To help achieve these goals and bring tangible Smart Grid benefits to Consumers, the OpenHAN Task Force undertook the development and subsequent revision of the HAN SRS. By providing common architecture, language, and requirements, the UCAIug HAN SRS 2.0 encourages a competitive market place and seeks to reduce costs, increase interoperability, and maximize solution longevity and maintainability.

[2] http://standards.ieee.org/reading/ieee/std_public/description/se/1233-1998_desc.html