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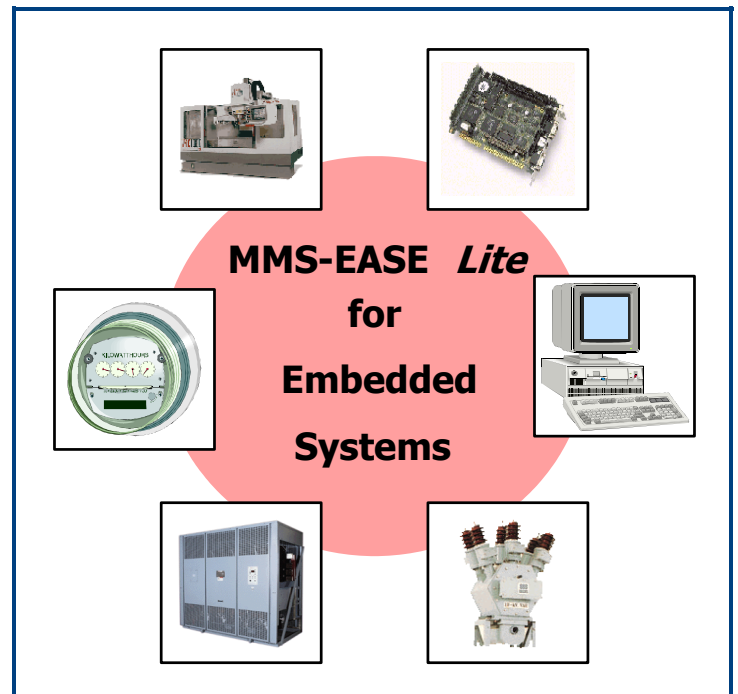
MMS-EASE *Lite*: IEC 61850 for Embedded Systems

MMS-EASE *Lite*

MMS-EASE *Lite* is a source code package for the Manufacturing Message Specification (MMS) protocols, IEC 61850 that has been optimized for use in Intelligent Electronic Devices (IEDs) such as RTUs, reclosers, PLCs, meters and other resource constrained embedded applications. MMS-EASE *Lite* gives the OEM a jump start on developing IEC 61850 and MMS compliant devices by significantly reducing the engineering effort it takes to build a compatible device interface. MMS-EASE *Lite* is an efficient and portable implementation of the following protocols that are ready to adapt into your IED:

- **IEC 61850** with support for GOOSE, GSSE, GSE Management, SMV, and SCL including objects and models in parts 6-1, 7-2, 7-3, 7-4, 8-1, and 9-2.
- **IEC 61850 V2** product is consistently updated with all mandatory technical issue resolutions published by the UCA International Users Group for conformance testing.
- **MMS** - per ISO 9506 Version 1 and 2
- **ACSE** - Association Control Service Elements per ISO 8650
- **ISO Presentation and Session** layers per ISO 8823, ISO9576, ISO 8327 and ISO9548 for operation over RFC1006 for TCP/IP
- **TCP/IP** - using RFC1006 (TCP/IP not included)
- **IEEE802.3** - Ethernet - EtherType

SISCO's MMS-EASE *Lite* is being used today in hundreds of different devices from many OEMs across the globe. Many thousands of devices using MMS-EASE *Lite* have been shipped and installed on every continent north of Antarctica.



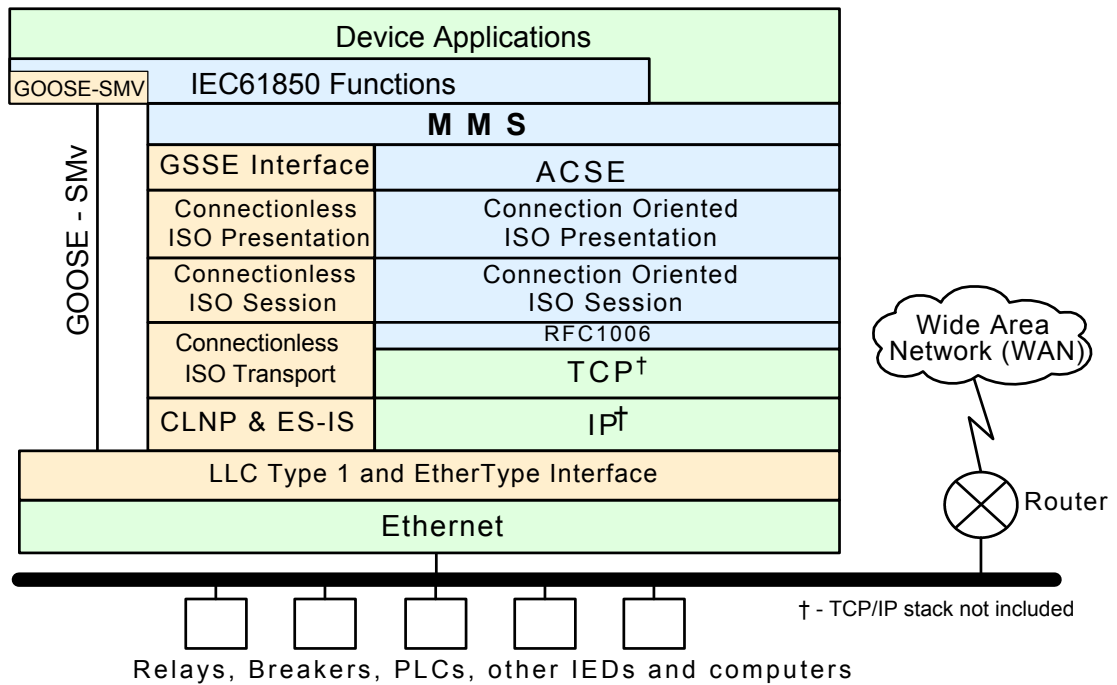
Benefits

- Field Proven implementation reduces development risk, minimizes development effort and shortens time to market.
- MMS Object Foundry automates much of the programming needed to implement IEC61850 compliant devices and objects.
- Designed specifically for embedded environments to minimize CPU and memory requirements and to maximize performance.
- ANSI C source code is provided for all functions to facilitate portation to virtually any environment.
- Flexible licensing options available to satisfy the diverse needs of the OEM developer.

MMS-EASE *Lite* Features/Specifications

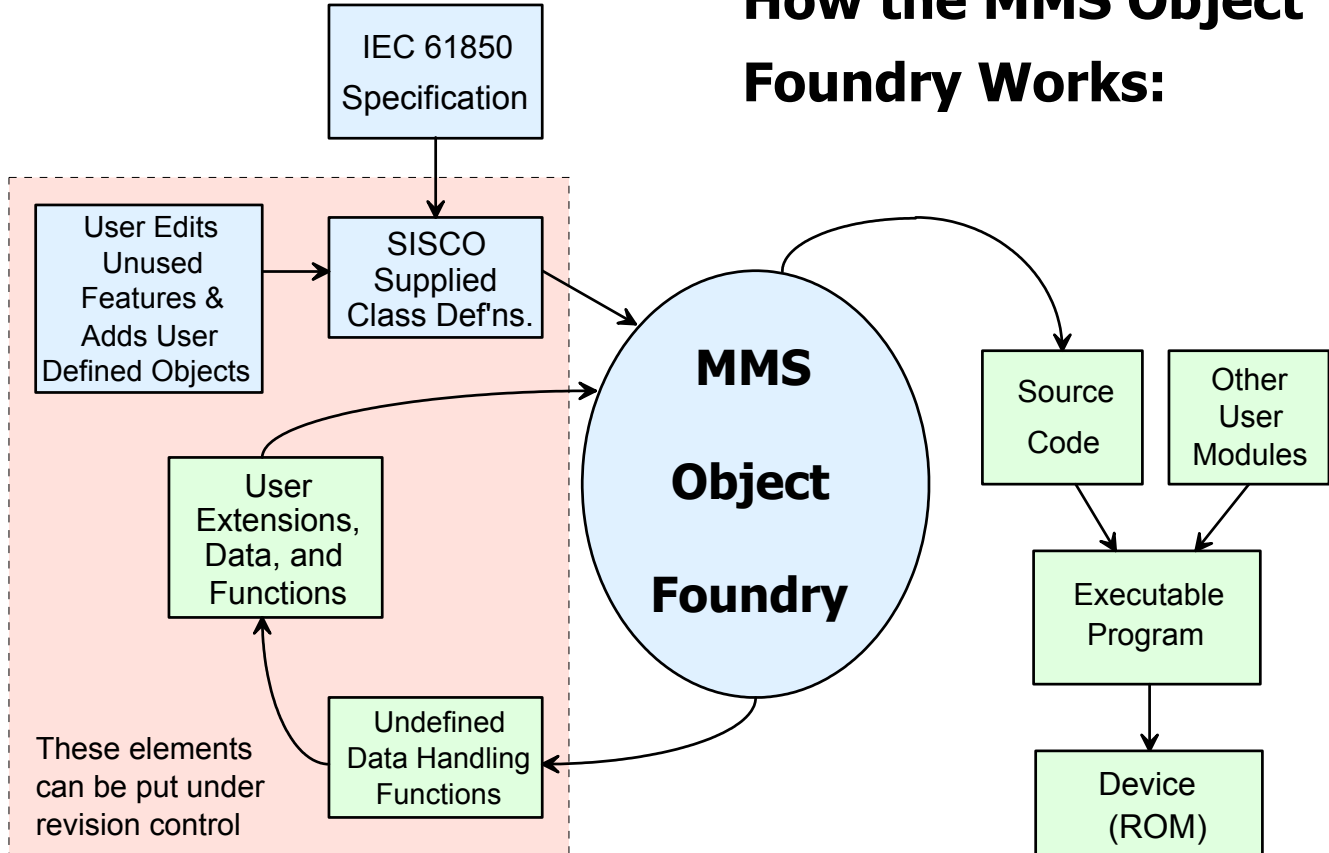
• KEY TECHNICAL FEATURES:

- ▶ Synchronous and asynchronous message processing supported
 - ▶ Connection oriented profiles support up to 1000 associations.
 - ▶ Supports static object definition via the exclusive SISCO MMS Object Foundry.
 - ▶ Supports dynamic (run-time) object creation via Substation Configuration Language (SCL per IEC61850-6-1) encoded XML.
 - ▶ Supports IEC 61850 data, logical node and object definitions per parts 7-2, 7-3, & 7-4.
 - ▶ Supports IEC 61850 Abstract Communication Service Interface (ACSI) functions per part 7-2.
 - ▶ Extendable to support other models such as windpower and DER.
 - ▶ GOOSE/GSSE multi-cast and uni-cast messaging.
 - ▶ Process bus and Sampled Measured Values (SMV) per IEC 61850-9-2
 - ▶ Supports all MMS services for both client and server per ISO 9506 Version 1 (1988).
 - ▶ Supports all MMS ISO9506 Version 2 features required for IEC61850.
 - ▶ "Minimal" implementation techniques provide highly efficient memory usage.
- MMS-EASE *Lite* includes a MMS Virtual Lite (MVL) framework that helps ease the development effort by providing functions for:
 - ▶ Automation of common MMS message processing for commonly used services.
 - ▶ Translating to/from local data formats.
 - ▶ Handling IEC 61850 buffered and un-buffered reporting.
 - MMS Object Foundry can be used to automatically generate MVL code for objects and devices conforming to IEC 61850-7-3, 7-4, GOMSF, including proprietary and standards based extensions.
- Source code and other files used by MMS-EASE *Lite* can be used with existing revision control systems and other development tools.
 - Source code is user manageable and modifiable. Users of MMS-EASE *Lite* are not dependent on SISCO for changes.
 - Complete, well commented, and human readable source code is provided for all supported functions using standard ANSI C constructs and function prototypes.
 - Software is modular to facilitate portation to other environments. SISCO, or existing users of MMS-EASE *Lite*, have ported to ThreadX, pSOS, VxWorks, Linux, Win32, "Home-Brew" O/S. Portable to any O/S supporting ANSI C compiler
 - Portation services to other environments are available from SISCO upon request.
 - Flexible memory management architecture:
 - ▶ Supports ROM based systems.
 - ▶ Static user-managed memory pool or dynamic memory allocation.
 - Available in two separate communications bundles to meet differing needs:
 - ▶ With upper layers only for TCP/IP (does not include GOOSE, GSSE, or SMV)
 - ▶ Complete support for TCP/IP, GOOSE, GSSE, and SMV.
 - Flexible source code licensing:
 - ▶ Run-time based license
 - ▶ Single product/project license
 - ▶ Paid-up license
 - ▶ Steep quantity discounts on run-times
 - Consulting/training programs get your development team productive quickly.
 - Comprehensive product support and maintenance package included for the first year. Yearly renewal available.



MMS-EASE *Lite* Architecture and Application

How the MMS Object Foundry Works:



Other products from SISCO

- **ICCP-TASE.2 Extensions for MMS-EASE Lite** adds support for the Intercontrol Center Communications Protocol (ICCP per IEC60870-6 TASE.2) to MMS-EASE Lite. Enables simultaneous communications with MMS, IEC61850, and ICCP-TASE.2 over the same physical network connection.
- **AX-S4 MMS** ("access for MMS") is an IEC61850 client and server application that provides "plug-in" access to IEC 61850 for any Windows compatible application that supports an OLE for Process Control (OPC) interface. AX-S4 MMS includes SISCO's MMS Object Explorer that allows you to visually interact with IEC61850/MMS devices and objects. AX-S4 MMS can be combined with off-the-shelf Windows based SCADA/HMI and testing products to both test your MMS-EASE Lite based device and provide a low-cost method for your customers to integrate your IEC61850 devices and applications in their systems.

About SISCO

SISCO, Inc. is a private company founded in 1983. SISCO has established itself as a leader in standards-based real-time integration and communications technologies serving the energy and automation industries. SISCO's products are widely used in many mission critical applications from electrical transmission systems to material handling. We work with both end users and OEMs serving those end users. SISCO's ability to partner with other OEMs and integrators allows us to deliver more capabilities at a lower cost resulting in better solutions for you. Today SISCO has demonstrated leadership and capabilities to provide solutions in the following areas:

- ❑ Model-driven integration technology based upon advanced publish/subscribe and object oriented technology for enterprise integration of heterogeneous applications in the utility environment.
- ❑ Real-time communications and networking based upon open, public, and international standards such as:
 - Inter-control Center Communications Protocol (ICCP) per IEC60870-6 TASE.2 for control center integration and power plant dispatching
 - IEC 61850 for substation automation.

NOTES: 1.) Specifications presented herein are thought to be accurate at time of publication but are subject to change without notice. NO WARRANTIES OF ANY KIND ARE IMPLIED ON THE INFORMATION CONTAINED IN THIS DOCUMENT. 2.) UCA is a trademark of the UCA International Users Group. All other company names, tradenames and trademarks are trademarks or registered trademarks of their respective companies. 3.) SISCO software products are available through SISCO directly or OEMs and/or distributors world-wide. Contact SISCO for the location of your representative. 4.) TCP/IP stack and Ethernet drivers not included with MMS-EASE Lite.

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