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INTERNATIONAL STANDARD

colour inside

Application integration at electric utilities – System interfaces for distribution management – Part 6: Interfaces for maintenance and construction

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FOREWORD

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This part of International Standard IEC 61968 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this standard is based on the following documents:

FDIS	Report on voting
57/1566/FDIS	57/1586/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61968 series, published under the general title *Application integration at electric utilities – System interfaces for distribution management*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The IEC 61968 standard, taken as a whole, defines interfaces for the major elements of an interface architecture for Distribution Management Systems (DMS). IEC 61968-1, *Interface architecture and general recommendations*, identifies and establishes requirements for standard interfaces based on an Interface Reference Model (IRM). IEC 61968-3 to 9 of this standard define interfaces relevant to each of the major business functions described by the Interface Reference Model.

As used in IEC 61968, a DMS consists of various distributed application components for the utility to manage electrical distribution networks. These capabilities include monitoring and control of equipment for power delivery, management processes to ensure system reliability, voltage management, demand-side management, outage management, work management, automated mapping and facilities management.

This set of standards is limited to the definition of interfaces and is implementation independent. They provide for interoperability among different computer systems, platforms, and languages. Methods and technologies used to implement functionality conforming to these interfaces are considered outside of the scope of these standards; only the interface itself is specified in these standards.

The purpose of this part of IEC 61968 is to define a standard for the integration of Maintenance and Construction Systems (MC), which would include Work Management Systems, with other systems and business functions within the scope of IEC 61968. The scope of this standard is the exchange of information between Maintenance and Construction Systems and other systems within the utility enterprise. The specific details of communication protocols those systems employ are outside the scope of this standard. Instead, this standard will recognize and model the general capabilities that can be potentially provided by maintenance and construction systems including planned, unplanned and conditional maintenance. In this way, this standard will not be impacted by the specification, development and/or deployment of next generation maintenance systems, either through the use of standards or proprietary means.

The IEC 61968 series of standards is intended to facilitate *inter-application integration* as opposed to *intra-application integration*. Intra-application integration is aimed at programs in the same application system, usually communicating with each other using middleware that is embedded in their underlying runtime environment, and tends to be optimised for close, real-time, synchronous connections and interactive request/reply or conversation communication models. IEC 61968, by contrast, is intended to support the inter-application integration of a utility enterprise that needs to connect disparate applications that are already built or new (legacy or purchased applications), each supported by dissimilar runtime environments. Therefore, these interface standards are relevant to loosely coupled applications with more heterogeneity in languages, operating systems, protocols and management tools. This series of standards is intended to support applications that need to exchange data every few seconds, minutes, or hours rather than waiting for a nightly batch run. This series of standards, which are intended to be implemented with middleware services that exchange messages among applications, will complement, not replace, utility data warehouses, database gateways, and operational stores.

As used in IEC 61968, a Distribution Management System (DMS) consists of various distributed application components for the utility to manage electrical distribution networks. These capabilities include monitoring and control of equipment for power delivery, management processes to ensure system reliability, voltage management, demand-side management, outage management, work management, automated mapping and facilities management. Standard interfaces are defined for each class of applications identified in the Interface Reference Model (IRM), which is described in IEC 61968-1, *Interface architecture and general recommendations*.

This part of IEC 61968 contains the clauses listed in Table 1.

Table 1 – Document overview for IEC 61968-6

Clause	Title	Purpose
1	Scope	The scope and purpose of the document are described.
2	Normative references	Documents that contain provisions which, through reference in this text, constitute provisions of this International Standard.
3	Reference and information models	Description of general approach to work management system, reference model, use cases, interface reference model, maintenance and construction functions and components, message type terms and static information model.
4	Maintenance and construction message types	Message types related to the exchange of information for documents related to maintenance and construction.
Annex A	Message type verbs	Description of the verbs that are used for the message types.
Annex B	XML schemas for message payloads	To provide xsd information for use by developers to create IEC 61968-9 messages.

APPLICATION INTEGRATION AT ELECTRIC UTILITIES – SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

Part 6: Interfaces for maintenance and construction

1 Scope

This part of IEC 61968 specifies the information content of a set of message types that can be used to support business functions related to Maintenance and Construction. Typical uses of the message types defined in this part of IEC 61968 include planned maintenance, unplanned maintenance, conditional maintenance, work management, new service requests, etc. Message types defined in other parts of IEC 61968 may also be relevant to these use cases.

The mapping of these messages to specific technologies such as XML will be described at a later date.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050, *International Electrotechnical Vocabulary*

IEC 61968-1, *Application integration at electric utilities – System interfaces for distribution management – Part 1: Interface architecture and general recommendations*

IEC TS 61968-2, *Application integration at electric utilities – System interfaces for distribution management – Part 2: Glossary*

IEC 61968-4, *Application integration at electric utilities – System interfaces for distribution management – Part 4: Interfaces for records and asset management*

IEC 61968-9:2013, *Application integration at electric utilities – System interfaces for distribution management – Part 9: Interfaces for meter reading and control*

IEC 61968-11, *Application integration at electric utilities – System interfaces for distribution management – Part 11: Common information model (CIM) extensions for distribution*

IEC 61970-301, *Energy management system application program interface (EMS-API) – Part 301: Common information model (CIM)* base

IEC TR 62051, *Electricity metering – Glossary of terms*

IEC 62055-31, *Electricity metering – Payment systems – Part 31: Particular requirements – Static payment meters for active energy (classes 1 and 2)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this standard, the terms and definitions given in IEC 60050-300, IEC TS 61968-2, IEC TR 62051, IEC 62055-31 and the following terms apply.

Where there is a difference between the definitions in this standard and those contained in other referenced IEC standards, then those defined in IEC 61968-2 shall take precedence over the others listed, and those defined in IEC 61968-6 shall take precedence over those defined in IEC 61968-2.

3.2 Abbreviations

AM	Asset Management
CIM	Common Information Model
NO	Network Operations
OMS	Outage Management System
WM	Work Management
GINV	Geographical Inventory
MAI	Maintenance & Inspection
CON	Construction
DGN	Design
SCHD	Work Scheduling and Dispatching
FRD	Field Recording
NE	Network Extension Planning
TCM	Trouble Call Management
MR&C	Meter Read and Control
CS	Customer Services
HR	Human Resources
FIN	Financials

4 Reference and information models

4.1 General

The message types defined in this document are based on a logical partitioning of the DMS business functions and components called the IEC 61968 Interface Reference Model.

Figure 1 provides an overview diagram which puts Maintenance and Construction as well as Work Management in context of Enterprise Asset Management. The diagram demonstrates the relationship between asset and power system resource. It also relates Work to the construction process (when new asset is built) and to the maintenance process (when inspection or repair is performed on the existing asset).

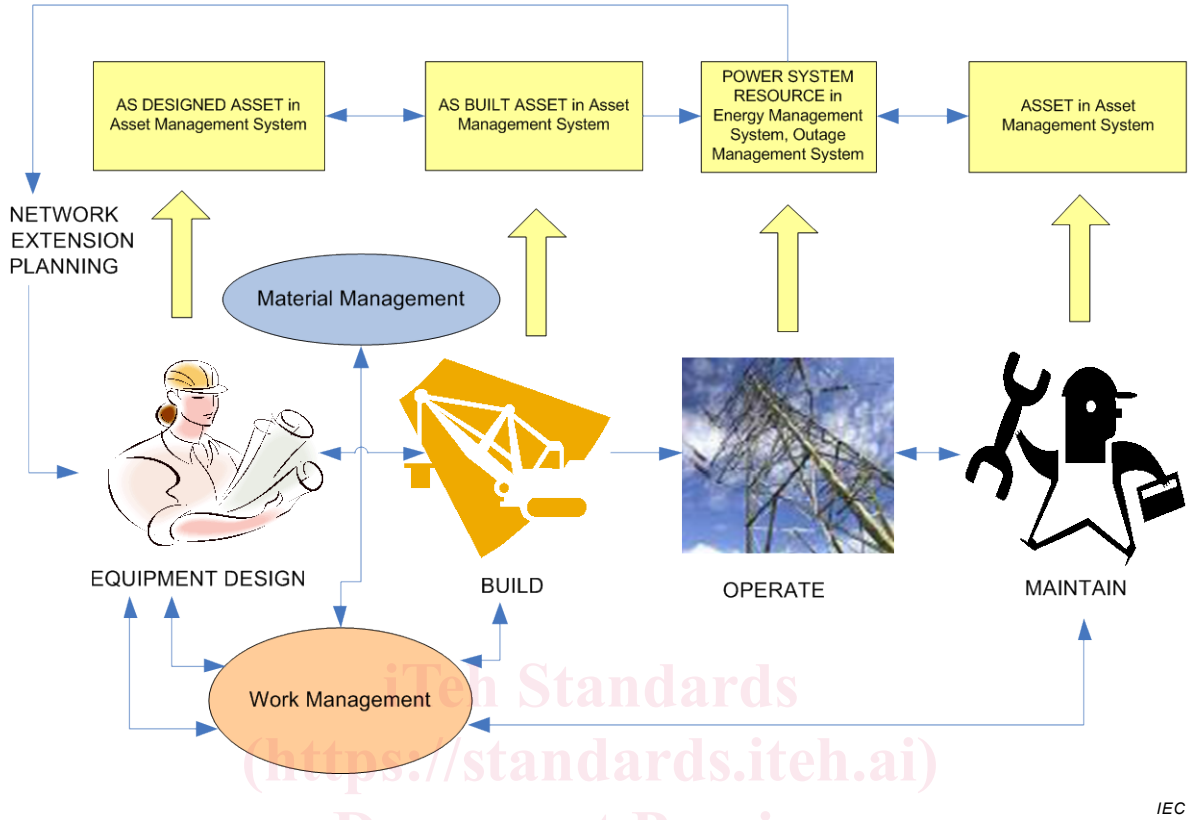

Figure 1 – Asset life cycle

The contents of the message types are based on a static information model to ensure consistency of field names and data types. Each message type is defined as a set of fields copied from the information model classes in IEC 61968-11. The message types defined in this standard are intended to satisfy a majority of typical applications. In some particular project implementations, it may be desirable to modify the set of fields using a methodology such as that described in IEC 61968-1.

4.2 Reference model

4.2.1 General

The diagram shown in Figure 2 serves as reference model and provides example of the logical components and data flows related to this International Standard. Subclause 4.5.2 provides references to terms that are defined by the CIM.

The diagram in Figure 2 describes the flows between the components in the reference model. The numbers in brackets provide linkages to the flow definitions. As per the title of Figure 2, this reference model includes only a subset of all maintenance and construction functions. The rest of the functions, especially functions related to Construction, will be included in future editions of this standard.

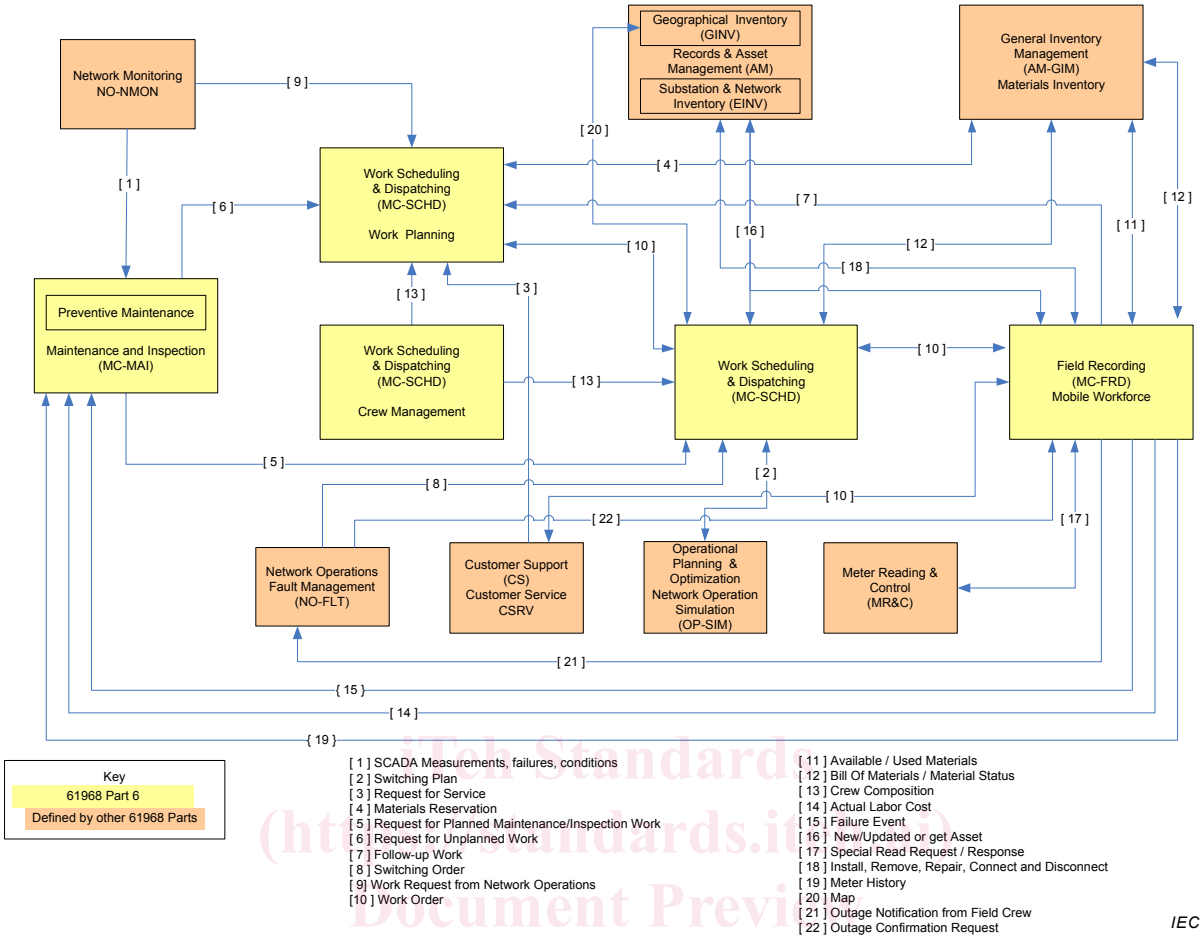

Figure 2 – IEC 61968-6 reference model for maintenance

The reference architecture reflects several main logical components (potentially realized as systems or subsystems) related to maintenance:

a) Geographical Inventory (GINV)
b) Maintenance and Inspection (MAI)
c) Construction (CON)
d) Design (DGN)
e) Work Scheduling and Dispatching (SCHD)
f) Field Recording (FRD)
g) Asset Management System (AM)
h) Network Operations Simulation (SIM)
i) Network Operations (NO)
j) Network Extension Planning (NE)
k) Trouble Call Management (TCM)
l) Meter Read and Control (MR&C)
m) Customer Service (CS)
n) Human Resources (HR)
o) Materials Management System
p) Financial System (FIN)

4.2.2 Geographical Inventory (GINV)

Management of geospatial data, typically by utilizing computer graphics technology to enter, store, and update graphic and non-graphic information. Geographic depictions and related non-graphic data elements for each entity are typically stored some form of a database. The graphic representations are referenced using a coordinate system that relates to locations on the surface of the earth. Information in the database can be queried and displayed based upon either the graphic or non-graphic attributes of the entities.

4.2.3 Maintenance and Inspection (MAI)

Work involving inspection, cleaning, adjustment, or other service of equipment to enable it to perform better or to extend its service life. Examples of maintenance work are routine oil changes and painting. Examples of inspection work are pole inspections, vault inspections, and substation inspections.

4.2.4 Construction

Examples of construction work include service installations, line extensions, and system betterment projects.

4.2.5 Design

A design is created by an engineer or work planner using the Design and Estimation System (DGN). Designs can be made up of individual line items or by a set of “Compatible Units” or CUs. Line items and Compatible Units are associated with a Design Location which is associated with the Location object in the CIM.

4.2.6 Work Scheduling and Dispatching (SCHD)

Work scheduling and dispatching makes it possible, for a defined scope of work, to assign the required resources and keep track of work progress.

4.2.7 Field Recording (FRD)

Field recording is often accomplished through hand held devices which allow field personnel to view and enter information relevant to the work they are performing in the field. For example, line crews and servicemen can access their respective district maps, do searches by pole number, substation, transformer number, switch numbers, and feeder names.

4.2.8 Network Operation Simulation (SIM)

This set of functions allows facilities to define, prepare and optimise the sequence of operations required for carrying out maintenance work on the system (release/clearance orders) and operational planning.

4.2.9 Customer Service (CS)

This function set covers the different aspects related to customer interfaces required for operation and commercial purposes.

4.2.10 Trouble call management (TCM)

Customer troubles related to blackouts are then transmitted and compared with network data in order to provide accurate information on the incident.