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**Application integration at electric utilities – System interfaces for distribution management –
Part 8: Interfaces for customer operations**

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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 8: Interfaces for customer operations

FOREWORD

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International Standard IEC 61968-8 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
57/1548/FDIS	57/1573/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 of the IEC 61968 series, 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 web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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INTRODUCTION

The purpose of this part of IEC 61968 is to define a standard for the integration of Customer Support (CS), which would include Customer Service, Trouble Management and Point of Sale related components integrated with other systems and business functions within the scope of IEC 61968. The scope of this standard is the exchange of information between a customer support system and other systems within the utility enterprise.

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: *Application integration at electric utilities – System interfaces for distribution management – Interface Architecture and General Requirements*.

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

Table 1 – Document overview for IEC 61968-8

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.	Terms, definitions and abbreviations	
4.	Reference and information models	Description of general approach to customer support, reference model, interface reference model, customer support functions and components, message type terms and static information model.
5.	Customer support message types	Message types related to the exchange of information for documents related to customer services.
Annex A	Sample XML schemas for message payloads	To provide XSD information for information use only.

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

Part 8: Interfaces for customer operations

1 Scope

This part of IEC 61968 specifies the information content of a set of message types that can be used to support many of the business functions related to customer support. Typical uses of the message types include service request, customer agreement, and trouble management.

The purpose of this part of IEC 61968 is to define a standard for the integration of customer support (CS), which would include customer service, trouble management and point of sale related components integrated with other systems and business functions within the scope of IEC 61968. The scope of this standard is the exchange of information between a customer support system and other systems within the utility enterprise.

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 61968-6, *Application integration at electric utilities – System interfaces for distribution management – Part 6: Interfaces for maintenance and construction*¹

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

IEC 61968-100, *Application integration at electric utilities – System interfaces for distribution management – Part 100: Implementation profiles*

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

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 61968-2, IEC 62051 and IEC 62055-31 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 this document shall take precedence over those defined in IEC 61968-2.

¹ To be published.

3.2 Abbreviations

CIM	Common information model
CIS	Customer information system
CRM	Customer relationship management
CSR	Customer service representative
ERT	Estimated restoration time
IVR	Interactive voice response
NO	Network operations
OMS	Outage management system
POS	Point of sale
UML	Unified modelling language
WM	Work management
XSD	XML schema definition

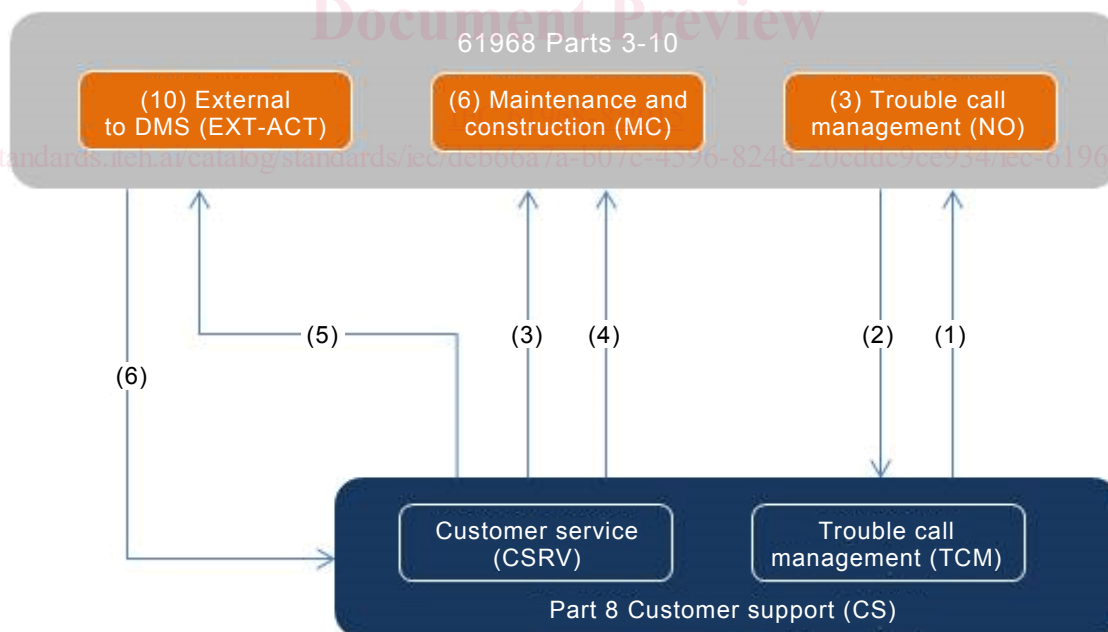
4 Reference and information models

4.1 Reference model

4.1.1 General

The diagram in Figure 1 serves as a reference model and provides examples of the logical components and data flows related to the context of this part of IEC 61968.

Figure 1 describes the information flows between the components defined in this part of IEC 61968 and the components in the reference model defined in IEC 61968-1.



1. Trouble ticket
2. Incident information
3. Service order
4. Work request
5. Customer agreement
6. Service request

Figure 1 – IEC 61968-8 context model

4.1.2 Customer support (CS)

Typical tasks of customer support:

- Customer services may include, but are not limited to, customer enquiries, new service, program enrollment and service or work request updates.
- Trouble call management may include, but are not limited to, trouble calls reported from customers and non-customers, outage notifications and restoration updates.

4.2 Customer support functions and components

Table 2 shows these functions and typical abstract components that are expected to be producers of information for these message types. Typical consumers of the information include, but are not restricted to, the other components as listed in IEC 61968-1.

Table 2 – Business functions and abstract components

Customer support (CS)	Customer service (CSRV)	Service requests
		Construction billing inquiry
		Billing inquiry
		Work status
		Self-service inquiry
		Customer connection
		Turn on, turn off
		Line losses
		Service level agreements
		Customer information analysis
		Customer information management
		Customer relationship management
		Trouble call management (TCM)
	Power quality	
	Planned outage notifications	
	Media communication	
	Performance indices	
	Point of sale (POS)	Restoration projection/confirmation
		Outage history

4.3 Static information model

4.3.1 General

The information model relevant to customer support consists of classes that provide a template for the attributes for each message.

The classes are defined in detail in IEC 61968-11, *Application integration at electric utilities – System interfaces for distribution management – Part 11: Common Information Model (CIM) Extensions for Distribution* or in IEC 61970-301, *Energy management system application program interfaces (EMS-API) – Part 301: Common information model (CIM) base*.

4.3.2 Classes for customer support

Table 3 lists classes used within message types. Usually all the attributes of these classes are contained within a message type. The descriptions provided describe usage within this part.

Classes described as type "Customer" are defined in the 61968/customer package of the CIM.

Table 3 – Customer support classes

Class/Noun	Package	Description
Customer	Customers	Organisation receiving services from service supplier
CustomerAgreement	Customers	Agreement between the customer and the service supplier to pay for service at a specific service location. It records certain billing information about the type of service provided at the service location and is used during charge creation to determine the type of service
DemandResponseProgram	Metering	Demand response program
Incident	Operations	Description of a problem in the field that may be reported in a trouble ticket or come from another source. It may have to do with an outage
Location	Common	The place, scene, or point of something where someone or something has been, is, and/or will be at a given moment in time. It can be defined with one or more position points (coordinates) in a given coordinate system
Outage	Operations	<p>Document describing details of an active or planned outage in a part of the electrical network.</p> <p>A non-planned outage may be created upon:</p> <ul style="list-style-type: none"> – a breaker trip, – a fault indicator status change, – a meter event indicating customer outage, – a reception of one or more customer trouble calls, or – an operator command, reflecting information obtained from the field crew. <p>Outage restoration may be performed using a switching plan which complements the outage information with detailed switching activities, including the relationship to the crew and work.</p> <p>A planned outage may be created upon:</p> <ul style="list-style-type: none"> – a request for service, maintenance or construction work in the field, or – an operator-defined outage for what-if/contingency network analysis. <p>The associated outage plan defines operational restrictions and atomic switch actions to define the changes that, after applied, would result in a total or partial equipment outage as required for network analysis.</p>
ServiceCategory	Customers	Category of service provided to the customer
ServiceLocation	Customers	A real estate location, commonly referred to as premise
TroubleTicket	Customers	A document that provides details about trouble in the power network
Work	Work	Document used to request, initiate, track and record work

NOTE The class definitions provided here are for convenience purposes only. The normative definitions are provided by IEC 61968-11, which describes the distribution extensions to the IEC CIM standard.

5 Customer support message types

5.1 General

The purpose of this section is to describe the message types related to IEC 61968-8. It is important to note that some of these message types may also be used by other parts of IEC 61968. The general approach to the realization of message structures and XML schemas for IEC 61968 messages is described in IEC 61968-1 and IEC 61968-100.

It is also important to note that the use cases and sequence diagrams provided in this standard are informative in nature, and are intended to provide examples of usage for the

normative messages definitions. There is no intent by this standard to standardize specific business processes.

5.2 Trouble ticket

5.2.1 General

Many electric utilities depend on the calls from the customers to begin the process to identify the location of the faulted section of the electric distribution circuit. The trouble ticket is the communication mechanism between the utility and the customer that is used to initiate an analysis to determine where best to deploy field personnel for service restoration. The trouble ticket is typically created based on direct conversation with the customer. The trouble ticket is also created based on customer report via an automated call taking system and on an outage report from an AMI meter. The trouble ticket contains the information of a customer call. Once created, the trouble ticket may be sent to the OMS for further processing.

Figure 2 provides a sequence diagram showing the use case for communication between the CIS and OMS using the trouble ticket message. Figure 3 presents an XSD diagram showing the contents of the trouble ticket message.

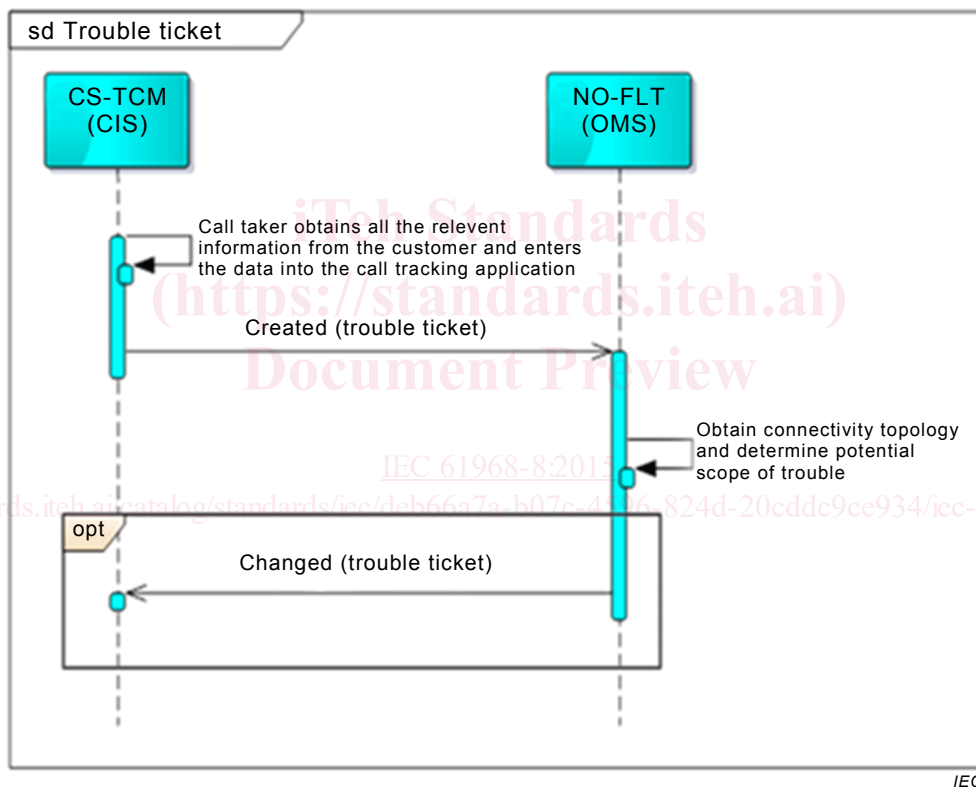


Figure 2 – Example of trouble ticket exchange between CIS and OMS

5.2.2 Message format

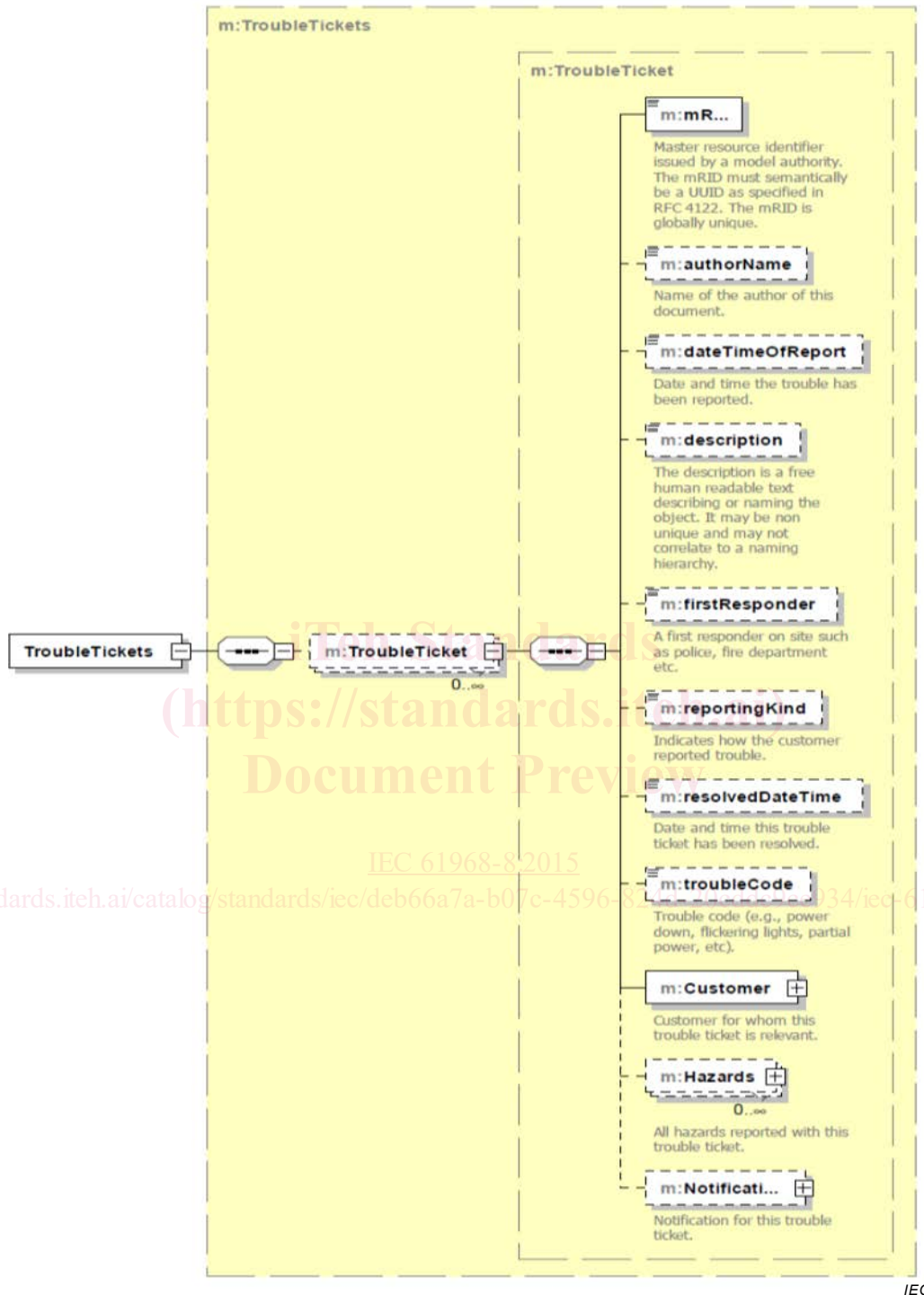


Figure 3 – Trouble ticket message

5.3 Incident information

5.3.1 General

When there is an outage and it is a confirmed outage, utilities typically can provide an estimated restoration time (ERT) depending on where the event is within the outage management processes. A request is made to outage management for a status update on a particular trouble ticket assigned to an outage incident, or to determine if an incident already exists before creating a trouble ticket (See Figure 4 showing the use case for this message exchange).