IEC TR 61850-90-4

Edition 2.0 2020-05

TECHNICAL REPORT

colour inside

Communication networks and systems for power utility automation – Part 90-4: Network engineering guidelines

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 90-4: Network engineering guidelines

FOREWORD

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IEC TR 61850-90-4, which is a technical report, has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- New object model for bridges and clocks based on UML autogeneration.
- An example of SCL configuration with a topology
- Extensions to the time distribution and clock
- Extension of the testing

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The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
57/2088/DTR	57/2159/RVDTR

Full information on the voting for the approval of this technical report 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 61850 series, published under the general title *Communication networks and systems for power utility automation,* can be found on the IEC website.

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This publication contains attached.nsd files which compose the Code Component of this part. These files are intended to be used as a complement and do not form an integral part of this standard.

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- withdrawn,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

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INTRODUCTION

The growing success of the IEC 61850 series calls for guidelines for engineering Ethernet networks. The IEC 61850 series specifies the basic requirements for the networks but not how to achieve them. Indeed, the IEC 61850 series of standards focuses on data modelling and the interchange of that data, leaving out physical interconnection details that are nevertheless needed for interoperability.

This Technical Report provides definitions, guidelines and specifications for the engineering of IEC 61850-based substation networks, which consists of one or several local area networks. It is also applicable to local area networks outside of the substation, e.g. substation-to-substation links or differential protection links, to which IEDs are directly connected. Data communication over Wide Area Networks is treated in IEC TR 61850-90-12.

This Technical Report addresses issues such as Ethernet technology, network topology, redundancy, traffic latency and quality of service, traffic management by multicast and VLAN filtering, network-based clock synchronization and testing of the network.

This Technical Report is based on existing standards for semantics, services, protocols, system configuration language and architecture. It relies on work done by IEC TC 57 WG 10 (Power system IED communication and associated data models) and IEC TC 57 WG 15 (Data and communications security), on IEC 61918 (*Industrial communication networks – Installation of communication networks in industrial premises*), IEC SC65C WG15 IEC 62439 (*Industrial communication networks – High-availability automation networks*) and IEC 61588 (*Precision clock synchronization protocol for networked measurement and control systems*), on the work of the IEEE 802.1 Working Group, the UCA International Users Group 9-2LE, the IEEE Power System Relaying Committee (PSRC) and on contributions by different companies.

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