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OPC unified architecture -
Part 13: Aggregates

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62541-13:2020. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62541-13 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This third edition cancels and replaces the second edition published in 2020. This edition constitutes a technical revision.

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

a) Multiple fixes for the computation of aggregates
   - The Raw status bit is always set for non-bad StatusCodes for the Start and End aggregates.
   - Entries in the Interpolative examples Tables A2.2 Historian1, Historian2, and Historian3 have been changed from Good to Good, Raw status codes when the timestamp matches with the timestamp of the data source.
   - Missing tables have been added for DurationInStateZero and DurationInStateNonZero.
   - The value of zero has been removed for results with a StatusCode of bad.
   - Data Type was listed as "Status Code" when it is "Double" for both Standard Deviation and both Variance Aggregates.
   - Rounding Error in TimeAverage and TimeAverage2 have been corrected.
   - The status codes have been corrected for the last two intervals and the value has been corrected in the last interval.
   - The wording has been changed to be more consistent with the certification testing tool.
   - UsedSlopedExtrapolation set to true for Historian2 and all examples locations needed new values or status' are modified.
   - Values affected by percent good and percent bad have been updated.
   - PercentGood/PercentBad are now accounted for in the calculation.
   - TimeAverage uses SlopedInterpolation but the Time aggregate is incorrectly allowed to used Stepped Interpolation.
   - Partial bit is now correctly calculated.
   - Unclear sentence was removed.
   - Examples have been moved to a CSV.
   - The value and status code for Historian 3 have been updated.
   - TimeAverage2 Historian1 now takes uncertain regions into account when calculating StatusCodes.
   - TimeAverage2 Historian2 now takes uncertain regions into account when calculating StatusCodes.
   - Total2 Historian1 now takes uncertain regions into account when calculating StatusCodes
   - Total2 Historian2 now takes uncertain regions into account when calculating StatusCodes
   - Maximum2 Historian1 now takes uncertain regions into account when calculating StatusCodes
   - MaximumActualTime2 Historian1 now takes uncertain regions into account when calculating StatusCodes
   - Minimum2 Historian1 now takes uncertain regions into account when calculating StatusCodes
   - MinimumActualTime2 Historian1 now has the StatusCodes calculated while using the TreatUncertainAsBad flag.

- Range2 Historian1 now looks at TreatUncertainAsBad in the calculation of the StatusCodes.
- Clarifications have been made to the text defining how PercentGood/PercentBad are used. The table values and StatusCodes of the TimeAverage2 and Total2 aggregates have been corrected.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65E/1059/CDV	65E/1098/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

Throughout this document and the other parts of the IEC 62541 series, certain document conventions are used:

Italics are used to denote a defined term or definition that appears in the "Terms and definitions" clause in one of the parts of the IEC 62541 series.

Italics are also used to denote the name of a service input or output parameter or the name of a structure or element of a structure that are usually defined in tables.

The *italicized terms and names* are, with a few exceptions, written in camel-case (the practice of writing compound words or phrases in which the elements are joined without spaces, with each element's initial letter capitalized within the compound). For example, the defined term is *AddressSpace* instead of Address Space. This makes it easier to understand that there is a single definition for *AddressSpace*, not separate definitions for Address and Space.

A list of all parts in the IEC 62541 series, published under the general title *OPC Unified Architecture*, can be found on the IEC website.

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

– reconfirmed,
– withdrawn, or
– revised.

1 Scope

This part of IEC 62541 is part of the overall OPC Unified Architecture specification series and defines the information model associated with Aggregates.

Programmatically produced aggregate examples are listed in Annex A.

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 and errata) applies.

IEC ~~TR~~ 62541-1*, OPC Unified Architecture - Part 1: Overview and Concepts*

IEC 62541-3, *OPC Unified Architecture - Part 3: Address Space Model*

IEC 62541-4, *OPC Unified Architecture - Part 4: Services*

IEC 62541-5, *OPC Unified Architecture - Part 5: Information Model*

IEC 62541-8, *OPC Unified Architecture - Part 8: Data Access*

IEC 62541-11, *OPC Unified Architecture - Part 11: Historical Access*