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IEEE Standard for eXtensible Event Stream (XES) for Achieving Interoperability in Event Logs and Event Streams

IEEE Computational Intelligence Society

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Standards Committee

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Abstract: A grammar for a tag-based language whose aim is to provide designers of information systems with a unified and extensible methodology for capturing systems' behaviors by means of event logs and event streams is defined in the XES standard. An "XML Schema" describing the structure of an XES event log/stream and a "XML Schema" describing the structure of an extension of such a log/stream are included in this standard. Moreover, a basic collection of so-called "XES extension" prototypes that provide semantics to certain attributes as recorded in the event log/stream is included in this standard.

Keywords: event log, event stream, extensions, IEEE 1849™, system behavior, XML

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Introduction

This introduction is not part of IEEE Std 1849-2016, IEEE Standard for eXtensible Event Stream (XES) for Achieving Interoperability in Event Logs and Event Streams.

Event logs contain information on how processes have evolved in running systems. As more and more systems capture such information, there is a need to be able to transfer this information from these running systems to a site where the information can be analyzed, either automatically by software from the computational intelligence field, or manually (at least in part) using such software.

This standard addresses this need by defining an eXtensible Event Stream (XES) structure for such event logs.

Furthermore, this standard defines the World Wide Web Consortium (W3C) Extensible Markup Language (XML) structure and constraints on the contents of XML 1.1 documents that can be used to represent XES instances, and a likewise structure (called XESEXT) that can be used to represent so-called extensions to this structure.

The purpose of this standard is to allow the generation and analysis of event logs using XML. This standard uses the W3C XML Schema definition language as the encoding, which allows for interoperability and the exchange of XES XML instances between various systems.

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IEEE Standard for eXtensible Event Stream (XES) for Achieving Interoperability in Event Logs and Event Streams

1. Overview

1.1 Scope

This standard defines World Wide Web Consortium (W3C) Extensible Markup Language (XML) structure and constraints on the contents of XML 1.1 documents that can be used to represent extensible event stream (XES) instances.[1] A XES instance corresponds to a file-based event log or a formatted event stream that can be used to transfer event-driven data in a unified and extensible manner from a first site to a second site. Typically, the first site will be the site generating this event-driven data (for example, workflow systems, case handling systems, procurement systems, devices like wafer steppers and X-ray machines, and hospitals) while the second site will be the site analyzing this data (for example, by data scientists and/or advanced software systems).

To transfer event-driven data in a unified manner, this standard includes a W3C XML Schema describing the structure of a XES instance. To transfer this data in an extensible manner, this standard also includes a W3C XML Schema describing the structure of an extension to such a XES instance. Basically, such an extension provides semantics to the structure as prescribed by the XES instance. Finally, this standard includes a basic collection of such extensions.

1.2 Purpose

The purpose of this standard is to provide a generally acknowledged XML format for the interchange of event data between information systems in many applications domains on the one hand and analysis tools for such data on the other hand. As such, this standard aims to fix the syntax and the semantics of the event data which, for example, is being transferred from the site generating this data to the site analyzing this data. As a result of this standard, if the event data is transferred using the syntax as described by this standard, its semantics will be well understood and clear at both sites.

[1] Although XES is now an IEEE standard, XES was already used before it became an IEEE standard. Annex A shows the history of this "old" XES leading up to this IEEE standard containing the "new" XES, Annex B shows the main differences between the "old" XES and the "new" XES, whereas Annex C contains a list of tools that support the "old" XES, a list of data sets already published using the "old" XES, and a list of publications referring to the "old" XES.